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Research Article/ Araştırma Makalesi

Bir İlçede Çalışan Öğretmenlerin Siberkondri Düzeyleri ve e-Sağlık Okuryazarlığı Arasındaki İlişki

The Relationship Between Cyberchondria Levels and e-Health Literacy of Teachers Working in a District

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Amaç: Bu araştırmada Sakarya İli Karasu İlçesinde görev yapan öğretmenlerin siberkondri düzeylerini saptamak ve bunun e-sağlık okuryazarlığı ile ilişkisini incelemek amaçlanmıştır.

Gereç ve Yöntemler: Araştırma 18 Ekim 2023 - 31 Aralık 2023 tarihleri arasında 379 öğretmen ile gerçekleştirilmiştir. Veri toplama aracı olarak Kişisel Bilgi Formu, Siberkondri Ciddiyet Ölçeği ve e-Sağlık Okuryazarlığı Ölçeği kullanılmıştır. Anket formu çevrimiçi olarak uygulanmıştır. Araştırmanın bağımlı değişkenlerini öğretmenlerin siberkondri ve e-sağlık okuryazarlığı düzeyleri; bağımsız değişkenlerini ise yaş, cinsiyet, medeni durum, gelir durumu, meslekteki yıl, kronik hastalık varlığı ve süresi, sağlıkla ilgili günlük internette geçirilen süre ve algılanan sağlık durumu oluşturmaktadır.

Bulgular: Çalışmaya katılan öğretmenlerin %55,1'i (n=209) kadın, %80,5'i (n=305) evli, %94,2'si (n=357) kamu çalışanıdır. Öğretmenlerin yaş ortalaması 38,26±7,73 yıldır. %45,9'u (n=174) gelirinin giderinden az olduğunu, %42,2'si (n=160) gelirinin giderine eşit olduğunu ifade etmiştir. Katılımcıların %38,8'ini (n=151) ortaokul öğretmenleri, %29,6'sını (n=112) lise öğretmenleri, %26,1'ini (n=99) ilkokul öğretmenleri, %4,5'ini ise (n=17) anaokulu öğretmenleri oluşturmaktadır. Katılımcıların %86,5'inin (n=328) herhangi bir kronik hastalığı bulunmamaktadır. Kronik hastalığı bulunan katılımcıların ortalama kronik hastalık süresi 14,57±11,37 yıldır. Çalışmaya katılan öğretmenlerin sağlıkla ilgili günlük internette geçirmiş oldukları süre ortalaması 13,51±13,16 dakika; algılanan sağlık durumlarına 0-100 arasında verdikleri puan ortalaması 74,61±16,63'tür. Katılımcıların siberkondri düzeyi ile e-sağlık okuryazarlığı düzeyi arasında pozitif yönlü, zayıf düzeyde ve istatistiksel açıdan anlamlı bir korelasyon saptanmıştır (r=0,221; p<0,001).

Sonuç: Bu araştırmada medeni durum, sağlıkla ilgili internette geçirilen süre ve algılanan sağlık durumunun siberkondri düzeyini etkilediği; cinsiyet, çalışılan kurum, yaş, meslekteki yıl ve sağlıkla ilgili internet kullanım süresinin e-sağlık okuryazarlığı düzeyini etkilediği ortaya konmuştur.

Anahtar Kelimeler: Sağlık hizmeti araştırması, Sağlık okuryazarlığı, Sağlık bilgisi, İnternet, Okul öğretmenleri

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Objective: This study aimed to determine the cyberchondria levels of teachers working in Karasu District of Sakarya Province and to explore its correlation with e-health literacy.

Materials and Methods: The research was carried out with 379 teachers between 18 October 2023 and 31 December 2023. Personal Information Form, Cyberchondria Severity Scale and e-Health Literacy Scale were used as data collection tools. The questionnaire was administered online. The study's dependent variables include teachers' cyberchondria and e-health literacy levels, while the independent variables encompass age, gender, marital status, income status, years in the profession, presence and duration of chronic disease, daily health-related time spent on the internet, and perceived health status.

Results: 55.1% (n=209) of the teachers participating in the study are women, 80.5% (n=305) are married, and 94.2% (n=357) are public employees. The mean age of teachers is 38.26±7.73 years. 45.9% (n=174) stated that their income was less than their expenses, while 42.2% (n=160) indicated that their income was equal to their expenses. 38.8% (n=151) of the participants were secondary school teachers, 29.6% (n=112) were high school teachers, 26.1% (n=99) were primary school teachers, and 4.5% (n=17) were preschool teachers. 86.5% of the participants (n=328) do not have any chronic disease. The average duration of chronic disease of the participants with chronic diseases is 14.57±11.37 years. The average time spent by the teachers participating in the research on the health-related internet on a daily basis is 13.51±13.51±13.16 minutes; The average score they gave to perceived health status between 0-100 was 74.61±16.63. A positive, weak and statistically significant relationship was found between the participants' cyberchondria level and e-health literacy level ($r=0.221$; $p<0.001$).

Conclusion: In this study, marital status, time spent on health-related internet and perceived health status affected the level of cyberchondria; the study revealed that gender, institution of employment, age, years in the profession, and duration of health-related internet use are factors affecting the level of e-health literacy.

Keywords: Healthcare research, Health literacy, Health knowledge, Internet, School teachers

EXTENDED ABSTRACT

Background

The internet is one of the fundamental components of modern technology. According to data from the Turkish Statistical Institute (TURKSTAT), while internet usage rates were 48.9% in 2013, this rate increased to 87.1% in 2023. With the increase in internet usage over time, the question of what purposes individuals use the internet for has become a subject of research. One such purpose is accessing health-related information. According to TURKSTAT 2023 data, the rate of internet usage for the purpose of "searching for health-related information (such as injuries, diseases, nutrition, improving health)" was 66.3% in 2023. These increases in health-related internet use highlight the concepts of cyberchondria and e-health literacy. Rising levels of cyberchondria may lead to increased anxiety and concern about health among individuals. Low e-health literacy can result in an increase in incorrect health behaviors as individuals may fail to assess the accuracy of the information they find online. Therefore, research on these two concepts has become a significant issue in the current technological era.

Purpose

This study aimed to determine the cyberchondria levels of teachers working in Karasu District of Sakarya Province and to examine its relationship with e-health literacy.

Materials and Methods

This research is descriptive in nature. Data collection was carried out with 379 teachers between October 18, 2023, and December 31, 2023. The data collection tools used were the

Personal Information Form, the Cyberchondria Severity Scale (CSS), and the e-Health Literacy Scale (e-HEALS). The CSS is a 5-point Likert scale consisting of 33 items and 5 sub-dimensions. The CSS is a continuous scale with no cut-off point. The lowest possible score on the scale is 33, and the highest is 165. The e-HEALS is a 5-point Likert scale consisting of 12 items and 3 sub-dimensions. The lowest possible score on the scale is 12, and the highest is 60.

The survey was administered online. The dependent variables of the study are the teachers' levels of cyberchondria and e-health literacy; the independent variables are age, gender, marital status, income level, years in the profession, presence and duration of chronic illness, daily time spent on health-related internet use, and perceived health status.

Results

Among the teachers participating in the study, 55.1% (n=209) are female, 80.5% (n=305) are married, and 94.2% (n=357) are public employees. The average age of the teachers is 38.26±7.73 years. 45.9% (n=174) reported that their income is less than their expenses, and 42.2% (n=160) reported that their income equals their expenses. 38.8% (n=151) of the participants are secondary school teachers, 29.6% (n=112) are high school teachers, 26.1% (n=99) are primary school teachers, and 4.5% (n=17) are kindergarten teachers. 86.5% (n=328) of the participants do not have any chronic disease. The average duration of chronic disease among those with chronic conditions is 14.57±11.37 years. The average time spent daily on health-related internet use by the teachers is 13.51±13.16 minutes; the average score given to their perceived health status, on a scale of 0-100, is 74.61±16.63.

The mean total score of the CSS was found to be 76.13±19.27. The average total score of the CSS was higher among married participants (77.14±19.47) compared to singles (71.96±17.95), and this difference was statistically significant (p=0.027). No statistically significant relationships were found between the participants' CSS total scores and gender, income level, sector, institution of employment, or presence of chronic disease (p=0.051; p=0.083; p=0.228; p=0.295; p=0.801). A negative, weak, and statistically significant correlation was found between the participants' CSS total scores and their perceived health status (r=-0.206; p<0.001).

The mean total score of the e-HEALS was found to be 41.34±6.73 (median: 42; minimum: 12; maximum: 60). The average total score of the e-HEALS was higher in women (42.41±5.79) compared to men (40.03±7.56), and this difference was statistically significant (p=0.012). A statistically significant relationship was found between the participants' e-HEALS total scores and the institution they work for (p=0.021). A negative, weak, and statistically significant correlation was found between participants' e-HEALS total scores and age (r=-0.151; p=0.003). A negative, weak, and statistically significant correlation was found between the e-HEALS total score and years in the profession (r=-0.131; p=0.011). A positive, weak, and statistically significant correlation was found between the participants' e-HEALS total scores and the time they spend daily on health-related internet use (r=0.172; p=0.001).

A positive, weak, and statistically significant correlation was found between the participants' levels of cyberchondria and e-health literacy (r=0.221; p<0.001).

Conclusion

This study found that marital status, time spent on health-related internet use, and perceived

health status affect the level of cyberchondria. Additionally, it was determined that gender, institution of employment, age, years in the profession, and duration of health-related internet use affect the level of e-health literacy.

1. GİRİŞ

İnternet, günümüz teknolojilerinin temel bileşenlerinden biridir. Türkiye İstatistik Kurumu (TÜİK) Hanehalkı Bilişim Teknolojileri Kullanım Araştırması 2023 yılı verilerine göre Türkiye'de 16-77 yaş grubu bireylerde internet kullanım oranları 2013 yalında %48,9 iken 2023'te bu oran %87,1'e yükselmiştir. İnternete erişim imkânı olan hane oranı ise 2012 yalına kıyasla yaklaşık 2 kat artış göstererek %95,5 olmuştur.[1] İnternet kullanımının zaman içerisinde artışı ile bireylerin interneti hangi amaçlarla kullandıkları sorusu da araştırma konusu hâline gelmiştir. Geçmişi 1960'a kadar uzanan bu teknolojinin zaman içerisindeki gelişimi ile kullanım amaçları da çeşitlilik kazanmıştır. Bu amaçlardan biri de sağlık bilgisine erişimdir. TÜİK 2023 verilerine göre "Sağlıkla ilgili bilgi arama (yaralanmalar, hastalıklar, beslenme, sağlığın iyileştirilmesi gibi)" amacıyla internet kullanım oranının 2023 yılında %66,3 olduğu görülmüştür.[1] Sağlıkla ilgili internet kullanımındaki bu artışlar bazı güncel kavramları beraberinde getirmektedir. Siberkondri ve e-sağlık okuryazarlığı da bu kavramlar arasında yer almaktadır.

Siberkondri, Starcevic ve Berle tarafından "Bireyin kendi sağlığı için aşırı endişe duymasına bağlı olarak sanal ortamda sağlıkla ilgili aşırı tekrara kaçan aramalar yapması davranışı" olarak tanımlanmıştır.[2] Artan siberkondri düzeyi bireylerde sağlıklarıyla ilgili kaygı ve endişenin artmasına, bireylerin gereksiz sağlık harcaması yapmalarına ve bunun sonucunda finansal zarara neden olabilmektedir.[3] Ayrıca artan siberkondri düzeyi sağlık hizmetlerinin kullanımda artışa neden olarak, ciddi bir ekonomik yük oluşturmaktadır.[3, 4]

E-sağlık okuryazarlığı kavramı "Elektronik kaynaklardan sağlık bilgilerini arama, bulma, anlama, değerlendirme ve elde edilen bilgileri bir sağlık sorununu ele almak veya çözmek için uygulama yeteneği" olarak tanımlanmıştır.[5]

Sağlıkla ilgili bilgilere erişim için internetin artan kullanımına karşın, internette yer alan bu bilgilerin güvenirliğinin tartışılması e-sağlık okuryazarlığının önemine dikkat çekmektedir. E-sağlık okuryazarlığının düşük olması bireylerin internette ulaştıkları bilgilerin doğruluğunu değerlendiremeyerek yanlış teşhis-tedavi ve hatalı sağlık davranışlarında artışa neden olabilmektedir.[6]

Bu araştırmanın amacı Sakarya İli Karasu İlçesinde anaokulu, ilkokul, ortaokul ve liselerde görev yapan öğretmenlerin siberkondri düzeylerini saptamak ve bunun e-sağlık okuryazarlığı ile ilişkisini incelemektir.

2. GEREÇ&YÖNTEM

Bu araştırma tanımlayıcı tipte bir araştırmadır. Araştırmanın veri toplama aşaması 18 Ekim 2023–31 Aralık 2023 tarihleri arasında gerçekleştirilmiştir. Haziran 2023'te Karasu İlçe Milli Eğitim Müdürlüğü'ne bağlı görev yapan 1051 öğretmen bulunmaktadır. Bu araştırmada herhangi bir örneklem seçimine gidilmemiş olup evrenin tamamına ulaşılması hedeflenmiştir.

Araştırmada veri toplamak için; literatür taraması sonucu oluşturulan Kişisel Bilgi Formu, McElroy ve Shevlin tarafından 2014 yılında geliştirilen ve 2018 yılında Süleyman Utku Uzun ve arkadaşlarının Türkçe geçerlik ve güvenirliğini yaptığı "Siberkondri Ciddiyet Ölçeği (SCÖ)" ile Chiang, Yang, Hsu tarafından 2015 yılında geliştirilen ve 2018 yılında Şeymanur Şenyurt ve arkadaşlarının Türkçe geçerlik ve güvenirliğini yaptığı "e-Sağlık Okuryazarlığı Ölçeği" kullanılmıştır.[7-10]

SCÖ 33 önermeden oluşan 5'li Likert tipinde (1-Hiçbir zaman, 2-Nadiren, 3-Bazen, 4-Genellikle, 5-Her zaman) ve 5 alt boyuttan oluşan bir ölçektir. Ölçeğin alt boyutlarından "Zorlantı" alt boyutu 8 maddeden, "Aşırı kaygı" alt boyutu 8 maddeden, "Aşırılık" alt boyutu 8 maddeden, "İçini rahatlatma" alt boyutu 6 maddeden, "Doktora güvensizlik" alt boyutu 3 maddeden oluşmaktadır. "Doktora güvensizlik" alt boyutunu oluşturan sorular ters puanlanmaktadır. SCÖ sürekli bir ölçektir ve kesme noktası bulunmamaktadır. Her bir sorudan elde edilen puanlar toplanarak kişinin toplam siberkondri puanı hesaplanmaktadır. Ölçekten en düşük 33 puan, en yüksek 165 puan alınabilmektedir.

E-Sağlık Okuryazarlığı Ölçeği (e-SOYÖ) 12 önermeden oluşan 5'li Likert tipinde (1-Kesinlikle katılmıyorum, 2-Katılmıyorum, 3-Orta derecede katılmıyorum, 4-Katılıyorum, 5-Kesinlikle katılıyorum) ve 3 alt boyuttan oluşan bir ölçektir. Ölçeğin alt boyutlarından "İşlevsel" alt boyut 3 maddeden, "Eleştirel" alt boyut 5 maddeden ve "İnteraktif" alt boyut 4 maddeden oluşmaktadır. Her bir sorudan elde edilen puanlar toplanarak kişinin e-SOYÖ toplam puanı hesaplanmaktadır. Ölçekten en düşük 12 puan, en yüksek 60 puan alınabilmektedir.

Katılımcılara uygulanacak anket formu Google Formlar (internet tabanlı anket) üzerinden hazırlanarak anket linki mesaj yoluyla katılımcılara iletilmiştir. Araştırma formunun başında yer alan bilgilendirilmiş onam formunun onaylanması ile katılımcıların onamları alınmıştır. Araştırmaya Karasu İlçe Milli Eğitim Müdürlüğü'ne bağlı okullarda görev yapan ve çalışmaya katılım konusunda gönüllü olan öğretmenler dahil edilmiştir. Formların doldurulma süresi ortalama 15 dk sürmüştür. Araştırmanın bağımlı değişkenlerini öğretmenlerin siberkondri ve e-sağlık okuryazarlığı düzeyleri; bağımsız değişkenlerini ise yaş, cinsiyet, medeni durum, gelir durumu, meslekteki yıl, kronik hastalık varlığı ve süresi, sağlıkla ilgili günlük internette geçirilen süre ve algılanan sağlık durumu oluşturmaktadır.

Araştırmanın etik kurul izni 10.07.2023 tarih ve 21 sayılı toplantıda alınan 4 no'lu karar ile Sakarya Üniversitesi Eğitim Araştırmaları ve Yayın Etik Kurulu'ndan alınmıştır. Araştırma için ölçek sahiplerinden e-posta yoluyla izin alınmıştır. Ayrıca araştırmanın yapılması için Karasu Kaymakamlığı'ndan olur ve Karasu İlçe Milli Eğitim Müdürlüğü'nden izin alınmıştır.

Tanımlayıcı istatistikler, sürekli veriler için ortalama, standart sapma, ortanca, minimum ve maksimum değerleri ile birlikte; kategorik veriler ise sayı ve yüzdelerle birlikte sunulmuştur. Sürekli verilerin normal dağılıma uygunluğu Kolmogorov-Smirnov ve Shapiro-Wilk testleri ile değerlendirilmiştir. Parametrik özellik gösteren iki grubun karşılaştırılmasında t testi, parametrik özellik göstermeyen iki grubun karşılaştırılmasında ise Mann-Whitney U testi kullanılmıştır. Parametrik özellik gösteren ikiden fazla grubun karşılaştırılmasında ANOVA testi, parametrik özellik göstermeyen ikiden fazla grubun karşılaştırılmasında Kruskal Wallis testi kullanılmıştır. Anlamlılığın hangi gruplardan kaynaklandığının saptanması için post-hoc analizler yapılmıştır. Sayısal değişkenler arasındaki ilişkinin incelenmesi için Spearman korelasyon analizi yapılmıştır. Korelasyon gücü açısından r=0,00-0,24 zayıf; 0,25-0,49 orta; 0,50-0,74 güçlü; 0,75-1,00 çok güçlü olarak kabul edilmiştir.

İstatistiksel anlamlılık için %95 güven aralığında, 0,05'in altında bulunan p değerleri anlamlı kabul edilmiştir. İstatistiksel analizler için IBM SPSS (Statistical Package for the Social Sciences, Chicago, IL, USA) programının 21.0 versiyonu kullanılmıştır.

3. BULGULAR

Çalışmaya katılan öğretmenlerin %55,1'i (n=209) kadın, %80,5'i (n=305) evli, %94,2'si (n=357) kamu çalışanıdır. Öğretmenlerin yaş ortalaması 38,26±7,73 yıldır. %45,9'u (n=174) gelirinin giderinden az olduğunu, %42,2'si (n=160) gelirinin giderine eşit olduğunu ifade etmiştir. Katılımcıların %38,8'ini (n=151) ortaokul öğretmenleri, %29,6'sını (n=112) lise öğretmenleri, %26,1'ini (n=99) ilkokul öğretmenleri, %4,5'ini ise (n=17) anaokulu öğretmenleri oluşturmaktadır. Katılımcıların %86,5'inin (n=328) herhangi bir kronik hastalığı bulunmamaktadır. Kronik hastalığı bulunan katılımcıların ortalama kronik hastalık süresi 14,57±11,37 yıldır. Çalışmaya katılan öğretmenlerin sağlıkla ilgili günlük internette geçirmiş oldukları süre ortalaması 13,51±13,16 dakika; algılanan sağlık durumlarına 0-100 arasında verdikleri puan ortalaması 74,61±16,63'tür (Tablo 1).

Katılımcıların sağlıkla ilgili internet kullanım nedenleri değerlendirildiğinde en sık tercih edilen 3 nedenin; internette sağlık/hastalık ve semptom araştırmak (%76,4), sağlık kuruluşundan randevu almak (%70) ve kendi elektronik sağlık kayıtlarına ulaşmak (%38,2) olduğu görülmüştür (Tablo 2).

Katılımcıların SCÖ alt boyutlarından "Zorlantı" alt boyutuna ait puan ortalamaları 12,86±5,92; "Aşırı Kaygı" alt boyutuna ait puan ortalamaları 18,66±6,39; "Aşırılık" alt boyutuna ait puan ortalamaları 24,02±6,38; "İçini Rahatlatma" alt boyutuna ait puan ortalamaları 41,34±6,74 ve SCÖ toplam puan ortalamaları 76,13±19,27 olarak saptanmıştır (Tablo 3).

SCÖ toplam puan ortalamalarının evli olan katılımcılarda (77,14±19,47), bekârlara göre (71,96±17,95) daha yüksek olduğu ve bu farkın istatistiksel olarak anlamlı olduğu bulunmuştur (p=0,027). Katılımcıların SCÖ toplam puanları ile cinsiyet, gelir durumu, sektör, çalışılan kurum ve kronik hastalık varlığı arasında istatistiksel açıdan anlamlı ilişki saptanmamıştır (p=0,051; p=0,083; p=0,228; p=0,295; p=0,801) (Tablo 4).

Katılımcıların SCÖ toplam puanları ile sağlıkla ilgili günlük internette geçirmiş oldukları süre arasında pozitif yönlü, orta düzeyde ve istatistiksel açıdan anlamlı bir korelasyon saptanmıştır (r=0,273; p<0,001). Katılımcıların SCÖ toplam puanları ile algılanan sağlık durumları arasında negatif yönlü, zayıf düzeyde ve istatistiksel açıdan anlamlı bir korelasyon saptanmıştır (r=-0,206; p<0,001). Katılımcıların SCÖ toplam puanları ile yaş, meslekteki yıl ve kronik hastalık süreleri arasında istatistiksel açıdan anlamlı bir korelasyon saptanmamıştır (p=0,056; p=0,182; p=0,388) (Tablo 5).

Katılımcıların e-SOYÖ toplam puan ortalamaları 41,34±6,73 (ortanca:42; minimum:12; maksimum:60) puan olarak bulunmuştur.

E-SOYÖ toplam puan ortalamalarının kadınlarda (42,41±5,79), erkeklere göre (40,03±7,56) daha yüksek olduğu ve bu farkın istatistiksel olarak anlamlı olduğu bulunmuştur (p=0.012). Katılımcıların e-SOYÖ toplam puanları ile çalışılan kurum arasında istatistiksel açıdan anlamlı ilişki saptanmıştır (p=0,021). Bu anlamlılık Lise-İlkokul (p=0,028) ve Ortaokul-İlkokul (p=0,042) arasındaki farktan kaynaklanmaktadır. Katılımcıların e-SOYÖ toplam puanları ile medeni durum, gelir durumu, sektör ve kronik hastalık varlığı arasında istatistiksel açıdan anlamlı ilişki saptanmamıştır (p=0,160; p=0,167; p=0,452; p=0,866) (Tablo 6).

Katılımcıların e-SOYÖ toplam puanları ile yaş arasında negatif yönlü, zayıf düzeyde ve istatistiksel açıdan anlamlı bir korelasyon saptanmıştır (r=-0,151; p=0,003). e-SOYÖ toplam puanı ile meslekteki yıl arasında negatif yönlü, zayıf düzeyde ve istatistiksel açıdan anlamlı bir korelasyon saptanmıştır (r=-0,131; p=0,011). Katılımcıların

e-SOYÖ toplam puanları ile sağlıkla ilgili günlük internette geçirmiş oldukları süre arasında pozitif yönlü, zayıf düzeyde ve istatistiksel açıdan anlamlı bir korelasyon saptanmıştır (r=0,172; p=0,001). Katılımcıların e-SOYÖ toplam puanları ile kronik hastalık süreleri ve algılanan sağlık durumları arasında istatistiksel açıdan anlamlı bir korelasyon saptanmamıştır (p=0,416; p=0,958) (Tablo 5).

Katılımcıların SCÖ toplam puanları ile e-SOYÖ toplam puanları arasında pozitif yönlü, zayıf düzeyde ve istatistiksel açıdan anlamlı bir korelasyon saptanmıştır (r=0,221; p<0,001) (Tablo 5).

Tablo 1.

Katılımcıların tanımlayıcı özellikleri

		Sayı	**Yüzde (%)**
Cinsiyet	**Kadın**	209	55,15
	Erkek	170	44,85
Medeni durum	**Bekâr**	74	19,52
	Evli	305	80,48
Gelir durumu	**Gelir giderden az**	174	45,91
	Gelir gidere eşit	160	42,21
	Gelir giderden fazla	45	11,88
Sektör	**Kamu**	357	94,19
	Özel	22	5,81
Kurum	**Anaokulu**	17	4,48
	İlkokul	99	26,12
	Ortaokul	151	39,84
	Lise	112	29,56
Kronik hastalık varlığı	**Yok**	328	86,54
	Var	51	13,46
Toplam		**379**	**100,0**

	Ortalama±SD (Ortanca; Min-Mak)
Yaş	38,26±7,73 (37; 23-63)
Meslekteki yıl	13,71±7,59 (12; 0-39)
Kronik hastalık süresi (yıl)	14,57±11,37 (10; 1-47)
Sağlıkla ilgili günlük internet kullanımı (dk)	13,51±13,16 (10; 0-60)
Algılanan sağlık durumu (0-100 arasında)	74,61±16,63 (80; 1-100)

SD: Standart sapma
Min: Minimum Mak: Maksimum

Tablo 2.

Katılımcıların sağlıkla ilgili internet kullanım nedenleri

	Sayı	**Yüzde (%)**
İnternette sağlık/hastalık ve semptom araştırmak	288	76,39
Sağlık kuruluşundan randevu almak	264	70,02
Kendi elektronik sağlık kayıtlarına ulaşmak	144	38,19
Sağlıkla ilgili forumları/sosyal medya sitelerini okumak	94	24,93
Sağlıkla ilgili makale/derleme okumak	74	19,62
Sağlıkla ilgili bir uygulama kullanmak	62	16,44
Doktora soru sormak	20	5,30
Sağlık hizmeti ile ilgili deneyimlerini paylaşmak	14	3,71
Diğer	7	1,85
Yanıtlayan toplam katılımcı sayısı	**377**	

Birden fazla seçenek işaretlenmiştir.

Tablo 3.

Katılımcıların SCÖ alt boyut ve SCÖ toplam puanları

	Ortalama	**SD**	**Ortanca**	**Minimum**	**Maksimum**
Zorlantı	12,86	5,92	10,00	8,00	32,00
Aşırı kaygı	18,66	6,39	19,00	8,00	38,00
Aşırılık	24,02	6,38	24,00	8,00	37,00
İçini Rahatlatma	41,34	6,74	42,00	12,00	60,00
SCÖ Toplam Puanı	76,13	19,27	74,00	33,00	126,00

SD: Standart sapma

Tablo 4.

SCÖ toplam puanının demografik özelliklere göre karşılaştırılması

		SCÖ Toplam Puanı					p
		Ortalama	SD	Ortanca	Minimum	Maksimum	
Cinsiyet	**Kadın**	77,72	18,62	78,00	33,00	125,00	0,051
	Erkek	74,18	19,92	72,00	33,00	126,00	
Medeni durum	**Bekâr**	71,96	17,95	68,50	42,00	123,00	0,027
	Evli	77,14	19,47	75,00	33,00	126,00	
Gelir durumu	**Gelir giderden az**	78,50	20,35	78,00	33,00	126,00	0,083*
	Gelir gidere eşit	73,89	17,81	72,00	33,00	125,00	
	Gelir giderden fazla	74,93	19,29	73,00	43,00	118,00	
Sektör	**Kamu**	76,27	18,86	74,00	33,00	126,00	0,228
	Özel	73,77	25,41	63,00	44,00	124,00	
Kurum	**Anaokulu**	78,88	24,75	78,00	46,00	125,00	0,295
	İlkokul	77,83	17,90	78,00	33,00	124,00	
	Ortaokul	76,74	19,00	74,00	40,00	126,00	
	Lise	73,38	19,83	71,00	33,00	125,00	
Kronik hastalık varlığı	**Yok**	76,03	19,54	74,00	33,00	126,00	0,801**
	Var	76,76	17,57	72,00	44,00	123,00	

SD: Standart sapma *ANOVA testi kullanılmıştır **t-testi kullanılmıştır.

Tablo 5.

SCÖ ve e-SOYÖ toplam puanının demografik özelliklerle ve birbiriyle ilişkisi

	SCÖ Toplam Puanı			e-SOYÖ Toplam Puanı		
	r	p	n	r	p	n
Yaş	-0,098	0,056	379	-0,151	**0,003**	379
Meslekteki yıl	-0,069	0,182	375	-0,131	**0,011**	375
Kronik hastalık süresi (yıl)	0,130	0,388	46	0,123	0,416	46
Sağlıkla ilgili günlük internet kullanımı (dk)	0,273	**<0,001**	356	0,172	**0,001**	356
Algılanan sağlık durumu (0-100 arasında)	-0,206	**<0,001**	379	0,003	0,958	379
SCÖ Toplam Puanı	**r**			0,221		
	p			**<0,001**		
	n			379		

r: korelasyon katsayısı

n: kişi sayısı

Tablo 6.

e-SOYÖ toplam puanının demografik özelliklere göre karşılaştırılması

		e-SOYÖ Toplam Puanı					p
		Ortalama	SD	Ortanca	Minimum	Maksimum	
Cinsiyet	**Kadın**	42,41	5,79	42,00	18,00	57,00	**0,012**
	Erkek	40,03	7,56	41,00	12,00	60,00	
Medeni durum	**Bekâr**	42,54	5,38	42,50	26,00	54,00	0,160
	Evli	41,05	7,01	42,00	12,00	60,00	
Gelir durumu	**Gelir giderden az**	41,20	6,68	41,50	12,00	60,00	0,167
	Gelir gidere eşit	41,08	6,93	42,00	12,00	57,00	
	Gelir giderden fazla	42,87	6,19	44,00	20,00	52,00	
Sektör	**Kamu**	41,25	6,73	42,00	12,00	60,00	0,452
	Özel	42,82	6,88	43,00	32,00	57,00	
Kurum	**Anaokulu**	42,00	5,92	42,00	34,00	54,00	**0,021 (Lise-İlkokul p=0,028; Ortaokul-İlkokul p=0,042)**
	İlkokul	43,08	5,65	44,00	21,00	55,00	
	Ortaokul	40,98	6,46	41,00	12,00	54,00	
	Lise	40,20	7,80	42,00	12,00	60,00	
Kronik hastalık varlığı	**Yok**	41,26	6,99	42,00	12,00	60,00	0,866
	Var	41,86	4,83	41,00	32,00	53,00	

SD: Standart sapma

4. TARTIŞMA

Siberkondri ve sağlık okuryazarlığı arasındaki ilişkinin incelendiği bu çalışma 379 öğretmen ile yapılmıştır. Bu araştırmada öğretmenlerin SCÖ toplam puan ortalamaları 76,13±19,27 olarak saptanmıştır. Üniversite öğrencileriyle yapılan bir araştırmada SCÖ puan ortalaması; 73,01±19,22 olarak, kalp hastalığı nedeniyle tedavi gören hastalarla yapılan bir araştırmada 68,00±27,04 olarak bulunmuştur.[11,12] ABD'de sağlıklı erişkinlerle yapılan bir araştırmada SCÖ toplam puan ortalamaları 69,14±21,28 olarak; birkaç ülkeden erişkinlerin dahil edildiği bir başka çalışmada ise 72,98±22,98 olarak saptanmıştır.[13,14] Bu farklılıklar araştırmaların yapıldığı popülasyonların ve yaş gruplarının çeşitliliğinden kaynaklanıyor olabilir. Araştırmamızda katılımcıların siberkondri düzeyleri diğer çalışmalara göre daha yüksek bulunmuştur. Bu durumda öğretmenlerin araştırmacı ve sorgulayıcı yönlerinin etkili olabileceği düşünülebilir.

Bu araştırmada cinsiyet değişkeninin siberkondri düzeyini etkilemediği belirlenmiştir. Bu sonuç literatür ile de benzerlik göstermektedir.[3, 11, 15-18] Ancak diyetsiyene başvuran bireylerin siberkondri düzeylerinin incelendiği bir başka çalışmada ise erkeklere kıyasla kadınların siberkondri düzeyleri anlamlı olarak yüksek bulunmuştur.[19] Bu

durumun araştırmaların yapıldığı popülasyonların farklılığından kaynaklanmış olabileceği düşünülebilir.

Katılımcıların medeni durumları ile siberkondri düzeyleri istatistiksel olarak anlamlı ilişki bulunmuştur ve evlilerin puan ortalaması bekârlara göre daha yüksekti (p=0,027). Aile hekimliği polikliniğine başvuran hastalarda siberkondri düzeyinin ve ilişkili faktörlerin değerlendirildiği bir çalışmada da bekâr katılımcıların siberkondri düzeyi evli ve boşanmışlara göre daha düşük tespit edilmiştir (p=0,001).[20] Ancak İstanbul'da oturan ve 18 yaşını doldurmuş 394 birey üzerinde yapılan bir başka çalışmada, katılımcıların medeni durumuna göre siberkondri düzeylerinin istatistiksel olarak farklılık göstermediği tespit edilmiştir.[3] Bizim çalışmamızda evli kişilerin siberkondri düzeylerinin daha yüksek çıkmış olması, evli kişilerin yalnızca kendi sağlık durumlarıyla ilgili değil; eşleri ve çocuklarının sağlık durumlarıyla ilgili de internette tekrarlayan sağlık aramaları yapması durumu ile ilişkili olabilir.

Bu araştırmada gelir durumunun siberkondri düzeyini etkilemediği belirlenmiştir. Üniversite çalışanlarında ve aile sağlığı merkezine başvuran erişkinlerde siberkondri düzeylerinin incelendiği 2 ayrı çalışmada da bizim araştırma bulgumuza benzer şekilde gelir durumu ile siberkondri düzeyi arasında anlamlı bir ilişki saptanmamıştır.[16, 21] Araştırmamızda elde ettiğimiz sonuçta örneklem grubunun tamamının aynı meslek grubundan olması ve benzer gelir seviyelerine sahip olmaları durumunun etkili olabileceği düşünülmüştür.

Araştırmada kronik hastalık varlığının siberkondri düzeyini etkilemediği belirlenmiştir. Öğrenciler üzerinde yapılan bir araştırmada da kronik rahatsızlık durumu ile siberkondri arasında anlamlı ilişki bulunmamıştır.[22] Sağlık alanında lisans eğitimi alan öğrencilerle yapılan bir çalışmada da kronik rahatsızlık durumu ile siberkondri arasında anlamlı ilişki bulunmamıştır.[4] Üniversite öğrencileriyle yapılan bir başka çalışmada da kronik rahatsızlık durumuna sahip olanların, olmayanlara göre daha fazla siberkondri davranışına sahip olduğu belirlenmiştir.[23] Bu durumun, araştırmaya dahil edilen popülasyonların farklılığından kaynaklanıyor olabileceği düşünülmüştür.

Katılımcıların SCÖ toplam puanları ile yaşları arasında istatistiksel açıdan anlamlı bir korelasyon saptanmamıştır (p=0,056). Bu bulgumuz; COVID-19 salgınının üniversite öğrencilerinin siberkondri düzeylerine etkisinin araştırıldığı bir çalışma bulgusuyla ve Sağlık Bilimleri Fakültesi öğrencilerinin siberkondri düzeylerinin incelendiği bir diğer çalışma bulgusuyla benzerlik göstermektedir.[4,22] Bu durum siberkondrinin her yaş grubunda karşılaşılabilecek bir sorun olduğunu ve yapılacak önleyici çalışmaların her yaş grubunu kapsayacak şekilde planlanması gerektiğine dikkat çekmektedir.

Katılımcıların SCÖ toplam puanları ile sağlıkla ilgili günlük internette geçirmiş oldukları süre arasında pozitif yönlü, orta düzeyde ve istatistiksel açıdan anlamlı bir korelasyon saptanmıştır (r=0,273; p<0,001). Sağlık bilimleri-Hemşierlik Fakültesi ve Tıp Fakültesi öğrencilerinden 1256 öğrenci ile yapılan bir başka çalışmada da sağlıkla ilgili internette geçirilen ortalama süre ile SCÖ puanı arasında pozitif yönde anlamlı korelasyon bulunduğu görülmüştür.[11] Siberkondri tanımında da geçen "sanal ortamda sağlıkla ilgili aşırı tekrara kaçan aramalar yapma" davranışının gerçekleşebilmesi; sağlıkla ilgili internette vakit geçirmeyi gerekli kılmakta ve geçen bu süre de siberkondri düzeyi ile paralellik göstererek çalışma bulgumuzu desteklemektedir.

Bu araştırmada katılımcıların SCÖ toplam puanları ile algılanan sağlık durumları arasında negatif

yönlü, zayıf düzeyde ve istatistiksel açıdan anlamlı bir korelasyon saptanmıştır (r=-0,206; p<0,001). Bir üniversite hastanesine başvuran hastaların siberkondri düzeylerinin değerlendirildiği bir çalışmada genel sağlık durumu orta olanların siberkondri düzeylerinin genel sağlık durumu iyi olanlardan daha yüksek olduğu ve korelasyon analizinde de genel sağlık durumu ile siberkondri arasında negatif yönlü bir ilişki olduğu saptanmıştır.[24] Çalışmamızda da literatürle uyumlu olan bu durumun sebebi; siberkondriyak kişilerin sağlığını olduğundan daha kötü algılıyor olması olabilir.

Siberkondriyi etkileyen birçok bileşen vardır. Yaşanılan bölge, hastalık öyküsü, sağlık kaynaklarına erişim, internet kullanımı gibi durumların siberkondri davranışını etkilediği bilinmektedir. Bu nedenle incelenen parametrelerin siberkondri üzerindeki etkileri ile ilgili literatürde farklı sonuçlar yer alabilmektedir.[15, 18]

Bu araştırmada katılımcıların e-SOYÖ toplam puanları ile cinsiyetleri arasında istatistiksel açıdan anlamlı ilişki saptanmıştır ve kadın katılımcıların e-SOYÖ toplam puan ortalamaları daha yüksek bulunmuştur (p=0,012). İstanbul'da 18 yaşını doldurmuş 394 bireyin dahil edildiği farklı bir çalışmada da benzer şekilde kadınların e-sağlık okuryazarlığı düzeyinin daha yüksek bulunduğu görülmüştür.[3] Bu durumun; çalışmaların yapıldığı örneklem gruplarının farklılığından kaynaklanabileceği düşünülmektedir.

Bu araştırmada katılımcıların e-SOYÖ toplam puanları ile medeni durumları arasında istatistiksel açıdan anlamlı ilişki saptanmamıştır (p=0,160). E-sağlık okuryazarlığı ve siberkondri arasındaki ilişkinin değerlendirildiği bir çalışmada da bireylerin medeni hali ile e-sağlık okuryazarlık düzeyleri arasında istatistiksel olarak herhangi bir ilişki bulunmamıştır.[3]

Bu araştırmada katılımcıların e-SOYÖ toplam puanları ile gelir durumları arasında istatistiksel açıdan anlamlı ilişki saptanmamıştır (p=0,167). Öğrencilerle yapılan bir araştırmada öğrencilerin ailelerinin gelir düzeyi ile e-sağlık okuryazarlığı arasında anlamlı ilişki saptanmazken (p=0,103); yaşlı bireylerin e-sağlık okuryazarlığının değerlendirildiği bir başka çalışmada ise katılımcıların e-sağlık okuryazarlık ölçek puanı ile gelir durumu arasında istatistiksel olarak anlamlı bir ilişki gözlenmiştir (p=0,001).[25, 26] Bu araştırmada e-SOYÖ toplam puanları ile gelir durumları arasında istatistiksel açıdan anlamlı ilişki saptanmamasında araştırmaya katılanların tamamının aynı meslek grubundan olması ve benzer gelir seviyelerine sahip olmaları durumu etkili olmuş olabilir.

Bu araştırmada katılımcıların e-SOYÖ toplam puanları ile kronik hastalık varlığı arasında istatistiksel açıdan anlamlı fark saptanmamıştır (p=0,866). Literatürde öğrencilerle yapılmış olan çalışmalarda da kronik hastalığı olan ve olmayan öğrencilerin e-sağlık okuryazarlığı puan ortalamaları arasında istatistiksel olarak anlamlı bir farklılık bulunmamıştır. Böylece kronik bir hastalığı olma durumunun da e-sağlık okuryazarlığını etkilemediği ortaya konmuştur.[25, 27] Bu anlamda araştırma sonuçlarımız literatür ile benzerlik göstermektedir.

Bu araştırmada katılımcıların e-SOYÖ toplam puanları ile yaş arasında negatif yönlü, zayıf düzeyde ve istatistiksel açıdan anlamlı bir korelasyon saptanmıştır (r=-0,151; p=0,003). E-SOYÖ toplam puanı ile meslekteki yıl arasında negatif yönlü, zayıf düzeyde ve istatistiksel açıdan anlamlı bir korelasyon saptanmıştır (r=-0,131; p=0,011). Meslekteki yılın yaş ile paralellik gösterdiği düşünüldüğünde her iki parametre ile e-SOYÖ toplam puanları arasında görülen anlamlı ve negatif yönlü korelasyon birbirini destekleyen

ve beklenen bir sonuçtur. Kronik hastalığı olup dahiliye polikliniğine başvuran 490 hasta ile yapılan literatürdeki bir başka araştırmada da benzer şekilde yaş arttıkça e-sağlık okuryazarlığı düzeyinin azaldığının saptandığı görülmüştür.[28] Bu durumun, e-Sağlık uygulamaları gibi teknolojik uygulamaları kullanmak ya da sağlıkla ilgili araştırma yapmak için ileri yaştaki bireylerin internet kullanma becerileri ve tercihlerinin daha az olmasından ileri gelmiş olabileceği düşünülmektedir.

Katılımcıların e-SOYÖ toplam puanları ile kronik hastalık süreleri ve algılanan sağlık durumları arasında istatistiksel açıdan anlamlı bir korelasyon saptanmamıştır (p=0,416; p=0,958). Kronik hastalığı olan bireylerle yapılan bir çalışmada kronik hastalık süresi arttıkça e-sağlık okuryazarlık düzeyinin azaldığını gösterilmiştir.[28] Bunun da çalışmadaki kişilerin yaşlarının farklılığından kaynaklanıyor olabileceği düşünülmüştür. İnternet bağımlılığı ve sağlık okuryazarlığı arasındaki ilişkinin incelendiği bir başka çalışmada da araştırma sonucumuzla benzer olarak, algılanan sağlık durumu ile sağlık okuryazarlığı puanları arasında istatistiksel olarak anlamlı bir ilişki bulunmamıştır.[29]

Katılımcıların e-SOYÖ toplam puanları ile sağlıkla ilgili günlük internette geçirmiş oldukları süre arasında pozitif yönlü, zayıf düzeyde ve istatistiksel açıdan anlamlı bir korelasyon saptanmıştır (r=0,172; p=0,001). Adölesanlarda yapılan bir çalışmada da internet kullanım süresi ile e-sağlık okuryazarlığı arasında anlamlı bir ilişki saptanmış ve internet kullanım süresi yüksek olan katılımcıların daha yüksek e-sağlık okuryazarlık düzeyine sahip olduğu belirlenmiştir.[27] Bu durumun e-sağlık okuryazarlığı daha yüksek olan kişilerin sağlıkla ilgili araştırma yaparken internetten daha çok faydalanmak istemeleri ve daha uzun süre internet kullanmaları ile ilişkili olabileceği düşünülmüştür.

Katılımcıların SCÖ toplam puanları ile e-SOYÖ toplam puanları arasında pozitif yönlü, zayıf düzeyde ve istatistiksel açıdan anlamlı bir korelasyon saptanmıştır (r=0,221; p<0,001). Literatürde e-sağlık okuryazarlığı ile siberkondriyi karşılaştıran çalışmalarda da e-sağlık okuryazarlığı ve siberkondri arasında pozitif yönlü ve düşük düzeyde bir ilişkinin olduğu görülmüştür.[3, 30] Çalışma bulgularımızdan sağlıkla ilgili günlük internette geçirilen süre ile siberkondri ve e-SOYÖ toplam puanları arasında pozitif yönlü, zayıf düzeyde ve istatistiksel açıdan anlamlı korelasyonlar saptanmıştır. Dolayısıyla e-sağlık okuryazarlığı ve siberkondri arasındaki pozitif korelasyonun nedeninin, iki parametreyi de pozitif etkileyen "sağlıkla ilgili internette geçirilen süre" olabileceği düşünülmüştür.

Günümüzde internetin bilgi kaynağı olarak kullanımının artması siberkondri ve e-sağlık okuryazarlığı kavramlarının da önemini artırmaktadır. Konuyla ilgili daha fazla sayıda kişinin katıldığı, daha farklı popülasyonların dahil edildiği ve farklı parametrelerin de incelendiği araştırmaların yapılması önerilebilir. Böylece günümüzde önemli bir konu haline gelen bu kavramların daha da aydınlatabileceği düşünülmektedir.

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Research Article

Overweight and Obese Patients' Attitudes Towards Anti-Obesity Treatments, and Attitude Associated Factors

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Objective: Obesity is a public health problem with a rising prevalence. When lifestyle modifications, diet, and exercise fail, anti-obesity medications and surgeries are treatment options. However, they seem to be underutilized, due in part to patients' attitudes towards these modalities. This study aimed to investigate patients' attitudes toward these treatments.

Materials and Methods: A descriptive survey was conducted in a face-to-face fashion. Weight perception, prior weight loss trials, exercise and dietary treatments, perceptions related to obesity and its treatment, and demographic factors, were assessed in relation to anti-obesity medications and surgical treatments. Perception was analyzed both verbally and visually. Misperception was defined as being thinner than reality misperceptions (TTRM), fatter than reality misperceptions (FTRM), or either of them (ETFTRM).

Results: 198 participants completed the survey. 30.8% and 23.7% of the participants would consider anti-obesity medications and surgeries, respectively. Females were more likely to consider anti-obesity medications (43.9% vs. 21.6%, p = 0.001). Patients who had exercised to lose weight were more likely to consider anti-obesity surgery (28.9% vs. 16.7%, p = 0.04). Appropriate weight perception was 16.2%. Weight misperception was not associated with higher or lower rates of anti-obesity treatments. However, among the patients in the highest body mass index (BMI) group (BMI > 35), participants with pure-TTRM were more likely to consider anti-obesity medications (66.7% vs. 18.8%, p = 0.01).

Conclusion: Medical and surgical obesity treatments are considered at a low rate among candidates or at-risk patients. Age, gender, exercise history, and pure-TTRM were associated with higher treatment considerations.

Keywords: Weight perception, Obesity, Obesity management, Anti-obesity agents, Bariatric surgery

1. INTRODUCTION

Obesity is defined as "the excess weight that poses a risk to one's health" and is a common public health problem among both developed and developing countries.[1] Turkey is a country with a high number of overweight and obese patients.[2] Various factors exist with regards to rising obesity rates in the last decades, such as easy access to food and a sedentary lifestyle, namely the adoption of a western lifestyle.[3] Obesity treatment starts with lifestyle modification, diet, and exercise, and they form the backbone of the treatment plans. When response to the aforementioned treatments is inadequate, medical treatments (e.g., glucagon-like peptide-1 receptor agonists, namely GLP-1 RAs) or surgical treatments (e.g., sleeve gastrectomy) are valid and proven options with moderate to high efficacy.[4,5] However, these latter modalities seem to be underutilized when taking into consideration the rates of obesity.[6,7] Several studies around the globe have shown that various barriers exist with regards to the utilization of these treatments, that

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is, weight stigma, surgery-related stigma, cost-related issues, misconceptions about the safety and efficacy of surgery, as well as consideration of obesity surgery as a cosmetic procedure.[6,8–12] However, no study regarding barriers to the utilization of obesity treatment was conducted in Turkey.

Weight perception is defined as how one perceives their weight and physical appearance.[13] It is known that weight perception changes are common, particularly among youngsters.[14,15] Besides, it is associated with psychiatric disorders.[13,15–17] More interestingly, studies demonstrated that youngsters who have weight misperceptions were less likely to try weight loss.[18] Since only a few studies exist with regards to weight misperception in Turkey, and belong to adolescents.[19], we have started a project about weight misperception in the adult population. We had planned a two-part study, in which the first part consisted of determinants of weight misperception (under review, to be published), and the second part (the current study) consisted of attitudes towards obesity treatment, related factors, and the association of weight misperception with obesity treatment. In the first part of the project, we have shown that weight misperception is very common among the Turkish population and is associated with low education levels, a higher BMI, and age.

In this study, we incorporated the findings from the prior study in order to put forth attitudes towards obesity treatment, find associated factors, and investigate whether weight misperception is associated with attitudes towards obesity medications and surgery.

2.METHODOLOGY

Design and Setting

This study was designed as a descriptive research survey and formed the second part of our weight misperception research, which was planned as a two-step study. Survey questions and structures were designed with the help of data acquired during the first step of the study (to be published). Participants aged 18 to 65 were asked whether they would want to participate in the study. If they opted to participate, then written informed consent was obtained. The participants were given an anonymous survey number and proceeded with the questions. No identifying name or number was obtained. The survey took approximately ten minutes to complete. Since this study's aim was to investigate weight misperception's effect on attitudes towards obesity management strategies, only participants with a BMI over 25 kg/m2 were included in the study.

Survey

The survey consisted of 15 questions. Surveys were performed by the four researchers (BK, NŞ, AÖ, and TIG) and took place in public places such as bus stops, cafés, parks, shopping malls, etc. All questions were read by the researcher, and each question was explained in detail to participants. The survey questions were as follows:

1. Age, and sex (Participants were asked to answer their biological sex, namely as female or male)
2. Weight (kilograms), height (centimeters), and BMI (kg/m2)
3. Education status:
    - Primary school or below
    - Middle or high school
    - College degree and above
4. Marital status:
    - Single
    - Married
    - Divorced

- Widow

5. Have you ever tried to lose weight before?
   - No
   - Yes, once
   - Yes, twice or more
6. (*If the former question's answer is yes, ask then*) Were you successful at losing weight?
   - No
   - Partially yes
   - Totally yes
7. Have you ever visited dietitian before with the purpose of losing weight?
   - No
   - Yes, once
   - Yes, twice or more
8. Have you ever exercised before with the purpose of losing weight?
   - No
   - Yes, once
   - Yes, twice or more
9. Have you ever used medication with the purpose of losing weight?
   - No
   - Liraglutide
   - Orlistat
   - Herbal remedies
10. (*If the former question's answer is no, ask then*) (*If BMI < 30kg/m^2, then start with "**if you were obese**")* Would you consider using anti-obesity medication with the purpose of losing weight?
    - I would not consider
    - I would consider
    - No opinion
11. (*If BMI < 30kg/m^2, then start with "**if you were obese**")* Would you consider anti-obesity surgery with the purpose of losing weight?
    - I would not consider
    - I would consider
    - No opinion
12. How important do you think obesity is?
    - Totally unimportant
    - Partially unimportant
    - Neither unimportant or important
    - Partially important
    - Totally important
13. How hard do you think it is to treat obesity?
    - Totally hard
    - Partially hard
    - Neither hard or easy
    - Partially easy
    - Totally easy
14. Verbal weight perception: Patients were asked to describe themselves as one of the following: (The question was read twice to make sure patients comprehended it correctly)
    - Underweight
    - Normal-weighted
    - Overweight
    - Mildly obese
    - Severely obese
15. Visual weight perception: A previously developed and validated body size guide (BSG) was used for visual weight perception analysis.[20] This scale was used in our first weight misperception study (to be published) as well. The BSG provides separate instructions for male and female participants. Each BSG features a

consistent portrayal of a male or female model, depicting their figure from being underweight to grossly obese. There are a total of 10 images for both males and females. The initial image depicts underweight individuals, while the second and third images portray individuals with a normal weight. The fourth image represents those who are overweight. The fifth and sixth images depict individuals with class I obesity, while the seventh and eighth pictures portray individuals with class II obesity. The final two images represent individuals with class III obesity. Given that we categorized the BMI of obese patients into two groups: mildly obese and severely obese, and the verbal weight perception question also classified obesity into two groups: mildly obese and severely obese, we assigned the seventh image from the visual weight perception question to the mildly obese group and the eighth image to the severely obese group, based on the patients' responses. Patients were presented with images based on their gender and instructed to identify the image that they perceived as most resembling themselves. Patients were instructed to carefully and thoroughly analyze all photos. The researchers stated that all the photos depict the same individual, although they differ in size, ranging from underweight to severe obesity.

Appropriate Perception and Misperceptions

We used the same methodology as our first study to define appropriate weight perception and misperceptions, which were defined as follows:

- Appropriate perception (AP) is described as the alignment between one's actual body mass index (BMI) and their responses to questions about their weight perception, both visually and verbally. For instance, if a patient's BMI was determined to be 32.5 kg/m2 (indicating mild obesity), they verbally acknowledged themselves as mildly obese and identified images numbered 5, 6, or 7 in their visual BSG, they were categorized as having "appropriate perception".
- The categorization of misperceptions was complex, requiring multiple classifications due to the following factors: Firstly, misperception refers to the cognitive process of perceiving oneself as either "thinner" or "fatter" than the actual truth. Furthermore, misconceptions can manifest either through visual cues, verbal communication, or a combination of both. Ultimately, individuals may see themselves as having a slimmer appearance visually, a larger one when spoken orally, or vice versa. The term "misperception" was employed as a comprehensive phrase to include both verbal and visual misinterpretations of perceiving oneself as slimmer or fatter than the actual truth. Five subgroups were established to categorize individuals based on their perspective of being thinner or fatter. These subgroups are referred to as t-SG and f-SG, representing thinner and fatter perceptions, respectively. These subgroups were designed to cover all possible perceptions.
    - t-SG1, no thinner than reality misperception: The patient does not perceive themselves as thinner than reality, both verbally and visually. However, they could perceive accurately or fatter than reality. f-SG1 constitutes the opposite of t-SG1.
    - t-SG2, visual misperception, verbal accurate perception: The patient perceives themselves thinner than reality on the BSG chart but answers the verbal weight perception question appropriately. f-SG2 constitutes the opposite of t-SG3.
    - t-SG3, verbal misperception, visual accurate perception: The patient perceives themselves thinner than reality when the verbal weight perception question is asked,

but points out an appropriate image on the BSG chart. f-SG4 constitutes the opposite of t-SG4.

- t-SG4, both visual and verbal misperception: The patient perceives themselves as thinner than reality when the verbal weight perception question is asked and points to a thinner than reality image on the BSG chart. f-SG4 constitutes the opposite of t-SG4.
- SG5, visual and verbal misperceptions oppose: The patient perceives themselves as thinner than reality when the verbal weight perception question is asked and points to a fatter than reality image on the BSG chart, or vice versa.

Thinner than reality misperception (TTRM) was divided into 2 categories: any-TTRM, which included subgroups 2, 3, and 4 (t-SG2, t-SG3, and t-SG4), and pure-TTRM, which included subgroup 4 (t-SG4) only. Fatter than reality misperception (FTRM) was also divided into 2 categories: any-FTRM, which included subgroups 2, 3, and 4 (f-SG2, f-SG3, and f-SG4), and pure-FTRM, which included subgroup 4 (f-SG4) only. Due to the presence of contradictory and inconsistent responses in SG5, it was excluded from the TTRM and FTRM. Not having verbal and visually appropriate perception is categorized as either thinner or fatter than reality misperception (ETFTRM) and calculated as "patients with appropriate perception subtracted from all patients".

Statistics

Categorical and continuous variables were analyzed via descriptive statistical methods. Differences between groups and categorical determinants were analyzed using Pearson's chi-squared test ($\chi 2$ test) (or Fisher's exact test if needed). Differences between continuous variables were analyzed using the student's t-test or Mann-Whitney U test, according to the distribution patterns of two groups. Continuous variables were presented as "mean (± standard deviation)" or "median (interquartile range)" according to distribution patterns. Categorical variables were presented as "numbers (percentages)". Two-sided significance testing was performed to calculate p-values, and p-values less than 0.05 were considered significant. Since we did not have robust data to calculate sample size prior to the survey, we could not conduct sample size analysis. All analyses were conducted using IBM SPSS Software version 23.0 (SPSS Inc., Chicago, IL).

Ethics

Participants were assigned an anonymous survey number to protect confidentiality. Written informed consent was obtained prior to survey initiation. The study complies with the principles outlined in the Declaration of Helsinki, and this study was approved by the Başkent University Institutional Review Board (Project number KA24/42).

3.RESULTS

Baseline Survey Results

One hundred and ninety-eight participants, with a median age of 46, responded to the survey. Of the participants, there was a slight male dominance. The median BMI was 29.3 and was similar across the sexes. While the majority of the participants had a college degree, less than one-third had a middle or high school degree, and only a fraction of the participants had either a primary school degree or a degree below.

More than three-fourths of the participants had tried to lose weight before, of whom more than 85% were successful. Less than one-third of the participants had visited dietitians before with the purpose of losing weight, and a little more than half of the participants had exercised before with the purpose of losing weight. More than 88% of

the participants had never used medication with the purpose of losing weight. Of the users, 13 had used herbal remedies, 7 had used orlistat, and only 2 had used liraglutide.

Regarding attitudes toward anti-obesity treatments, 30.8% of the participants would consider anti-obesity medications, whereas 23.7% would consider anti-obesity surgery for weight loss. More than four-fifths of the participants think obesity is a totally important disease, and more than 65% think that it is either partially or totally hard to treat obesity.

In terms of weight perception, while 47.5% of the participants responded as overweight verbally, 50% of the participants responded as mildly obese when asked visually. Table 1 demonstrates the baseline survey results in detail.

Weight Misperception

One hundred and sixty-six of the participants (83.8%) had either thinner or fatter than reality misperception (ETFTRM), which translates into the fact that only 16.2% of the participants had appropriate weight perception. Thinner than reality misperception (TTRM) was more common compared to fatter than reality misperception (FTRM), both in "any" type misperception and "pure" type misperception. Regarding the former type, 49% had any TTRM, and 34.8% had any FTRM. Regarding the latter type, 21.2% had pure TTRM and 1.5% had pure FTRM. Table 2 demonstrates the weight misperception types of the participants in detail.

Table 1.

Participants' characteristics according to the survey

Questions	**Choices/Answers**	**Values***
Age		46 (20)
Sex	Female Male	(41.4%) 116 (58.6%)
Body mass index (continuous)	Female Male	29.1 (5.1) 29.5 (4.1)
Body mass index (categorical)	25.0 – 29.9 30.0 – 34.9 35 and over	111 (56.1%) 59 (29.8%) 28 (14.1%)
Education status	Primary school or below Middle or high school College degree and above	14 (7.1%) 63 (31.8%) 121 (61.1%)
Marital status	Married Single Divorced Widowed	146 (73.7%) 30 (15.2%) 11 (5.6%) 11 (5.6%)
Have you ever tried to lose weight before?	Yes (either once or more)	155 (78.3%)
Were you successful at losing weight?	Yes (either partially or totally)	133 (85.8%)
Have you ever visited dietitian before with the purpose of losing weight?	Yes (either once or more)	60 (30.3%)
Have you ever exercised before with the purpose of losing weight?	Yes (either once or more)	114 (57.6%)

Have you ever used medication with the purpose of losing weight?	No Liraglutide Orlistat Herbal remedies	176 (88.9%) 2 (1%) 7 (3.5%) 13 (6.6%)
Would you consider using anti-obesity medication with the purpose of losing weight?	I would not consider I would consider No opinion	113 (57.1%) 61 (30.8%) 24 (12.1%)
Would you consider anti-obesity surgery with the purpose of losing weight?	I would not consider I would consider No opinion	134 (67.7%) 47 (23.7%) 17 (8.6%)
How important do you think obesity is?	Totally unimportant Partially unimportant Neither unimportant or important Partially important Totally important	6 (3%) 1 (0.5%) 8 (4%) 15 (7.6%) 168 (84.8%)
How hard do you think it is to treat obesity?	Totally hard Partially hard Neither hard or easy Partially easy Totally easy	80 (40.4%) 50 (25.3%) 43 (21.7%) 17 (8.6%) 8 (4%)
Verbal weight perception	Underweight Normal-weighted Overweight Mildly obese Severely obese	2 (1%) 69 (34.8%) 94 (47.5%) 26 (13.1%) 7 (3.5%)
Visual weight perception	Underweight Normal-weighted Overweight Mildly obese Severely obese	1 (0.5%) 28 (14.1%) 39 (19.7%) 99 (50%) 31 (15.7%)

* Values are either shown as median (interquartile range) or frequency (percentage%)

Table 2.

Weight misperception types of the participants

Weight Misperception Type	**Frequency**
Any TTRM	97 (49%)
Pure TTRM	42 (21.2%)
Any FTRM	69 (34.8%)
Pure FTRM	3 (1.5%)
ETFTRM	166 (83.8%)

ETFTRM: Either thinner or fatter than reality misperception, FTRM: Fatter than reality misperception, TTRM: Thinner than reality misperception

Characteristics of the Participants Who Would Consider Anti-Obesity Medications

Female responders would consider anti-obesity medications more than males (43.9% vs. 21.6%, p = 0.001), and participants who would consider anti-obesity medications had a statistically significantly lower age compared to participants who would not (42 vs. 47, p = 0.05). Education and marital status, weight loss trial and success, dietitian visit and exercise history, obesity importance, and hardness thoughts were not different across two groups (all p > 0.05). However, participants who had ever used anti-obesity medications with the purpose of losing weight were more likely to use anti-obesity medications (72.7% vs. 25.6%, p<0.001). Moreover, participants who would consider anti-obesity medication for obesity treatment were also more likely to consider anti-obesity surgery (59.6% vs. 21.6%, p<0.001). Weight misperceptions, however, were not different between different participant attitudes (all p > 0.05). Table 3 demonstrates the characteristics of the participants with a positive attitude towards anti-obesity medications in detail.

Table 3.

Association of positive anti-obesity medication treatment attitude and presence of clinicosocial determinants

Determinant	**Choices/Answers**	**Value**	**p***
Age		42 (18) vs. 47 (21)	0.05
Sex	Female Male	36 (43.9%) 25 (21.6%)	0.001
Education status	Primary school or below Middle or high school College degree and above	6 (42.9%) 20 (31.7%) 35 (28.9%)	0.55
Marital status	Married Single Divorced Widowed	43 (29.5%) 11 (36.7%) 5 (45.5%) 2 (18.2%)	0.46
Have you ever tried to lose weight before?	Yes (either once or more) No	52 (33.5%) 9 (20.9%)	0.11
Were you successful at losing weight?	Yes (either partially or totally) No	42 (31.6%) 10 (45.5%)	0.2
Have you ever visited dietitian before with the purpose of losing weight?	Yes (either once or more) No	20 (33.3%) 41 (29.7%)	0.61
Have you ever exercised before with the purpose of losing weight?	Yes (either once or more) No	32 (28.1%) 29 (34.5%)	0.33
Have you ever used medication with the purpose of losing weight?	Yes (any) No	16 (72.7%) 45 (25.6)	<0.001

How important do you think obesity is?	Totally unimportant Partially unimportant Neither unimportant or important Partially important Totally important	2 (33.3%) 0 2 (25%) 2 (13.3%) 55 (32.7%)	0.55
How hard do you think it is to treat obesity?	Totally hard Partially hard Neither hard or easy Partially easy Totally easy	26 (32.5%) 14 (28%) 12 (27.9%) 6 (35.3%) 3 (37.5%)	0.94
Would you consider anti-obesity surgery with the purpose of losing weight?	I would not consider I would consider No opinion	29 (21.6%) 28 (59.6%) 4 (23.5%)	<0.001
Any TTRM	Yes No	30 (30.9%) 31 (30.7%)	1
Pure TTRM	Yes No	17 (40.5%) 44 (28.2%)	0.12
Any FTRM	Yes No	23 (33.3%) 38 (29.5%)	0.57
Pure FTRM	Yes No	0 61 (31.3%)	0.55
ETFTRM	Yes No	53 (31.9%) 8 (25%)	0.43

*p values with a statistical significance are shown in bold

ETFTRM: Either thinner or fatter than reality misperception, FTRM: Fatter than reality misperception, TTRM: Thinner than reality misperception

Characteristics of the Participants Who Would Consider Anti-Obesity Surgery

Similar to participants who have positive attitudes towards anti-obesity medications, participants who would consider anti-obesity surgery as a weight loss treatment modality were also younger than participants who would not consider it (43 vs. 47, p = 0.02). Although the percentage of females who would consider surgery was also higher, this did not reach statistical significance (29.3% vs. 19.8%, p = 0.12). Education and marital status, weight loss trial and success, dietitian visit, exercise history, obesity importance, and hardness thoughts were not different across the two groups. However, participants who had exercised before with the purpose of losing weight were more likely to consider anti-obesity surgery (28.9% vs. 16.7%, p = 0.04). Similar to higher anti-obesity medication consideration, participants who had ever used medications with the purpose of weight loss were more likely to consider anti-obesity surgery (45.5% vs. 21%, p = 0.01). Moreover, participants who would consider anti-obesity surgery were also more likely to consider anti-obesity medication with the purpose of losing weight (45.9% vs. 14.2%, p<0.001). Similar to anti-obesity medication considerations, anti-obesity surgery considerations were not affected by the presence of weight

misperception (all p > 0.05). Table 4 demonstrates the characteristics of the participants with a positive attitude towards anti-obesity surgery in detail.

Obesity Treatment Considerations According to BMI Levels

Anti-obesity medication and surgery considerations did not differ according to weight misperception presence in the total cohort, but we also wanted to test whether this finding also applies to all BMI levels. Regarding participants with a BMI of 35.0 and over, those with a pure TTRM were also more likely to consider anti-obesity medications (66.7% vs. 18.8%, p = 0.01). No other differences were demonstrated with BMI subgrouping. Table 5 demonstrates the association between weight misperception types and obesity treatment considerations according to different body mass index levels.

Table 4.

Association of positive anti-obesity surgery treatment attitude and clinicosocial determinants

Determinant	**Choices/Answers**	**Value**	**p***
Age		43 (17) vs. 47 (21)	**0.02**
Sex	Female Male	24 (29.3%) 23 (19.8%)	0.12
Education status	Primary school or below Middle or high school College degree and above	3 (21.4%) 20 (31.7%) 24 (19.8%)	0.19
Marital status	Married Single Divorced Widowed	36 (24.7%) 7 (23.3%) 3 (27.3%) 1 (9.1%)	0.69
Have you ever tried to lose weight before?	Yes (either once or more) No	37 (23.9%) 10 (23.3%)	0.99
Were you successful at losing weight?	Yes (either partially or totally) No	30 (22.6%) 7 (31.8%)	0.34
Have you ever visited dietitian before with the purpose of losing weight?	Yes (either once or more) No	18 (30%) 29 (21%)	0.17
Have you ever exercised before with the purpose of losing weight?	Yes (either once or more) No	33 (28.9%) 14 (16.7%)	**0.04**
Have you ever used medication with the purpose of losing weight?	Yes (any) No	10 (45.5%) 37 (21%)	**0.01**
How important do you think obesity is?	Totally unimportant Partially unimportant Neither unimportant or important Partially important Totally important	1 (16.7%) 0 0 2 (13.3%) 44 (26.2%)	0.35

How hard do you think it is to treat obesity?	Totally hard Partially hard Neither hard or easy Partially easy Totally easy	25 (31.3%) 11 (22%) 6 (14%) 3 (17.6%) 2 (25%)	0.26
Would you consider anti-obesity medication with the purpose of losing weight?	I would not consider I would consider No opinion	16 (14.2%) 28 (45.9%) 3 (12.5%)	**<0.001**
Any TTRM	Yes No	23 (23.7%) 23 (23.8%)	0.99
Pure TTRM	Yes No	11 (26.2%) 36 (23.1%)	0.67
Any FTRM	Yes No	13 (18.8%) 34 (26.4%)	0.23
Pure FTRM	Yes No	1 (33.3%) 46 (23.6%)	0.55
ETFTRM	Yes No	36 (21.7%) 11 (34.4%)	0.12

*p values with a statistical significance are shown in bold
ETFTRM: Either thinner or fatter than reality misperception, FTRM: Fatter than reality misperception, TTRM: Thinner than reality misperception

Table 5.

Presence of weight misperception types and positive attitude+ toward obesity treatment types, according to different body mass index levels

	BMI = 25.0 – 29.9		**BMI = 30.0 – 34.9**		**BMI = 35 and over**	
Anti-obesity Medication	**WM + vs. VM -**	**p***	**WM + vs. VM -**	**p***	**WM + vs. VM -**	**p***
Any TTRM	35.3% vs. 36.4%	0.91	46.7% vs. 63.6%	0.24	91.7% vs. 68.8%	0.14
Pure TTRM	17.6% vs. 19.5%	0.82	20% vs. 15.9%	0.71	66.7% vs. 18.8%	**0.01**
Any FTRM	55.9% vs. 49.4%	0.52	26.7% vs. 18.2%	0.48	0 vs. 0	NA
Pure FTRM	0 vs. 3.9%	0.24	0 vs. 0	NA	0 vs. 0	NA
ETFTRM	91.2% vs. 85.7%	0.42	73.3% vs. 81.8%	0.48	91.7% vs. 68.8%	0.14
Anti-obesity Surgery						
Any TTRM	37.5% vs. 35.6%	0.86	46.7% vs. 63.6%	0.24	87.5% vs. 75%	0.46
Pure TTRM	12.5% vs. 20.7%	0.36	26.7% vs. 13.6%	0.24	50% vs. 35%	0.46
Any FTRM	41.7% vs. 54%	0.28	20% vs. 20.5%	0.97	0 vs. 0	NA
Pure FTRM	4.2% vs. 2.3%	0.52	0 vs. 0	NA	0 vs. 0	NA
ETFTRM	79.2% vs. 89.7%	0.17	66.7% vs. 84.1%	0.14	87.5% vs. 75%	0.46

+ Responder would consider the relevant obesity treatment
*p values with a statistical significance are shown in bold
BMI: Body mass index, ETFTRM: Either thinner or fatter than reality misperception, FTRM: Fatter than reality misperception, NA: Not applicable, TTRM: Thinner than reality misperception, WM +: Weight misperception is present for the particular type, WM -: Weight misperception is absent for the particular type

4.DISCUSSION

This study showed that medical and surgical obesity treatment considerations are low among overweight and obese patients. Female and younger participants were more likely to consider medical and surgical treatments. Prior exercise history with the purpose of weight loss was shown to be associated with higher anti-obesity surgery consideration. Among patients with a BMI of 35 kg/m2, patients with pure-TTRM were more likely to consider medical obesity treatment compared to those who do not have pure-TTRM. To the best of our knowledge, this is the first study in Turkey to evaluate overweight and obese patients' attitudes towards medical and surgical treatment of obesity and describe associated factors.

Non-pharmaceutical and non-surgical therapies, that is, lifestyle modification, dietary modification, and regular exercise, constitute the backbone of obesity treatment. Moreover, both patients and healthcare providers do not perceive medical and surgical treatments as desirable weight-loss options.[10] However, long-term compliance with non-medical and non-surgical therapies is low, and patients tend to return to their baseline weight.[21] This phenomenon is called "weight cycling", which is sequential weight loss and regain associated with adverse cardiometabolic results.[22] Therefore, various guidelines regarding cardiometabolic diseases suggest medical and surgical obesity treatment options for patients who have failed non-interventional treatments.[4,23] We demonstrated that less than one in three participants would consider anti-obesity medications or surgeries as an option for weight loss. These findings are in parallel with findings from an Asian study.[10] Considering the fact that more than three-fourths of the participants have tried to lose weight before and more than 90% think that obesity is at least partially important, the figures for weight loss medications and surgery are remarkably low. The gap between evidence-based medicine and daily clinical practice should be closed in order to avoid obesity related adverse outcomes.

Discrepancy between the perceived and measured weight is called weight misperception, and it has been shown to affect future weight loss, with the studies having conflicting results: While several studies indicate that weight misperception is associated with lower odds of weight loss[18,24], Sonneville et al. demonstrated that weight misperception is associated with lower future weight gain. (25) Our main study cohort did not demonstrate a difference between weight misperception groups and anti-obesity medication or surgery consideration; however, when only patients with the highest BMI (i.e., BMI >35) were considered, patients who perceived them thinner than real both verbally and visually were more likely to consider anti-obesity surgery and medications. Although this consideration does not necessitate lower future weight loss, as demonstrated by Sonneville et al., our finding seems to be in parallel with their findings.

We have found that female participants were significantly more likely to consider anti-obesity medications compared to male participants, and although there was no statistical significance, they also tend to consider anti-obesity surgery more than males. A survey conducted in Mauritius on female teenagers also demonstrated that weight-loss behaviors were more prevalent among female participants compared to males.[26] However, a study conducted in Saudi Arabia demonstrated that male participants were more likely to consider weight-loss surgery.[9] These differences may reflect the impact of cultural differences on obesity treatment attitudes.

We acknowledge our study's limitations. Firstly, this study was conducted among patients

comprising highly educated people (61.1% have a college degree and above), which markedly differed from the education statistics of Turkey.[27] Secondly, we did not inform participants about the benefits and risks of anti-obesity medications and anti-obesity surgery; thus, some patients may be unaware of the real-world effectiveness of these modalities. Finally, the number of stage 3 obese individuals was low. Since they are the ones who are most likely to benefit from the anti-obesity treatments, their underrepresentation may have affected the results.

In conclusion, anti-obesity treatment consideration is low among participants who are candidates for treatment. Policymakers as well as clinicians should work together to increase awareness of obesity and its treatment modalities.

Author Contributions

ATG and MO conceptualized the study. ATG, MO, BK, NŞ, AÖ, and TIG designed the study. BK, NŞ, AÖ, and TIG collected data. ATG and MO performed the statistics. ATG, MO, BK, NŞ, AÖ, and TIG prepared the draft manuscript, ATG and MO prepared the final manuscript.

Conflict of interest

All authors declare no conflict of interest

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Research Article

Impact of P2Y12 Inhibitors on Thrombus Burden in Patients with ST-Segment Elevation Myocardial Infarction

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Introduction and Aim: In this study, we aimed to investigate the effects of P2Y12 inhibitors administered at the time of admission to the emergency department in patients presenting with ST-segment elevation myocardial infarction (STEMI) and undergoing primary percutaneous coronary intervention on the thrombus score in the culprit lesion.

Materials and Methods: This retrospective study planned to compare the pre-procedural thrombus scores of 225 patients who presented with STEMI underwent primary percutaneous coronary intervention, and received different P2Y12 inhibitors within 2 hours after the onset of chest pain.

Results: A total of 225 patients were included in our study. Among them, 72 patients received clopidogrel, 85 received ticagrelor, and 68 received prasugrel as the P2Y12 inhibitor. The pre-procedural Grade 5 thrombus was significantly lower in the ticagrelor group compared to the other groups (Clopidogrel 77.78%, Ticagrelor 61.18%, Prasugrel 77.94%; p=0.017).

Conclusions: In our study, ticagrelor among the pre-procedurally loaded P2Y12 inhibitors was found to be superior in terms of early thrombus intensity, and these results are thought to be associated with the early onset antiplatelet effect of ticagrelor.

Keywords: ST segment elevation myocardial infarction, Clopidogrel, Prasugrel, Ticagrelor, Thrombus score

1. INTRODUCTION

ST-segment elevation myocardial infarction (STEMI) is a common condition caused by intracoronary thrombosis following plaque rupture.[1] In patients with STEMI who undergo primary percutaneous coronary intervention (PCI), intracoronary thrombosis has been observed in up to 91.6% of cases during angiography.[2] A study comparing 900 STEMI patients investigated the relationship between thrombus score and cardiac events (death, myocardial infarction, and recurrent revascularization). The study found that the TIMI thrombus score was associated with 2-year mortality in patients with grade 0-3 thrombus compared to grade 4-5 thrombus (p<0.001).[2] Thus, a large thrombus was identified as an independent predictor of mortality and major cardiac events. In guidelines, PCI is considered the best and most current treatment option for STEMI.[3] Intracoronary thrombus in STEMI patients is regarded as a negative prognostic factor for in-hospital and long-term adverse cardiac events.[4] Early reperfusion in the culprit lesion before intervention has been shown to create significant changes in ejection fraction (EF), microvascular obstruction, and infarct area.[5]

For patients presenting with STEMI, dual antiplatelet therapy (aspirin and an ADP antagonist) is recommended, with prasugrel

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or ticagrelor primarily suggested. Clopidogrel is recommended if prasugrel and ticagrelor are unavailable, contraindicated, or cannot be tolerated.[3] In this study, we aimed to investigate the effect of the P2Y12 inhibitor given at the time of admission to the emergency department on the thrombus score in the culprit lesion.

2. MATERIALS AND METHODS

Our study was conducted by retrospectively examining the files and coronary angiography images of patients with a diagnosis of STEMI followed in the Coronary Intensive Care Unit of Sakarya University Training and Research Hospital Cardiology Department between 01/01/2018 and 30/08/2019

Patients aged between 30 and 75 years, who presented with chest pain within the first 3 hours and underwent primary PCI, and who received dual antiplatelet therapy at the time of diagnosis in the emergency department were included in the study. Patients with a history of previous coronary revascularization, stent thrombosis, thrombophilia, active treatment for oncologic disease, a history of chemotherapy, rheumatic disease, end-stage renal failure, hemodialysis, those who had used oral antiaggregants in the last week, those with a history of hematologic disorders affecting platelet function, and those with a history of cerebrovascular disease were excluded from the study.

Two hundred twenty five patients (189 male, 36 female) were included in our study. The included patients' demographic characteristics were obtained from the hospital database records. All patients received 300 mg of aspirin and, 60 mg of prasugrel/180 mg of ticagrelor/600 mg of clopidogrel in the emergency department according to the guidelines at the time of diagnosis. All patients received UFH i.v. bolus during PCI of 70-100 IU/kg. The patients were divided into three groups according to prasugrel, ticagrelor, or clopidogrel administration. The ECGs of the patients were evaluated, and the localization of myocardial infarction was classified.

Blood samples taken from the patients during admission and in the coronary intensive care unit, as well as other laboratory values such as urea, creatinine, estimated glomerular filtration rate (GFR), LDL, HDL, triglyceride, total cholesterol, and HbA1c levels, were recorded.

Coronary angiographies were performed by experienced cardiologists. Nonionic low-osmolality contrast medium (Omnipaque 350 MG/ml; GE Healthcare, Cork, Ieland) was used in coronary interventions. Coronary angiography images were reviewed by two different interventional cardiologists, and the culprit lesion, TIMI thrombus score, initial TIMI flow grade, and post-procedure TIMI flow grade were evaluated.

The door-to-cross-wire time was calculated based on the admission and cross-wire times. Angiographic classification of thrombus density was performed using the TIMI thrombus classification[6] , which includes Grade 0 to Grade 5 thrombus.

According to this classification:

Grade 0: Thrombus is not visible angiographically.

Grade 1: Suspected thrombus, irregularity at the lesion borders, decreased contrast density.

Grade 2: Definite thrombus present, size ≤1/2 of the luminal diameter.

Grade 3: Definite thrombus present, size <1/2-<2 of the luminal diameter.

Grade 4: Definite thrombus present, size >2 times the luminal diameter.

Grade 5: Total occlusion is present. Thrombus burden cannot be evaluated due to this.

2.1 Statistical Analysis

Statistical analyses were performed using SPSS version 22 (SPSS Inc., Chicago, IL) software. The normal distribution of variables was examined using visual methods (histograms and probability plots) and analytical methods (Kolmogorov-Smirnov/Shapiro-Wilk tests). Continuous variables were expressed as mean (±standard deviation) or median (interquartile range) depending on their normality distribution. Non-normally distributed variables were compared using the Kruskal-Wallis test. Pairwise comparisons were made using the Mann-Whitney U test and evaluated with Bonferroni correction. Normally distributed variables were compared using a one-way ANOVA test. The homogeneity of variances was assessed using the Levene test. The chi-square test was used to determine whether there was a difference in categorical variables between the groups. Post-hoc analysis results were considered. A type-1 error level of 5% was used for statistical significance.

3. RESULTS

Two hundred twenty five atients (189 male, 36 female) were included in our study. The mean age of the patients was 55.5±8.3 years, and there was no significant difference between the groups (56.2±7.1 in the clopidogrel group, 55.9±9.4 in the ticagrelor group, 54.1±9 in the prasugrel group; p=0.245). Among these patients, 114 had inferior MI, 79 had anterior MI, 11 had extensive anterior MI, 9 had inferoposterior, 6 had inferolateral, 3 had high lateral, 2 had posterior, and 1 had posterolateral MI diagnosis.

Seventy two patients received clopidogrel, 85 received ticagrelor, and 68 received prasugrel loading in appropriate doses. There was no statistically significant difference between the study groups regarding age, gender, hypertension, diabetes mellitus, smoking status, hyperlipidemia, presence of coronary artery disease (Table 1)

The creatinine levels in the emergency department were higher in the clopidogrel group compared to the other groups (Clopidogrel 0.95 (0.82-1.1), Ticagrelor 0.84 (0.74-0.99), Prasugrel 0.85 (0.71-0.96); p=0.002), and the GFR was lower in the clopidogrel group (Clopidogrel 88.0 (66.0-98.0), Ticagrelor 98.8 (83.2-104.0), Prasugrel 101.5 (88.3-107.0); p<0.001) (Table 2)

Table 1.

Comparison of Baseline Characteristics Among the Study Groups

Parameter	Clopidogrel	Ticagrelor	Prasugrel	p-value
Age (years)	56.2±7.1	55.9±9.4	54.1±9.9	0.245
Gender (Female/Male) %	15.3/84.7	16.5/83.5	16.2/83.8	0.978
Hypertension (%)	45.8	36.5	29.4	0.130
Diabetes Mellitus (%)	29.2	22.4	29.4	0.522
Smoking (%)	63.9	77.6	77.9	0.089
Hyperlipidemia (%)	22.2	25.9	38.2	0.089
Coronary Artery Disease (%)	5.6	7.1	4.4	0.780
Family History (%)	4.2	5.9	5.9	0.867

Table 2.

Comparison of Laboratory Values Among the Study Groups

Parameter	Clopidogrel	Ticagrelor	Prasugrel	p-value
Creatinine (mg/dL)	0.95 (0.82-1.1)	0.84 (0.74-0.99)	0.85 (0.71-0.96)	**0.002***
GFR (mL/min/1.73 m^2)	88.0 (66.0-98.0)	98.8 (83.2-104.0)	101.5 (88.3-107.0)	**<0.001****
WBC ($10^3/mm^3$)	11.0 (9.2-13.6)	11.1 (9.6-14.1)	12.2 (9.6-15.6)	0.446
LDL (mg/dL)	137.1±32.6	142.8±30.8	147.0±36.5	0.150
TG (mg/dL)	95.0 (59.0-187.5)	87.0 (56.5-166.5)	113.0 (65.3-196.5)	0.254
HDL (mg/dL)	42.0 (36.5-48.0)	43.0 (36.5-49.0)	40.0 (36.0-46.0)	0.125
HbA1C (%)	5.8 (5.5-6.2)	5.7 (5.4-6.3)	5.7 (5.5-7.5)	0.109
Initial Troponin (ng/L)	49.2 (11.7-186.0)	34.0 (8.8-154.0)	37.5 (12.3-140.5)	0.286

GFR= Glomerular Filtration Rate , **WBC=** White Blood Count, **LDL=**Low-Density Lipoprotein, **TG=**Triglyserides, **HDL=** High-Density Lipoprotein, HbA1C: Haemoglobin A1C

*: Creatinine is higher in the Clopidogrel group.

**: GFR is lower in the Clopidogrel group compared to other groups.

The culprit lesion in the patients was located in the LAD in 89, RCA in 89, CX in 33, RCA's posterolateral branch in 5, major OM in 4, D1 in 2, IM in 2, and PDA in 1 patient. The door-to-cross time, pain-to-cross time, tirofiban infusion rate, and no-reflow rate were similar among the groups (Table 3).

When initial TIMI flow rates were divided into 0/1 and 2/3 and compared, no significant difference was observed among the groups (Figure 1).

The initial Grade 5 thrombus was significantly lower in the ticagrelor group compared to the other groups (Clopidogrel 77.78%, Ticagrelor 61.18%, Prasugrel 77.94%; p=0.017). (Figure 2).

Table 3.

Angiographic Findings Among the Study Groups

Parameter	Clopidogrel	Ticagrelor	Prasugrel	p-value
Door-to-Cross Time (minutes)	39.0 (27.5-51.0)	38.0 (31.0-48.0)	33.5 (26.5-43.5)	0.057
Pain-to-Cross Time (minutes)	151 (96.25-196.0)	138 (95-208.5)	122 (86.5-171)	0.156
Tirofiban Infusion (%)	2.8	1.2	5.9	0.245
No-Reflow (%)	4.2	4.7	1.5	0.530

Figure 1.

İnitial TIMI Flow in the Study Groups

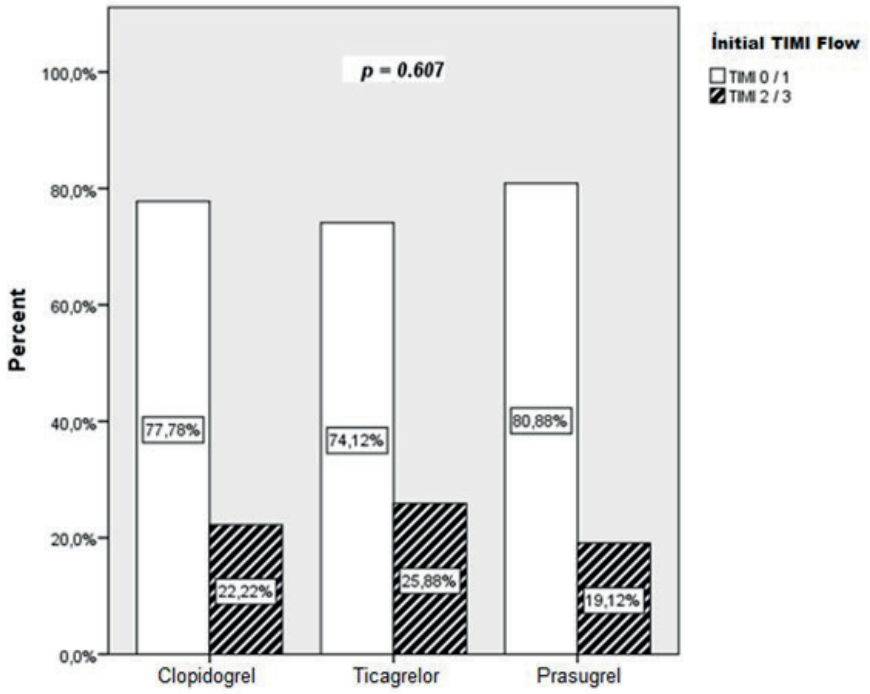
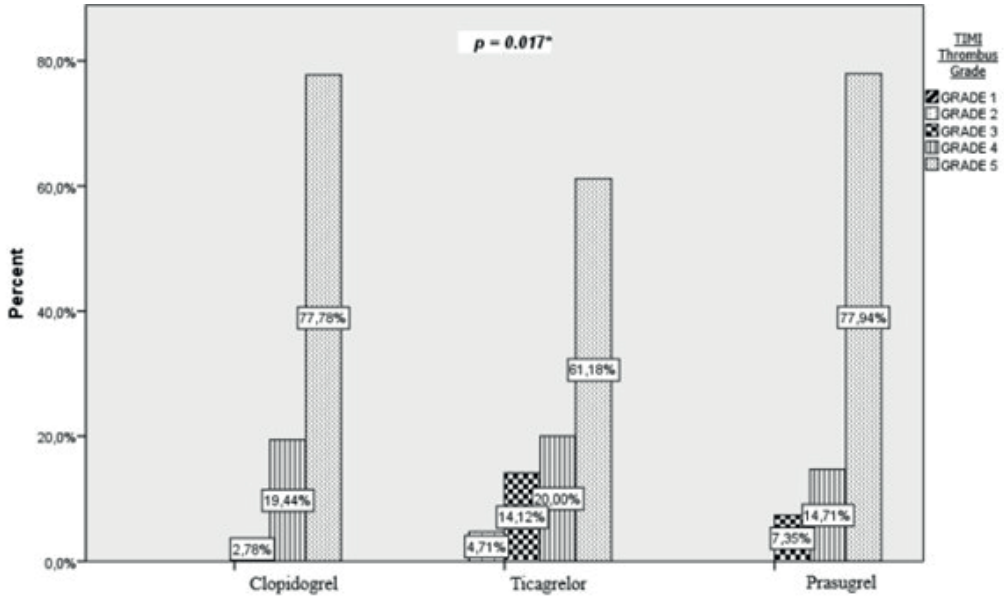


Figure 2.

Thrombus Scores and Grades in the Study Groups



*Grade 5: Lower in the ticagrelor group compared to the other groups
*Grade 3 : Clopidogrel group has a lower incidence of Grade 3 thrombus compared to the ticagrelor group and is similar to the prasugrel group.

4. DISCUSSION

In our study, the pre-procedural thrombus burden in the ticagrelor group was significantly lower than in the other groups. This finding is believed to be related to the early onset of antiplatelet efficacy of ticagrelor. In our study, an evaluation has been made in terms of preoperative thrombus burden, and this is the first study conducted on this subject. Since our study was conducted in 2018, emergency department administered P2Y12 inhibitors according to the 2017 ESC STEMI guidelines.[7] However, the 2023 ESC Acute Coronary Syndrome guidelines have reclassified P2Y12 inhibitor loading as Class 2b.[3]

Ticagrelor inhibits adenosine uptake from red blood cells and increases extracellular adenosine, leading to platelet aggregation inhibition and vasodilation.[8] In healthy volunteers, ticagrelor reached maximum plasma concentration within approximately 1.5 hours after the loading dose.[9] In stable coronary artery patients, after 180 mg of ticagrelor loading, significant antiplatelet effects were achieved within the first 30 minutes, and a nearly complete antiplatelet effect (>80%) was observed within 1 hour.[10] In our study, the door-to-cross time was 38.0 (31.0-48.0) minutes in the ticagrelor group, similar to the other groups, indicating that ticagrelor's early-onset antiplatelet effect reduced thrombus burden more compared to other preparations.

The PLATO study demonstrated the superiority of ticagrelor over clopidogrel in platelet inhibition.[11] Another study comparing ticagrelor and prasugrel in STEMI patients found that ticagrelor had superior platelet inhibition after 5 days.[12] As an active drug, Ticagrelor provides early platelet inhibition compared to prasugrel because of its mechanism.[13] Significant platelet inhibition was reported in the PLATO PLATELET sub-study in 4/5 of STEMI patients and 7/7 of NSTEMI patients within 1 hour after 180 mg of ticagrelor loading.[14] Moreover, in a meta-analysis of 14 studies involving 1822 patients evaluating platelet inhibition, ticagrelor had higher platelet inhibition than prasugrel (High on-treatment platelet reactivity (HTPR) rates were 1.5% for ticagrelor and 9.8% for prasugrel ($p<0.001$)).[15] This earlier onset of platelet inhibition with ticagrelor, compared to clopidogrel and prasugrel, is consistent with the results of our study favoring ticagrelor in terms of thrombus score.

The ATLANTIC study, published in 2014, is the only randomized controlled trial conducted regarding the timing of P2Y12 inhibitors.[16] In this study, ticagrelor was compared in STEMI patients by administering it pre-hospital and in the catheter laboratory. No significant differences were found in pre-procedural TIMI 3 flow presence, ST-segment resolution, or composite endpoints. Major and minor bleedings were similar in both arms. However, when other endpoints of the study were examined, stent thrombosis was significantly less in the pre-hospital group ($p=0.008$). Furthermore, limitations of the study mentioned delayed absorption due to morphine intake, and a significant difference in EKG-based primary endpoint was observed in patients not taking morphine. The study did not include an angiographic evaluation of thrombus burden. In our study, although there was no significant difference among the groups in terms of TIMI flow rates, the favorable difference in thrombus score in favor of ticagrelor may be associated with its early onset effects.

The ISAR-REACT 5 study is the trial comparing ticagrelor and prasugrel in patients with acute coronary syndrome.[17] In this study, the composite of death from cardiovascular causes, myocardial infarction, or stroke occurred in 161 out of 2012 patients (8.1%) in the ticagrelor group and 124 out of 2006 patients (6.3%) in the prasugrel

group (hazard ratio, 1.32; 95% CI, 1.04 to 1.66). Angiographic data were not examined in the study, and one-year clinical outcomes were evaluated. According to the results of this study, despite the early onset of antiplatelet effect with ticagrelor, prasugrel is more effective in the long term.

LIMITATIONS

Our study was limited by its single-center design and a relatively small number of patients, which may have impacted the evaluation of clinical outcomes. Additionally, the study was retrospective and non-randomized and the results of TIMI grade flow and TIMI thrombus assessment conducted by operators could differ from evaluations done by a core lab, which could introduce bias.

CONCLUSION

In our study, the thrombus burden before the procedure was significantly lower in the ticagrelor group compared to the other groups, while no significant difference was observed between the prasugrel and clopidogrel groups. This finding suggests that the early onset of ticagrelor's antiplatelet effect may contribute to its effectiveness in reducing thrombus burden. However, further randomized and prospective studies are needed to confirm these findings.

Financial Support

No financial support was received from any institution for the study.

Conflict of Interest

There is no conflict of interest between the authors.

Author contribution

All authors contributed to substantial contributions to conception and design (EE,MBV), or acquisition of data (DY,EE), or analysis and interpretation of data (MBV-DY), drafting the article or revising it critically for important intellectual content (EE-MBV) and final approval of the version to be published.

Ethical Statement

The study was performed in accordance with the ethical considerations of the Helsinki Declarations. The study was approved by the ethics committee of Sakarya University, with decision number 71522473/050.01.04/77, dated September 18, 2019.

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Research Article

Can Tumor Recurrence Be Predicted by Magnetic Resonance Imaging Findings Before Microwave Ablation in Patients with Hepatocellular Carcinoma?

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Objective: Hepatocellular carcinoma (HCC) is a common cancer. The primary treatment is surgery or liver transplantation. Percutaneous ablation techniques constitute the primary treatment in patients who are not suitable for surgery. Although it gives successful results, some studies report a recurrence rate of up to 50%. This study aimed to obtain an idea about the possibility of possible recurrence by evaluating the lesion characteristics in the pre-procedural MRI images of patients with and without recurrence.

Methods: Forty-eight patients who underwent microwave ablation for HCC in our center between 2018 and 2021 were included in the study. Lesion size, presence of peripheral enhancement, arterial contrast enhancement, and T2 signal characteristics were evaluated on pre-procedural MRI. Subsequently, the relationship of these features with tumor recurrence was evaluated.

Results: The risk of recurrence was higher in patients with lesion sizes with larger than 3 cm diameter and in lesions showing peripheral contrast enhancement (p= 0.036 and p= 0.021, respectively).

Conclusion: Close follow-up will be beneficial in HCCs larger than 3 cm and showing peripheral enhancement since there is a high probability of recurrence after ablation.

Keywords: Hepatocellular carcinoma, Microwave ablation, MRI

1. INTRODUCTION

Hepatocellular carcinoma (HCC) is one of the most common cancers in our country and around the world. It is the most common subtype of primary liver cancer and accounts for 75% of all primary liver cancers. Although it ranks fifth among the most common cancers, it ranks third in cancer-related deaths.[1] Chronic liver disease is the most common cause of HCC. Hepatitis B and C viruses are the most common factors causing chronic liver disease.[2] Other etiological factors are alcohol dependency, non-alcoholic fatty liver disease (NAFLD), obesity, and smoking. Despite the increasing technological developments in diagnosis and treatment options, the desired level of reduction in HCC-related mortality has not yet been achieved. [3]

Barcelona Clinic Liver Cancer (BCLC) staging is the most common staging method used in the management of HCC patients. There are many treatment options for HCC which include surgical resection, percutaneous or laparoscopic ablation, chemoembolization, radioembolization, radiotherapy, systemic tyrosine kinase therapy, systemic immunotherapy, and liver transplantation. Treatment preference varies depending on the location, number, and size of the tumor and the stage of the patient's chronic liver disease, if any. According to the guidelines, surgery or transplantation is still the first option for tumors that are smaller than 3 cm in size and located suitable for resection. However, percutaneous tumor ablation is being used effectively in increasingly more centers as a minimally

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invasive method in patients who cannot tolerate surgery due to comorbidities or in lesions whose location is not suitable for surgery. [4,5]

Currently, radiofrequency ablation and microwave ablation are used as thermal ablation techniques. Both methods are based on creating coagulation necrosis by creating a temperature increase in a determined volume in the target tissue. In suitable patients, ablation therapy is one of the primary treatment methods and offers the chance of curative treatment.[5] However, since the risk of local recurrence is relatively high in these patients, predicting recurrence before the procedure is essential for patient selection and management.

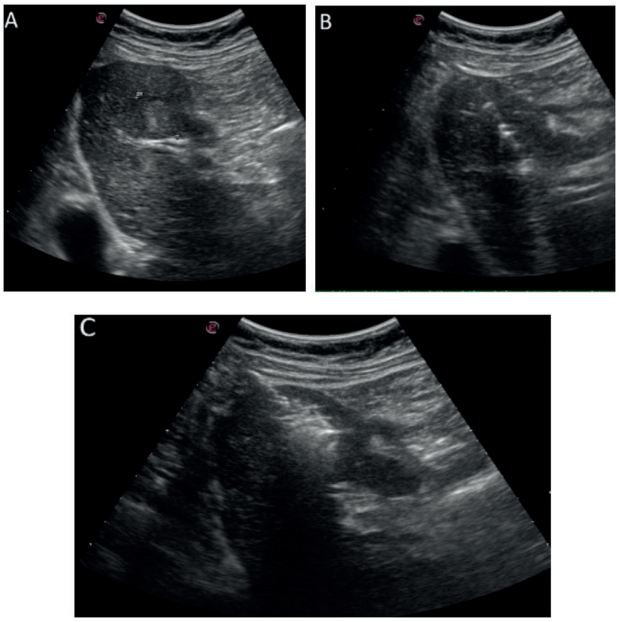
Our aim in this study is to evaluate the potential role of the lesion's pre-procedural magnetic resonance imaging (MRI) features in predicting local recurrence in HCC patients undergoing microwave ablation therapy (MWA).

2. MATERIAL AND METHODS

Ethical approval was obtained from the Local Ethics Committee of the Faculty of Medicine, with the approval number 21457-214. Forty-eight patients who underwent microwave ablation for HCC in our center between 2018 and 2021 were included in the study. The diagnosis of HCC was made by radiographic appearance and high AFP level in cross-sectional imaging using LI-RADS criteria.[6] All procedures were performed under sedoanalgesia and ultrasonography (US) guidance. After the patient was positioned appropriately, antennas of appropriate diameter and length were placed in the center of the lesion under US guidance. As microwave antenna diameter, 14-16-17 Gauge antennas were used, taking into account the location and size of the lesion. Again, ablation was performed at appropriate electrical power (watts) and duration depending on the size and location of the lesion (Figure 1). In cases where a sufficient and homogeneous ablation zone could not be obtained, the antenna was repositioned, and the procedure was continued. The ablation area was visualized simultaneously with the US, and all lesions remained within the ablation zone. Afterward, tract ablation was performed, the antennas were removed, and the procedure was terminated. Twenty-four hours after the procedure, the ablation zone was evaluated with triphasic contrast-enhanced CT, and it was confirmed that the ablation zone covered the tumoral lesion and did not show significant contrast enhancement in all patients.

Figure 1.

A) A mass in the right lobe of the liver (HCC). B-C) The lesion was placed with an antenna, and ablation was performed to cover the entire lesion.



Dynamic contrast-enhanced MRI images and serum AFP values of all patients at least one month before the procedure, in the 1st month, in the 3rd month, and in the 6th month were obtained from the hospital data system. Lesion size, presence of corona enhancement, arterial enhancement, and T2 signal characteristics were evaluated on

pre-procedural MRI, and the differences between recurrent and non-recurrent lesions were evaluated. What is meant by peripheral contrast enhancement? Regardless of its shape, it was defined as parenchymal enhancement observed outside the tumor border in the arterial phase. It became isointense with the background liver parenchyma in subsequent dynamic phase images. Lesion dimensions were measured in three planes in T2 ve contrast-enhanced series, and the most extensive length was defined as the lesion diameter. The MRI sequence that best showed the ablation border was used for border measurements.

MedCalc (version 12, Ostend, Belgium) was used for statistical analysis. Descriptive statistics are given as means. The independent sample test was used to compare continuous variables with normal distribution, and the Mann-Whitney U test was used for data that did not comply with the normal distribution, according to the Kolmogorov-Smirnov test. Kaplan-Meier analysis was used to evaluate primary patency. A value of $P<0.05$ was considered statistically significant.

3. RESULTS

Forty-eight patients were included in the study. All patients had a single lesion. The average age of the patients was 61.1± 10.8 years. Thirty patients were male (62.5%), and 18 were female (37.5%). The majority (83.3%) of the patients were cirrhotic. The most common etiology was viral hepatitis (hepatitis B 62.5%, hepatitis C 12.5%, both hepatitis B and C 4.2%). The patients were mostly Child-Pugh class A (62.5%). The average AFP of the patients was 211.7 ± 101.5. 16G antennas were used in 23 patients, 17G in 18 patients, and 14G in 7 patients, and total ablation times varied according to lesion size and antenna diameter.

Technical success rate was 100%. The most common complication after the procedure was abdominal pain which developed in 29 patients (60.4%). It was ultimately resolved within 24 hours with analgesic support. In 1 patient, a 2-unit hemoglobin drop occurred after the procedure. After erythrocyte suspension and fluid support, hemoglobin levels were stabilized.

In follow-up MRI images, there was local recurrence in 18 patients (37.5%). The ablation zone and its adjacent foci showing contrast enhancement in the arterial phase and wash-out in the venous phase were evaluated in favor of relapse in 3rd-month control MRI (Figure 2). There was no recurrence in 30 patients (62.5%) (Table 1). There was a statistically significant difference between the two groups in terms of tumor size (≥ 3cm) and peripheral contrast enhancement (p 0.036 and p 0.021, respectively). Notably, lesions with recurrence were larger and showed significant peripheral contrast enhancement in the pre-procedural MRI. When arterial contrast enhancement and T2 signal characteristics were evaluated, no statistically significant difference was observed between the groups (p 0.744 and p 0.149, respectively).

Figure 2.

In the pre-ablation MRI examination, a 35 mm diameter peripheral contrast-enhancing lesion in the liver in the arterial phase (A) shows washout in the venous phase (B). In the post-ablation control MRI images, nodular contrast enhancement in the ablation zone in the arterial phase (C) and washout in the venous phase (D) were interpreted in favor of recurrence.

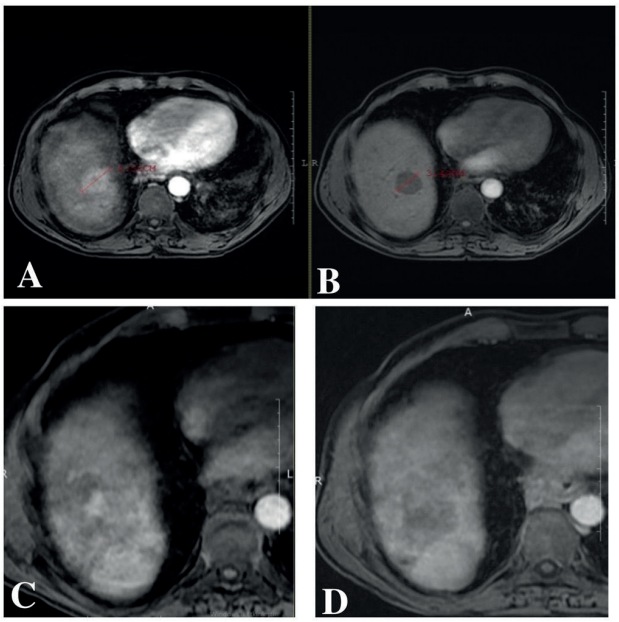


Table 1.

Comparison of parameters on pre-procedural MRI in the groups with and without local recurrences

	With Local Tumor Recurrence n=18 (%37,5)	**Without Local Tumor Recurrence n=30 (%62,5)**	**P**
Age(mean)	63.5±10	59.8±13.4	0.292
Gender(F/M)	6/12	12/18	0.422
Tumor size (≥ 3 cm)	%50	%25	**0.036**
Periferal Enhancement	%83.3	%30	**0.021**
Contrast Enhancement in Arterial Phase	%83.3	%80	0.744
T2 Hyperintensity	%66.6	%60	0.149

4. DISCUSSION

Our study has shown that the probability of recurrence is higher if the ablated lesion is larger than three centimeters and shows peripheral contrast enhancement on preoperative MRI images.

Percutaneous ablation is an effective method used to keep the disease under control until the disease is suitable for surgical resection or liver transplantation or until transplant preparations are made.[7] The most commonly used techniques nowadays are radiofrequency ablation (RFA) and (MWA.) Both methods have their strengths and weaknesses. Microwave ablation offers technical advantages over RFA, including predictable ablation zones, faster ablation times, and insensitivity to current and thermal heat sinks within the ablation area.[8] We included only cases treated with MWA in our study to eliminate technique-related differences.

MRI provides better contrast between soft tissues and higher spatial resolution with higher sensitivity than CT. Recent advances in MRI have made it possible to image the liver with a high spatial resolution during a single breath-hold. In addition, the fact that the patient is not exposed to X-rays is the basis for its increased use. However, CT, with its fast acquisition feature, still constitutes a good alternative in the follow-up of patients who cannot hold their breath and cannot comply with commands.[9,10]

30-55% recurrence rates have been reported in patients treated with thermal ablation.[9,11] When comparing hepatic lesions, it is noteworthy that the recurrence rate is higher in HCCs than in metastases and other lesions.[11] Our study aimed to determine whether pre-procedural MR imaging features of the lesions could effectively predict recurrence.

The study by Chu et al. showed that the probability of recurrence was higher in tumors larger than 2 cm.[12] In a recent study, Dong et al. also showed that the likelihood of recurrence increases as tumor size increases.[13] When the MRI images were evaluated in our study, the tumor was larger than 3cm in 9 (50%) relapsed patients. It was observed that this rate remained at 20% in patients without recurrence (p 0.036). Similar to the literature, it has been shown that the likelihood of recurrence increases as tumor size increases.

Another parameter we examined in our study was peripheral contrast enhancement. Peripheral contrast enhancement was observed in 15 (83.3%) of 18 patients with recurrence. In patients without recurrence, this rate was determined to be 30%, and it was shown that there was a statistically significant difference (p:0.021). It was noted that the findings were compatible with the literature. [14,15]

Arterial enhancement is a common finding in HCCs. Rapid washout in the early venous phase is characteristic of the diagnosis of HCC. Arterial contrast enhancement assessed in the T1 phase of MRI was detected in more than 80% of the patients in both groups. It was not statistically significant in predicting recurrence (p 0.744). When peripheral enhancement and arterial enhancement were compared, it can be speculated that peripheral-enhancing lesions may be more invasive in spreading to the adjacent parenchyma, which may increase the risk of recurrence.

When patient age, gender, and T2 hyperintensity were evaluated, no statistically significant difference was found in predicting the development of recurrence between the two groups.

Our study has many limitations. First of all, it is a single-center study and sample size. Another limitation is that patients were not grouped according to HCC subgroups.

5. CONCLUSION

In conclusion, tumor size and peripheral enhancement on pre-procedural MRI can be used as easily accessible and helpful parameters to predict the local recurrence risk of HCCs before MWA ablation.

Ethical Approval

The study was approved by the Ethics Committee of the Sakarya University Faculty of Medicine, (Number:21457-214 Date: 30.03.2021), and performed by Helsinki Declaration.

Conflict of Interest

The authors declare that they have no conflict of interest.

Informed Consent

Informed consent was obtained from all patients before the procedure.

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Author Contribution Statement

Concept/Design/Analysis/Writing: MÖ

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Research Article

Comparison of Surgery and Stent Application in the Treatment of Tracheal Stenosis

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Introduction: Tracheal stenosis is a pathology that is gradually increasing and requires intervention. Surgical treatment has been used as the gold standard for years, but it is difficult to decide on surgery in patients with comorbidities and high surgical risk. We aimed to evaluate the data of both treatment methods applied in our center.

Materials: Our study was designed as retrospective and observational. The data of 61 patients who underwent resection & reconstruction and Methods or stent due to tracheal stenosis in our center between May 2002 - May 2019 were analyzed. Tracheal stenosis classifications, etiology, demography and treatment data, imaging measurements, and a satisfaction survey were used.

Results: 53 patients who met the inclusion criteria were studied. Both treatment methods were found to be effective in reducing the stenosis and regressing the complaints. The average age in the stent group was higher than in the surgery group. As the intensive care period in the intubated state increases; Severe stenosis and deterioration of cartilage integrity increased. The satisfaction score of the surgery group was higher than the stent group.

Conclusion: Both treatment methods are effective in improving respiratory functions and quality of life. The lesion was located higher in the surgical group and was longer in the stent group. Hospitalization times were longer in patients with severe stenosis and antibiotic changes were more frequent in patients using steroids. No statistically significant difference was found.

Keywords: Trachea, Stenosis, Resection, Reconstruction, Stent implantation

1. INTRODUCTION

Tracheal stenosis is an important pathology that we encounter more frequently in recent years and negatively affects the quality of life. Among the benign causes, stenosis that develops after intubation is the most common one.[1] In addition trauma, various infections and benign tumors can be detected, but sometimes the cause cannot be determined. Cases of tracheal stenosis are increasing as a result of increasing human lifespan, increasing number and use of intensive care and advanced life support units.[2]

The main reason is that the cuff of the intubation tube is inflated with more pressure than it should be and this situation continues for a long time due to prolonged intubation times. Thus, submucosal blood flow decreases, resulting in fibrotic stenosis. If the stenosis narrows the lumen by more than 50%, stridor and exertional dyspnea occur.[3] Various endoluminal treatment methods can be chosen to reduce airway stenosis in patients who are not suitable for surgery or in patients with irresectable pathologies. Nowadays, these treatments are combined to increase their effectiveness.

Tracheal stenosis occurs in 0.6-21% after intubation and tracheostomy, and these become

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clinically significant stenosis in less than 1% of patients.[4 5]

The aim of this study is to investigate the effectiveness of both accepted treatments and to assist in the selection and management of treatment in these life-threatening patients.

2. MATERIAL AND METHOD

The Declaration of Helsinki was complied with throughout the entire study process. Our study was approved to conduct scientific research with the approval of the Scientific Board of the University of Health Sciences and the academic board of our hospital. (See Supplementary File-1)

Our study was designed as a retrospective and observational study. Data of patients who underwent tracheal stent or tracheal resection and reconstruction between May 2002 and May 2019 were examined in the hospital medical database and our clinic bronchoscopy reports. 53 Patients who met the inclusion criteria were included in the study. After examining the data of all patients, surgery and stent patients were examined and compared separately.

In tracheal intervention evaluations reported to date, the number of cases was low or multicenter studies were observed. Surgical and endoluminal complications are important in patient follow-up, and other modalities should be applied in combination when necessary in patients who cannot undergo surgery. In this study, we interpreted the interventions preferred in our clinic with their long-term results. We conducted our multivariate analyzes based on patient age, day of ICU admission, postintubation or posttraumatic stenosis, duration of being intubated , DM, anemia, steroid usage (intravenous and/or inhaler), leukocytosis and antibiotherapy revision, cardiac comorbidity, tracheostomy status, cartilage structure integrity. We applied it on Brichet Myer and McCaffrey classifications.

Patient selection and definitions

Inclusion Criteria

- Intervention (surgery or stent) due to tracheal stenosis in all ages (14-83)
- Access of complete anamnesis, thoracic and tracheal imaging, bronchoscopy and laboratory results in the hospital database

Exclusion Criteria

- Insufficient database of patient who underwent these treatments
- Other procedures in stenosis treatment (balloon dilation, dilatation with rigid bronchoscope)

Limitations of the study include being a single center, limited data access before 2008, patients who stopped follow-up early, and the low number of patients in the stent group.

Operation technique

Silicone stents are placed with a rigid bronchoscope under general anesthesia. The tip of the rigid bronchoscope is placed proximal to stenosis. While stent is being pushed, rigid bronchoscope is kept stationary and the stent is ensured to fit into stenosis area. Position is corrected with forceps. If stent does not fully expand, dilatation is performed with balloons or smaller rigid tubes. Diameter, length and localization of stenosis are determined by tomography and bronchoscopy examinations.

In cases of upper tracheal stenosis, a collar incision is preferred. Control with FOB is made through intubation tube and localization of stenosis is determined. The tube is withdrawn to proximal of stenosis, tracheal lumen is opened with a straight incision distal to stenosis, and distal intubation is performed from surgical area and connected to new sterile ventilation set. Posterior membrane is sutured with continuous 4-0 absorbable sutures,

and tracheal cartilage is sutured with 3-0 or 4-0 absorbable sutures, passing 3-4 mm away from anastomosis line. After suturing, distal intubation tube is withdrawn and orotracheal tube is being pushed without traumatizing the anastomosis, under supervision of surgeon. To reduce tension in anastomosis line, patients chin is sutured to the anterior chest wall, while neck is flexed.[6]

Postoperative follow-up

48 hours after operation, stent site is confirmed and cleaned by control bronchoscopy. Patients should be assisted with nebulizer and importance of humidification should be explained.[7] Risk of contamination from oral flora should not be forgotten and this risk is higher in patients using steroids or patients in DM.[8]

Statistical analysis

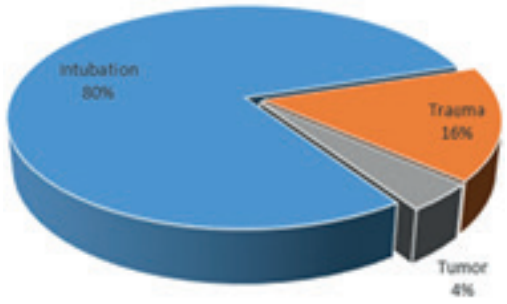
IBM SPSS Statistics 22 software was used for statistical analysis. In this study, nominal variables were given as numbers and percentages, and continuous variables were given as mean and standard deviation. In addition to descriptive statistics, Chi-Square test was used for nominal values when comparing groups, Fisher Exact Chi-Square test was used if expected frequencies were below 5, independent sample t-test was used to compare parametric data, and Mann Whitney U test was used to compare nonparametric data. $P < 0.05$ was accepted for significance in the analyses.

3. RESULTS

40 male and 13 female patients who underwent tracheal resection & reconstruction or stenting were included. There is no significant difference in demographic data for the stent and surgery groups. Resection and reconstruction was performed in 40 patients, and tracheal stent was applied in 13 patients. We applied tracheal stent to one patient who underwent chemoradiotherapy due to primary tracheal tumor. As result of etiological research, stenosis was detected post-intubation in 39 patients (79.6%), post-trauma in 8 patients (16.3%), and due to tumor in 2 patients (Graphic 1).

Graphic 1.

Causes of Tracheal Stenosis in Patients



Considering all patients, average age was determined as 48.45±15.86. Average age of patients who underwent surgery was 47.11±14.23 years, and for stenting group is 53.54±19.62 years. It was determined that surgery was performed in 7 of 8 patients (87.5%) who developed post-traumatic stenosis ($p = 0.212$). In patients who underwent surgery (n:40), cartilage integrity was disrupted in 60.6% of patients, and in those who underwent stenting (n:13), this rate was similar (61.5%) (Table 1).

It was observed that 25 (96.1%) of patients (n: 26) who underwent surgery after intensive care follow-up had prolonged intubation. This rate was 55.5% in patients who underwent stenting after intensive care follow-up ($p=0.003$).

When surgery and stent group patients were examined separately; it was determined that antibiotics were changed in 75% of patients given steroids. This rate is 57.9% in patients who are not being given steroids; it can be interpreted as increased antibiotic change rates in tracheal stenosis patients who are being given steroids, but exact difference could not be shown statistically due to limited number of patients ($p = 0.217$) (Table 1).

According to the Brichet classification, 80.6% of surgical patients have complex stenosis; This rate was found to be 100% in patients who received stents. 97% of surgical patients fall into McCaffrey stage 2, 3 and 97% fall into Myer stage 2, 3. When the intensive care unit stay times of patients with preserved and impaired cartilage structure integrity were compared (16.81±17.45, 18.68±19.92); It was found to be longer in patients with damaged cartilage structure, with a difference of approximately 2 days (p = 0.747) (Table 1).

Table 1.

General Statistical Values

	Surgery (n=40)	Stent (n=13)	p
Age	47.11±14.23	53.54±19.62	0.212
Gender (M/F)	29 (72.5%)/ 11	11 (84.6%)/2	0.480
DM	5 (15.2%)	3 (23.1%)	0.669
Obesity	4 (12.9%)	2 (16.7%)	1.000
Anemia	13 (37.1%)	5 (41.7%)	0.781
Stenosis Etiology			
Intubation	29 (78.4%)	10 (83.3%)	0.508
Trauma	7 (18.9%)	1 (8.3%)	
Tumor	1 (2.7%)	1 (8.3%)	
Impaired Cartilage	20 (60.6%)	8 (61.5%)	0.953
Steroid Usage (+)	19 (57.6%)	9 (69.2%)	0.522
Steroid Usage (-)	14 (42.4%)	4 (30.8%)	0.460
Steroid Usage - IV	4 (12.1%)	4 (30.8%)	
Steroid Usage - Inhaler	5 (15.2%)	1 (7.7%)	
Steroid Usage - IV&Inh	10 (30.3%)	4 (30.8%)	
ICU in patients history	26 (83.9%)	9 (69.2%)	0.414
ICU (day)	19.06±18.61	14.92±17.91	0.422
Prolonged Intubation	25 (67.6%)	5 (38.5%)	0.065
Leukocytosis & Changing Antibiotic	28 (75.7%)	8 (61.5%)	0.329
Stenotic Diameter	6.28±2.20	6.69±2.96	0.970
McCaffrey			
1	0 (0%)	0 (0%)	0.269
2	16 (48.5%)	3 (25%)	
3	16 (48.5%)	9 (75%)	
4	1 (3%)	0 (0%)	
Brichet			
Simple	7 (19.4%)	0 (0%)	0.167
Complex	29 (80.6%)	13 (100%)	
Myer			
1	1 (3.1%)	1 (7.7%)	0.239
2	21 (65.6%)	5 (38.5%)	
3	10 (31.3%)	7 (53.8%)	

According to the Brichet classification, 80.6% of surgical patients have complex stenosis; This rate was found to be 100% in patients who received stents. 97% of surgical patients fall into McCaffrey stage 2, 3 and 97% fall into Myer stage 2, 3. When the intensive care unit stay times of patients with preserved and impaired cartilage structure integrity were compared (16.81±17.45, 18.68±19.92); It was found to be longer in patients with damaged cartilage structure, with a difference of approximately 2 days (p = 0.747) (Table 2).

When patients complying with Myer classification 2 and 3 were compared in terms of ICU hospitalization duration, a significant difference was detected in ICU hospitalization duration for stent, surgery and all patients.

Table 2.

ICU stay duration (days) according to Myer classification

	Myer 2	Myer 3	P
All patients	15.75±16.49	22.31±20.68	0.368
Surgery	18.58±17.26	27.38±22.17	0.287
Stenting	5.00±6.285	18.43±20.35	0.246

In the preoperative period, 8 (15%) of the patients had a tracheostomy cannula, 2 had a tracheal tumor, and 1 patient had a lung lesion causing tracheal stenosis. The distance of the lesions detected in the bronchoscopic examination and tomographic examinations performed on all patients to the vocal cords is shown below (Table 3).

Table 3.

Distance of the stenosis from the vocal cords and average stenotic length (millimeters)

	Surgery n=27	Stenting n=11	P
Distance to vocal cords	24.48 ±9.00	29.18 ± 5.44	0.071
Stenotic length	16.52 ± 9.55	25.64 ± 24.43	0.339

The distance between the vocal cord and the stenotic area in the patients was measured as 13-45 mm. No significant difference was found between the distance in surgical patients (24.48 ± 9.00) and the distance in stenting patients (29.18 ± 5.44) (p = 0.071). Surgical resection was performed in 40 patients, and the resected materials measured between 15 mm and 50 mm in pathological evaluation, with an average of 27.02 mm. The stenotic

segment length in the stent group (25.64 ± 24.43 mm) was found to be longer than the surgery patients (16.52 ± 9.55 mm) (p = 0.339) (Table 3).

In our study, the complication rate after surgery was found to be 22.5%, and the complication rate after stent procedure was 53.6%. Restenosis was observed in 7 of 9 patients who had post-surgical complications, and 5 of these patients underwent dilatation with a rigid bronchoscope and 2 underwent stenting. Temporary unidirectional vocal cord paralysis was detected in 1 patient, and esophageal stenosis was detected in a patient operated for TEF. Of the 7 patients who had complications after the stent procedure, stenosis was detected in 5 due to newly formed hyperplastic granulation tissue in the proximal or distal part of the stent, and migration was detected in 2. In 1 of 5 patients with stenosis, coagulum was observed in the stent lumen and was removed (Table 4). A patient who developed restenosis after being operated on at an external center underwent resection, and a Montgomery T-tube was placed in a patient who had a tracheostomy at the time of admission.

Table 4.

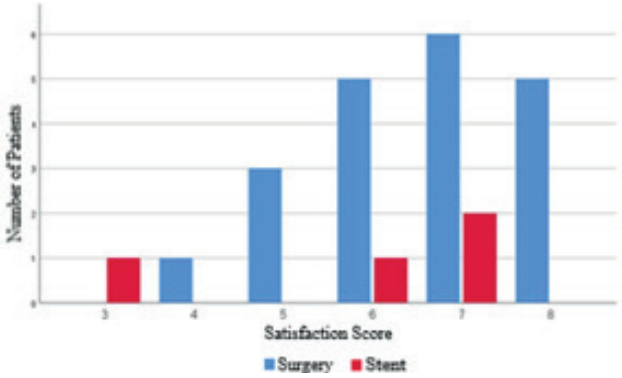
List of Complications

List of Complications
Post Surgery Complications
– Stenosis in anastomosis line (7)
– Temporary unilateral vocal cord paralysis (1)
– Esophageal stenosis (1)
Post Stenting Complications
– Hyperplastic granulation tissue in proximal and distal of the stent (5)
– Migration (2)
– Coagulum in the stent

A satisfaction survey consisting of 8 questions was prepared for all patients to be asked over the phone. Patients were asked about recurrence, rehospitalization, wheezing or stridor, shortness of breath that wakes them up from sleep, post-discharge medication use, post-procedure effort capacity, post-treatment compliance and psychosocial well-being, and a total of 8-point patient satisfaction survey was administered, with each question receiving 1 point. With the data taken from the hospital database, 29 interviews were made and 5 exitus were detected in the patients reached. The satisfaction average of the remaining 24 patients was calculated as 6.41 out of 8, 6.55 for patients who underwent surgery and 5.75 for patients who underwent stenting (p=0.477) (Graph 2).

Graph 2.

Satisfaction Survey Results



One patient who underwent surgery died due to hypertensive pulmonary edema and systemic infection (2.5%), and a terminal cancer patient who received a stent for palliation died within 30 days postoperatively due to immobilization and pneumonia (7.6%).

4. DISCUSSION

According to the Brichet classification, 80.6% of surgical patients have complex stenosis; This rate was found to be 100% in patients who received stents. 97% of surgical patients fall into McCaffrey stage 2, 3 and 97% fall into Myer stage 2, 3. When the intensive care unit stay times of patients with preserved and impaired cartilage structure

integrity were compared; It was found to be longer in patients with damaged cartilage structure, with a difference of approximately 2 days (p = 0.747) (Table 2).

When patients complying with Myer classification 2 and 3 were compared in terms of ICU hospitalization days, a significant difference was detected in ICU hospitalization times for stent, surgery and all patients. (Table 2).

When the surgery and stent group patients were examined separately; It was determined that antibiotics were changed in 75% of patients given steroids. This rate is 57.9% in patients not given steroids; It can be interpreted as increased antibiotic change rates in tracheal stenosis patients given steroids, but the current difference could not be shown statistically due to the limited number of patients (p = 0.217) (Table 1).

In another study with a large series, the average age was measured as 47.4 years, with an age range of 4-86 years.[9,10] In our study, the average age was found to be 48.4, with 16.9% aged >65 and 3.7% aged >80 years. The average age of stent-treated patients was (53.5) higher than surgical patients (47.1) (Table 1).

The first case series regarding tracheal damage after intubation was published in 1995.[11] The incidence of tracheal damage after endotracheal intubation is 5-19 per 10000.[12] There are publications indicating the incidence of tracheal laceration after double-lumen intubation (12/10000).[13] In the publication of Spaggiari et al., the incidence of damage as a result of 800 double-lumen intubations performed in 4 years was 0.37%.[14] Özdemir et al. Of the 42 patients treated for benign stenosis, 23 (54.7%) underwent bronchoscopic intervention (laser, dilation, cryotherapy or stent placement), and 19 (45.3%) underwent surgery, and 6-month results showed success rates of 43.4% and 94.7%.[15] We performed surgery on 74% of our patients and stents on 16%, and achieved similar success results.

In a study published in 1996 on complications after tracheal stent, 17.5% migration, 6.3% granulation, and 6.3% mucostasis were found.[16] In a study dated 2016 investigating the results of bronchoscopic treatment; No complications were observed after treatment for simple tracheal stenosis, except for 16% mucostasis; In complex stenoses, 41% migration, 33.1% granulation at the proximal or distal end, and 43% mucostasis have been reported.[17] In our study, when the patients who received stents were examined, we found 61.5% complex stenosis. When our complication rate after stent application (53.6%) was compared with the literature, no significant difference was detected.

Several risk factors have been shown to increase complication rates. These; reoperation, DM, long resections (>4 cm), laryngotracheal resections, age younger than 17 and the presence of preoperative tracheostomy. In the study published by Marulli et al. in 2007, the total anastomotic complication rate was 8.1% and the separation rate was 5.4%.[18] In Grillo's publication of 503 patients, post-surgical morbidity was 32%, and the most common complications were granulation tissue formation (9.7%), wound infection (3%), glottic dysfunction (2.2%), dehiscence and restenosis (5.7%).[1] In our study, we found the postoperative morbidity rate to be 22.5%. We detected stenosis in the anastomosis line in 17.5%, temporary unidirectional vocal cord paralysis in 2.5%, and esophageal stenosis in 2.5%.

Segmental tracheal resection is the most preferred method in the treatment of postintubation stenosis. In the nonoperative techniques (endoscopic dilatation and stent placement) we applied in 13 cases in our clinic; We found that patient

satisfaction was lower compared to patients who underwent surgery (surgery 6.55, stent 5.75). It was noted that the stent group was in the older age group and required frequent rehospitalization.

The segment length to be removed in tracheal surgery is one of the major problems. As the length increases, the risk of tension and complications in the anastomosis line increases. When the resection length is examined in our study, the average length is 27.02 millimeters (between 15-50 mm). In Grillo et al.'s 1995 study, resection lengths were between 10-75 mm, and in Uluşan et al.'s 2017 study, the average resection length was 25 mm.[1,19] Ashiku et al. They examined 73 patients between 1971 and 2002 and the average resection length was found to be 26 mm (10-50 mm).[20] When compared with current values, it was found compatible with our study data.

Another controversial issue is steroid usage, which negatively affects anastomotic healing. When the effect of steroids on intensive care unit stays was investigated, hospitalization times were observed to be longer in the group using steroids for all patients and surgical patients; When looking at patients who received stents, this period was found to be shorter for those using steroids. It should not be forgotten that the choice of steroid may affect the duration of stay, and it should be used considering its effect on surgical site healing. In our study, it was determined that antibiotics were changed in 21 of 28 patients (75%) who were given steroids, and this rate was 57.9% in patients who were not given steroids; It can be interpreted as an increased antibiotic revision rate in tracheal stenosis patients given steroids, but it could not be shown statistically due to the limited number of patients.

In the literature reviews, postoperative morbidity was found to be 5-15%, mortality was 1-5%, and morbidity was found to be 3% in experienced centers.[1, 21, 22] In our study, we found the post-surgical complication rate to be 22.5% and found it to be compatible with the literature.

During the study, we experienced difficulties such as the study being retrospective and the number of cases not being sufficient to allow detailed analysis. Due to the characteristics of our center, the majority of patients with cardiac comorbidities were admitted. In our study investigating tracheal stenosis treatment preferences and results, we found that the most important factor was the surgeon's experience and appropriate patient selection. Etiology, ICU stay, DM, anemia, steroid usage, leukocytosis and antibiotic therapy, form and localization of stenosis, cartilage structure integrity and surgical techniques are important factors that affect the research but there is no significant values that would affect our preference orientation.

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Meeting presentation

This manuscript has not been published anywhere before

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Research Article

Effectiveness of ACLS Training Programs: A Comparative Study of Pre- and Post-Test Results Across Health Professional Groups

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Objective: The primary aims of our study were to evaluate the fundamental knowledge and skills related to advanced cardiac life support (ACLS) and basic life support (BLS) across different professional groups through a survey-based assessment and to compare pre-test and post-test surveys following theoretical and simulation-based training to assess improvements in knowledge.

Materials and methods: This study was conducted retrospectively between April 1, 2024, and May 15, 2024. The study group consisted entirely of healthcare professionals. The pre-and post-course results of ACLS training provided by 12 emergency medicine specialists with at least five years of experience in ACLS instruction were evaluated. The statistical analyses of the data were performed using the IBM SPSS 25.0 software package.

Results: The study included a total of 456 participants, of whom 48.5% (n=221) were male. Among the participants, 35.5% (n=162) were emergency medicine residents. Analysis based on the participants' roles revealed a statistically significant difference between the pre-test and post-test results (p=0.010). Post-hoc analysis indicated statistically significant differences between general practitioners and nurses, as well as between general practitioners and paramedics (p=0.012 and p=0.029, respectively).

Conclusion: The study found that a guided ACLS training program, which included standard didactic, practical, and simulation methods, resulted in improved ACLS and increased ACLS knowledge levels among all healthcare professionals. However, no single professional group exhibited a more pronounced increase in post-course success levels compared to others.

Keywords: Advanced cardiovascular life support, Cardiopulmonary resuscitation, Education, Interprofessional education

1. INTRODUCTION

Sudden cardiac death affects 350,000 individuals annually in the USA alone. The provision of early and effective basic life support (BLS) and advanced cardiac life support (ACLS) following sudden cardiac arrest, which has a high mortality rate, is closely linked with the return of spontaneous circulation and favorable neurological recovery in patients.[1] Consequently, BLS and ACLS training programs are widely conducted worldwide, not only for emergency and critical care personnel but also for all healthcare professionals.

Several studies have revealed deficiencies in the resuscitation knowledge of healthcare professionals.[2,3] Highlighting the need for BLS and ACLS training. Globally, BLS and ACLS training continues rapidly through both face-to-face and digital platforms. However, it is known that BLS and ACLS training that includes face-to-face practice and simulations is more effective compared to training without simulations.[4] Courses involving simulations or practical applications enhance participants' skills in performing appropriate chest compressions, using defibrillators, recognizing

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lethal rhythms, and intervening accordingly. The quality and effectiveness of the trainers are as crucial as the format of the training itself. In addition, the effect of the training is related to the participants' roles within the healthcare system. A previous study demonstrated that physicians increased their ACLS knowledge and skills more than nurses following an ACLS course,[5] a finding that is associated with social roles.[6] Nevertheless, all healthcare professionals must be able to provide adequate and effective BLS and ACLS during sudden cardiac arrest. A study involving medical students and resident physicians showed significant improvements in success rates for both groups following appropriately conducted ACLS training.[7] Therefore, training programs should be tailored to the knowledge and experience levels of all healthcare professionals .

In Turkey, many associations and organizations conduct ACLS courses, most of which integrate both theoretical and practical training. The primary aims of the current study were to evaluate the fundamental knowledge and skills related to BLS and ACLS among different professional groups through a survey-based assessment and to compare pre-test and post-test surveys following theoretical and simulation-based training to assess improvements in knowledge.

2. MATERIALS AND METHOD

Study design and population:

This study was conducted retrospectively from April 1, 2024, to May 15, 2024. This study was approved by the Atatürk University Clinical Research Ethics Committee with decision number 3/63 and dated May 3, 2024. The study was performed in accordance with the tenets of the Declaration of Helsinki.

The results of ACLS theoretical and simulation training courses, conducted by 12 emergency medicine specialists with at least five years of experience in ACLS instruction, were evaluated. Participants in these courses were healthcare professionals from various occupational groups (specialist doctors, general practitioners, nurses, and paramedics). The ACLS training provided included a total of 12 hours of theoretical lessons. The theoretical lesson topics were as follows:

1. BLS,
2. ACLS and innovations,
3. Airway management,
4. Cardiovascular pharmacology,
5. Myocardial infarction,
6. Dysrhythmias,
7. Lethal dysrhythmias and electrical therapies,
8. Special considerations in resuscitation (pregnancy, trauma, cardiac arrest in asthma)
9. Special considerations in resuscitation 2 (cardiac arrest in toxicological emergencies)
10. Special considerations in resuscitation 3 (environmental emergencies: anaphylaxis, drowning, hypothermia, and cardiac arrest in electric shock and lightning strikes),
11. Special considerations in resuscitation 4 (thrombolytic use in the emergency department and cardiac arrest in stroke and pulmonary embolism),
12. Ethical and legal aspects of resuscitation.

In addition, the participants received eight hours of practical training with appropriate simulation models, allowing them to practice the following:

1. BLS procedures and the use of automatic external defibrillators,

2. Airway management,
3. Rhythm recognition,
4. Electrical therapy for lethal rhythms and defibrillator use,
5. Management of special cardiac arrest scenarios.

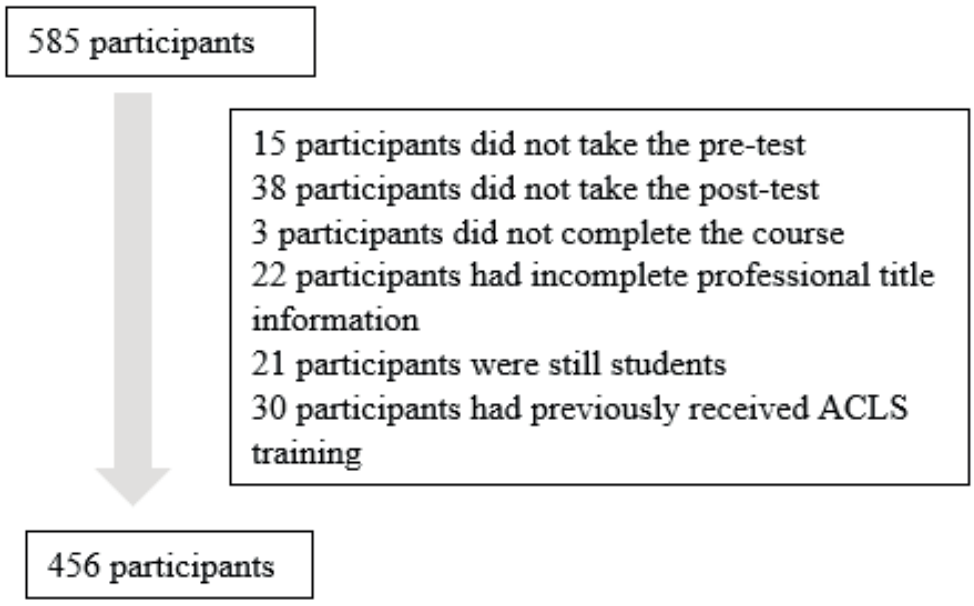
A pre-test was administered to all participants before the lessons began. Following the completion of the theoretical and simulation-based training, a post-test was undertaken. Both the pre-test and post-test consisted of 40 multiple-choice questions, prepared and reviewed by the 12 emergency medicine specialists who provided the ACLS training. The study included all participants from 14 ACLS courses conducted over one year. Excluded from the study were individuals who did not attend the entire course, did not take the pre-test or post-test, were still students, had previously taken an ACLS course, or whose professional titles were not available. A total of 585 participants were initially considered, but only 456 who met the inclusion criteria completed the study. Figure 1 presents the flow chart for the participants.

Statistical analysis:

In this study, statistical analyses were conducted using the IBM SPSS 25.0 software package. The Kolmogorov-Smirnov test was employed to assess the normality of the data distribution. Categorical data were presented as frequencies and percentages, while numerical data were provided as means and standard deviations. For dependent groups, the Wilcoxon test was used to compare two groups. When comparing three or more dependent groups, the Friedman test was utilized. The Dunnett T3 test was employed for the post-hoc analysis of the data. Throughout the study, a p-value of less than 0.05 was considered statistically significant.

Figure 1.

Flow chart for the participants.



3. RESULTS

The study included a total of 456 participants, of whom 48.5% (n = 221) were male. Among the participants, 35.5% (n = 162) were working as emergency medicine residents, and 6.4% (n = 29) were actively working as emergency medicine specialists. The sociodemographic characteristics of the participants are summarized in Table 1.

Examining the pre-test results of the participants included in the study, it was determined that the group of emergency medicine specialists had higher pre-test scores compared to the remaining groups. All groups improved their success levels in the post-test following the course. This increase was also found to be statistically significant (p≤0.001, Table 1).

In the study, when evaluating the differences between the pre-test and post-test scores of the participants, statistical significance was found in terms of gender (p = 0.01 0). Additionally, a statistically significant difference was observed between the pre-test and post-test scores based on the participants' roles (p = 0.010). The post-hoc analysis revealed statistically significant differences between general practitioners and nurses, as well as between general practitioners and paramedics (p = 0.012 and p = 0.029, respectively). No statistical significance was found in the comparison of the remaining groups (p > 0.05) (Table 2).

Table 1.

Pre-test and post-test results according to the participants' sociodemographic characteristics, gender, and professional role.

Variable	n(%)	Pre-test	Post-test	P value
Gender				
Male	221 (48.5%)	54.3 ± 14.9 (12-100)	70.2 ± 14.3 (22.5-97.5)	≤0.001
Female	235 (51.5%)	51.2 ± 13.9 (12-84)	65.5 ± 14.0 (20.2-97.5)	≤0.001
Professional role				
EMS	29 (6.4%)	63.4 ± 11.5 (40-84)	79.3 ± 10.6 (55-97.5)	≤0.001
SD	66 (14.5%)	54.7 ± 12.7 (24-84)	71.1 ± 10 (47.5-92.5)	≤0.001
General practitioner	69 (15.1%)	48.7 ± 12.6 (20-76)	66.1 ± 11.2 (40-95)	≤0.001
Nurse	77 (16.9%)	41.4 ± 13.4 (12-72)	53.2 ± 13 (20-87.5)	≤0.001
Paramedic	53 (11.6%)	45.9 ± 13.1 (24-84)	57.7 ± 15.8 (22.5-92.5)	≤0.001
EMR	162 (35.5%)	59.3 ± 12.2 (24-100)	67.8 ± 9.4 (47.5-97.5)	≤0.001

EMS: Emergency medicine specialist, SD: Specialist doctor in other branches of medicine, EMR: Emergency medicine resident

Table 2.

Comparison of the participants' delta values according to gender and professional role

Variable	Delta test	P value	Post-hoc
Gender			
Male	16.1 ± 13.0 (-27.0-50.5)	0.123	-
Female	14.5 ± 12.8 (-20.0-62.5)		
Professional role			
Emergency medicine specialist[a]	15.9 ± 8.1 (-5.0-30.0)		
Specialist doctor in other branches of medicine[a]	16.4 ± 12.2 (-8.5-41.0)		
General practitioner[a,b]	19.0 ± 122.8 (-12-62.5)	0.010	b > c, d
Nurse[a,c]	11.9 ± 15.5 (-20-51.5)		
Paramedic[a,d]	11.8 ± 14.1 (-27.0-40.5)		
Emergency medicine resident[a]	15.9 ± 11.8 (-19.5-51.0)		

4. DISCUSSION

This study revealed that post-test scores evaluated after the course increased across all groups compared to pre-test scores. However, the increased success rates showed no significant difference among these groups, with almost all healthcare professionals exhibiting a similar level of improvement. Participants should benefit equally from a training program that includes all medical professional groups. For efficient training, it is important to use guided training, as the guide possesses expertise in the subject matter, imparts knowledge, demonstrates its application, and instructs on how to implement it.[8] In addition, standard didactics, face-to-face skill stations, and high-quality simulation training methods should all be implemented during adult education. It has previously been reported in the literature that training with this method increases success rates.[9] The ACLS course provided utilized a full range of guided, standardized didactics, hands-on skills stations, and high-quality simulation training formats and was conducted in small groups, ensuring that all participants were able to equally benefit from them.

The theoretical knowledge provided during school years may be recalled during ACLS courses. However, some participants, such as specialist doctors working in non-emergency medical fields, may not have the opportunity to refresh or practice resuscitation skills sufficiently in their daily work. Therefore, simulations conducted during ACLS training can be instructive for such participants.[10] Simulation is considered the most effective method among educational approaches used to retain knowledge and enhance resuscitation skills.[11] The abundance of professional experience (continuous exposure to resuscitation) may explain why the emergency medicine specialists in the current study scored higher than the remaining professional groups in both pre-tests and post-tests. Emergency medicine specialists are often required to perform resuscitation numerous times

due to the nature of their specialization. Repeated practices ensure the retention of resuscitation knowledge and skills. Thus, although they scored higher than all remaining groups in pre-tests and post-tests due to actively performing resuscitation in their routine work lives, their post-course development did not differ significantly from the other groups. A previous study on determining the frequency of resuscitation training for emergency medicine specialists also reported that the time elapsed after their last training and even the presence of a previous training history did not affect their resuscitation skills.[12] This can also be attributed to the continuous experience these professionals gain in their daily work lives.

Nurses participating in this study had the lowest scores in both pre-tests and post-tests. A study by Botes et al. reported that nurses working in emergency departments and intensive care units had insufficient ACLS knowledge both before and after training.[13] Similarly, Rajeswaran et al. observed that nurses had significantly low levels of resuscitation knowledge before the course. While their post-course knowledge levels increased, a considerable decline was noted when the participants were reassessed after six months.[14] The inadequacy of resuscitation knowledge among nurses in Turkey may be related to their roles in administering medication, preparing materials, etc., during resuscitation. This situation can also be associated with legally binding rules in Turkey's nursing practice, such as the clause requiring nurses to collaborate with physicians in emergency situations and initiate resuscitation in the absence of a physician or a certified practitioner with an unexpired certificate.[15] However, despite these factors, a study conducted with nurse participants in Turkey found that 53.9% of the participants initiated resuscitation without a physician, and nurses with longer work experience were likely more successful in resuscitation, possibly due to their increased experience.[15] In addition, the authors determined that nurses working in emergency departments scored higher on average compared to other nurses. Based on these results, it can be stated that nurses who work in units with constant exposure to resuscitation, such as emergency rooms and intensive care units, have higher success rates compared to their colleagues, most likely due to their greater experience.

The participants working as paramedics in the healthcare system had an increase in their ACLS knowledge levels following the course. This increase could be related to the inclusion of simulations in the training. A previous study found that paramedic students achieved a higher success rate with simulation-based training compared to traditional methods.[16] Furthermore, paramedic participants were observed to perform better than nurses in both pre-tests and post-tests. A study conducted with paramedics in Turkey determined that performing defibrillation or cardioversion during resuscitation significantly increased their knowledge level about resuscitation.[17] The higher scores of paramedics compared to nurses in Turkey may be attributed to their increased exposure to pre-hospital resuscitation protocols due to the frequent solitary nature of their work in ambulances, necessitating the execution of all resuscitation steps prior to hospital admission, thereby facilitating greater experiential gains.

In Turkey, the term "general practitioner" refers to physicians who have graduated from medical school without receiving specialized training in any medical field. Therefore, general practitioners acquire their ACLS-related knowledge during medical school and post-graduation work experience. Consequently, their experience and theoretical knowledge are limited compared to doctors who have undergone specialized training.

In the current study, both groups had increased post-test scores, with similar increases in success rates following training. When comparing general practitioners to doctors working in non-emergency medical fields, specialist doctors scored higher in both pre-tests and post-tests. Similarly, a study undertaken by Stirparo et al. reported that more experienced doctors had higher ACLS knowledge levels compared to new graduates.[18] Our study also indicated that general practitioners scored higher on average in both pre-tests and post-tests compared to nurses and paramedics, which, we believe, is due to the abundance of theoretical education received during school years rather than professional experience.

Our study focused on the benefits gained from the course rather than evaluating participants as successful or unsuccessful. However, we only included participants from the last 14 courses in our study; therefore, our data only reflects the evaluation of the last 14 trainings. We also did not consider the participants' ages or the length of their professional experience. Furthermore, the nursing group was not divided into subgroups based on their encounters with resuscitation processes, such as emergency nurses or intensive care nurses. Lastly, the educational levels of the participants in the nursing group were overlooked, which can be considered another limitation of our study.

5. CONCLUSION

This study revealed that guided ACLS training, involving the utilization of standard didactic, practical, and simulation methods, increased ACLS knowledge levels among all healthcare professional groups. However, the post-course success levels did not significantly differ according to the professional role. The increase in ACLS knowledge levels will also affect the outcomes of resuscitation. To increase survival rates after cardiac arrest, such training should be provided at frequent intervals, especially to healthcare professionals not regularly involved in resuscitation procedures, including emergency medicine specialists and residents.

Ethics Committee Approval

This study was approved by the Atatürk University Clinical Research Ethics Committee with decision number 3/63 and dated May 3, 2024.

Conflict of Interest

The authors declare no conflict of interest in this study.

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Research Article/ Araştırma Makalesi

Migren Profilaksisinde Etkili Bir Ajan; Galcanezumab: Tek Merkez Deneyimleri

An Effective Agent in Migraine Prophylaxis: Galcanezumab: Single-Center Experiences

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Giriş: Migren, tipik olarak 4 ile 72 saat süren, genellikle orta veya şiddetli tekrarlayan başağrısı atakları ile karakterizedir. Başağrısı, genellikle bulantı, kusma ve/veya ışığa ve sese karşı tahammülsüzlük ile birlikte görülür. Migren ile ilgili birçok tedavi modalitesi olmakla birlikte bu çalışmada kliniğimizde migren hastalarının Galcanezumab tedavi deneyimleri ve sonuçlarının sunulması amaçlanmıştır.

Gereç ve Yöntem: Sakarya Üniversitesi Eğitim Araştırma Hastanesi Nöroloji Anabilim Dalı'nda 2021-2023 yılları arasında başvuran, 18 yaşın üzerinde, en az iki yıllık migren öyküsüne sahip olan ve ICHD-3 kriterlerine göre tanı almış olan Galcanezumab tedavisi alan dokuz olgu dâhil edilmiştir.

Bulgular: Olguların ortalama migren süresi dört ve otuz yıl arasında değişmektedir ve ortalama 17,4 (6,8) yıldır. Hastaların Galcanezumab öncesi ortalama aylık migren başağrısı gün sayısı on beş ve yirmi beş gün arasında değişmektedir ve ortalama 18,3 (3,5) gündür. Hastalar Galcanezumab tedavisi sonrası ortalama %86,6 migren başağrısı şiddetinde azalma ve ortalama %90 migren başağrısı sıklığında azalma ve %88,8'i akut ilaç kullanımında azalma bildirmektedir.

Tartışma: Çalışmamızda hastaların Galcanezumab tedavisi ile migren sıklığı, şiddeti ve analjezik tüketiminde önemli bir ölçüde iyileşme gösterdiğini tespit ettik. Çalışmaya, tedaviye en az altı ay devam eden hastalar dâhil edilmiştir. Bu hastalar aylık enjeksiyonun sürekli ilaç kullanımına göre kolaylığı ve klinikte önemli ölçüde fayda görmeleri nedeniyle tedaviye devam ettiklerini bildirdiler. Migrenin patofizyolojik bilgisi ve klinik çalışmalardaki yüksek araştırma standartları, risk altındaki kişilerde hastalığın ilerlemesini önlemeyi mümkün kılabilir.

Sonuç: Bu çalışma, ülkemiz genelinde kullanımı giderek yaygınlaşan Galcanezumab tedavisinin migren başağrısı tedavisinde önemli bir rolü olduğunu göstermek ve klinik deneyimlerimizi paylaşmak amacıyla sunulmuştur.

Anahtar Kelimeler: Başağrısı, Migren, Galcanezumab

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Introduction: Migraine is typically characterized by recurrent attacks of headache lasting between 4 and 72 hours, often of moderate or severe intensity. The headache is usually accompanied by nausea, vomiting, and intolerance to light and sound. Although there are many treatment modalities related to migraine, this study aims to present the experiences and outcomes of Galcanezumab treatment in migraine patients in our clinic.

Materials and Methods: Nine cases who were over 18 years of age, had a history of migraine for at least two years, and were diagnosed according to the ICHD-3 criteria, and received Galcanezumab treatment between 2021-2023 at the Neurology Department of Sakarya University Training and Research Hospital were included.

Results: The average duration of migraine among the cases ranged from four to thirty years, with a mean of 17.4 (6.8) years. The patients' average number of monthly migraine headache days before Galcanezumab treatment ranged from fifteen to twenty-five days, with a mean of 18.3 (3.5) days. After Galcanezumab treatment, patients reported an average of 86.6% reduction in migraine headache severity, 90% reduction in migraine headache frequency, and 88.8% reduction in acute medication use.

Discussion: In our study, we found that patients showed significant improvement in migraine frequency, severity, and analgesic consumption with Galcanezumab treatment. The study included patients who continued the treatment for at least six months. These patients maintained their treatment regimen due to the greater convenience of monthly injections over continuous medication. They also observed significant clinical benefits. Understanding the pathophysiology of migraine and maintaining high research standards in clinical studies may make it possible to prevent disease progression in at-risk individuals.

Conclusion: This study aims to demonstrate the significant role of Galcanezumab treatment, which is becoming increasingly widespread in our country, in the treatment of migraine headaches and to share our clinical experiences.

Keywords: Headache, Migraine, Galcanezumab

EXTENDED ABSTRACT

Introduction

Migraine is typically characterized by recurrent attacks of headache lasting between 4 and 72 hours, often of moderate or severe intensity. The headache is often accompanied by nausea, vomiting, and/or intolerance to light and sound. Migraine is more common among women of all age groups compared to men; 17% of women and 6% of men are affected by headaches annually. Headaches can occur with or without aura, with the non-aura subtype being the most common. The type of migraine can be determined based on the frequency of monthly migraine headache days and monthly headache days. The International Classification of Headache Disorders, Third Edition (ICHD-3) defines chronic migraine (CM) as a headache lasting for more than 3 months, with migraine headache characteristics occurring on at least 8 days per month for a minimum of 15 days per month. Episodic migraine (EM) is defined as a headache occurring on fewer than 14 days per month for at least 3 months, with migraine headache characteristics present on at least 4 days. In the treatment of migraine, both acute and preventive therapies are available. Preventive treatment options include beta-blockers, tricyclic antidepressants, anticonvulsants, occipital nerve blocks, botulinum toxin, and calcitonin gene-related peptide (CGRP) monoclonal antibodies such as erenumab, fremanezumab, galcanezumab, and eptinezumab. This study aims to present the experiences and outcomes of galcanezumab treatment for migraine patients in our clinic.

Material and Methods

Nine cases were included in the study, all of whom were over 18 years old, had at least one year of migraine history, and were diagnosed according to ICHD-3 criteria, and who received galcanezumab

treatment at the Neurology Department of Sakarya University Training and Research Hospital between 2021 and 2023. Retrospectively, the study examined gender, age, education, employment status, comorbid conditions, duration of migraine, average number of painful migraine days per month, and the number of acute medication uses in terms of acute attack and preventive treatment experiences. Patients who received galcanezumab treatment for less than six months were not included in the study.

Results

The study included a total of nine cases, consisting of six women and three men. The age range of the cases varies between 33 and 50 years, with an average age of 39.6 (6.4) years. The average duration of migraine among the cases ranges from 4 to 30 years, with an average of 17.4 (6.8) years. Before starting galcanezumab, the average number of migraine headache days per month ranged from 15 to 25 days, with an average of 18.3 (3.5) days. Before starting galcanezumab, the number of acute medication use days per month ranged from 10 to 50 days, with an average of 20.5 (11.8) days. 33.3% of the patients were diagnosed with chronic migraine, and 66.6% were diagnosed with both chronic migraine and medication overuse headache (MOH). All patients reported experiencing severe headaches that significantly affected their quality of life. All patients have used various treatments for acute migraine attacks, with the average values being 88.8% using triptan medications, 77.7% using nonsteroidal anti-inflammatory drugs (NSAIDs), 55.5% using acetaminophen-containing medications, 33.3% using combination therapies, 22.2% using alternative medicine methods, and 11.1% using ergotamine-containing medications. All patients have used various preventive treatments for migraine, with 88.8% using antidepressant medications and occipital nerve blocks, 55.5% using anticonvulsants, 22.2% using beta-blockers, 11.1% using acupuncture, and 11.1% using botulinum toxin treatment. After galcanezumab treatment, patients reported an average improvement of 77.5% in nausea and osmophobia, 70% in vomiting, 72.2% in photophobia, and 80% in phonophobia and physical activity. Including patients who are still receiving galcanezumab treatment, the average duration of treatment is 9.4 (4.3) months. After galcanezumab treatment, patients reported an average reduction of 86.6% in migraine headache intensity, an average reduction of 90% in the frequency of migraine headaches, and 88.8% reported a decrease in acute medication use. 66.6% of patients reported experiencing no headaches during the treatment period, and 66.6% also reported not needing any acute treatment while receiving galcanezumab therapy.

Discussion

Migraine is a chronic, widespread neurological condition that can significantly impact individuals' lives and lead to disability. It negatively affects quality of life, social functioning, and work life. It is known that calcitonin gene-related peptide (CGRP) plays an important role in the pathophysiology of pain. It has been found that CGRP triggers migraine headaches and is present at high levels during attacks. New migraine pharmacotherapies focus on reducing or blocking CGRP release. The current CGRP monoclonal antibodies are erenumab, fremanezumab, galcanezumab, and eptinezumab. The CGRP monoclonal antibody available in Turkey is galcanezumab. The study included a total of nine patients: three with a diagnosis of chronic migraine (CM) and six with a diagnosis of both chronic migraine (CM) and medication overuse headache (MOH). The average number of migraine headache days per month before starting galcanezumab was 18.3 days. During the treatment period, six patients reported experiencing

no migraine headache attacks. The other three patients reported a reduction in attack frequency of 50-90% and a reduction in migraine headache intensity of 50-80% during the treatment period. After galcanezumab treatment, patients reported an average reduction of 90% in attack frequency and 86.6% in headache intensity, with 88.8% indicating significant benefit from the treatment. After galcanezumab treatment, 88.8% of patients reported a reduction in acute medication use, while 66.6% indicated that they did not use any medication at all. In our study, we found that patients showed significant improvement in migraine frequency, intensity, and analgesic consumption with galcanezumab treatment. These patients reported that they continued the treatment due to the convenience of monthly injections compared to continuous medication use and the significant benefits they experienced. Understanding the pathophysiology of migraine and the high research standards in clinical studies may make it possible to prevent the progression of the disease in at-risk individuals.

Conclusion

This study aims to demonstrate the significant role of Galcanezumab treatment, which is becoming increasingly widespread in our country, in the treatment of migraine headaches and to share our clinical experiences.

1. GİRİŞ

Migren tipik olarak 4 ile 72 saat arası süren, genellikle orta veya şiddetli tekrarlayan başağrısı atakları ile karakterizedir. Bu ağrılar genellikle tek taraflı ve pulsatildir. Başağrısı, genellikle bulantı, kusma ve/veya ışığa ve sese karşı tahammülsüzlük ile birlikte görülür[1]. Migren, dünya çapında insanların %15'ini etkilemektedir. Migren, erkeklerle karşılaştırıldığında tüm yaş gruplarındaki kadınlar arasında daha yaygındır; kadınların yılda %17'si, erkeklerin %6'sı başağrısından etkilenir. Migren, tipik olarak 25-55 yaş arasındaki üreme çağındaki insanlarda daha sık görülmektedir. Başağrısı auralı olabildiği gibi aurasız olan alt tipi en yaygın türüdür[2]. Migren tipi, aylık migren başağrısı günleri ve aylık başağrısı günleri sıklığına göre belirlenebilir. Uluslararası başağrısı sınıflandırma sistemi üçüncü baskı (ICHD-3); aylık olarak en az 15 gün süren, migren başağrısı özelliklerini en az 8 gün boyunca gösteren 3 aydan fazla süren başağrısını kronik migren (KM) olarak tanımlamaktadır. Episodik migren (EM) ise en az 3 ay boyunca ayda 14 günden az başağrısı süren ve en az 4 gün boyunca migren başağrısı özelliklerini gösteren olarak tanımlamıştır[3]. Migren tedavisinde hem atak hem de önleyici (profilaksi) tedaviler mevcuttur. Önleyici tedaviler optimize edilmiş atak tedavilerine rağmen yaşam kalitesi bozulmuş hastalarda düşünülmektedir. Önleyici tedaviler genellikle ayda en az 4 gün boyunca migren nedeniyle olumsuz etkilenen hastalar için önerilir. Ancak bu kural kesin değildir ve migrenin şiddeti, süresi ve günlük yaşam aktiviteleri üzerine olumsuz etkileri gibi diğer faktörler de göz önünde bulundurulmalıdır. Ayrıca akut ilaçları aşırı kullananlar için de önleyici tedavi gerekebilmektedir. Önleyici tedavileri seçenekleri arasında betablokörler, trisiklik antideprasan, antikonvulzanlar, oksipital sinir blokajı, botulinum toksini ve kalsitonin gen ilişkili peptit monoklonal antikoru olan erenumab, fremanezumab, galcanezumab ve eptinezumabtır[4]. Bu çalışmada da kliniğimizde migren hastalarının galcanezumab tedavi deneyimleri ve sonuçlarının sunulması amaçlanmıştır.

2. GEREÇ VE YÖNTEM

Sakarya Üniversitesi Eğitim Araştırma Hastanesi Nöroloji Anabilim Dalı'nda 2021-2023 yılları arasında başvuran, 18 yaşın üzerinde, en az bir yıllık migren öyküsüne sahip olan ve ICHD-3 kriterlerine göre tanı almış olan galcanezumab (başlangıçta 240 mg dozunu takiben aylık 120 mg) tedavisi alan dokuz olgu dâhil edilmiştir.

Retrospektif olarak, cinsiyet, yaş, eğitim, çalışma durumu, eşlik eden hastalıklar, migren süresi, aylık ortalama ağrılı migren gün sayısı ve akut ilaç kullanım sayısı akut atak ve önleyici tedavi deneyimleri yönüyle incelenmiştir. Çalışmaya galcanezumab tedavisine altı aydan az devam eden hastalar dâhil edilmemiştir.

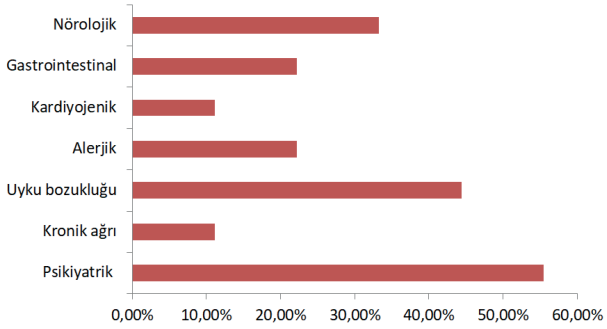
3. BULGULAR

Çalışmaya altı kadın ve üç erkek olmak üzere toplam dokuz olgu dâhil edilmiştir. Olguların yaş aralığı otuz üç ve elli arasında değişmekte olup ortalama değeri 39,6 (6,4) yıldır. Olguların %55,5'i üniversite mezunu ve %55,5'i kendi işinde çalışmaktadır. Hastaların %88,8'inde eşlik eden hastalıklar mevcuttu ve ortalama %55,5'inde psikiyatrik hastalık, %44,4'ünde uyku bozukluğu, %11,1'inde kronik ağrı, %22,2'sinde alerjik hastalık öyküsü, %22,22'sinde gastrointestinal sistem hastalık öyküsü, %11,1'sinde kardiyolojik hastalık öyküsü, %22,2'sinde huzursuz bacak sendromu ve %11,1'inde olguda sinüs ven trombozu öyküsü bulunmaktaydı (şekil-1).

Olguların ortalama migren süresi dört ile otuz yıl arasında değişmektedir ve ortalama 17,4 (6,8) yıldır. Hastaların galcanezumab öncesi ortalama aylık migren başağrısı gün sayısı on beş ve yirmi beş gün arasında değişmektedir ve ortalama 18,3 (3,5) gündür. Hastaların galcanezumab öncesi aylık akut ilaç kullanım gün sayısı on ve elli gün arasında değişmektedir ve ortalama 20,5 (11,8)'dir. Hastaların %33,3'ü kronik migren ve %66,6'sı kronik migren ve ilaç aşırı kullanım başağrısı (İAKB) tanısı almıştır. Hastaların tamamı yaşam kalitesini önemli ölçüde etkileyen şiddetli başağrısı yaşadıklarını bildirdi. Hastaların tamamı akut migren atağı için çeşitli tedaviler kullanmıştır ve bunlar ortalama değer olarak %88,8'si triptan grubu ilaçlar, %77,7'si nonsteroid antiinflamatuar ilaçlar (nsaii), %55,5'i parasetamol içeren ilaçlar, %33,3'ü kombine tedaviler, %22,2'si de alternatif tıp yöntemleri ve %11,1'i ergotamin içeren ilaçlar kullanmıştır (şekil-2). Hastaların tamamı migren için çeşitli önleyici tedaviler kullanmıştır ve bunların %88,8'i antidepresan ilaçlar ve oksipital sinir blokajı, %55,5'i antikonvülzan ilaçlar, %22,2'si betablokör ilaçlar, %11,1'i akupuntur tedavisi, ve %11,1'i botulinum toksini tedavisidir (şekil-3).

Şekil 1.

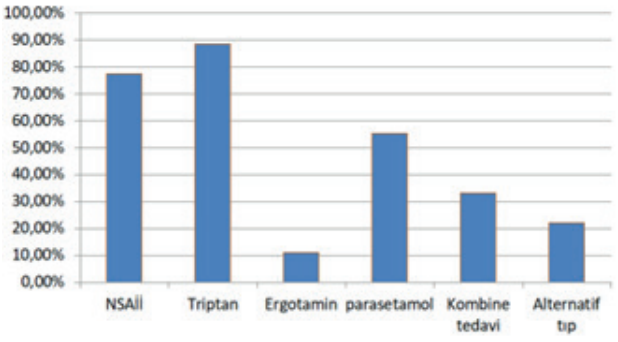
Hastaların migren başağrısına eşlik eden komorbiditeler.



Galcanezumab tedavisi öncesi hastaların hepsi migren başağrısına eşlik eden en rahatsız edici semptomları fotofobi, fonofobi ve günlük yaşam kalitesinde bozulmaya sebep olacak fiziksel aktivitede azalma olarak bildirmişlerdir. Hastaların %88'i bulantı ve osmofobi, %66,6'sı da kusmanın başağrısına eşlik ettiğini bildirdi. Galcanezumab tedavisi sonrası hastalar ortalama olarak bulantı ve osmofobide %77,5, kusmada % 70, fotofobide %72,2, fonofobide ve fiziksel aktivitede %80 iyileşme bildirdi (şekil-4).

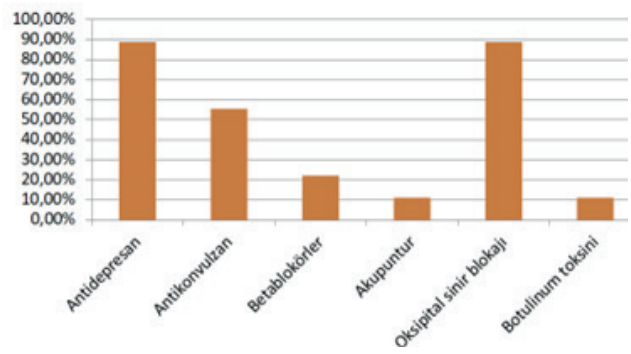
Şekil 2.

Hastaların akut tedavi deneyimleri.



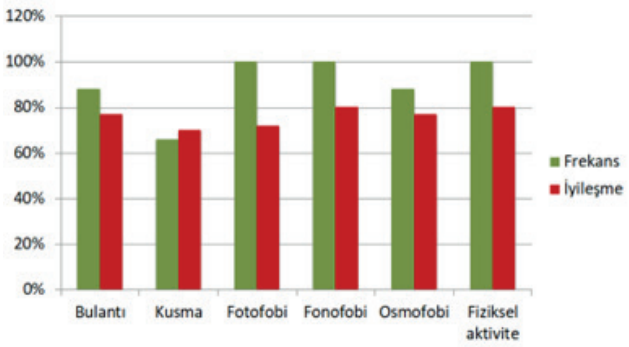
Şekil 3.

Hastaların önleyici tedavi deneyimleri.



Şekil 4.

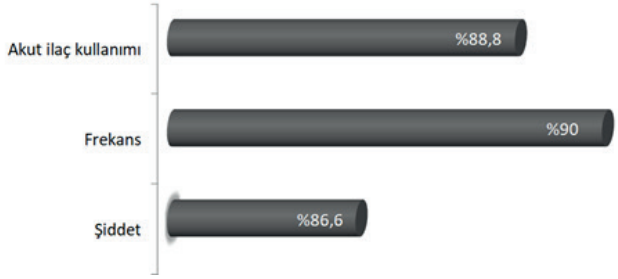
Hastaların galcanezumab öncesi semptomların sıklığı ve galcanezumab sonrası semptomlarda iyileşme oranları.



Galcanezumab tedavisi devam etmekte olan hastalarla beraber ortalama tedavi süresi 9,4 (4,3) aydır. Galcanezumab tedavisi sırasında bir hastada (%11,1) hafif alerjik yan etki dışında başka bir yan etki gözlenmemiştir. Hastalar galcanezumab tedavisi sonrası ortalama %86,6 migren başağrısı şiddetinde azalma ve ortalama %90 migren başağrısı sıklığında azalma ve %88,8'i akut ilaç kullanımında azalma bildirmektedir (**şekil-5**). Hastaların %66,6'sı tedavi süresince hiç başağrısı yaşamadıklarını bildirirken yine %66,6'sı galcanezumab tedavisi alırken hiçbir akut tedaviye ihtiyaç duymadıklarını bildirdiler.

Şekil 5.

Galcanezumab sonrası hastaların migren başağrısı frekansı, şiddeti ve akut ilaç kullanımında azalma yüzdeleri.



4. TARTIŞMA

Primer başağrıları içinde en sık görülenleri gerilim tipi başağrısı ve migrendir[5]. Migren, bireylerin yaşamlarını önemli ölçüde etkileyebilen, kronik, yaygın ve engelliliğe yol açan nörolojik bir hastalıktır[6]. Yaşam kalitesini, sosyal işlevselliği ve çalışma hayatını olumsuz yönde etkilemektedir[7]. Yalnızca başağrısı değil gastrointestinal şikayetler, uyku bozuklukları, duygusal semptomlar ve diğer somatik durumları içeren bir dizi semptomlar da insanları önemli ölçüde rahatsız etmektedir[8]. Ağrının patofizyolojisinde kalsitonin geniyle ilişkili peptitin (CGRP) önemli bir rol oynadığı bilinmektedir. CGRP merkezi ve periferik sinir sisteminde özellikle dorsal kök gangliyonu ve trigeminal gangliyondaki duyusal nöronlarda yaygın bulunan güçlü bir vazodilatatördür. CGRP'nin migren başağrısını tetiklediği ve atak sırasında yüksek düzeyde olduğu tespit edilmiştir. CGRP'nin migren ile ilgili üç ana etkisi olduğu bilinmektedir. Bunlar; arterler duvarındaki düz kas hücrelerindeki reseptörlere bağlanarak vazodilatasyon, beyindeki nöronların aşırı uyarılması ile inflamasyon ve başağrısıdır. Yeni migren farmokoterapileri CGRP salınımını azaltmak veya bloke etmek üzerinedir[10]. Mevcut CGRP monoklonol antikorları erenumab, fremanezumab, galcanezumab ve eptinezumabtır.

Türkiye'de bulunan CGRP monoklonal antikoru galcanezumabtır. Migrenin dünya genelinde %14,4'lük bir kesimi etkilediği tahmin edilmekte ve kadınlarda daha sık görüldüğü bilinmektedir[11]. Bizim çalışmamızda da %66,6 ile kadın hastalar daha fazlaydı. Çalışmaya KM tanısı olan üç hasta, KM ve İAKB tanısı alan altı hasta olmak üzere toplam dokuz hasta dâhil edilmiştir. Hastaların galcanezumab öncesi aylık ortalama migren başağrısı gün sayısı 18,3 gün olup altı hasta tedaviye devam ettikleri süre boyunca hiç migren başağrısı atağı yaşamadıklarını bildirdiler. Diğer üç hasta ise tedavi süresince %50-90 arasında atak sıklığında azalma, %50-80 arasında da migren başağrısı şiddetinde azalma bildirmiştir. Hastalar galcanezumab sonrası ortalama olarak %90 atak sıklığında ve %86,6 da başağrısı şiddetinde azalma bildirmiş olup %88,8'i tedaviden belirgin fayda gördüğünü ifade etmiştir. Migren anksiyete, depresyon, uyku bozukluğu ve kronik ağrı ile de ilişkilidir. Bu ilişkiler kronik migren hastalarında epizodik migren hastalarına göre daha belirgindir[4]. Bizim hastalarımızda %55,5 ile en fazla komorbidite psikiyatrik hastalıklar olup %44,4 ile uyku bozukluğu izlemiştir. Migrende komorbid durumların tanınması önemlidir çünkü bunlar ilaç seçimini de etkilemektedir[4]. Bu çalışmada hastalar, migren başağrısına eşlik eden en sık semptom olarak fotofobi, fonofobi ve yaşam kalitesini bozan günlük fiziksel aktivitenin azalmasından yakınıyorlardı. Hastalar %66,6 ile en az eşlik eden semptomu kusma olarak bildirmişlerdi. Takizawa ve ark. yaptığı bir çalışmada galnacezumab tedavisi sonrasında hastaların %61,5'inin migren sıklığında %50 veya daha fazla azalma olduğu ve %64,9'unun fotofobide, %50'sinin osmofobide, %63,9'nun bulantı ve kusmada iyileşme gösterdiğini bildirmişlerdir[12]. Bizim çalışmamızda da hastalar ortalama %80 ile en iyi iyileşmeyi fonofobi ve fiziksel aktivitede artış bildirildi. Bizim çalışmamızda %70 ile en az iyileşmeyi kusmada bildirmiş olsalar da tüm semptomlarda ortalama %70-80 iyileşme ile genel olarak belirgin düzeyde iyileşme tespit edilmiştir. Galcanezumab öncesi hastaların %88,8 oranında akut ilaç tedavisi olarak en sık triptan grubu ilaçlar ve yine %88,8 oranında en sık önleyici tedaviler olarak antidepresanlar ve oksipital sinir blokajı tedavilerini tercih ettikleri görüldü. Galnacezumab tedavisi sonrası hastaların %88,8'i akut ilaç kullanımında azalma bildirirken %66,6'sı hiçbir ilaç kullanmadıklarını bildirmişlerdir. Çalışmamızda hastaların galcanezumab tedavisi ile migren sıklığı, şiddeti ve analjezik tüketiminde önemli bir ölçüde iyileşme gösterdiğini tespit ettik. Çalışmamıza, tedaviye en az altı ay devam eden hastaları dahil etmiştik. Bu hastalar aylık enjeksiyonun sürekli ilaç kullanımına göre kolaylığı ve gördükleri önemli ölçüde fayda sonucunda tedaviye devam ettiklerini bildirdiler. Migreninin patofizyolojik bilgisi ve klinik çalışmalardaki yüksek araştırma standartları, risk altındaki kişilerde hastalığın ilerlemesini önlemeyi mümkün kılabilir[2].

5.SONUÇ

Migren dayanılması güç bir başağrısıdır ve bu durum hem hasta ve aile hem de toplum için bir yük oluşturmaktadır. Hasta geçmişinin anlaşılması zaman alıcıdır, ancak doğru anketin yapılması, doğru teşhisin bulunması, doğru tedavinin doğru zaman içinde verilmesi tedavi başarısını artırmaktadır. Bu çalışma ülkemiz genelinde kullanımı giderek yaygınlaşan galcanezumab tedavisinin migren başağrısı tedavisinde önemli bir rolü olduğunu göstermek amacıyla sunulmuştur.

Limitasyonlar:

Çalışmanın en önemli limitasyonu hasta sayısının azlığıdır. Ancak ilerleyen yıllarda özellikle tedavi maliyetinin azaltılmasıyla daha fazla veri sunulabilecektir.

Bu araştırma; kamu, ticari veya kâr amacı gütmeyen

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Research Article

Comparative Clinical and Functional Results of Microfracture and Mosaicoplasty in Medial Talus Osteochondral Lesions

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Introduction: This study aims to compare the early clinical and functional outcomes of two surgical interventions, microfracture and mosaicoplasty, in the treatment of medial talus osteochondral lesions (OCLs).

Materials and Methods: This retrospective study included patients treated in the Department of Orthopaedics and Traumatology, Faculty of Medicine, Düzce University from January 2016 to January 2022. Patients were divided into two groups as those who underwent arthroscopic microfracture (Group 1, n=20) and those who underwent mosaicoplasty (Group 2, n=17). Preoperative and postoperative follow-up data were evaluated with visual analogue scale (VAS) and American Orthopaedic Foot and Ankle Society (AOFAS) scores at baseline, 6 months and 12 months.

Results: The mean age was 37.9±12.5 years in the microfracture group and 38±12.46 years in the mosaicoplasty group (p=0.981). Both groups showed significant improvement in VAS scores from baseline to the 6th and 12th months, and pain reduction was more significant in the mosaicoplasty group (p<0.001). AOFAS scores improved significantly in both groups and the mosaicoplasty group had better functional results at 12 months (p=0.069).

Conclusions: Microfracture and mosaicoplasty are effective in the treatment of medial talus OCLs to reduce pain and improve clinical status in the early period.

Keywords: Talus, Osteochondral lesions, Microfracture, Mosaicplasty

1. INTRODUCTION

Medial talus osteochondral lesions (OCLs) are characterized by the separation or degeneration of subchondral bone and articular cartilage [1,2]. These lesions typically result from trauma and are most commonly observed in the knee joint, with the ankle joint being the second most frequently affected site. Medial talus osteochondral lesions (OCLs) are disruptions of the cartilage and underlying bone, often resulting from trauma and leading to significant pain and impaired joint function. These lesions can progress to osteoarthritis if not addressed promptly. Timely diagnosis and intervention are essential to avert long-term complications. Early management of talus OCLs is crucial for maintaining joint function, reducing pain, and halting the progression to osteoarthritis. Various treatment options, both conservative and surgical, are available [3-5].

Surgical options for treating talus OCLs encompass debridement, bone marrow stimulation (microfracture), scaffold implants, autologous chondrocyte implantation, matrix-associated autologous chondrocyte implantation, autologous osteochondral transplantation (mosaicplasty), and allograft transplantation. Among these, microfracture and mosaicplasty are frequently used procedures [5,6].

In the literature, various methods for treating talus OCLs have been examined. The microfracture

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technique involves creating small perforations in the subchondral bone to allow bone marrow elements to access the defect area, thereby promoting the formation of new cartilage tissue [7]. This method is generally recommended for small- to medium-sized lesions and has shown favorable short-term results. However, newly formed fibrocartilage is less durable than native hyaline cartilage in the long term. According to the current recommendations for 2024, the German Society of Orthopedics and Traumatology reported that while microfracture effectively reduces pain in the short term, it fails to maintain cartilage integrity over time [8].

Mosaicplasty, on the other hand, involves the transplantation of healthy cartilage and bone from a non-weight-bearing area to the defect site. This technique is typically preferred for larger and deeper lesions and provides results more comparable to those of natural cartilage [9]. Solheim et al. demonstrated that mosaicplasty yields better long-term outcomes than microfracture in knee cartilage repair [10]. Kılınççıoğlu and Kalacı reported that mosaicplasty, particularly in young and active patients, is superior to microfracture for treating talus OCLs [11].

Despite these findings, most existing studies have focused on knee joints, and specific data on medial talus OCLs are limited. This study aimed to fill this gap by comparing the early clinical and functional outcomes of microfracture and mosaicplasty in treating medial talus OCLs.

2. MATERIALS AND METHODS

The study design was approved by the Düzce University Clinical Research Ethics Committee (Düzce, Türkiye) (No. 2024/138), and the study was performed in accordance with the principles of the Declaration of Helsinki. Informed consent was obtained from the parents or guardians of the patients included in the study.

Study Design and Participants

This retrospective study was conducted at the Orthopedics and Traumatology Department of Düzce University Medical Faculty. Patients who were diagnosed with medial talus osteochondral lesions between January 2016 and January 2022 were reviewed. The study included patients who underwent either microfracture (Group 1, n=20) or mosaicplasty (Group 2, n=17) procedures. The inclusion criteria included complete preoperative and postoperative follow-up data. Patients with incomplete follow-up data, who were diagnosed with diabetic neuropathy, or who developed posttraumatic ankle arthritis were excluded from the study. Figures 1 and 2 illustrate the anteromedial osteochondral lesion of the medial talus with the perioperative application of microfracture and the preoperative and postoperative application of mosaicplasty for an anteromedial osteochondral lesion of the medial talus, respectively.

Figure 1.

Arthroscopic microfracture of an anteromedial osteochondral lesion of the talus

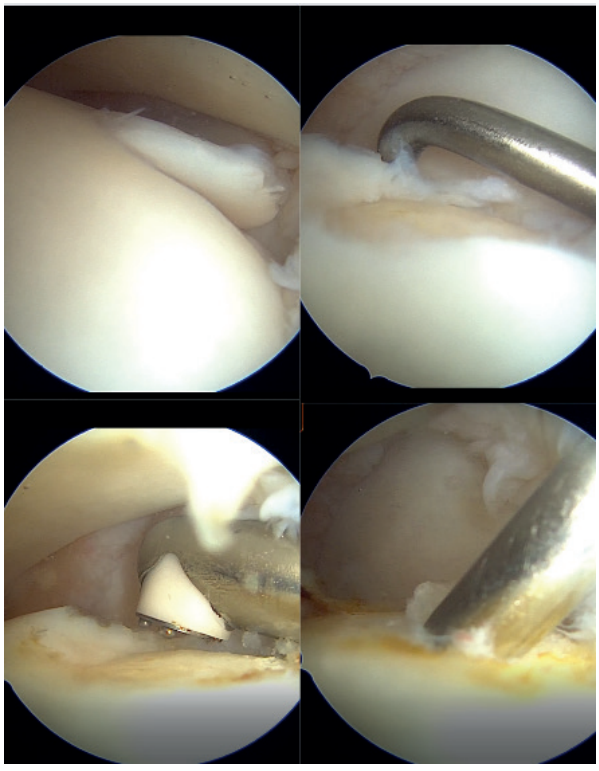
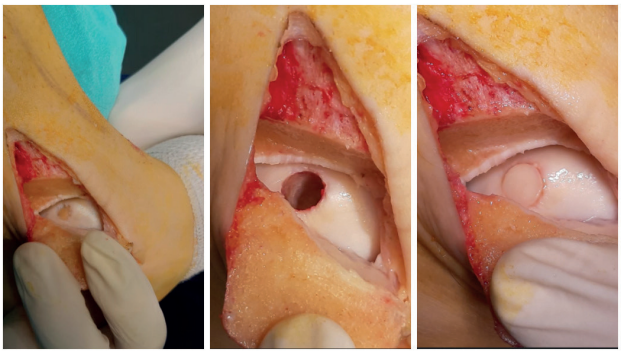


Figure 2.
Mosaicoplasty of the anteromedial osteochondroplasty lesion of the talus



Data collection and evaluation

Demographic data and clinical outcomes, including visual analog scale (VAS) and American Orthopedic Foot and Ankle Society (AOFAS) scores, were collected at preoperative and postoperative intervals (baseline, 6 months, and 12 months).

VAS score: The VAS score was used to measure pain intensity. It is a 10 cm line anchored by 0 (no pain) and 10 (worst imaginable pain). Patients marked a point on the line that represented their pain level, which was then measured in centimeters.

AOFAS score: The AOFAS score evaluates pain (40 points), function (50 points), and alignment (10 points), with a total possible score of 100. Higher scores indicate better functional status.

Statistical analysis

The statistical analysis was performed using NCSS (Number Cruncher Statistical System) 2007 Statistical Software (Utah, USA). The data distribution was assessed using the Shapiro–Wilk normality test. For normally distributed variables, a paired one-way ANOVA was used for within-group comparisons over time, while the Newman–Keuls multiple comparison test was employed for subgroup analyses. Independent t tests were utilized for between-group comparisons. For nonnormally distributed variables, the Friedman test was applied for within-group comparisons over time, and Dunn's multiple comparison test was used for subgroup analyses. The Mann–Whitney U test was used for between-group comparisons. Categorical data were analyzed using the chi-square test. A p value less than 0.05 was considered to indicate statistical significance.

3. RESULTS

The study included 37 patients divided into two groups: the microfracture group (n=20) and the mosaicplasty group (n=17). The demographic and clinical characteristics are summarized in Table 1.

According to Table 2, there were no statistically significant differences in age or sex distributions between the microfracture and mosaicplasty groups (p=0.981, p=0.630). Similarly, no significant differences were observed in terms of side (right/left) or etiology distributions (p=0.666, p=0.302). The mean BMI values were also not significantly different between the two groups (p=0.713). However, the mean symptom duration was significantly greater in the mosaicplasty group than in the microfracture group (p=0.009). The follow-up duration was not significantly different between the two groups (p=0.680).

Table 3 shows that VAS scores at baseline, 6 months, and 12 months were significantly lower in the mosaicplasty group than in the microfracture group (p=0.011, p=0.0001, p=0.001). Both groups showed significant improvements in VAS scores over time (p=0.0001 for both groups). The AOFAS score also improved significantly in both groups, with the mosaicplasty group showing better functional outcomes at the 12-month follow-up (p=0.069).

Table 1.

Demographic and Clinical Characteristics

Characteristic	Microfracture Group (n=20)	Mosaicplasty Group (n=17)	p value
Age (years)	37.9 ± 12.5	38 ± 12.46	0.981*
Gender			0.630+
Male	11 (55.00%)	8 (47.06%)	
Female	9 (45.00%)	9 (52.94%)	
Side			0.666+
Right	12 (60.00%)	9 (52.94%)	
Left	8 (40.00%)	8 (47.06%)	
Etiology			0.302+
Sprain	4 (20.00%)	2 (11.76%)	
No Trauma	14 (70.00%)	10 (58.82%)	
Sports	2 (10.00%)	5 (29.41%)	
BMI (kg/m^2)	26.65 ± 3.28	27.08 ± 3.68	0.713*
Symptom Duration	9.20 ± 2.55	12.59 ± 4.76	0.009*
Follow-up Duration	28.6 ± 10.89	32 ± 14.35	0.680†
Median (IQR)	25.5 (19.25-35.75)	31 (18.5-47.5)	

*Independent t test, †Mann–Whitney U test, +Chi-square test

Table 2.

VAS and AOFAS Scores

Score	Microfracture Group (n=20)	Mosaicplasty Group (n=17)	p value
VAS			
Baseline	9.1 ± 0.79	8.12 ± 1.27	0.011†
	Median (IQR)	9 (9-10)	8 (7-9)
6 Months	8.00 ± 1.12	3.82 ± 1.38	0.0001†
	Median (IQR)	8 (7-9)	4 (3-5)
12 Months	3.75 ± 2.25	1.53 ± 1.23	0.001†
	Median (IQR)	4 (2-5)	1 (1-2)
p‡	0.0001	0.0001	
AOFAS			
Baseline	41.3 ± 13.98	38.41 ± 13.13	0.524*
6 Months	75.95 ± 12.1	77.76 ± 13.3	0.667*
12 Months	90.7 ± 7.37	94.59 ± 4.68	0.069*
p⁑	0.0001	0.0001	

*Independent t test, †Mann–Whitney U test, ‡Friedman test, ⁑Paired one-way ANOVA

Table 3.

Multiple Comparison Tests for VAS and AOFAS Scores

Comparison	Microfracture Group	Mosaicplasty Group
VAS		
Baseline/6 Months	0.0001	0.0001
Baseline/12 Months	0.0001	0.0001
6 Months/12 Months	0.0001	0.0001
AOFAS		
Baseline/6 Months	0.0001	0.0001
Baseline/12 Months	0.0001	0.0001
6 Months/12 Months	0.0001	0.0001

Table 4.

Changes in the VAS and AOFAS Scores

Change Difference	Microfracture Group (n=20)	Mosaicplasty Group (n=17)	p value
VAS			
6 Months - Baseline	-1.1 ± 1.02	-4.29 ± 1.11	0.0001
	Median (IQR)	-1 (-2-0)	-4 (-5--3.5)
12 Months - Baseline	-5.35 ± 2.18	-6.59 ± 1.46	0.068
	Median (IQR)	-5 (-7--3.25)	-6 (-7.5--5)
AOFAS			
6 Months - Baseline	34.65 ± 18.45	39.35 ± 16.22	0.432
	Median (IQR)	39 (14-55)	43 (27-55)
12 Months - Baseline	49.4 ± 18.02	56.18 ± 10.68	0.357
	Median (IQR)	54 (29.5-65.25)	59 (53-66)

†Mann–Whitney U test

The Dunn multiple comparison test for VAS scores and the Newman–Keuls multiple comparison test for AOFAS scores indicated significant improvements within both groups over time.

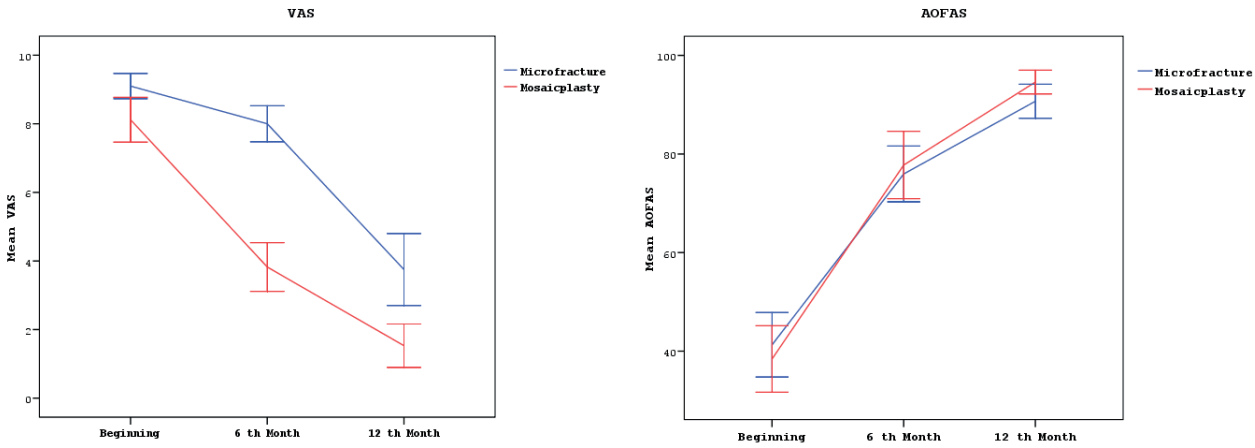
As shown in Table 4, the change in VAS score from baseline to 6 months was significantly greater in the mosaicplasty group than in the microfracture group (p=0.0001). However, there was no significant difference between the two groups in terms of VAS score change from baseline to 12 months (p=0.068). Similarly, there were no significant differences between the groups in the change in AOFAS score from baseline to 6 and 12 months (p=0.432, p=0.357).

Figure 3 illustrates the changes in the visual analog scale (VAS) and American Orthopedic Foot and Ankle Society (AOFAS) scores over time for the microfracture and mosaicplasty groups. The

graph on the left shows the mean VAS scores at baseline, 6 months, and 12 months, indicating a more significant reduction in pain for the mosaicplasty group than for the microfracture group. The graph on the right presents the mean AOFAS scores at the same time intervals, demonstrating an improvement in functional outcomes for both groups, with the mosaicplasty group achieving higher scores at 12 months.

Figure 3.

Changes in VAS and AOFAS scores at 6th and 12th months



4. DISCUSSION

The findings of this study provide valuable insights into the comparative effectiveness of microfracture and mosaicplasty in the treatment of medial talus osteochondral lesions (OCLs). Our study highlights the comparative effectiveness of microfracture and mosaicplasty in treating medial talus osteochondral lesions. Both techniques showed significant improvements in pain and function; however, mosaicplasty demonstrated superior outcomes in several areas, suggesting its potential as a more effective long-term treatment, especially for larger lesions.Both surgical interventions demonstrated significant improvements in pain and functional outcomes over time; however, mosaicplasty showed superior results in several key areas, suggesting that it may be a more effective long-term treatment option for certain patients.

The significant reduction in VAS scores observed in the mosaicplasty group compared to the microfracture group at 6 and 12 months indicates that mosaicplasty may offer better pain relief for patients with medial talus OCLs. Similarly, in the literature, mosaicplasty provides better long-term pain management than does microfracture of the joint [12,13]. This finding may be attributed to the ability of mosaicplasty to create a more durable and congruent cartilage surface [14].

Both groups showed significant improvements in the AOFAS score; however, the mosaicplasty group demonstrated better functional outcomes at 12 months. This suggests that mosaicplasty may be more effective not only for pain management but also for preserving and enhancing joint function. Kılınççıoğlu and Kalacı [11] also noted that mosaicplasty yielded superior outcomes, particularly in young and active patients.

Other studies in the literature support these

findings [15,16]. Guney et al.[17] indicated that mosaicplasty is more successful for larger and deeper lesions and promotes faster patient recovery. Similarly, Mukai et al. reported that mosaicplasty is more effective than microfracture in maintaining cartilage integrity and improving long-term joint function [18,19].

Pallamar et al. evaluated different surgical procedures for treating atraumatic osteochondrosis dissecans in young and adolescent patients [20]. They found that advanced fixation and reconstruction procedures resulted in lower clinical scores and a greater incidence of joint degeneration than did drilling procedures applied for stable lesions. This highlights the advantages of mosaicplasty in terms of stabilization and functional recovery.

Kim et al. investigated the long-term outcomes of arthroscopic microfracture in talar osteochondral lesions and reported that symptomatic improvement was maintained for up to three years [21]. This suggests that while microfracture is effective initially, its results may stabilize over the long term. Additionally, Rikken et al. emphasized that microfracture is more effective for smaller and superficial lesions, whereas larger and deeper lesions should preferably be treated with mosaicplasty [22].

This study has several limitations. First, it was designed as a retrospective study, which does not provide as strong evidence as prospective, randomized controlled trials. Additionally, the sample size was relatively small, limiting the generalizability of the findings. The follow-up period was also short, providing limited information on long-term outcomes. Future studies with larger sample sizes and longer follow-up periods are needed to confirm and expand upon these findings.

5. CONCLUSION

In conclusion, this study demonstrated the comparative effectiveness of microfracture and mosaicplasty in the surgical treatment of medial talus OCLs that do not heal with conservative treatment. Although mosaicoplasty provides clinically and functionally better results than microfracture, both treatments have been shown to be beneficial in the early period. However, more research is needed to confirm and extend these findings. Future studies should focus on different patient populations and longer follow-up periods to provide more comprehensive information about the effectiveness of these two methods.

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Conflict of Interest

The authors declare no conflicts of interest with respect to the authorship and/or publication of this article.

Ethics Committee Approval

The study protocol was approved by the local ethics committee (No: 2024/138). The study was conducted in accordance with the principles of the Declaration of Helsinki.

Author Contributions

SS, MA, MOY and ZOK contributed to the analysis and interpretation of the data and to the writing and revision of the manuscript. SS and MA performed the surgical operations. ZOK, RED, MOY and SS contributed to data analysis, interpretation and writing. RED and MOY contributed to data collection, analysis and methodology. ZOK, MA,SS and RED contributed to experimental design, data collection and data revision.

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Research Article

Comparison of Intramedullary Nail Fixation and Minimally Invasive Plate Osteosynthesis in Distal Tibial Fractures in Geriatric Patients

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Introduction: Minimally invasive plate osteosynthesis (MIPO) and intramedullary nails are two accepted and effective methods in the treatment of tibial fractures. This study was aimed to evaluate the surgical treatment and complications of distal tibial fractures not related to the ankle joint with MIPO and intramedullary nails in the geriatric group retrospectively.

Materials and Methods: Between 2019 and 2020, 42 patients in the geriatric group with distal tibia fractures that did not extend to the ankle joint and who underwent surgical treatment were evaluated retrospectively. The patients were divided into two groups: those who underwent MIPO and those who underwent osteosynthesis with an intramedullary nail. Patients were evaluated according to JoVVhner Wrush criteria.

Results: This study enrolled 42 patients. The mean age of the patients was 70±3.4 years. 22 of these patients underwent osteosynthesis with intramedullary nailing. MIPO was performed in the treatment of 20 patients. Based on the Johner Wrush criteria, the intramedullary nail group evaluated 16 patients as very good, 5 as good, and 1 as bad. The MIPO group evaluated 15 patients as excellent, 3 as good, 1 as moderate, and 1 as poor.

Conclusion: In geriatric age groups, there was no significant difference in clinical outcomes or complications from surgical treatment of closed tibial distal fractures that do not extend to the ankle joint. Both surgical treatment methods can be applied effectively to geriatric patients.

Keywords: Fracture, Geriatric, Tibia

1. INTRODUCTION

Distal tibia fractures are commonly seen fractures and their incidence is 10-13% among all tibial fractures.[1,2] Distal tibia fractures occur after high-energy trauma. Torsional forces are effective in the formation of distal tibia fractures. After treatment of these fractures, many complications such as malunion, delayed union, nonunion, and wound infection may occur.[3]

Minimally invasive plate osteosynthesis (MIPO) and intramedullary nails are two accepted and effective methods in the treatment of tibial fractures. Both treatment methods have complications. Alignment disorders and anterior knee pain are the most common complications after osteosynthesis with intramedullary nailing. Wound complications can be seen after plate osteosynthesis.[4,5]

The purpose of this study was to evaluate the surgical treatment and complications of distal tibial fractures not related to the ankle joint with MIPO and intramedullary nails in the geriatric group retrospectively.

2. Material Method

This study was approved by the Ethics Committee of Bahcesehir University (Decision No 2022-11/02). All patients provided informed consent. The study includes patients in the geriatric age

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group who were operated on between 2019 and 2020 with a fracture of the distal part of the tibia that did not extend to the ankle joint. Inclusion criteria for the study were geriatric patients with closed distal tibia fractures that did not extend to the ankle joint and who were treated surgically and evaluated with Johner Wrush criteria in their follow-up files. 42 patients who met the criteria of the study were included in the study.[6]

2.1.Surgical technique
2.2.Fixation with intramedullary nail

Surgeries of the patients were performed under a pneumatic tourniquet, and prophylaxis was performed with 1 gram of cefazolin sodium before the surgery. With the knee flexed, longitudinal incisions were made from the midline of the patellar tendon, and the patellar tendon fibers were dissected longitudinally. The entry hole of the nail was opened from the proximal end of the tibia, and the fracture was reduced under fluoroscopy control, the guide wire was sent from the medulla, and the fracture line was passed and sent distally. Appropriate nail lengths were determined over the guide wire. The reaming was performed by sending the medullary reamers over the guide wire. After the reaming process was completed, the appropriate nail was adapted to the medulla. Fixation is completed with locking screws.

2.3.Surgical treatment of MIPO

Surgeries of the patients were performed under a pneumatic tourniquet, and prophylaxis was performed with 1 gram of cefazolin sodium before the surgery. A distal incision was made approximately 4 cm long from the distal medial of the anterior border of the tibia to fit the proximal end of the plate. The plate was retrogradely adapted from distal to proximal subperiostally. After checking the compatibility of the bone and plate under the fluoroscope. Distal and proximal screws were locked, then the other screws were adapted to the plate through 1 cm incisions.

2.4.Post-operative period

Cefazolin sodium and low molecular weight heparin were administered prophylactically to the patients after surgery. Wound care was performed every other day and sutures were removed 15 days after surgery. Isometric quadriceps exercises were started on the first postoperative day. Exercises to provide knee and ankle joint range of motion were started. The patients were evaluated in the outpatient clinic monthly with radiography controls. The presence of callus tissue in 3 cortices was considered a union. During the follow-ups, dynamization was performed between 8 and 16 weeks in 4 patients treated with intramedullary nails. The clinical evaluations of the patients were made according to the Johner Wrush criteria at the last follow-up.

2.5.Statistical analysis

The compliance of the data to normal distribution was tested, and since they were not normally distributed, the Mann-Whitney U test, which is a non-parametric method, was used to compare numerical variables, and the Chi-square-Fisher Exact test was used for categorical data. The value of $p<0.05$ was considered statistically significant in the 95% confidence interval.

3.RESULTS

This study enrolled 42 patients, 16 were female and 26 were male. The mean age of the patients was 70±3.4 years. Patients were divided into two according to treatment intramedullary nail and MIPO group and evaluated retrospectively. 22 of these patients underwent osteosynthesis with intramedullary nailing. MIPO was performed in the treatment of 20 patients.

The mean age in the intramedullary nail group was 72±3.6, and the mean age in the MIPO group

was 68±3.1. The mean follow-up period of the patients was determined as 14.9±2.1 months. According to the Johner Wrush criteria, 31 patients were evaluated as very good, 8 patients as good, 1 patient as moderate, and 2 patients as bad. In the radiological evaluation, union was detected in all but one patient who did not. The patient without union was in the intramedullary nail group and re-operated, debridement was performed for the fracture ends, autografting was performed and fixed with a plate. Union was achieved in the further follow-up of this patient. The mean radiological union time was determined as 11.9±3.1 weeks.

According to Johner Wrush criteria, 16 patients were evaluated to be very good, 5 patients were good and 1 patient was bad in the intramedullary nail group. The mean radiological union time was determined to be 11.7±3 weeks. Nail removal was performed in 4 patients in advanced follow-up. A pulmonary embolism was detected in 1 patient. Superficial infection was seen in 3 patients and they were treated with antibiotics, and no additional surgical intervention was needed. (Table 1)

The union time was determined as 12.4±1.9 months in the MIPO group. According to the Johner-Wrush criteria, 15 patients were evaluated as excellent, 3 patients as good, 1 patient as moderate, and 1 patient as poor. Superficial infection was detected in 4 patients and the patients were treated with antibiotics. Delayed union was detected in 2 patients.

There was no statistically significant difference between the fixation with intramedullary nail and fixation with MIPO in terms of clinical outcomes, infection rates, and union times (p>0.05 for all).

Table 1.
Demographic and clinical parameters of the patients

	All patients (n: 42)	**Intramedullary nail (n: 22)**	**MIPO (n: 20)**
Mean age (years)	70 ± 3.4	72±3.6	68±3.1.
Healing time (weeks)	11.9±3.1	11.7±3	12.4±1.9
Johner Wrush criteria (very good)	31	16	15
Johner Wrush criteria (good)	8	5	3
Johner Wrush criteria (moderate)	1	0	1
Johner Wrush criteria (bed)	2	1	1

MIPO: Minimally invasive plate osteosynthesis.
**p >0.05 for all*

4.DISCUSSION

Mioc et al. showed no statistically significant difference between the two fixation methods according to the results of intramedullary nailing and MIPO comparison in extra-articular distal tibia fractures, but it was stated that the clinical results of the group treated with MIPO were better.[7] Daolagupu et al. compared the results of osteosynthesis with intramedullary nails and plates in extra-articular distal tibia fractures. While the mean time to union was 18.26 weeks in the group fixed with the intramedullary nail, the mean union time was determined as 21.70 weeks in the group fixed with the plate, and there was a statistically significant difference. There were fewer complications in terms of implant irritation, ankle stiffness, and infection in the group that underwent intramedullary nailing compared to the group that underwent osteosynthesis with a plate.[8] According to the results of our study, no significant difference was found between the two techniques in terms of clinical outcomes and complications.

A retrospective comparison of patients with extra-articular distal tibia fractures and those who underwent MIPO fixation and intramedullary nailing were compared. As a result of the study, it was determined that the union time was earlier, the complication rates were lower, and the functional results were better in patients who were fixed with intramedullary nails compared to the MIPO group.[9] As a result of a meta-analysis that evaluated studies with large series, it is stated that intramedullary nail fixation has fewer postoperative complications and may result in faster recovery compared to plate fixation.[10] According to the results of our study, no significant difference was found in terms of union times and complications in both methods.

Skin entrapment is an important problem in distal tibial fractures treated surgically with MIPO, and when such complications occur, plate extraction can be performed after a union is detected.[11] In our follow-ups, no complications related to the entrapment of the skin were detected in the group that underwent osteosynthesis with MIPO, and therefore plate extraction was not performed. The fact that the patients in the group included in our study were a geriatric group and their skin elasticity was high and this may be the reason that there was no skin entrapment complication.

In extra-articular distal tibia fractures after fixation with an intramedullary nail, it causes minimal alignment changes when weight-bearing is applied in the early period and is a reliable method for patients.[12] In the study, early weight bearing was allowed in patients who were fixed with intramedullary nails, and there was no need for surgical treatment secondary to malalignment in follow-ups.

The proximity of tibial intramedullary nail distal locking screw holes to anterior tibial artery variations carries a risk of iatrogenic vascular injury during distal locking. Coronal locking screws carry the greatest risk of iatrogenic injury for laterally located anterior tibial artery variation.[13] We did not detect any anterior tibial artery iatrogenic injury while distal locking was performed during fixation with an intramedullary nail.

Alignment disorders in distal tibia fractures fixed with intramedullary nails may cause limitations in knee and ankle functions. It has been reported that fracture fixation stability is better and malalignment rates are lower after reaming intramedullary nailing and multi-planed distal locking.[14] In our study, reamed nails were used in all surgeries performed using intramedullary nails, and distal locking was multiplanned. We did not detect any malalignment in geriatric patients.

It has been reported that the probability of malunion in tibial distal end fractures with surgical fixation with MIPO is lower than in patients with intramedullary nail fixation.[15] Malunions, which are likely to cause functional problems, require surgical treatment again. In another study, high malrotation rates were found in tibial metaphyseal-diaphyseal fractures treated with the MIPO technique, but it was determined that this finding did not have a significant negative effect on knee and ankle joint functions.[16] No malunion was detected that would require reoperation after the follow-up of the patients treated with both fixation methods. Re-surgery in geriatric patients makes surgical fixation with MIPO superior because it is likely to cause problems in the general condition of the patients, but it is not compatible with the results of this study.

Song et al. mentioned that MIPO would be associated with better functional results and fewer complications.[17] No significant difference was found between complications and functional outcomes in both groups as a result of this study.

Jain et al. detected soft tissue problems in 10 patients at a rate of 22% among 45 patients treated with MIPO.[18] Lau et al. detected late infection in 7 patients among 48 patients treated with MIPO.[19] There was no statistically significant difference between superficial tissue infections of both groups. As a result of this study soft tissue problems are not a disadvantage of fixation with MIPO.

As a result of a study that compared intramedullary nailing and MIPO technique in open tibial fractures, it was determined that the MIPO technique has the same safety as intramedullary nail fixation technique in the treatment of Gustilo-Anderson type I, II, and III-A open tibial shaft fractures.[20] Since open fractures were not included in this study inclusion criteria of the study is limited in determining the effectiveness of both fixation methods on open fractures.

It has been reported that during surgery of the distal tibia with intramedullary nails are exposed to significantly more radiation than those treated with MIPO.[21] Flourocope was used during the surgeries, but the lack of dose measurements limits our study.

5.CONCLUSION

There was no significant difference in clinical outcomes and complications of surgical treatment of closed tibial distal fractures that do not extend to the ankle joint in geriatric age groups with intramedullary nailing and the MIPO method.

Ethics Committee Approval

This study was approved by the Ethics Committee of Bahçeşehir University with decision number 2022-11/02. It is conducted in accordance with the principles of the Helsinki declaration. Informed consent was obtained from patients.

Conflict of Interest

The authors declare that they have no conflict of interest.

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Research Article

The Efficacy of Prismatic Bifocal Spectacle Lenses in Controlling Myopia Progression in Children

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Objective: The progression of myopia can lead to vision impairment and increase the risk of sight-threatening complications. Various treatment methods have been described to control the progression of myopia, including the use of specialized spectacle lenses. This retrospective study aimed to evaluate the efficacy of prismatic bifocal spectacle lenses in controlling the progression of myopia in pediatric patients.

Materials and Methods: Fifty-two eyes of 26 patients who used prismatic bifocal spectacle lenses were retrospectively analyzed. Patients who showed an increase in myopia greater than 0.50 D during the last year of follow-up with single-vision spectacle lenses and whose eyes had a cycloplegic objective refraction measurement of ≥-2.00 D were included in the study. Demographic data of the patients such as age and gender were recorded. The increase in objective spherical equivalent and axial length after one year of using single-vision spectacle lenses were compared with the increase observed after one year of using prismatic bifocal spectacle lenses. The effects of potential variables such as age, sex, baseline myopia degree, and increase in axial length on myopia treatment were investigated.

Results: The mean age of the patients was 11.65 ± 2.70 years. Sixteen patients were male, and 10 patients were female. The increase in mean spherical equivalent after using single-vision spectacle lenses was 1.25 ± 0.76 D, whereas it was 0.24 ± 0.14 D after using prismatic bifocal spectacle lenses and this difference was statistically significant. The increase in mean axial length with single-vision spectacle lenses was 0.66 ± 0.31 mm, whereas with bifocal spectacle lenses it was 0.014 ± 0.015 mm. The difference was also statistically significant. Prismatic bifocal spectacle lenses were found to be more effective in myopia treatment in eyes with high baseline myopia and a higher increase in axial length.

Conclusion: Prismatic bifocal spectacle lenses have been found to be an effective in myopia control, particularly in children with rapid myopia progression. However, further studies with larger sample sizes and longer follow-up periods are needed to fully assess the long-term effects of this treatment method.

Keywords: Axial length, Myopia progression, Prismatic bifocal spectacles, Spherical equivalent

1. INTRODUCTION

Myopia, also known as nearsightedness, presents a significant and growing global health concern. The World Health Organization estimates that by 2050, nearly half of the world's population will be affected by this refractive error.[1] The increasing prevalence of myopia is influenced by various factors, including genetic predisposition, environmental influences such as increased near-work activities and decreased outdoor time.[2] Uncorrected myopia can lead to significant vision impairment and increase the risk of developing sight-threatening complications, such as myopic maculopathy and optic neuropathy.[1,2]

Addressing this issue has become a priority, and researchers have explored various treatment methods to control the progression of myopia, including the use of specialized spectacle lenses, orthokeratology, contact lenses and low-dose

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atropine.[3] Specialized spectacle lenses, such as multifocal and peripheral defocus lenses, work by altering the optical properties of the eye, which effectively slows the elongation of the eyeball and the progression of myopia.[3–5] Extensive research has confirmed the efficacy of these lenses, with major ophthalmic organizations, such as the American Academy of Ophthalmology, recognizing them as a safe and effective intervention.[3]

These lenses are anticipated to play a crucial role in addressing the global challenge of myopia. Bifocal spectacles with a prism component have shown promise in slowing myopia progression by manipulating the optical focus and reducing peripheral hyperopic defocus, a contributor to axial elongation.[6] By creating myopic defocus in the peripheral retina, these specialized bifocal lenses with prisms inhibit elongation of the eyeball and the subsequent increase in myopia.[7–9]

Aim of this study was to evaluate the efficacy of prismatic bifocal spectacle lenses to control the progression of myopia.

2. MATERIALS AND METHODS

The study retrospectively analyzed 52 eyes of 26 patients who used prismatic bifocal spectacle lenses to control the progression of myopia. The study was approved by the Ethics Committee of Sakarya University Faculty of Medicine (10.04.2023/262) in accordance with the Declaration of Helsinki. Informed consent was obtained from all patients' parents.

A prismatic bifocal spectacle lenses made of polycarbonate material were used in the study. The lenses featured a +3.25 D front base curve and a conventional executive bifocal design with a +2.00 D add power. The prescription range encompassed plano to -6.00 D sphere and up to 4.00 D cylinder. A 3-Δ base-in prism was incorporated into the near segment of each lens, resulting in a total of 6 Δ base-in prism (Essilor Myopilux Max, Essilor International S.A.).[10] Incorporating a 6-Δ base-in prism into the near segment effectively neutralized lens-induced exophoria.[6]

Patients who showed an increase in myopia greater than 0.50 D during the last year of follow-up with single-vision spectacles, who were compliant with axial length measurements and whose eyes had a cycloplegic objective refraction measurement of ≥-2.00 D were included in the study. Patients with strabismus, any retinal or anterior segment diseases, or those who had previously undergone other treatment methods for myopia control were excluded from the study. The demographic data of the patients, including age and gender were recorded. During all follow-ups, patients underwent best-corrected visual acuity measurements with Snellen chart, detailed anterior and posterior segment examinations with slit-lamb biomicroscope, as well as cycloplegic refraction and axial length measurements.

The primary outcome variable was the progression of myopia, determined by calculating the change in objective cycloplegic spherical equivalent using an automated refractor (average of 5 measurements, Tonoref II, Nidek Co. Ltd., Japan). Cycloplegia was induced by administering two drops of 1% cyclopentolate, spaced 5 minutes apart. Refraction was measured 30 minutes after the cycloplegia. The increase in objective spherical equivalent after one year of using single-vision spectacle lenses were compared with the increase observed after one year of using bifocal prismatic spectacle lenses. Axial length was measured with optical biometry (average of 5 measurements, IOL Master 500, Zeiss, Carl Zeiss Meditec, Germany) at baseline, after one year of using single-vision spectacle lenses and after one year of using prismatic bifocal spectacle lenses. The change in axial length served

as the secondary outcome variable. To assess the compliance with spectacle lenses, both children and parents were asked whether they paid attention to the child's spectacle-wearing habits.

IBM SPSS Statistics version 24.0 (IBM Corp., Armonk, NY, USA) package software was used for all statistical analyses. The normality of the variables was assessed with the Shapiro-wilk test. As the variables did not show a normal distribution, nonparametric tests such as the Mann–Whitney U test were used to compare changes in spherical equivalent and axial length. The chi-square test was employed to evaluate differences in non-continuous variables. A multiple linear regression analyze was used to evaluate the effects of potential variables such as age, sex, baseline myopia degree, and increase in axial length on myopia treatment. The Pearson correlation test was used to evaluate the relationship between changes in axial length and the progression of myopia. For all statistical analyses, a p value < 0.05 was considered statistically significant. Data were presented as mean ± standard deviation (SD).

3. RESULTS

The mean age of the patients was 11.65 ± 2.70 years (range: 6 to 15). Sixteen (61.5%) patients were male, and 10 (38.5%) patients were female. The mean objective spherical equivalent was 2.53 ± 1.14 D at baseline. After one year of using single-vision spectacle lenses, it was 3.83 ± 1.32 D and after one year of using prismatic bifocal spectacle lenses, it was 4.04 ± 1.27 D. The increase in mean spherical equivalent was 1.25 ± 0.76 D after one year of using single-vision spectacle lenses, compared to 0.24 ± 0.14 D after one year of using prismatic bifocal spectacle lenses, This difference was statistically significant (p<0.001). The increase in spherical equivalent was 0.250 D in 26 (50%) eyes, 0.125 D in 9 (27.3%) eyes, 0.0 D in 6 (11.5%) eyes, 0.375 D in 4(7.7%) eyes and 0.50 D in 7(13.5%) eyes. No eyes experienced an increase exceeding 0.50 D.

The mean axial length was 23.47 ± 0.36 mm at baseline. After one year of using single-vision spectacle lenses, it was 24.13 ± 0.07 mm and after one year of using prismatic bifocal spectacle lenses, it was 24.15 ± 0.07 mm. Similarly, the increase in mean axial length was 0.66 ± 0.31 mm with single-vision spectacle lenses and 0.014 ± 0.015 mm with prismatic bifocal spectacle lenses. This difference was also statistically significant (p<0.001). The increase in axial length was 0.0125 mm in 25 (48.1%) eyes, 0.0163 mm in 9 (17.3%) eyes, 0.050 mm in 7 (13.5%) eyes, 0.200 mm in 6 (11.5%) eyes, and 0.11 mm in 1 (1.9%) eyes. Figures 1 and 2 show the changes in objective spherical equivalent and axial length.

Multiple linear regression analysis revealed that baseline myopia (higher baseline myopia was associated with a greater treatment effect, p=0.016) and increase in axial length (a higher increase in axial length was associated with greater treatment effect, p=0.036) were both statistically significantly associated with the treatment effect. Age and sex did not show a significant association with the effect of treatment. As expected, the progression of myopia showed a significant correlation with increase in axial length (p<0.001, r=0.52).

4. DISCUSSION

The management of myopia, a prevalent and potentially sight-threatening refractive error, has been a subject of extensive research in recent years.[11,12] Among the various interventions explored, prismatic bifocal spectacle lenses have emerged as a promising option for slowing the progression of myopia, particularly in children.[11] Numerous studies have demonstrated the effectiveness of prismatic bifocal spectacle lenses in controlling the progression of myopia.[6,8–10,12,13]

Figure 1.

The changes in mean objective spherical equivalent

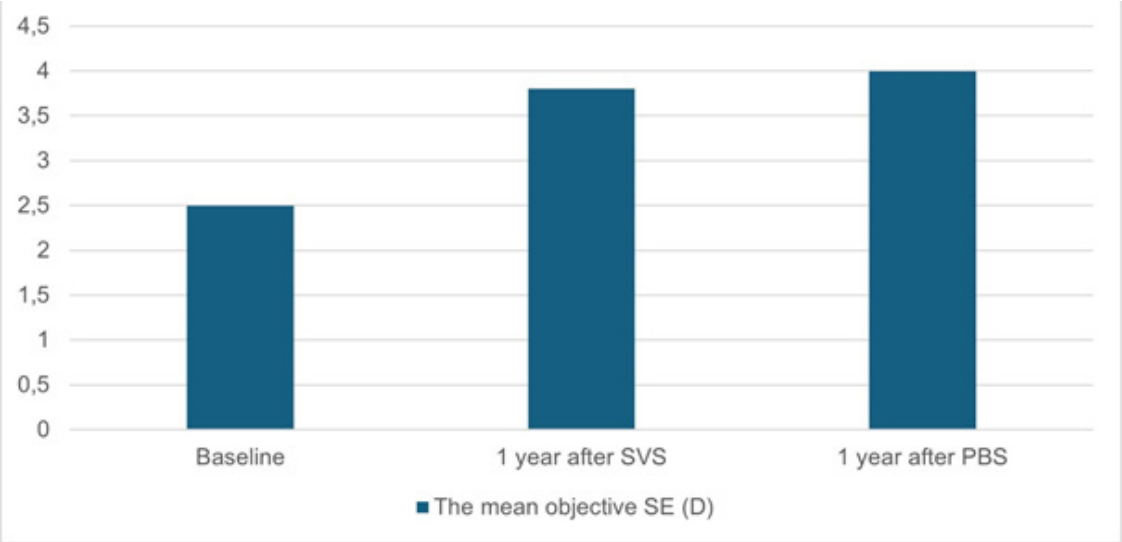
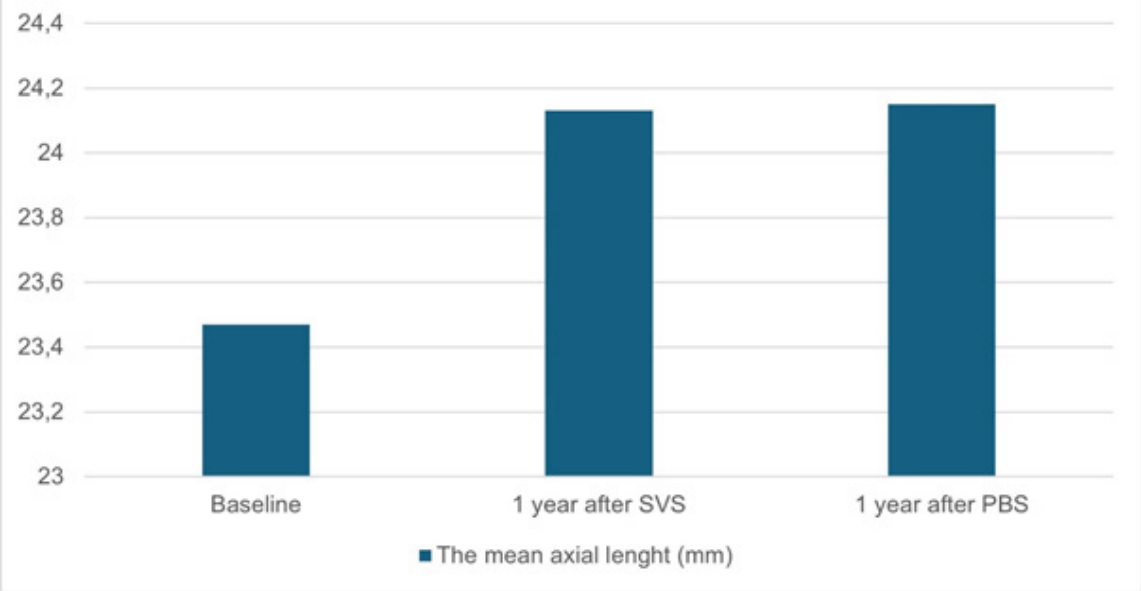


Figure 2.

The changes in mean axial length



Similar to previous studies, prismatic bifocal spectacle lenses were found to be effective in controlling myopia progression after one year of using, compared to single-vision spectacle lenses in same patients in our study.

Axial length measurement provides a quick and objective assessment of myopia progression. Studies have demonstrated that bifocal spectacles are particularly effective in treating myopia in eyes with rapid axial elongation.[10,14] Our results align with these findings, showing that axial elongation is a crucial factor in myopia progression. The treatment effect of prismatic bifocal spectacle lenses was found to be most pronounced during the first year in slowing myopia progression.[10] Huang et al. [15] reported a treatment effect of 0.34 D with prismatic bifocals in the first year.

Similarly, Leung at all[16] and Cheng at all.[10] observed comparable treatment effects with prismatic bifocal spectacles. Our findings were consisted with these results, showing that prismatic bifocals are effective in managing rapid myopia progression during the initial year of treatment. Executive bifocal lenses may be more effective than multifocal lenses in controlling myopia[10]. This could be because the distinct segment line in executive bifocals encourages children to use the appropriate portion of the lens for near work. In contrast, children wearing multifocal lenses may not consistently use the near-addition portion for reading.[17] Additionally, the full-width positive power in the lower portion of executive bifocal lenses might contribute to their effectiveness by creating a wider field of peripheral myopic defocus.[7,8]

The mechanisms through which bifocal prismatic lenses work to control myopia progression are multifaceted. The prismatic component of these lenses induces a relative peripheral hyperopic defocus, which has been shown to inhibit axial elongation.[6,8,10] This peripheral defocus acts to counteract the myopic peripheral defocus that is often associated with the development of myopia. Additionally, the bifocal design of these lenses can reduce the demand for accommodation, which has also been linked to myopia progression.[9,18,19] By addressing both the peripheral defocus and accommodation aspects, bifocal prismatic lenses effectively target key factors contributing to the development and progression of myopia. In our study similar to previous studies, we found that axial elongation was slower in those using prismatic bifocal spectacle lenses compared to those using single vision spectacle lenses.

Given the high accommodation convergence to accommodation ratios observed in myopic children, those with orthophoria and exophoria who wear positive lenses may experience a significant shift towards exophoria.[20,21] This shift increases the demand for positive fusional vergence. Research suggests that this disrupted oculomotor balance could diminish the effectiveness of positive-lens treatments.[6] Subsequent studies have indicated that incorporating near base-in prism when prescribing near additions for myopic children can mitigate the exophoria induced by positive lenses.[6] Therefore, we chose to use bifocal glasses with added prisms.

The limitations of the study were the absence of accommodation measurement, which could have provided insights into the adaptive responses of participants using prismatic bifocal lenses and the lack of measurement of outdoor activities and near work durations. Additionally, the study solely focused on prismatic bifocal spectacle lenses, limiting the exploration of other types of lenses or interventions that could potentially affect myopia control differently. One strength of the study was the use of the same patients throughout the investigation. This approach helped to control for variables such as outdoor activities and near work, which were assumed to have similar characteristics.

In conclusion, the findings indicated that prismatic bifocal spectacle lenses have the potential to decelerate myopia progression in children with high rates of myopic progression. However, prospective studies with larger sample sizes and longer follow-up periods are needed to further investigate this topic.

Ethical Approval

Ethics committee approval dated 10.04.2023 and numbered 262 was obtained from Sakarya University Faculty of Medicine Non-Interventional Ethics Committee.

Conflict of Interest

The authors declare that they have no conflict of interest.

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Case Report

A Case of Autoimmune Encephalitis Presenting with CASPR-2 Antibody Positivity

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Objective: In parallel with the increase in awareness about the disease the number of patients diagnosed with autoimmune encephalitis has been increasing in recent years. Diagnosis is delayed in cases of autoimmune encephalitis where symptoms such as fever, neck stiffness, nausea, vomiting and confusion, which we are used to seeing in central nervous system infections, are more in the background and cognitive disorders, behavioral problems and psychiatric findings are at the forefront. The prognosis is good with early diagnosis and treatment especially in cases with the formation of antibodies against cell surface antigens.

Methods: In this article a case of autoimmune encephalitis with Contactin-related protein-2 (CASPR-2) antibody positivity, which is in the group of autoimmune encephalitis with the formation of antibodies against cell surface antigens is presented.

Results: Our patient responded well to immunotherapy, no recurrence was observed during the following 1 year and no malignancy was detected.

Conclusion: In patients presenting with confusion, epileptic seizures, hallucinations and non-specific sensory symptoms during a subacute process autoimmune encephalitis should be considered in the differential diagnosis. The chance for early diagnosis and treatment should not be missed.

Keywords: Autoimmune encephalitis, Contactin-Related Protein-2 (CASPR-2), Early diagnosis and treatment

1. INTRODUCTION

Central nervous system (CNS) infections can be grouped under four headings: inflammation of the meninges (meningitis), inflammation of the brain parenchyma (encephalitis), inflammation of the brain parenchyma with a limited area around it (abscess) and inflammation of vascular structures (vasculitis/phlebitis). Encephalitis is mainly divided into two categories: infectious and autoimmune. Fever, headache, nausea, vomiting, altered consciousness, neck stiffness, meningeal irritation findings, focal neurological findings, epileptic seizures which are frequently seen in CNS infections may have an insignificant course in autoimmune encephalitis.[1,2] Subacute course, vagueness of clinical findings, difficulties in differential diagnosis, occasional confusion with psychiatric diseases and the late results of related antibody panels cause delays in the diagnosis and treatment of autoimmune encephalitis. Autoimmune encephalitis is divided into two main groups: syndromes associated with antibodies against neuron surface antigens or intracellular antigens. There are some differences between these two groups. Forms associated with neuron surface antigens are less associated with malignancy and respond better to immunotherapy. Autoimmune encephalitis with contactin-associated protein-2 (CASPR-2) antibody positivity are among the syndromes associated with neuron surface antigens and their prognosis is generally good.[3]

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This case report aims to draw attention to encephalitis with CASPR-2 antibody positivity due to delays in diagnosis.

2. CASE REPORT

A 39-year-old male patient was admitted to the emergency room on July 15, 2023 with complaints of meaningless speech, confusion and seizures. His complaints started approximately 1 month before he applied to our hospital. He had difficulty in finding words. Then absence seizures lasting for a few seconds were added and progressed over the days. His communication with his environment decreased, his reaction time increased, memory problems were added, absence seizures became more frequent, meaningless speech and complaints of repeating the same word were added. 2-3 weeks after the onset of complaints, he had a short-term attack accompanied by involuntary contractions in the arms and legs and loss of consciousness after screaming in his sleep. He applied to various polyclinics with these complaints. He was referred to the Internal Medicine unit upon detection of high blood sugar and was diagnosed with Diabetes Mellitus (DM). During this period, he applied to the Brain Surgery unit due to pain starting from his left arm and radiating to his neck, cranial and cervical Magnetic Resonance Imaging (MRI) were performed, no pathology was detected. Electroencephalography (EEG) performed at an external center on 12.07.2023 revealed "15-20 seconds 1-2 Hz spike slow wave activity" after hyperventilation (Figure-1) and anti-seizure treatment (valproate 1000 mg/day) was started. His medical history included newly diagnosed DM, hypertension (HT) and smoking 1 pack/day for 10 years. He did not describe substance use or exposure to toxins.

On his first admission to the emergency room, his fever was 36.7 C°, his blood sugar was 197 mg/dl and his electrocardiogram (ECG) was in normal sinus rhythm. His neurological examination revealed confusion. He was able to produce words but he was repeating the same words. He did not understand simple commands. His naming was impaired. There was no neck stiffness. Cranial nerves were intact. His motor examination was normal. Deep tendon reflexes (DTR) were normoactive. The plantar reflex was bilaterally flexor. Routine laboratory tests were normal. Sedimentation and C reactive protein (CRP) were within normal values. No pathology was detected in the first brain computed tomography taken in the emergency room on 15/07/2023. In the cranial MRI, a hyperintense area was seen in the medial part of the left temporal lobe in the diffusion sequence. The image was isointense in the Apparent Diffusion Coefficient (ADC) sequence (Figure-2). Lumbar puncture was unremarkable. No cells were seen in the cerebrospinal fluid (CSF). Glucose in CSF was 104 mg/dl (simultaneous blood sugar was 122 mg/dl), protein was 21 mg/dl, Na was 144 mmol/liter, K was 2.6 mmol/liter. Viral meningitis and autoimmune encephalitis panels were performed. After the evaluation in the emergency room, CNS infection, autoimmune encephalitis, post-ictal confusion, metabolic encephalopathy due to hyperglycemia, encephalopathy due to substance use, exposure to toxic substances, cerebrovascular disease and conversion disorder were considered, and the patient was admitted to the Neurology ward. No significant pathology was seen in the first contrast-enhanced cranial MRI taken on 17/07/2023. In the 2nd contrast-enhanced cranial MRI taken on 21/07/2023, mild contrast enhancement was seen in the medial part of the left temporal lobe (Figure-3). Both EEG's taken in our hospital were normal. On the 3rd day of his admission to our clinic his comprehension was completely impaired, agitation developed and his speech consisted entirely of word repetitions.

Visual hallucinations were added to the picture during his hospitalization. During the morning visit he stated that someone he did not know sat in the chair next to him and then got up and left. The patient was evaluated by the Psychiatry unit. Since the content of the hallucinations were "vivid hallucinations incompatible with psychotic hallucinations" psychotic disorder was not considered at the forefront. It was recommended to continue investigating organic causes. During his follow-up in the clinic complex partial seizures accompanied by oroalimentary automatism in the mouth and forced head-eye deviations of less than 1 minute were observed. After the adjustment of anti-seizure medication the seizures decreased and stopped. He complained of a burning sensation in his head. 1000 mg/day intravenous methylprednisolone treatment for 5 days was given with a preliminary diagnosis of possible autoimmune encephalitis. After the symptoms improved, the patient was discharged with recommendations. Contrast-enhanced thoracic and abdominal computed tomography (CT) scans for malignancy screening were normal. Tumor markers were negative. In the outpatient clinic follow-up his clinical condition was good, he had no new complaints and no treatment was given. Cranial MRI and EEG taken during the follow-up were normal. The viral and bacterial meningitis panel that ended after discharge was negative. CASPR2 positivity was detected in the autoimmune encephalitis panel studied from the serum.

Figure 1.

In the EEG taken in an external center, "15-20 seconds of 1-2 Hz spike slow wave activity after hyperventilation" was detected

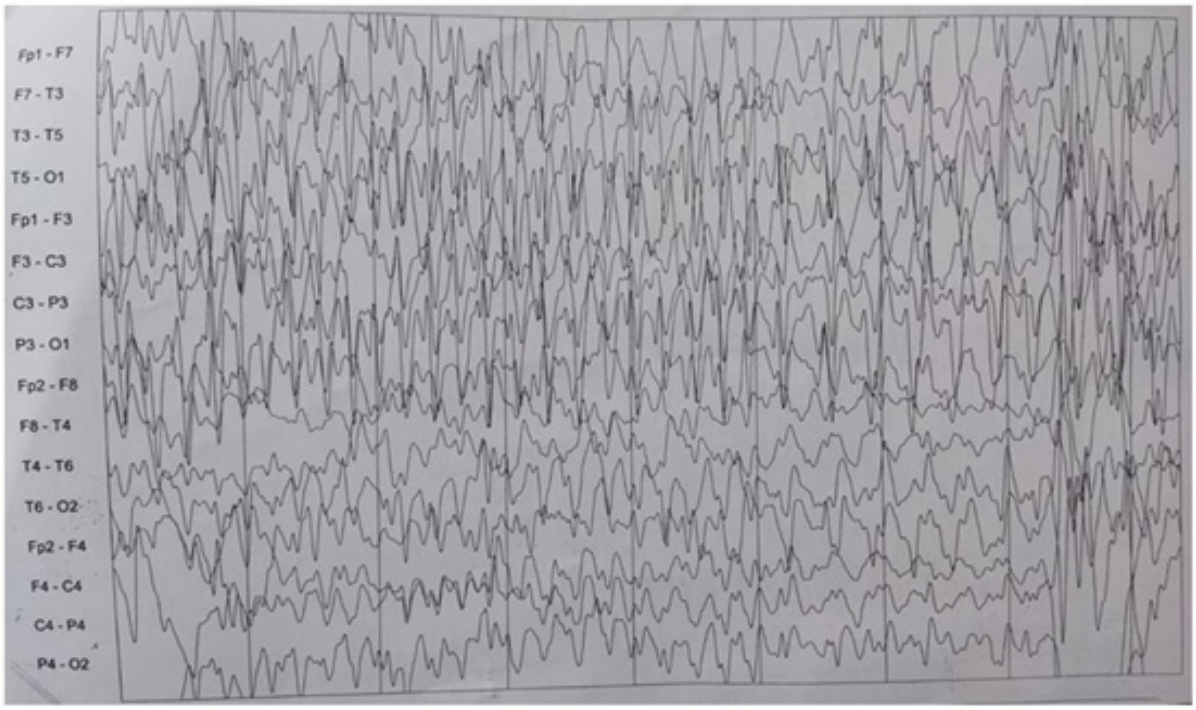


Figure 2.

A hyperintense area was seen in the medial part of the left temporal lobe in diffusion MRI. Its counterpart was isointense in the ADC sequence

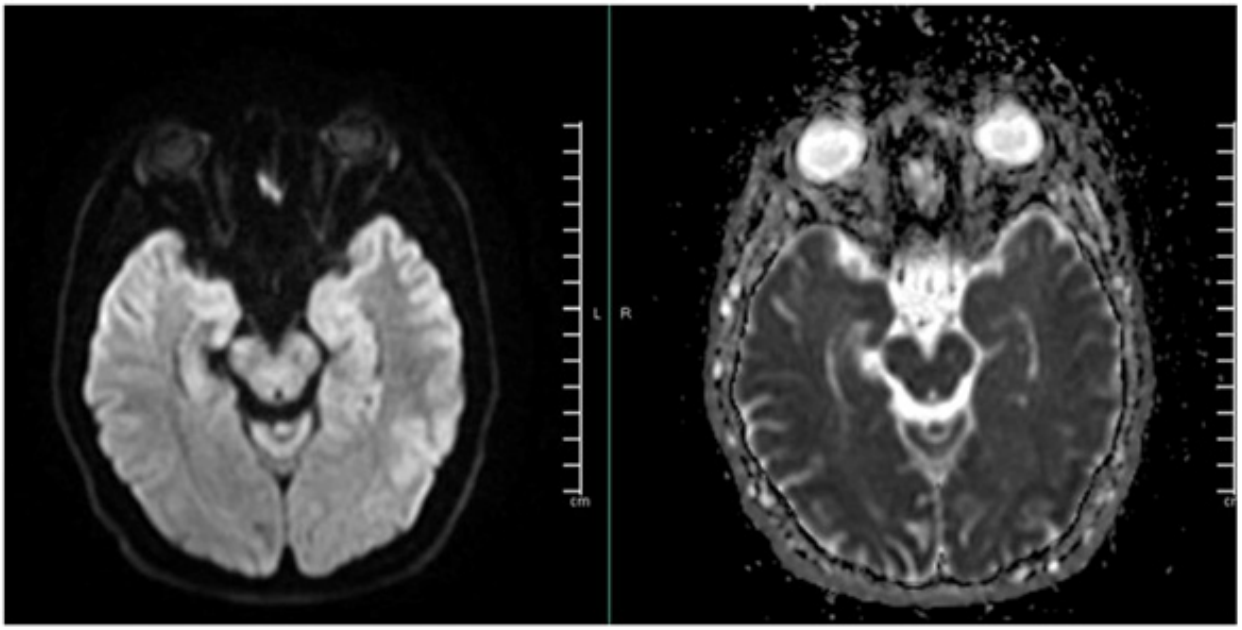
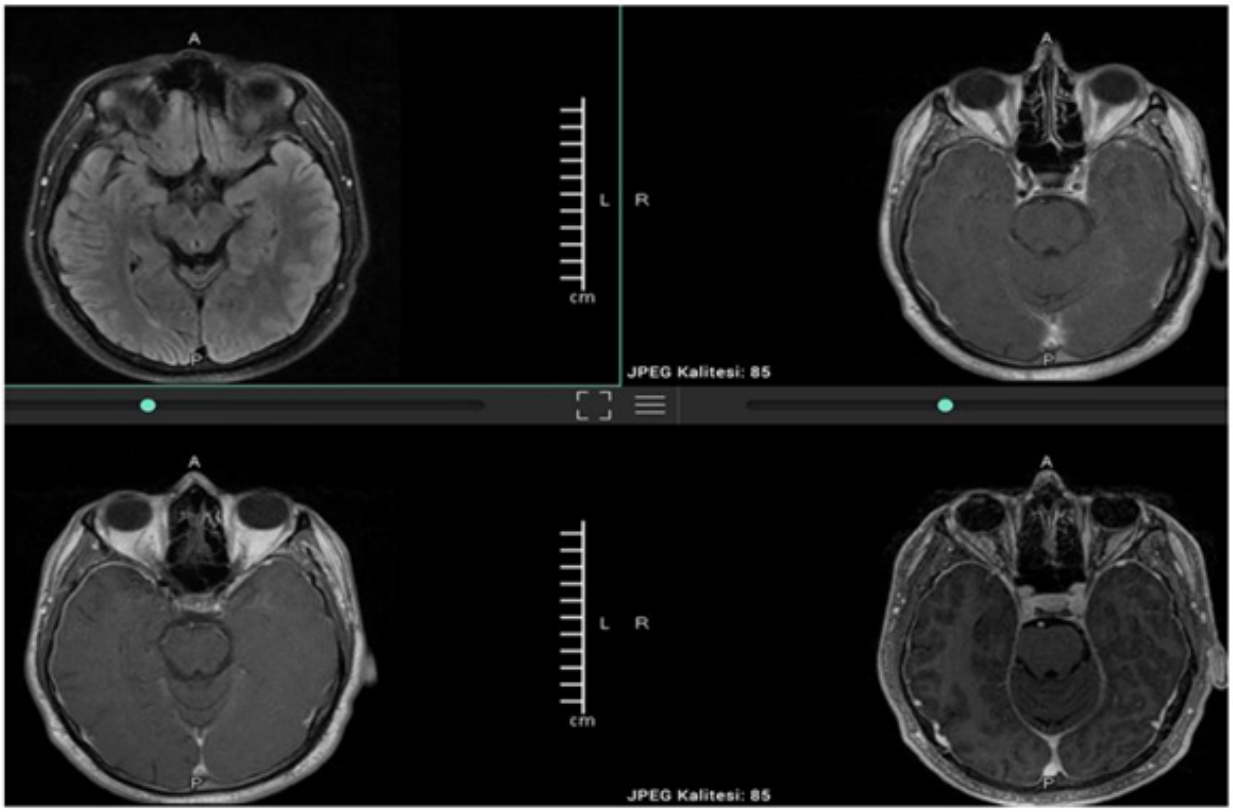


Figure 3.

Contrast-enhanced MRI showed mild contrast enhancement in the medial part of the left temporal lobe



3. DISCUSSION

Delays in the diagnosis and treatment of autoimmune encephalitis have brought the definition of "possible autoimmune encephalitis" to the agenda. Possible autoimmune encephalitis diagnostic criteria can be grouped under three main headings. The first is subacute (less than 3 months) memory loss, mental status change or psychiatric findings. For the second item, new focal CNS findings, new-onset seizures, CSF pleocytosis (WBC>5 cells/mm^3) and at least one of the encephalitis findings on cranial MRI must be present. The third item includes the exclusion of other causes that would cause these findings.[4]

CASPR2 is a cellular adhesion molecule in the neuroxin family. It is associated with ankyrin protein called 4.1B and PDZ binding motif with its C-terminal end.[5] It is located in the juxta-paranodal region of Ranvier node on the axon. CASPR2, contactin2 protein and potassium (K) channels form the voltage-sensitive K channel complex.[5–7] It is thought that the blockage of the relationship between CASPR2 and contactin-2 due to the formation of antibodies is involved in the pathogenesis of the disease. Due to this blockage the expression of K channels is impaired. This causes a an increase in the expression of K channels in some regions such as hippocampus and decrease in the expression of K channels in some regions such as the dorsal root ganglion. This is thought to lead to hyperexcitability and seizures.[8] Voltage-gated potassium channels (VGKC) are associated with the repolarization of the synaptic membrane. Blockage of these channels causes excitability in the nerves.[9] CASPR2 is abundant in the limbic system, basal ganglia, other motor areas, sensory pathways and especially the temporal lobe. The widespread presence of CASPR2 in both the CNS and peripheral nervous system (PNS) leads to the observation of different clinical findings related to the disease. These findings can be listed as ataxia, epilepsy, psychiatric symptoms, encephalitis, Morvan syndrome, neuropathic pain and Isaac syndrome.[10] Morvan Syndrome is an autoimmune disease that can affect the CNS, PNS and autonomic nervous system (ANS). Symptoms such as neuromyotonia (cramps, rigidity, fasciculation), seizures, fever, encephalopathy, insomnia, dysautonomic signs, especially hyperhidrosis and cardiovascular instability, neuropathic pain, skin lesions or pruritus may be observed.[11-12] Isaac syndrome is an acquired peripheral nerve hyperexcitability. Its main findings can be summarized as myokymia, cramps, fasciculation, twitching, rigidity and pseudomyotonia. Muscle activity may continue even when the patient is asleep. This condition can cause muscle hypertrophy. Dysautonomia (hyperhidrosis, sialorrhea), Trousseau and Chvostek signs may also be present, sensory findings are rare, reflexes are usually normal. Symptoms are usually insidious and develop over years.[13,14]

In a multicenter retrospective study of 25 cases of CASPR encephalitis, it was seen that the disease was mostly seen in men (68%), and the age of symptom onset was 42. The average time from the onset of complaints to admission of hospital was 17 days, ranging from 2 days to 6 months. Fever was the initial symptom in 6 of the patients. The most common symptom was cognitive impairment, seen in 17 of 25 patients. 8 patients met the criteria for limbic encephalitis. 6 of the 8 patients diagnosed with limbic encephalitis had epileptic seizures. 4 patients were diagnosed with Morvan syndrome. All patients had positive anti-CASPR-2 antibodies in serum. Antibodies were shown in both CSF and blood in 6 patients. White blood cells were high in CSF in 8 patients. While 10 patients had high protein levels in CSF, 7 patients had low protein levels and

8 patients had normal protein levels in CSF. Slow background activity and epileptic patterns were observed as EEG findings. Cranial MRI showed abnormal signal increase in bilateral hippocampus in 3 patients with cognitive impairment. Positron emission tomography (PET-CT) showed increased metabolism in bilateral basal ganglia and mesial temporal lobe in 1 patient with limbic encephalitis. Relapse was observed in 4 out of 25 patients after 2 months. This study showed that both CNS and PNS findings are seen in CASPR-2 encephalitis. Lung tumor was detected in only 1 patient and there was a good response to immunotherapy.[10] In our case confusion, hallucinations, epileptic seizures and sensory symptoms such as numbness in the left arm at the beginning of the complaints, burning in the head were observed during the hospitalization, and these were consistent with the literature. It is known that the diagnosis process of the disease can take up to 6 months. Our patient who applied to our clinic 1 month after the onset of his complaints was diagnosed quickly. The patient responded well to immunotherapy, no recurrence was observed during the following 1 year and no malignancy was detected.

In patients presenting with confusion, epileptic seizures, hallucinations and non-specific sensory symptoms during a subacute process autoimmune encephalitis should be considered in the differential diagnosis. It should be remembered that the prognosis is good especially in those with antibody formation against surface antigens. The chance for early diagnosis and treatment should not be missed. Due to the late results of autoimmune encephalitis-related antibody panels the diagnostic criteria for "possible autoimmune encephalitis" should be known and treatment should be started before the antibody panel is completed in clinically appropriate cases. Due to its association with malignancies, malignancy screening should also be performed while the diagnosis and treatment process is ongoing. It should not be forgotten that relapses may be seen and tumors may be detected in the post-disease period, patients should be closely monitored in this regard during outpatient clinic follow-up and it should not be forgotten that there may be cases where immunotherapy should be continued for a long time.

There is no conflict of interest between the authors. The type of the study is case report so we did not get ethical approval. The informed consent form was signed by the patient. All off the authors have participated in the design and writing of the manuscript.

Ethical Approval

Presented as an electronic poster (EP-627) at the 59th National Neurology Congress held at Kaya Plaza Hotel, Antalya, December 13-18, 2023.

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Research Article/ Araştırma Makalesi

Bir İlçede Çalışan Öğretmenlerin Siberkondri Düzeyleri ve e-Sağlık Okuryazarlığı Arasındaki İlişki

The Relationship Between Cyberchondria Levels and e-Health Literacy of Teachers Working in a District

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Amaç: Bu araştırmada Sakarya İli Karasu İlçesinde görev yapan öğretmenlerin siberkondri düzeylerini saptamak ve bunun e-sağlık okuryazarlığı ile ilişkisini incelemek amaçlanmıştır.

Gereç ve Yöntemler: Araştırma 18 Ekim 2023 - 31 Aralık 2023 tarihleri arasında 379 öğretmen ile gerçekleştirilmiştir. Veri toplama aracı olarak Kişisel Bilgi Formu, Siberkondri Ciddiyet Ölçeği ve e-Sağlık Okuryazarlığı Ölçeği kullanılmıştır. Anket formu çevrimiçi olarak uygulanmıştır. Araştırmanın bağımlı değişkenlerini öğretmenlerin siberkondri ve e-sağlık okuryazarlığı düzeyleri; bağımsız değişkenlerini ise yaş, cinsiyet, medeni durum, gelir durumu, meslekteki yıl, kronik hastalık varlığı ve süresi, sağlıkla ilgili günlük internette geçirilen süre ve algılanan sağlık durumu oluşturmaktadır.

Bulgular: Çalışmaya katılan öğretmenlerin %55,1'i (n=209) kadın, %80,5'i (n=305) evli, %94,2'si (n=357) kamu çalışanıdır. Öğretmenlerin yaş ortalaması 38,26±7,73 yıldır. %45,9'u (n=174) gelirinin giderinden az olduğunu, %42,2'si (n=160) gelirinin giderine eşit olduğunu ifade etmiştir. Katılımcıların %38,8'ini (n=151) ortaokul öğretmenleri, %29,6'sını (n=112) lise öğretmenleri, %26,1'ini (n=99) ilkokul öğretmenleri, %4,5'ini ise (n=17) anaokulu öğretmenleri oluşturmaktadır. Katılımcıların %86,5'inin (n=328) herhangi bir kronik hastalığı bulunmamaktadır. Kronik hastalığı bulunan katılımcıların ortalama kronik hastalık süresi 14,57±11,37 yıldır. Çalışmaya katılan öğretmenlerin sağlıkla ilgili günlük internette geçirmiş oldukları süre ortalaması 13,51±13,16 dakika; algılanan sağlık durumlarına 0-100 arasında verdikleri puan ortalaması 74,61±16,63'tür. Katılımcıların siberkondri düzeyi ile e-sağlık okuryazarlığı düzeyi arasında pozitif yönlü, zayıf düzeyde ve istatistiksel açıdan anlamlı bir korelasyon saptanmıştır (r=0,221; p<0,001).

Sonuç: Bu araştırmada medeni durum, sağlıkla ilgili internette geçirilen süre ve algılanan sağlık durumunun siberkondri düzeyini etkilediği; cinsiyet, çalışılan kurum, yaş, meslekteki yıl ve sağlıkla ilgili internet kullanım süresinin e-sağlık okuryazarlığı düzeyini etkilediği ortaya konmuştur.

Anahtar Kelimeler: Sağlık hizmeti araştırması, Sağlık okuryazarlığı, Sağlık bilgisi, İnternet, Okul öğretmenleri

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Objective: This study aimed to determine the cyberchondria levels of teachers working in Karasu District of Sakarya Province and to explore its correlation with e-health literacy.

Materials and Methods: The research was carried out with 379 teachers between 18 October 2023 and 31 December 2023. Personal Information Form, Cyberchondria Severity Scale and e-Health Literacy Scale were used as data collection tools. The questionnaire was administered online. The study's dependent variables include teachers' cyberchondria and e-health literacy levels, while the independent variables encompass age, gender, marital status, income status, years in the profession, presence and duration of chronic disease, daily health-related time spent on the internet, and perceived health status.

Results: 55.1% (n=209) of the teachers participating in the study are women, 80.5% (n=305) are married, and 94.2% (n=357) are public employees. The mean age of teachers is 38.26±7.73 years. 45.9% (n=174) stated that their income was less than their expenses, while 42.2% (n=160) indicated that their income was equal to their expenses. 38.8% (n=151) of the participants were secondary school teachers, 29.6% (n=112) were high school teachers, 26.1% (n=99) were primary school teachers, and 4.5% (n=17) were preschool teachers. 86.5% of the participants (n=328) do not have any chronic disease. The average duration of chronic disease of the participants with chronic diseases is 14.57±11.37 years. The average time spent by the teachers participating in the research on the health-related internet on a daily basis is 13.51±13.51±13.16 minutes; The average score they gave to perceived health status between 0-100 was 74.61±16.63. A positive, weak and statistically significant relationship was found between the participants' cyberchondria level and e-health literacy level ($r=0.221$; $p<0.001$).

Conclusion: In this study, marital status, time spent on health-related internet and perceived health status affected the level of cyberchondria; the study revealed that gender, institution of employment, age, years in the profession, and duration of health-related internet use are factors affecting the level of e-health literacy.

Keywords: Healthcare research, Health literacy, Health knowledge, Internet, School teachers

EXTENDED ABSTRACT

Background

The internet is one of the fundamental components of modern technology. According to data from the Turkish Statistical Institute (TURKSTAT), while internet usage rates were 48.9% in 2013, this rate increased to 87.1% in 2023. With the increase in internet usage over time, the question of what purposes individuals use the internet for has become a subject of research. One such purpose is accessing health-related information. According to TURKSTAT 2023 data, the rate of internet usage for the purpose of "searching for health-related information (such as injuries, diseases, nutrition, improving health)" was 66.3% in 2023. These increases in health-related internet use highlight the concepts of cyberchondria and e-health literacy. Rising levels of cyberchondria may lead to increased anxiety and concern about health among individuals. Low e-health literacy can result in an increase in incorrect health behaviors as individuals may fail to assess the accuracy of the information they find online. Therefore, research on these two concepts has become a significant issue in the current technological era.

Purpose

This study aimed to determine the cyberchondria levels of teachers working in Karasu District of Sakarya Province and to examine its relationship with e-health literacy.

Materials and Methods

This research is descriptive in nature. Data collection was carried out with 379 teachers between October 18, 2023, and December 31, 2023. The data collection tools used were the

Personal Information Form, the Cyberchondria Severity Scale (CSS), and the e-Health Literacy Scale (e-HEALS). The CSS is a 5-point Likert scale consisting of 33 items and 5 sub-dimensions. The CSS is a continuous scale with no cut-off point. The lowest possible score on the scale is 33, and the highest is 165. The e-HEALS is a 5-point Likert scale consisting of 12 items and 3 sub-dimensions. The lowest possible score on the scale is 12, and the highest is 60.

The survey was administered online. The dependent variables of the study are the teachers' levels of cyberchondria and e-health literacy; the independent variables are age, gender, marital status, income level, years in the profession, presence and duration of chronic illness, daily time spent on health-related internet use, and perceived health status.

Results

Among the teachers participating in the study, 55.1% (n=209) are female, 80.5% (n=305) are married, and 94.2% (n=357) are public employees. The average age of the teachers is 38.26±7.73 years. 45.9% (n=174) reported that their income is less than their expenses, and 42.2% (n=160) reported that their income equals their expenses. 38.8% (n=151) of the participants are secondary school teachers, 29.6% (n=112) are high school teachers, 26.1% (n=99) are primary school teachers, and 4.5% (n=17) are kindergarten teachers. 86.5% (n=328) of the participants do not have any chronic disease. The average duration of chronic disease among those with chronic conditions is 14.57±11.37 years. The average time spent daily on health-related internet use by the teachers is 13.51±13.16 minutes; the average score given to their perceived health status, on a scale of 0-100, is 74.61±16.63.

The mean total score of the CSS was found to be 76.13±19.27. The average total score of the CSS was higher among married participants (77.14±19.47) compared to singles (71.96±17.95), and this difference was statistically significant (p=0.027). No statistically significant relationships were found between the participants' CSS total scores and gender, income level, sector, institution of employment, or presence of chronic disease (p=0.051; p=0.083; p=0.228; p=0.295; p=0.801). A negative, weak, and statistically significant correlation was found between the participants' CSS total scores and their perceived health status (r=-0.206; p<0.001).

The mean total score of the e-HEALS was found to be 41.34±6.73 (median: 42; minimum: 12; maximum: 60). The average total score of the e-HEALS was higher in women (42.41±5.79) compared to men (40.03±7.56), and this difference was statistically significant (p=0.012). A statistically significant relationship was found between the participants' e-HEALS total scores and the institution they work for (p=0.021). A negative, weak, and statistically significant correlation was found between participants' e-HEALS total scores and age (r=-0.151; p=0.003). A negative, weak, and statistically significant correlation was found between the e-HEALS total score and years in the profession (r=-0.131; p=0.011). A positive, weak, and statistically significant correlation was found between the participants' e-HEALS total scores and the time they spend daily on health-related internet use (r=0.172; p=0.001).

A positive, weak, and statistically significant correlation was found between the participants' levels of cyberchondria and e-health literacy (r=0.221; p<0.001).

Conclusion

This study found that marital status, time spent on health-related internet use, and perceived

health status affect the level of cyberchondria. Additionally, it was determined that gender, institution of employment, age, years in the profession, and duration of health-related internet use affect the level of e-health literacy.

1. GİRİŞ

İnternet, günümüz teknolojilerinin temel bileşenlerinden biridir. Türkiye İstatistik Kurumu (TÜİK) Hanehalkı Bilişim Teknolojileri Kullanım Araştırması 2023 yılı verilerine göre Türkiye'de 16-77 yaş grubu bireylerde internet kullanım oranları 2013 yalında %48,9 iken 2023'te bu oran %87,1'e yükselmiştir. İnternete erişim imkânı olan hane oranı ise 2012 yalına kıyasla yaklaşık 2 kat artış göstererek %95,5 olmuştur.[1] İnternet kullanımının zaman içerisinde artışı ile bireylerin interneti hangi amaçlarla kullandıkları sorusu da araştırma konusu hâline gelmiştir. Geçmişi 1960'a kadar uzanan bu teknolojinin zaman içerisindeki gelişimi ile kullanım amaçları da çeşitlilik kazanmıştır. Bu amaçlardan biri de sağlık bilgisine erişimdir. TÜİK 2023 verilerine göre "Sağlıkla ilgili bilgi arama (yaralanmalar, hastalıklar, beslenme, sağlığın iyileştirilmesi gibi)" amacıyla internet kullanım oranının 2023 yılında %66,3 olduğu görülmüştür.[1] Sağlıkla ilgili internet kullanımındaki bu artışlar bazı güncel kavramları beraberinde getirmektedir. Siberkondri ve e-sağlık okuryazarlığı da bu kavramlar arasında yer almaktadır.

Siberkondri, Starcevic ve Berle tarafından "Bireyin kendi sağlığı için aşırı endişe duymasına bağlı olarak sanal ortamda sağlıkla ilgili aşırı tekrara kaçan aramalar yapması davranışı" olarak tanımlanmıştır.[2] Artan siberkondri düzeyi bireylerde sağlıklarıyla ilgili kaygı ve endişenin artmasına, bireylerin gereksiz sağlık harcaması yapmalarına ve bunun sonucunda finansal zarara neden olabilmektedir.[3] Ayrıca artan siberkondri düzeyi sağlık hizmetlerinin kullanımda artışa neden olarak, ciddi bir ekonomik yük oluşturmaktadır.[3, 4]

E-sağlık okuryazarlığı kavramı "Elektronik kaynaklardan sağlık bilgilerini arama, bulma, anlama, değerlendirme ve elde edilen bilgileri bir sağlık sorununu ele almak veya çözmek için uygulama yeteneği" olarak tanımlanmıştır.[5]

Sağlıkla ilgili bilgilere erişim için internetin artan kullanımına karşın, internette yer alan bu bilgilerin güvenirliğinin tartışılması e-sağlık okuryazarlığının önemine dikkat çekmektedir. E-sağlık okuryazarlığının düşük olması bireylerin internette ulaştıkları bilgilerin doğruluğunu değerlendiremeyerek yanlış teşhis-tedavi ve hatalı sağlık davranışlarında artışa neden olabilmektedir.[6]

Bu araştırmanın amacı Sakarya İli Karasu İlçesinde anaokulu, ilkokul, ortaokul ve liselerde görev yapan öğretmenlerin siberkondri düzeylerini saptamak ve bunun e-sağlık okuryazarlığı ile ilişkisini incelemektir.

2. GEREÇ&YÖNTEM

Bu araştırma tanımlayıcı tipte bir araştırmadır. Araştırmanın veri toplama aşaması 18 Ekim 2023–31 Aralık 2023 tarihleri arasında gerçekleştirilmiştir. Haziran 2023'te Karasu İlçe Milli Eğitim Müdürlüğü'ne bağlı görev yapan 1051 öğretmen bulunmaktadır. Bu araştırmada herhangi bir örneklem seçimine gidilmemiş olup evrenin tamamına ulaşılması hedeflenmiştir.

Araştırmada veri toplamak için; literatür taraması sonucu oluşturulan Kişisel Bilgi Formu, McElroy ve Shevlin tarafından 2014 yılında geliştirilen ve 2018 yılında Süleyman Utku Uzun ve arkadaşlarının Türkçe geçerlik ve güvenirliğini yaptığı "Siberkondri Ciddiyet Ölçeği (SCÖ)" ile Chiang, Yang, Hsu tarafından 2015 yılında geliştirilen ve 2018 yılında Şeymanur Şenyurt ve arkadaşlarının Türkçe geçerlik ve güvenirliğini yaptığı "e-Sağlık Okuryazarlığı Ölçeği" kullanılmıştır.[7-10]

SCÖ 33 önermeden oluşan 5'li Likert tipinde (1-Hiçbir zaman, 2-Nadiren, 3-Bazen, 4-Genellikle, 5-Her zaman) ve 5 alt boyuttan oluşan bir ölçektir. Ölçeğin alt boyutlarından "Zorlantı" alt boyutu 8 maddeden, "Aşırı kaygı" alt boyutu 8 maddeden, "Aşırılık" alt boyutu 8 maddeden, "İçini rahatlatma" alt boyutu 6 maddeden, "Doktora güvensizlik" alt boyutu 3 maddeden oluşmaktadır. "Doktora güvensizlik" alt boyutunu oluşturan sorular ters puanlanmaktadır. SCÖ sürekli bir ölçektir ve kesme noktası bulunmamaktadır. Her bir sorudan elde edilen puanlar toplanarak kişinin toplam siberkondri puanı hesaplanmaktadır. Ölçekten en düşük 33 puan, en yüksek 165 puan alınabilmektedir.

E-Sağlık Okuryazarlığı Ölçeği (e-SOYÖ) 12 önermeden oluşan 5'li Likert tipinde (1-Kesinlikle katılmıyorum, 2-Katılmıyorum, 3-Orta derecede katılmıyorum, 4-Katılıyorum, 5-Kesinlikle katılıyorum) ve 3 alt boyuttan oluşan bir ölçektir. Ölçeğin alt boyutlarından "İşlevsel" alt boyut 3 maddeden, "Eleştirel" alt boyut 5 maddeden ve "İnteraktif" alt boyut 4 maddeden oluşmaktadır. Her bir sorudan elde edilen puanlar toplanarak kişinin e-SOYÖ toplam puanı hesaplanmaktadır. Ölçekten en düşük 12 puan, en yüksek 60 puan alınabilmektedir.

Katılımcılara uygulanacak anket formu Google Formlar (internet tabanlı anket) üzerinden hazırlanarak anket linki mesaj yoluyla katılımcılara iletilmiştir. Araştırma formunun başında yer alan bilgilendirilmiş onam formunun onaylanması ile katılımcıların onamları alınmıştır. Araştırmaya Karasu İlçe Milli Eğitim Müdürlüğü'ne bağlı okullarda görev yapan ve çalışmaya katılım konusunda gönüllü olan öğretmenler dahil edilmiştir. Formların doldurulma süresi ortalama 15 dk sürmüştür. Araştırmanın bağımlı değişkenlerini öğretmenlerin siberkondri ve e-sağlık okuryazarlığı düzeyleri; bağımsız değişkenlerini ise yaş, cinsiyet, medeni durum, gelir durumu, meslekteki yıl, kronik hastalık varlığı ve süresi, sağlıkla ilgili günlük internette geçirilen süre ve algılanan sağlık durumu oluşturmaktadır.

Araştırmanın etik kurul izni 10.07.2023 tarih ve 21 sayılı toplantıda alınan 4 no'lu karar ile Sakarya Üniversitesi Eğitim Araştırmaları ve Yayın Etik Kurulu'ndan alınmıştır. Araştırma için ölçek sahiplerinden e-posta yoluyla izin alınmıştır. Ayrıca araştırmanın yapılması için Karasu Kaymakamlığı'ndan olur ve Karasu İlçe Milli Eğitim Müdürlüğü'nden izin alınmıştır.

Tanımlayıcı istatistikler, sürekli veriler için ortalama, standart sapma, ortanca, minimum ve maksimum değerleri ile birlikte; kategorik veriler ise sayı ve yüzdelerle birlikte sunulmuştur. Sürekli verilerin normal dağılıma uygunluğu Kolmogorov-Smirnov ve Shapiro-Wilk testleri ile değerlendirilmiştir. Parametrik özellik gösteren iki grubun karşılaştırılmasında t testi, parametrik özellik göstermeyen iki grubun karşılaştırılmasında ise Mann-Whitney U testi kullanılmıştır. Parametrik özellik gösteren ikiden fazla grubun karşılaştırılmasında ANOVA testi, parametrik özellik göstermeyen ikiden fazla grubun karşılaştırılmasında Kruskal Wallis testi kullanılmıştır. Anlamlılığın hangi gruplardan kaynaklandığının saptanması için post-hoc analizler yapılmıştır. Sayısal değişkenler arasındaki ilişkinin incelenmesi için Spearman korelasyon analizi yapılmıştır. Korelasyon gücü açısından r=0,00-0,24 zayıf; 0,25-0,49 orta; 0,50-0,74 güçlü; 0,75-1,00 çok güçlü olarak kabul edilmiştir.

İstatistiksel anlamlılık için %95 güven aralığında, 0,05'in altında bulunan p değerleri anlamlı kabul edilmiştir. İstatistiksel analizler için IBM SPSS (Statistical Package for the Social Sciences, Chicago, IL, USA) programının 21.0 versiyonu kullanılmıştır.

3. BULGULAR

Çalışmaya katılan öğretmenlerin %55,1'i (n=209) kadın, %80,5'i (n=305) evli, %94,2'si (n=357) kamu çalışanıdır. Öğretmenlerin yaş ortalaması 38,26±7,73 yıldır. %45,9'u (n=174) gelirinin giderinden az olduğunu, %42,2'si (n=160) gelirinin giderine eşit olduğunu ifade etmiştir. Katılımcıların %38,8'ini (n=151) ortaokul öğretmenleri, %29,6'sını (n=112) lise öğretmenleri, %26,1'ini (n=99) ilkokul öğretmenleri, %4,5'ini ise (n=17) anaokulu öğretmenleri oluşturmaktadır. Katılımcıların %86,5'inin (n=328) herhangi bir kronik hastalığı bulunmamaktadır. Kronik hastalığı bulunan katılımcıların ortalama kronik hastalık süresi 14,57±11,37 yıldır. Çalışmaya katılan öğretmenlerin sağlıkla ilgili günlük internette geçirmiş oldukları süre ortalaması 13,51±13,16 dakika; algılanan sağlık durumlarına 0-100 arasında verdikleri puan ortalaması 74,61±16,63'tür (Tablo 1).

Katılımcıların sağlıkla ilgili internet kullanım nedenleri değerlendirildiğinde en sık tercih edilen 3 nedenin; internette sağlık/hastalık ve semptom araştırmak (%76,4), sağlık kuruluşundan randevu almak (%70) ve kendi elektronik sağlık kayıtlarına ulaşmak (%38,2) olduğu görülmüştür (Tablo 2).

Katılımcıların SCÖ alt boyutlarından "Zorlantı" alt boyutuna ait puan ortalamaları 12,86±5,92; "Aşırı Kaygı" alt boyutuna ait puan ortalamaları 18,66±6,39; "Aşırılık" alt boyutuna ait puan ortalamaları 24,02±6,38; "İçini Rahatlatma" alt boyutuna ait puan ortalamaları 41,34±6,74 ve SCÖ toplam puan ortalamaları 76,13±19,27 olarak saptanmıştır (Tablo 3).

SCÖ toplam puan ortalamalarının evli olan katılımcılarda (77,14±19,47), bekârlara göre (71,96±17,95) daha yüksek olduğu ve bu farkın istatistiksel olarak anlamlı olduğu bulunmuştur (p=0,027). Katılımcıların SCÖ toplam puanları ile cinsiyet, gelir durumu, sektör, çalışılan kurum ve kronik hastalık varlığı arasında istatistiksel açıdan anlamlı ilişki saptanmamıştır (p=0,051; p=0,083; p=0,228; p=0,295; p=0,801) (Tablo 4).

Katılımcıların SCÖ toplam puanları ile sağlıkla ilgili günlük internette geçirmiş oldukları süre arasında pozitif yönlü, orta düzeyde ve istatistiksel açıdan anlamlı bir korelasyon saptanmıştır (r=0,273; p<0,001). Katılımcıların SCÖ toplam puanları ile algılanan sağlık durumları arasında negatif yönlü, zayıf düzeyde ve istatistiksel açıdan anlamlı bir korelasyon saptanmıştır (r=-0,206; p<0,001). Katılımcıların SCÖ toplam puanları ile yaş, meslekteki yıl ve kronik hastalık süreleri arasında istatistiksel açıdan anlamlı bir korelasyon saptanmamıştır (p=0,056; p=0,182; p=0,388) (Tablo 5).

Katılımcıların e-SOYÖ toplam puan ortalamaları 41,34±6,73 (ortanca:42; minimum:12; maksimum:60) puan olarak bulunmuştur.

E-SOYÖ toplam puan ortalamalarının kadınlarda (42,41±5,79), erkeklere göre (40,03±7,56) daha yüksek olduğu ve bu farkın istatistiksel olarak anlamlı olduğu bulunmuştur (p=0.012). Katılımcıların e-SOYÖ toplam puanları ile çalışılan kurum arasında istatistiksel açıdan anlamlı ilişki saptanmıştır (p=0,021). Bu anlamlılık Lise-İlkokul (p=0,028) ve Ortaokul-İlkokul (p=0,042) arasındaki farktan kaynaklanmaktadır. Katılımcıların e-SOYÖ toplam puanları ile medeni durum, gelir durumu, sektör ve kronik hastalık varlığı arasında istatistiksel açıdan anlamlı ilişki saptanmamıştır (p=0,160; p=0,167; p=0,452; p=0,866) (Tablo 6).

Katılımcıların e-SOYÖ toplam puanları ile yaş arasında negatif yönlü, zayıf düzeyde ve istatistiksel açıdan anlamlı bir korelasyon saptanmıştır (r=-0,151; p=0,003). e-SOYÖ toplam puanı ile meslekteki yıl arasında negatif yönlü, zayıf düzeyde ve istatistiksel açıdan anlamlı bir korelasyon saptanmıştır (r=-0,131; p=0,011). Katılımcıların

e-SOYÖ toplam puanları ile sağlıkla ilgili günlük internette geçirmiş oldukları süre arasında pozitif yönlü, zayıf düzeyde ve istatistiksel açıdan anlamlı bir korelasyon saptanmıştır (r=0,172; p=0,001). Katılımcıların e-SOYÖ toplam puanları ile kronik hastalık süreleri ve algılanan sağlık durumları arasında istatistiksel açıdan anlamlı bir korelasyon saptanmamıştır (p=0,416; p=0,958) (Tablo 5).

Katılımcıların SCÖ toplam puanları ile e-SOYÖ toplam puanları arasında pozitif yönlü, zayıf düzeyde ve istatistiksel açıdan anlamlı bir korelasyon saptanmıştır (r=0,221; p<0,001) (Tablo 5).

Tablo 1.

Katılımcıların tanımlayıcı özellikleri

		Sayı	**Yüzde (%)**
Cinsiyet	**Kadın**	209	55,15
	Erkek	170	44,85
Medeni durum	**Bekâr**	74	19,52
	Evli	305	80,48
Gelir durumu	**Gelir giderden az**	174	45,91
	Gelir gidere eşit	160	42,21
	Gelir giderden fazla	45	11,88
Sektör	**Kamu**	357	94,19
	Özel	22	5,81
Kurum	**Anaokulu**	17	4,48
	İlkokul	99	26,12
	Ortaokul	151	39,84
	Lise	112	29,56
Kronik hastalık varlığı	**Yok**	328	86,54
	Var	51	13,46
Toplam		**379**	**100,0**

	Ortalama±SD (Ortanca; Min-Mak)
Yaş	38,26±7,73 (37; 23-63)
Meslekteki yıl	13,71±7,59 (12; 0-39)
Kronik hastalık süresi (yıl)	14,57±11,37 (10; 1-47)
Sağlıkla ilgili günlük internet kullanımı (dk)	13,51±13,16 (10; 0-60)
Algılanan sağlık durumu (0-100 arasında)	74,61±16,63 (80; 1-100)

SD: Standart sapma
Min: Minimum Mak: Maksimum

Tablo 2.

Katılımcıların sağlıkla ilgili internet kullanım nedenleri

	Sayı	**Yüzde (%)**
İnternette sağlık/hastalık ve semptom araştırmak	288	76,39
Sağlık kuruluşundan randevu almak	264	70,02
Kendi elektronik sağlık kayıtlarına ulaşmak	144	38,19
Sağlıkla ilgili forumları/sosyal medya sitelerini okumak	94	24,93
Sağlıkla ilgili makale/derleme okumak	74	19,62
Sağlıkla ilgili bir uygulama kullanmak	62	16,44
Doktora soru sormak	20	5,30
Sağlık hizmeti ile ilgili deneyimlerini paylaşmak	14	3,71
Diğer	7	1,85
Yanıtlayan toplam katılımcı sayısı	**377**	

Birden fazla seçenek işaretlenmiştir.

Tablo 3.

Katılımcıların SCÖ alt boyut ve SCÖ toplam puanları

	Ortalama	**SD**	**Ortanca**	**Minimum**	**Maksimum**
Zorlantı	12,86	5,92	10,00	8,00	32,00
Aşırı kaygı	18,66	6,39	19,00	8,00	38,00
Aşırılık	24,02	6,38	24,00	8,00	37,00
İçini Rahatlatma	41,34	6,74	42,00	12,00	60,00
SCÖ Toplam Puanı	76,13	19,27	74,00	33,00	126,00

SD: Standart sapma

Tablo 4.

SCÖ toplam puanının demografik özelliklere göre karşılaştırılması

		SCÖ Toplam Puanı					p
		Ortalama	SD	Ortanca	Minimum	Maksimum	
Cinsiyet	**Kadın**	77,72	18,62	78,00	33,00	125,00	0,051
	Erkek	74,18	19,92	72,00	33,00	126,00	
Medeni durum	**Bekâr**	71,96	17,95	68,50	42,00	123,00	0,027
	Evli	77,14	19,47	75,00	33,00	126,00	
Gelir durumu	**Gelir giderden az**	78,50	20,35	78,00	33,00	126,00	0,083*
	Gelir gidere eşit	73,89	17,81	72,00	33,00	125,00	
	Gelir giderden fazla	74,93	19,29	73,00	43,00	118,00	
Sektör	**Kamu**	76,27	18,86	74,00	33,00	126,00	0,228
	Özel	73,77	25,41	63,00	44,00	124,00	
Kurum	**Anaokulu**	78,88	24,75	78,00	46,00	125,00	0,295
	İlkokul	77,83	17,90	78,00	33,00	124,00	
	Ortaokul	76,74	19,00	74,00	40,00	126,00	
	Lise	73,38	19,83	71,00	33,00	125,00	
Kronik hastalık varlığı	**Yok**	76,03	19,54	74,00	33,00	126,00	0,801**
	Var	76,76	17,57	72,00	44,00	123,00	

SD: Standart sapma *ANOVA testi kullanılmıştır **t-testi kullanılmıştır.

Tablo 5.

SCÖ ve e-SOYÖ toplam puanının demografik özelliklerle ve birbiriyle ilişkisi

	SCÖ Toplam Puanı			e-SOYÖ Toplam Puanı		
	r	p	n	r	p	n
Yaş	-0,098	0,056	379	-0,151	**0,003**	379
Meslekteki yıl	-0,069	0,182	375	-0,131	**0,011**	375
Kronik hastalık süresi (yıl)	0,130	0,388	46	0,123	0,416	46
Sağlıkla ilgili günlük internet kullanımı (dk)	0,273	**<0,001**	356	0,172	**0,001**	356
Algılanan sağlık durumu (0-100 arasında)	-0,206	**<0,001**	379	0,003	0,958	379
SCÖ Toplam Puanı	**r**			0,221		
	p			**<0,001**		
	n			379		

r: korelasyon katsayısı

n: kişi sayısı

Tablo 6.

e-SOYÖ toplam puanının demografik özelliklere göre karşılaştırılması

		e-SOYÖ Toplam Puanı					p
		Ortalama	SD	Ortanca	Minimum	Maksimum	
Cinsiyet	**Kadın**	42,41	5,79	42,00	18,00	57,00	**0,012**
	Erkek	40,03	7,56	41,00	12,00	60,00	
Medeni durum	**Bekâr**	42,54	5,38	42,50	26,00	54,00	0,160
	Evli	41,05	7,01	42,00	12,00	60,00	
Gelir durumu	**Gelir giderden az**	41,20	6,68	41,50	12,00	60,00	0,167
	Gelir gidere eşit	41,08	6,93	42,00	12,00	57,00	
	Gelir giderden fazla	42,87	6,19	44,00	20,00	52,00	
Sektör	**Kamu**	41,25	6,73	42,00	12,00	60,00	0,452
	Özel	42,82	6,88	43,00	32,00	57,00	
Kurum	**Anaokulu**	42,00	5,92	42,00	34,00	54,00	**0,021 (Lise-İlkokul p=0,028; Ortaokul-İlkokul p=0,042)**
	İlkokul	43,08	5,65	44,00	21,00	55,00	
	Ortaokul	40,98	6,46	41,00	12,00	54,00	
	Lise	40,20	7,80	42,00	12,00	60,00	
Kronik hastalık varlığı	**Yok**	41,26	6,99	42,00	12,00	60,00	0,866
	Var	41,86	4,83	41,00	32,00	53,00	

SD: Standart sapma

4. TARTIŞMA

Siberkondri ve sağlık okuryazarlığı arasındaki ilişkinin incelendiği bu çalışma 379 öğretmen ile yapılmıştır. Bu araştırmada öğretmenlerin SCÖ toplam puan ortalamaları 76,13±19,27 olarak saptanmıştır. Üniversite öğrencileriyle yapılan bir araştırmada SCÖ puan ortalaması; 73,01±19,22 olarak, kalp hastalığı nedeniyle tedavi gören hastalarla yapılan bir araştırmada 68,00±27,04 olarak bulunmuştur.[11,12] ABD'de sağlıklı erişkinlerle yapılan bir araştırmada SCÖ toplam puan ortalamaları 69,14±21,28 olarak; birkaç ülkeden erişkinlerin dahil edildiği bir başka çalışmada ise 72,98±22,98 olarak saptanmıştır.[13,14] Bu farklılıklar araştırmaların yapıldığı popülasyonların ve yaş gruplarının çeşitliliğinden kaynaklanıyor olabilir. Araştırmamızda katılımcıların siberkondri düzeyleri diğer çalışmalara göre daha yüksek bulunmuştur. Bu durumda öğretmenlerin araştırmacı ve sorgulayıcı yönlerinin etkili olabileceği düşünülebilir.

Bu araştırmada cinsiyet değişkeninin siberkondri düzeyini etkilemediği belirlenmiştir. Bu sonuç literatür ile de benzerlik göstermektedir.[3, 11, 15-18] Ancak diyetsiyene başvuran bireylerin siberkondri düzeylerinin incelendiği bir başka çalışmada ise erkeklere kıyasla kadınların siberkondri düzeyleri anlamlı olarak yüksek bulunmuştur.[19] Bu

durumun araştırmaların yapıldığı popülasyonların farklılığından kaynaklanmış olabileceği düşünülebilir.

Katılımcıların medeni durumları ile siberkondri düzeyleri istatistiksel olarak anlamlı ilişki bulunmuştur ve evlilerin puan ortalaması bekârlara göre daha yüksekti (p=0,027). Aile hekimliği polikliniğine başvuran hastalarda siberkondri düzeyinin ve ilişkili faktörlerin değerlendirildiği bir çalışmada da bekâr katılımcıların siberkondri düzeyi evli ve boşanmışlara göre daha düşük tespit edilmiştir (p=0,001).[20] Ancak İstanbul'da oturan ve 18 yaşını doldurmuş 394 birey üzerinde yapılan bir başka çalışmada, katılımcıların medeni durumuna göre siberkondri düzeylerinin istatistiksel olarak farklılık göstermediği tespit edilmiştir.[3] Bizim çalışmamızda evli kişilerin siberkondri düzeylerinin daha yüksek çıkmış olması, evli kişilerin yalnızca kendi sağlık durumlarıyla ilgili değil; eşleri ve çocuklarının sağlık durumlarıyla ilgili de internette tekrarlayan sağlık aramaları yapması durumu ile ilişkili olabilir.

Bu araştırmada gelir durumunun siberkondri düzeyini etkilemediği belirlenmiştir. Üniversite çalışanlarında ve aile sağlığı merkezine başvuran erişkinlerde siberkondri düzeylerinin incelendiği 2 ayrı çalışmada da bizim araştırma bulgumuza benzer şekilde gelir durumu ile siberkondri düzeyi arasında anlamlı bir ilişki saptanmamıştır.[16, 21] Araştırmamızda elde ettiğimiz sonuçta örneklem grubunun tamamının aynı meslek grubundan olması ve benzer gelir seviyelerine sahip olmaları durumunun etkili olabileceği düşünülmüştür.

Araştırmada kronik hastalık varlığının siberkondri düzeyini etkilemediği belirlenmiştir. Öğrenciler üzerinde yapılan bir araştırmada da kronik rahatsızlık durumu ile siberkondri arasında anlamlı ilişki bulunmamıştır.[22] Sağlık alanında lisans eğitimi alan öğrencilerle yapılan bir çalışmada da kronik rahatsızlık durumu ile siberkondri arasında anlamlı ilişki bulunmamıştır.[4] Üniversite öğrencileriyle yapılan bir başka çalışmada da kronik rahatsızlık durumuna sahip olanların, olmayanlara göre daha fazla siberkondri davranışına sahip olduğu belirlenmiştir.[23] Bu durumun, araştırmaya dahil edilen popülasyonların farklılığından kaynaklanıyor olabileceği düşünülmüştür.

Katılımcıların SCÖ toplam puanları ile yaşları arasında istatistiksel açıdan anlamlı bir korelasyon saptanmamıştır (p=0,056). Bu bulgumuz; COVID-19 salgınının üniversite öğrencilerinin siberkondri düzeylerine etkisinin araştırıldığı bir çalışma bulgusuyla ve Sağlık Bilimleri Fakültesi öğrencilerinin siberkondri düzeylerinin incelendiği bir diğer çalışma bulgusuyla benzerlik göstermektedir.[4,22] Bu durum siberkondrinin her yaş grubunda karşılaşılabilecek bir sorun olduğunu ve yapılacak önleyici çalışmaların her yaş grubunu kapsayacak şekilde planlanması gerektiğine dikkat çekmektedir.

Katılımcıların SCÖ toplam puanları ile sağlıkla ilgili günlük internette geçirmiş oldukları süre arasında pozitif yönlü, orta düzeyde ve istatistiksel açıdan anlamlı bir korelasyon saptanmıştır (r=0,273; p<0,001). Sağlık bilimleri-Hemşierlik Fakültesi ve Tıp Fakültesi öğrencilerinden 1256 öğrenci ile yapılan bir başka çalışmada da sağlıkla ilgili internette geçirilen ortalama süre ile SCÖ puanı arasında pozitif yönde anlamlı korelasyon bulunduğu görülmüştür.[11] Siberkondri tanımında da geçen "sanal ortamda sağlıkla ilgili aşırı tekrara kaçan aramalar yapma" davranışının gerçekleşebilmesi; sağlıkla ilgili internette vakit geçirmeyi gerekli kılmakta ve geçen bu süre de siberkondri düzeyi ile paralellik göstererek çalışma bulgumuzu desteklemektedir.

Bu araştırmada katılımcıların SCÖ toplam puanları ile algılanan sağlık durumları arasında negatif

yönlü, zayıf düzeyde ve istatistiksel açıdan anlamlı bir korelasyon saptanmıştır (r=-0,206; p<0,001). Bir üniversite hastanesine başvuran hastaların siberkondri düzeylerinin değerlendirildiği bir çalışmada genel sağlık durumu orta olanların siberkondri düzeylerinin genel sağlık durumu iyi olanlardan daha yüksek olduğu ve korelasyon analizinde de genel sağlık durumu ile siberkondri arasında negatif yönlü bir ilişki olduğu saptanmıştır.[24] Çalışmamızda da literatürle uyumlu olan bu durumun sebebi; siberkondriyak kişilerin sağlığını olduğundan daha kötü algılıyor olması olabilir.

Siberkondriyi etkileyen birçok bileşen vardır. Yaşanılan bölge, hastalık öyküsü, sağlık kaynaklarına erişim, internet kullanımı gibi durumların siberkondri davranışını etkilediği bilinmektedir. Bu nedenle incelenen parametrelerin siberkondri üzerindeki etkileri ile ilgili literatürde farklı sonuçlar yer alabilmektedir.[15, 18]

Bu araştırmada katılımcıların e-SOYÖ toplam puanları ile cinsiyetleri arasında istatistiksel açıdan anlamlı ilişki saptanmıştır ve kadın katılımcıların e-SOYÖ toplam puan ortalamaları daha yüksek bulunmuştur (p=0,012). İstanbul'da 18 yaşını doldurmuş 394 bireyin dahil edildiği farklı bir çalışmada da benzer şekilde kadınların e-sağlık okuryazarlığı düzeyinin daha yüksek bulunduğu görülmüştür.[3] Bu durumun; çalışmaların yapıldığı örneklem gruplarının farklılığından kaynaklanabileceği düşünülmektedir.

Bu araştırmada katılımcıların e-SOYÖ toplam puanları ile medeni durumları arasında istatistiksel açıdan anlamlı ilişki saptanmamıştır (p=0,160). E-sağlık okuryazarlığı ve siberkondri arasındaki ilişkinin değerlendirildiği bir çalışmada da bireylerin medeni hali ile e-sağlık okuryazarlık düzeyleri arasında istatistiksel olarak herhangi bir ilişki bulunmamıştır.[3]

Bu araştırmada katılımcıların e-SOYÖ toplam puanları ile gelir durumları arasında istatistiksel açıdan anlamlı ilişki saptanmamıştır (p=0,167). Öğrencilerle yapılan bir araştırmada öğrencilerin ailelerinin gelir düzeyi ile e-sağlık okuryazarlığı arasında anlamlı ilişki saptanmazken (p=0,103); yaşlı bireylerin e-sağlık okuryazarlığının değerlendirildiği bir başka çalışmada ise katılımcıların e-sağlık okuryazarlık ölçek puanı ile gelir durumu arasında istatistiksel olarak anlamlı bir ilişki gözlenmiştir (p=0,001).[25, 26] Bu araştırmada e-SOYÖ toplam puanları ile gelir durumları arasında istatistiksel açıdan anlamlı ilişki saptanmamasında araştırmaya katılanların tamamının aynı meslek grubundan olması ve benzer gelir seviyelerine sahip olmaları durumu etkili olmuş olabilir.

Bu araştırmada katılımcıların e-SOYÖ toplam puanları ile kronik hastalık varlığı arasında istatistiksel açıdan anlamlı fark saptanmamıştır (p=0,866). Literatürde öğrencilerle yapılmış olan çalışmalarda da kronik hastalığı olan ve olmayan öğrencilerin e-sağlık okuryazarlığı puan ortalamaları arasında istatistiksel olarak anlamlı bir farklılık bulunmamıştır. Böylece kronik bir hastalığı olma durumunun da e-sağlık okuryazarlığını etkilemediği ortaya konmuştur.[25, 27] Bu anlamda araştırma sonuçlarımız literatür ile benzerlik göstermektedir.

Bu araştırmada katılımcıların e-SOYÖ toplam puanları ile yaş arasında negatif yönlü, zayıf düzeyde ve istatistiksel açıdan anlamlı bir korelasyon saptanmıştır (r=-0,151; p=0,003). E-SOYÖ toplam puanı ile meslekteki yıl arasında negatif yönlü, zayıf düzeyde ve istatistiksel açıdan anlamlı bir korelasyon saptanmıştır (r=-0,131; p=0,011). Meslekteki yılın yaş ile paralellik gösterdiği düşünüldüğünde her iki parametre ile e-SOYÖ toplam puanları arasında görülen anlamlı ve negatif yönlü korelasyon birbirini destekleyen

ve beklenen bir sonuçtur. Kronik hastalığı olup dahiliye polikliniğine başvuran 490 hasta ile yapılan literatürdeki bir başka araştırmada da benzer şekilde yaş arttıkça e-sağlık okuryazarlığı düzeyinin azaldığının saptandığı görülmüştür.[28] Bu durumun, e-Sağlık uygulamaları gibi teknolojik uygulamaları kullanmak ya da sağlıkla ilgili araştırma yapmak için ileri yaştaki bireylerin internet kullanma becerileri ve tercihlerinin daha az olmasından ileri gelmiş olabileceği düşünülmektedir.

Katılımcıların e-SOYÖ toplam puanları ile kronik hastalık süreleri ve algılanan sağlık durumları arasında istatistiksel açıdan anlamlı bir korelasyon saptanmamıştır (p=0,416; p=0,958). Kronik hastalığı olan bireylerle yapılan bir çalışmada kronik hastalık süresi arttıkça e-sağlık okuryazarlık düzeyinin azaldığını gösterilmiştir.[28] Bunun da çalışmadaki kişilerin yaşlarının farklılığından kaynaklanıyor olabileceği düşünülmüştür. İnternet bağımlılığı ve sağlık okuryazarlığı arasındaki ilişkinin incelendiği bir başka çalışmada da araştırma sonucumuzla benzer olarak, algılanan sağlık durumu ile sağlık okuryazarlığı puanları arasında istatistiksel olarak anlamlı bir ilişki bulunmamıştır.[29]

Katılımcıların e-SOYÖ toplam puanları ile sağlıkla ilgili günlük internette geçirmiş oldukları süre arasında pozitif yönlü, zayıf düzeyde ve istatistiksel açıdan anlamlı bir korelasyon saptanmıştır (r=0,172; p=0,001). Adölesanlarda yapılan bir çalışmada da internet kullanım süresi ile e-sağlık okuryazarlığı arasında anlamlı bir ilişki saptanmış ve internet kullanım süresi yüksek olan katılımcıların daha yüksek e-sağlık okuryazarlık düzeyine sahip olduğu belirlenmiştir.[27] Bu durumun e-sağlık okuryazarlığı daha yüksek olan kişilerin sağlıkla ilgili araştırma yaparken internetten daha çok faydalanmak istemeleri ve daha uzun süre internet kullanmaları ile ilişkili olabileceği düşünülmüştür.

Katılımcıların SCÖ toplam puanları ile e-SOYÖ toplam puanları arasında pozitif yönlü, zayıf düzeyde ve istatistiksel açıdan anlamlı bir korelasyon saptanmıştır (r=0,221; p<0,001). Literatürde e-sağlık okuryazarlığı ile siberkondriyi karşılaştıran çalışmalarda da e-sağlık okuryazarlığı ve siberkondri arasında pozitif yönlü ve düşük düzeyde bir ilişkinin olduğu görülmüştür.[3, 30] Çalışma bulgularımızdan sağlıkla ilgili günlük internette geçirilen süre ile siberkondri ve e-SOYÖ toplam puanları arasında pozitif yönlü, zayıf düzeyde ve istatistiksel açıdan anlamlı korelasyonlar saptanmıştır. Dolayısıyla e-sağlık okuryazarlığı ve siberkondri arasındaki pozitif korelasyonun nedeninin, iki parametreyi de pozitif etkileyen "sağlıkla ilgili internette geçirilen süre" olabileceği düşünülmüştür.

Günümüzde internetin bilgi kaynağı olarak kullanımının artması siberkondri ve e-sağlık okuryazarlığı kavramlarının da önemini artırmaktadır. Konuyla ilgili daha fazla sayıda kişinin katıldığı, daha farklı popülasyonların dahil edildiği ve farklı parametrelerin de incelendiği araştırmaların yapılması önerilebilir. Böylece günümüzde önemli bir konu haline gelen bu kavramların daha da aydınlatabileceği düşünülmektedir.

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Research Article

Overweight and Obese Patients' Attitudes Towards Anti-Obesity Treatments, and Attitude Associated Factors

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Objective: Obesity is a public health problem with a rising prevalence. When lifestyle modifications, diet, and exercise fail, anti-obesity medications and surgeries are treatment options. However, they seem to be underutilized, due in part to patients' attitudes towards these modalities. This study aimed to investigate patients' attitudes toward these treatments.

Materials and Methods: A descriptive survey was conducted in a face-to-face fashion. Weight perception, prior weight loss trials, exercise and dietary treatments, perceptions related to obesity and its treatment, and demographic factors, were assessed in relation to anti-obesity medications and surgical treatments. Perception was analyzed both verbally and visually. Misperception was defined as being thinner than reality misperceptions (TTRM), fatter than reality misperceptions (FTRM), or either of them (ETFTRM).

Results: 198 participants completed the survey. 30.8% and 23.7% of the participants would consider anti-obesity medications and surgeries, respectively. Females were more likely to consider anti-obesity medications (43.9% vs. 21.6%, p = 0.001). Patients who had exercised to lose weight were more likely to consider anti-obesity surgery (28.9% vs. 16.7%, p = 0.04). Appropriate weight perception was 16.2%. Weight misperception was not associated with higher or lower rates of anti-obesity treatments. However, among the patients in the highest body mass index (BMI) group (BMI > 35), participants with pure-TTRM were more likely to consider anti-obesity medications (66.7% vs. 18.8%, p = 0.01).

Conclusion: Medical and surgical obesity treatments are considered at a low rate among candidates or at-risk patients. Age, gender, exercise history, and pure-TTRM were associated with higher treatment considerations.

Keywords: Weight perception, Obesity, Obesity management, Anti-obesity agents, Bariatric surgery

1. INTRODUCTION

Obesity is defined as "the excess weight that poses a risk to one's health" and is a common public health problem among both developed and developing countries.[1] Turkey is a country with a high number of overweight and obese patients.[2] Various factors exist with regards to rising obesity rates in the last decades, such as easy access to food and a sedentary lifestyle, namely the adoption of a western lifestyle.[3] Obesity treatment starts with lifestyle modification, diet, and exercise, and they form the backbone of the treatment plans. When response to the aforementioned treatments is inadequate, medical treatments (e.g., glucagon-like peptide-1 receptor agonists, namely GLP-1 RAs) or surgical treatments (e.g., sleeve gastrectomy) are valid and proven options with moderate to high efficacy.[4,5] However, these latter modalities seem to be underutilized when taking into consideration the rates of obesity.[6,7] Several studies around the globe have shown that various barriers exist with regards to the utilization of these treatments, that

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is, weight stigma, surgery-related stigma, cost-related issues, misconceptions about the safety and efficacy of surgery, as well as consideration of obesity surgery as a cosmetic procedure.[6,8–12] However, no study regarding barriers to the utilization of obesity treatment was conducted in Turkey.

Weight perception is defined as how one perceives their weight and physical appearance.[13] It is known that weight perception changes are common, particularly among youngsters.[14,15] Besides, it is associated with psychiatric disorders.[13,15–17] More interestingly, studies demonstrated that youngsters who have weight misperceptions were less likely to try weight loss.[18] Since only a few studies exist with regards to weight misperception in Turkey, and belong to adolescents.[19], we have started a project about weight misperception in the adult population. We had planned a two-part study, in which the first part consisted of determinants of weight misperception (under review, to be published), and the second part (the current study) consisted of attitudes towards obesity treatment, related factors, and the association of weight misperception with obesity treatment. In the first part of the project, we have shown that weight misperception is very common among the Turkish population and is associated with low education levels, a higher BMI, and age.

In this study, we incorporated the findings from the prior study in order to put forth attitudes towards obesity treatment, find associated factors, and investigate whether weight misperception is associated with attitudes towards obesity medications and surgery.

2.METHODOLOGY

Design and Setting

This study was designed as a descriptive research survey and formed the second part of our weight misperception research, which was planned as a two-step study. Survey questions and structures were designed with the help of data acquired during the first step of the study (to be published). Participants aged 18 to 65 were asked whether they would want to participate in the study. If they opted to participate, then written informed consent was obtained. The participants were given an anonymous survey number and proceeded with the questions. No identifying name or number was obtained. The survey took approximately ten minutes to complete. Since this study's aim was to investigate weight misperception's effect on attitudes towards obesity management strategies, only participants with a BMI over 25 kg/m2 were included in the study.

Survey

The survey consisted of 15 questions. Surveys were performed by the four researchers (BK, NŞ, AÖ, and TIG) and took place in public places such as bus stops, cafés, parks, shopping malls, etc. All questions were read by the researcher, and each question was explained in detail to participants. The survey questions were as follows:

1. Age, and sex (Participants were asked to answer their biological sex, namely as female or male)
2. Weight (kilograms), height (centimeters), and BMI (kg/m2)
3. Education status:
    - Primary school or below
    - Middle or high school
    - College degree and above
4. Marital status:
    - Single
    - Married
    - Divorced

- Widow

5. Have you ever tried to lose weight before?
   - No
   - Yes, once
   - Yes, twice or more
6. (*If the former question's answer is yes, ask then*) Were you successful at losing weight?
   - No
   - Partially yes
   - Totally yes
7. Have you ever visited dietitian before with the purpose of losing weight?
   - No
   - Yes, once
   - Yes, twice or more
8. Have you ever exercised before with the purpose of losing weight?
   - No
   - Yes, once
   - Yes, twice or more
9. Have you ever used medication with the purpose of losing weight?
   - No
   - Liraglutide
   - Orlistat
   - Herbal remedies
10. (*If the former question's answer is no, ask then*) (*If BMI < 30kg/m^2, then start with "**if you were obese**")* Would you consider using anti-obesity medication with the purpose of losing weight?
    - I would not consider
    - I would consider
    - No opinion
11. (*If BMI < 30kg/m^2, then start with "**if you were obese**")* Would you consider anti-obesity surgery with the purpose of losing weight?
    - I would not consider
    - I would consider
    - No opinion
12. How important do you think obesity is?
    - Totally unimportant
    - Partially unimportant
    - Neither unimportant or important
    - Partially important
    - Totally important
13. How hard do you think it is to treat obesity?
    - Totally hard
    - Partially hard
    - Neither hard or easy
    - Partially easy
    - Totally easy
14. Verbal weight perception: Patients were asked to describe themselves as one of the following: (The question was read twice to make sure patients comprehended it correctly)
    - Underweight
    - Normal-weighted
    - Overweight
    - Mildly obese
    - Severely obese
15. Visual weight perception: A previously developed and validated body size guide (BSG) was used for visual weight perception analysis.[20] This scale was used in our first weight misperception study (to be published) as well. The BSG provides separate instructions for male and female participants. Each BSG features a

consistent portrayal of a male or female model, depicting their figure from being underweight to grossly obese. There are a total of 10 images for both males and females. The initial image depicts underweight individuals, while the second and third images portray individuals with a normal weight. The fourth image represents those who are overweight. The fifth and sixth images depict individuals with class I obesity, while the seventh and eighth pictures portray individuals with class II obesity. The final two images represent individuals with class III obesity. Given that we categorized the BMI of obese patients into two groups: mildly obese and severely obese, and the verbal weight perception question also classified obesity into two groups: mildly obese and severely obese, we assigned the seventh image from the visual weight perception question to the mildly obese group and the eighth image to the severely obese group, based on the patients' responses. Patients were presented with images based on their gender and instructed to identify the image that they perceived as most resembling themselves. Patients were instructed to carefully and thoroughly analyze all photos. The researchers stated that all the photos depict the same individual, although they differ in size, ranging from underweight to severe obesity.

Appropriate Perception and Misperceptions

We used the same methodology as our first study to define appropriate weight perception and misperceptions, which were defined as follows:

- Appropriate perception (AP) is described as the alignment between one's actual body mass index (BMI) and their responses to questions about their weight perception, both visually and verbally. For instance, if a patient's BMI was determined to be 32.5 kg/m2 (indicating mild obesity), they verbally acknowledged themselves as mildly obese and identified images numbered 5, 6, or 7 in their visual BSG, they were categorized as having "appropriate perception".
- The categorization of misperceptions was complex, requiring multiple classifications due to the following factors: Firstly, misperception refers to the cognitive process of perceiving oneself as either "thinner" or "fatter" than the actual truth. Furthermore, misconceptions can manifest either through visual cues, verbal communication, or a combination of both. Ultimately, individuals may see themselves as having a slimmer appearance visually, a larger one when spoken orally, or vice versa. The term "misperception" was employed as a comprehensive phrase to include both verbal and visual misinterpretations of perceiving oneself as slimmer or fatter than the actual truth. Five subgroups were established to categorize individuals based on their perspective of being thinner or fatter. These subgroups are referred to as t-SG and f-SG, representing thinner and fatter perceptions, respectively. These subgroups were designed to cover all possible perceptions.
    - t-SG1, no thinner than reality misperception: The patient does not perceive themselves as thinner than reality, both verbally and visually. However, they could perceive accurately or fatter than reality. f-SG1 constitutes the opposite of t-SG1.
    - t-SG2, visual misperception, verbal accurate perception: The patient perceives themselves thinner than reality on the BSG chart but answers the verbal weight perception question appropriately. f-SG2 constitutes the opposite of t-SG3.
    - t-SG3, verbal misperception, visual accurate perception: The patient perceives themselves thinner than reality when the verbal weight perception question is asked,

but points out an appropriate image on the BSG chart. f-SG4 constitutes the opposite of t-SG4.

- t-SG4, both visual and verbal misperception: The patient perceives themselves as thinner than reality when the verbal weight perception question is asked and points to a thinner than reality image on the BSG chart. f-SG4 constitutes the opposite of t-SG4.
- SG5, visual and verbal misperceptions oppose: The patient perceives themselves as thinner than reality when the verbal weight perception question is asked and points to a fatter than reality image on the BSG chart, or vice versa.

Thinner than reality misperception (TTRM) was divided into 2 categories: any-TTRM, which included subgroups 2, 3, and 4 (t-SG2, t-SG3, and t-SG4), and pure-TTRM, which included subgroup 4 (t-SG4) only. Fatter than reality misperception (FTRM) was also divided into 2 categories: any-FTRM, which included subgroups 2, 3, and 4 (f-SG2, f-SG3, and f-SG4), and pure-FTRM, which included subgroup 4 (f-SG4) only. Due to the presence of contradictory and inconsistent responses in SG5, it was excluded from the TTRM and FTRM. Not having verbal and visually appropriate perception is categorized as either thinner or fatter than reality misperception (ETFTRM) and calculated as "patients with appropriate perception subtracted from all patients".

Statistics

Categorical and continuous variables were analyzed via descriptive statistical methods. Differences between groups and categorical determinants were analyzed using Pearson's chi-squared test ($\chi 2$ test) (or Fisher's exact test if needed). Differences between continuous variables were analyzed using the student's t-test or Mann-Whitney U test, according to the distribution patterns of two groups. Continuous variables were presented as "mean (± standard deviation)" or "median (interquartile range)" according to distribution patterns. Categorical variables were presented as "numbers (percentages)". Two-sided significance testing was performed to calculate p-values, and p-values less than 0.05 were considered significant. Since we did not have robust data to calculate sample size prior to the survey, we could not conduct sample size analysis. All analyses were conducted using IBM SPSS Software version 23.0 (SPSS Inc., Chicago, IL).

Ethics

Participants were assigned an anonymous survey number to protect confidentiality. Written informed consent was obtained prior to survey initiation. The study complies with the principles outlined in the Declaration of Helsinki, and this study was approved by the Başkent University Institutional Review Board (Project number KA24/42).

3.RESULTS

Baseline Survey Results

One hundred and ninety-eight participants, with a median age of 46, responded to the survey. Of the participants, there was a slight male dominance. The median BMI was 29.3 and was similar across the sexes. While the majority of the participants had a college degree, less than one-third had a middle or high school degree, and only a fraction of the participants had either a primary school degree or a degree below.

More than three-fourths of the participants had tried to lose weight before, of whom more than 85% were successful. Less than one-third of the participants had visited dietitians before with the purpose of losing weight, and a little more than half of the participants had exercised before with the purpose of losing weight. More than 88% of

the participants had never used medication with the purpose of losing weight. Of the users, 13 had used herbal remedies, 7 had used orlistat, and only 2 had used liraglutide.

Regarding attitudes toward anti-obesity treatments, 30.8% of the participants would consider anti-obesity medications, whereas 23.7% would consider anti-obesity surgery for weight loss. More than four-fifths of the participants think obesity is a totally important disease, and more than 65% think that it is either partially or totally hard to treat obesity.

In terms of weight perception, while 47.5% of the participants responded as overweight verbally, 50% of the participants responded as mildly obese when asked visually. Table 1 demonstrates the baseline survey results in detail.

Weight Misperception

One hundred and sixty-six of the participants (83.8%) had either thinner or fatter than reality misperception (ETFTRM), which translates into the fact that only 16.2% of the participants had appropriate weight perception. Thinner than reality misperception (TTRM) was more common compared to fatter than reality misperception (FTRM), both in "any" type misperception and "pure" type misperception. Regarding the former type, 49% had any TTRM, and 34.8% had any FTRM. Regarding the latter type, 21.2% had pure TTRM and 1.5% had pure FTRM. Table 2 demonstrates the weight misperception types of the participants in detail.

Table 1.

Participants' characteristics according to the survey

Questions	**Choices/Answers**	**Values***
Age		46 (20)
Sex	Female Male	(41.4%) 116 (58.6%)
Body mass index (continuous)	Female Male	29.1 (5.1) 29.5 (4.1)
Body mass index (categorical)	25.0 – 29.9 30.0 – 34.9 35 and over	111 (56.1%) 59 (29.8%) 28 (14.1%)
Education status	Primary school or below Middle or high school College degree and above	14 (7.1%) 63 (31.8%) 121 (61.1%)
Marital status	Married Single Divorced Widowed	146 (73.7%) 30 (15.2%) 11 (5.6%) 11 (5.6%)
Have you ever tried to lose weight before?	Yes (either once or more)	155 (78.3%)
Were you successful at losing weight?	Yes (either partially or totally)	133 (85.8%)
Have you ever visited dietitian before with the purpose of losing weight?	Yes (either once or more)	60 (30.3%)
Have you ever exercised before with the purpose of losing weight?	Yes (either once or more)	114 (57.6%)

Have you ever used medication with the purpose of losing weight?	No Liraglutide Orlistat Herbal remedies	176 (88.9%) 2 (1%) 7 (3.5%) 13 (6.6%)
Would you consider using anti-obesity medication with the purpose of losing weight?	I would not consider I would consider No opinion	113 (57.1%) 61 (30.8%) 24 (12.1%)
Would you consider anti-obesity surgery with the purpose of losing weight?	I would not consider I would consider No opinion	134 (67.7%) 47 (23.7%) 17 (8.6%)
How important do you think obesity is?	Totally unimportant Partially unimportant Neither unimportant or important Partially important Totally important	6 (3%) 1 (0.5%) 8 (4%) 15 (7.6%) 168 (84.8%)
How hard do you think it is to treat obesity?	Totally hard Partially hard Neither hard or easy Partially easy Totally easy	80 (40.4%) 50 (25.3%) 43 (21.7%) 17 (8.6%) 8 (4%)
Verbal weight perception	Underweight Normal-weighted Overweight Mildly obese Severely obese	2 (1%) 69 (34.8%) 94 (47.5%) 26 (13.1%) 7 (3.5%)
Visual weight perception	Underweight Normal-weighted Overweight Mildly obese Severely obese	1 (0.5%) 28 (14.1%) 39 (19.7%) 99 (50%) 31 (15.7%)

* Values are either shown as median (interquartile range) or frequency (percentage%)

Table 2.

Weight misperception types of the participants

Weight Misperception Type	**Frequency**
Any TTRM	97 (49%)
Pure TTRM	42 (21.2%)
Any FTRM	69 (34.8%)
Pure FTRM	3 (1.5%)
ETFTRM	166 (83.8%)

ETFTRM: Either thinner or fatter than reality misperception, FTRM: Fatter than reality misperception, TTRM: Thinner than reality misperception

Characteristics of the Participants Who Would Consider Anti-Obesity Medications

Female responders would consider anti-obesity medications more than males (43.9% vs. 21.6%, p = 0.001), and participants who would consider anti-obesity medications had a statistically significantly lower age compared to participants who would not (42 vs. 47, p = 0.05). Education and marital status, weight loss trial and success, dietitian visit and exercise history, obesity importance, and hardness thoughts were not different across two groups (all p > 0.05). However, participants who had ever used anti-obesity medications with the purpose of losing weight were more likely to use anti-obesity medications (72.7% vs. 25.6%, p<0.001). Moreover, participants who would consider anti-obesity medication for obesity treatment were also more likely to consider anti-obesity surgery (59.6% vs. 21.6%, p<0.001). Weight misperceptions, however, were not different between different participant attitudes (all p > 0.05). Table 3 demonstrates the characteristics of the participants with a positive attitude towards anti-obesity medications in detail.

Table 3.

Association of positive anti-obesity medication treatment attitude and presence of clinicosocial determinants

Determinant	**Choices/Answers**	**Value**	**p***
Age		42 (18) vs. 47 (21)	0.05
Sex	Female Male	36 (43.9%) 25 (21.6%)	0.001
Education status	Primary school or below Middle or high school College degree and above	6 (42.9%) 20 (31.7%) 35 (28.9%)	0.55
Marital status	Married Single Divorced Widowed	43 (29.5%) 11 (36.7%) 5 (45.5%) 2 (18.2%)	0.46
Have you ever tried to lose weight before?	Yes (either once or more) No	52 (33.5%) 9 (20.9%)	0.11
Were you successful at losing weight?	Yes (either partially or totally) No	42 (31.6%) 10 (45.5%)	0.2
Have you ever visited dietitian before with the purpose of losing weight?	Yes (either once or more) No	20 (33.3%) 41 (29.7%)	0.61
Have you ever exercised before with the purpose of losing weight?	Yes (either once or more) No	32 (28.1%) 29 (34.5%)	0.33
Have you ever used medication with the purpose of losing weight?	Yes (any) No	16 (72.7%) 45 (25.6)	<0.001

How important do you think obesity is?	Totally unimportant Partially unimportant Neither unimportant or important Partially important Totally important	2 (33.3%) 0 2 (25%) 2 (13.3%) 55 (32.7%)	0.55
How hard do you think it is to treat obesity?	Totally hard Partially hard Neither hard or easy Partially easy Totally easy	26 (32.5%) 14 (28%) 12 (27.9%) 6 (35.3%) 3 (37.5%)	0.94
Would you consider anti-obesity surgery with the purpose of losing weight?	I would not consider I would consider No opinion	29 (21.6%) 28 (59.6%) 4 (23.5%)	<0.001
Any TTRM	Yes No	30 (30.9%) 31 (30.7%)	1
Pure TTRM	Yes No	17 (40.5%) 44 (28.2%)	0.12
Any FTRM	Yes No	23 (33.3%) 38 (29.5%)	0.57
Pure FTRM	Yes No	0 61 (31.3%)	0.55
ETFTRM	Yes No	53 (31.9%) 8 (25%)	0.43

*p values with a statistical significance are shown in bold

ETFTRM: Either thinner or fatter than reality misperception, FTRM: Fatter than reality misperception, TTRM: Thinner than reality misperception

Characteristics of the Participants Who Would Consider Anti-Obesity Surgery

Similar to participants who have positive attitudes towards anti-obesity medications, participants who would consider anti-obesity surgery as a weight loss treatment modality were also younger than participants who would not consider it (43 vs. 47, p = 0.02). Although the percentage of females who would consider surgery was also higher, this did not reach statistical significance (29.3% vs. 19.8%, p = 0.12). Education and marital status, weight loss trial and success, dietitian visit, exercise history, obesity importance, and hardness thoughts were not different across the two groups. However, participants who had exercised before with the purpose of losing weight were more likely to consider anti-obesity surgery (28.9% vs. 16.7%, p = 0.04). Similar to higher anti-obesity medication consideration, participants who had ever used medications with the purpose of weight loss were more likely to consider anti-obesity surgery (45.5% vs. 21%, p = 0.01). Moreover, participants who would consider anti-obesity surgery were also more likely to consider anti-obesity medication with the purpose of losing weight (45.9% vs. 14.2%, p<0.001). Similar to anti-obesity medication considerations, anti-obesity surgery considerations were not affected by the presence of weight

misperception (all p > 0.05). Table 4 demonstrates the characteristics of the participants with a positive attitude towards anti-obesity surgery in detail.

Obesity Treatment Considerations According to BMI Levels

Anti-obesity medication and surgery considerations did not differ according to weight misperception presence in the total cohort, but we also wanted to test whether this finding also applies to all BMI levels. Regarding participants with a BMI of 35.0 and over, those with a pure TTRM were also more likely to consider anti-obesity medications (66.7% vs. 18.8%, p = 0.01). No other differences were demonstrated with BMI subgrouping. Table 5 demonstrates the association between weight misperception types and obesity treatment considerations according to different body mass index levels.

Table 4.

Association of positive anti-obesity surgery treatment attitude and clinicosocial determinants

Determinant	**Choices/Answers**	**Value**	**p***
Age		43 (17) vs. 47 (21)	**0.02**
Sex	Female Male	24 (29.3%) 23 (19.8%)	0.12
Education status	Primary school or below Middle or high school College degree and above	3 (21.4%) 20 (31.7%) 24 (19.8%)	0.19
Marital status	Married Single Divorced Widowed	36 (24.7%) 7 (23.3%) 3 (27.3%) 1 (9.1%)	0.69
Have you ever tried to lose weight before?	Yes (either once or more) No	37 (23.9%) 10 (23.3%)	0.99
Were you successful at losing weight?	Yes (either partially or totally) No	30 (22.6%) 7 (31.8%)	0.34
Have you ever visited dietitian before with the purpose of losing weight?	Yes (either once or more) No	18 (30%) 29 (21%)	0.17
Have you ever exercised before with the purpose of losing weight?	Yes (either once or more) No	33 (28.9%) 14 (16.7%)	**0.04**
Have you ever used medication with the purpose of losing weight?	Yes (any) No	10 (45.5%) 37 (21%)	**0.01**
How important do you think obesity is?	Totally unimportant Partially unimportant Neither unimportant or important Partially important Totally important	1 (16.7%) 0 0 2 (13.3%) 44 (26.2%)	0.35

How hard do you think it is to treat obesity?	Totally hard Partially hard Neither hard or easy Partially easy Totally easy	25 (31.3%) 11 (22%) 6 (14%) 3 (17.6%) 2 (25%)	0.26
Would you consider anti-obesity medication with the purpose of losing weight?	I would not consider I would consider No opinion	16 (14.2%) 28 (45.9%) 3 (12.5%)	**<0.001**
Any TTRM	Yes No	23 (23.7%) 23 (23.8%)	0.99
Pure TTRM	Yes No	11 (26.2%) 36 (23.1%)	0.67
Any FTRM	Yes No	13 (18.8%) 34 (26.4%)	0.23
Pure FTRM	Yes No	1 (33.3%) 46 (23.6%)	0.55
ETFTRM	Yes No	36 (21.7%) 11 (34.4%)	0.12

*p values with a statistical significance are shown in bold
ETFTRM: Either thinner or fatter than reality misperception, FTRM: Fatter than reality misperception, TTRM: Thinner than reality misperception

Table 5.

Presence of weight misperception types and positive attitude+ toward obesity treatment types, according to different body mass index levels

	BMI = 25.0 – 29.9		**BMI = 30.0 – 34.9**		**BMI = 35 and over**	
Anti-obesity Medication	**WM + vs. VM -**	**p***	**WM + vs. VM -**	**p***	**WM + vs. VM -**	**p***
Any TTRM	35.3% vs. 36.4%	0.91	46.7% vs. 63.6%	0.24	91.7% vs. 68.8%	0.14
Pure TTRM	17.6% vs. 19.5%	0.82	20% vs. 15.9%	0.71	66.7% vs. 18.8%	**0.01**
Any FTRM	55.9% vs. 49.4%	0.52	26.7% vs. 18.2%	0.48	0 vs. 0	NA
Pure FTRM	0 vs. 3.9%	0.24	0 vs. 0	NA	0 vs. 0	NA
ETFTRM	91.2% vs. 85.7%	0.42	73.3% vs. 81.8%	0.48	91.7% vs. 68.8%	0.14
Anti-obesity Surgery						
Any TTRM	37.5% vs. 35.6%	0.86	46.7% vs. 63.6%	0.24	87.5% vs. 75%	0.46
Pure TTRM	12.5% vs. 20.7%	0.36	26.7% vs. 13.6%	0.24	50% vs. 35%	0.46
Any FTRM	41.7% vs. 54%	0.28	20% vs. 20.5%	0.97	0 vs. 0	NA
Pure FTRM	4.2% vs. 2.3%	0.52	0 vs. 0	NA	0 vs. 0	NA
ETFTRM	79.2% vs. 89.7%	0.17	66.7% vs. 84.1%	0.14	87.5% vs. 75%	0.46

+ Responder would consider the relevant obesity treatment
*p values with a statistical significance are shown in bold
BMI: Body mass index, ETFTRM: Either thinner or fatter than reality misperception, FTRM: Fatter than reality misperception, NA: Not applicable, TTRM: Thinner than reality misperception, WM +: Weight misperception is present for the particular type, WM -: Weight misperception is absent for the particular type

4.DISCUSSION

This study showed that medical and surgical obesity treatment considerations are low among overweight and obese patients. Female and younger participants were more likely to consider medical and surgical treatments. Prior exercise history with the purpose of weight loss was shown to be associated with higher anti-obesity surgery consideration. Among patients with a BMI of 35 kg/m2, patients with pure-TTRM were more likely to consider medical obesity treatment compared to those who do not have pure-TTRM. To the best of our knowledge, this is the first study in Turkey to evaluate overweight and obese patients' attitudes towards medical and surgical treatment of obesity and describe associated factors.

Non-pharmaceutical and non-surgical therapies, that is, lifestyle modification, dietary modification, and regular exercise, constitute the backbone of obesity treatment. Moreover, both patients and healthcare providers do not perceive medical and surgical treatments as desirable weight-loss options.[10] However, long-term compliance with non-medical and non-surgical therapies is low, and patients tend to return to their baseline weight.[21] This phenomenon is called "weight cycling", which is sequential weight loss and regain associated with adverse cardiometabolic results.[22] Therefore, various guidelines regarding cardiometabolic diseases suggest medical and surgical obesity treatment options for patients who have failed non-interventional treatments.[4,23] We demonstrated that less than one in three participants would consider anti-obesity medications or surgeries as an option for weight loss. These findings are in parallel with findings from an Asian study.[10] Considering the fact that more than three-fourths of the participants have tried to lose weight before and more than 90% think that obesity is at least partially important, the figures for weight loss medications and surgery are remarkably low. The gap between evidence-based medicine and daily clinical practice should be closed in order to avoid obesity related adverse outcomes.

Discrepancy between the perceived and measured weight is called weight misperception, and it has been shown to affect future weight loss, with the studies having conflicting results: While several studies indicate that weight misperception is associated with lower odds of weight loss[18,24], Sonneville et al. demonstrated that weight misperception is associated with lower future weight gain. (25) Our main study cohort did not demonstrate a difference between weight misperception groups and anti-obesity medication or surgery consideration; however, when only patients with the highest BMI (i.e., BMI >35) were considered, patients who perceived them thinner than real both verbally and visually were more likely to consider anti-obesity surgery and medications. Although this consideration does not necessitate lower future weight loss, as demonstrated by Sonneville et al., our finding seems to be in parallel with their findings.

We have found that female participants were significantly more likely to consider anti-obesity medications compared to male participants, and although there was no statistical significance, they also tend to consider anti-obesity surgery more than males. A survey conducted in Mauritius on female teenagers also demonstrated that weight-loss behaviors were more prevalent among female participants compared to males.[26] However, a study conducted in Saudi Arabia demonstrated that male participants were more likely to consider weight-loss surgery.[9] These differences may reflect the impact of cultural differences on obesity treatment attitudes.

We acknowledge our study's limitations. Firstly, this study was conducted among patients

comprising highly educated people (61.1% have a college degree and above), which markedly differed from the education statistics of Turkey.[27] Secondly, we did not inform participants about the benefits and risks of anti-obesity medications and anti-obesity surgery; thus, some patients may be unaware of the real-world effectiveness of these modalities. Finally, the number of stage 3 obese individuals was low. Since they are the ones who are most likely to benefit from the anti-obesity treatments, their underrepresentation may have affected the results.

In conclusion, anti-obesity treatment consideration is low among participants who are candidates for treatment. Policymakers as well as clinicians should work together to increase awareness of obesity and its treatment modalities.

Author Contributions

ATG and MO conceptualized the study. ATG, MO, BK, NŞ, AÖ, and TIG designed the study. BK, NŞ, AÖ, and TIG collected data. ATG and MO performed the statistics. ATG, MO, BK, NŞ, AÖ, and TIG prepared the draft manuscript, ATG and MO prepared the final manuscript.

Conflict of interest

All authors declare no conflict of interest

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Research Article

Impact of P2Y12 Inhibitors on Thrombus Burden in Patients with ST-Segment Elevation Myocardial Infarction

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Introduction and Aim: In this study, we aimed to investigate the effects of P2Y12 inhibitors administered at the time of admission to the emergency department in patients presenting with ST-segment elevation myocardial infarction (STEMI) and undergoing primary percutaneous coronary intervention on the thrombus score in the culprit lesion.

Materials and Methods: This retrospective study planned to compare the pre-procedural thrombus scores of 225 patients who presented with STEMI underwent primary percutaneous coronary intervention, and received different P2Y12 inhibitors within 2 hours after the onset of chest pain.

Results: A total of 225 patients were included in our study. Among them, 72 patients received clopidogrel, 85 received ticagrelor, and 68 received prasugrel as the P2Y12 inhibitor. The pre-procedural Grade 5 thrombus was significantly lower in the ticagrelor group compared to the other groups (Clopidogrel 77.78%, Ticagrelor 61.18%, Prasugrel 77.94%; p=0.017).

Conclusions: In our study, ticagrelor among the pre-procedurally loaded P2Y12 inhibitors was found to be superior in terms of early thrombus intensity, and these results are thought to be associated with the early onset antiplatelet effect of ticagrelor.

Keywords: ST segment elevation myocardial infarction, Clopidogrel, Prasugrel, Ticagrelor, Thrombus score

1. INTRODUCTION

ST-segment elevation myocardial infarction (STEMI) is a common condition caused by intracoronary thrombosis following plaque rupture.[1] In patients with STEMI who undergo primary percutaneous coronary intervention (PCI), intracoronary thrombosis has been observed in up to 91.6% of cases during angiography.[2] A study comparing 900 STEMI patients investigated the relationship between thrombus score and cardiac events (death, myocardial infarction, and recurrent revascularization). The study found that the TIMI thrombus score was associated with 2-year mortality in patients with grade 0-3 thrombus compared to grade 4-5 thrombus (p<0.001).[2] Thus, a large thrombus was identified as an independent predictor of mortality and major cardiac events. In guidelines, PCI is considered the best and most current treatment option for STEMI.[3] Intracoronary thrombus in STEMI patients is regarded as a negative prognostic factor for in-hospital and long-term adverse cardiac events.[4] Early reperfusion in the culprit lesion before intervention has been shown to create significant changes in ejection fraction (EF), microvascular obstruction, and infarct area.[5]

For patients presenting with STEMI, dual antiplatelet therapy (aspirin and an ADP antagonist) is recommended, with prasugrel

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or ticagrelor primarily suggested. Clopidogrel is recommended if prasugrel and ticagrelor are unavailable, contraindicated, or cannot be tolerated.[3] In this study, we aimed to investigate the effect of the P2Y12 inhibitor given at the time of admission to the emergency department on the thrombus score in the culprit lesion.

2. MATERIALS AND METHODS

Our study was conducted by retrospectively examining the files and coronary angiography images of patients with a diagnosis of STEMI followed in the Coronary Intensive Care Unit of Sakarya University Training and Research Hospital Cardiology Department between 01/01/2018 and 30/08/2019

Patients aged between 30 and 75 years, who presented with chest pain within the first 3 hours and underwent primary PCI, and who received dual antiplatelet therapy at the time of diagnosis in the emergency department were included in the study. Patients with a history of previous coronary revascularization, stent thrombosis, thrombophilia, active treatment for oncologic disease, a history of chemotherapy, rheumatic disease, end-stage renal failure, hemodialysis, those who had used oral antiaggregants in the last week, those with a history of hematologic disorders affecting platelet function, and those with a history of cerebrovascular disease were excluded from the study.

Two hundred twenty five patients (189 male, 36 female) were included in our study. The included patients' demographic characteristics were obtained from the hospital database records. All patients received 300 mg of aspirin and, 60 mg of prasugrel/180 mg of ticagrelor/600 mg of clopidogrel in the emergency department according to the guidelines at the time of diagnosis. All patients received UFH i.v. bolus during PCI of 70-100 IU/kg. The patients were divided into three groups according to prasugrel, ticagrelor, or clopidogrel administration. The ECGs of the patients were evaluated, and the localization of myocardial infarction was classified.

Blood samples taken from the patients during admission and in the coronary intensive care unit, as well as other laboratory values such as urea, creatinine, estimated glomerular filtration rate (GFR), LDL, HDL, triglyceride, total cholesterol, and HbA1c levels, were recorded.

Coronary angiographies were performed by experienced cardiologists. Nonionic low-osmolality contrast medium (Omnipaque 350 MG/ml; GE Healthcare, Cork, Ieland) was used in coronary interventions. Coronary angiography images were reviewed by two different interventional cardiologists, and the culprit lesion, TIMI thrombus score, initial TIMI flow grade, and post-procedure TIMI flow grade were evaluated.

The door-to-cross-wire time was calculated based on the admission and cross-wire times. Angiographic classification of thrombus density was performed using the TIMI thrombus classification[6] , which includes Grade 0 to Grade 5 thrombus.

According to this classification:

Grade 0: Thrombus is not visible angiographically.

Grade 1: Suspected thrombus, irregularity at the lesion borders, decreased contrast density.

Grade 2: Definite thrombus present, size ≤1/2 of the luminal diameter.

Grade 3: Definite thrombus present, size <1/2-<2 of the luminal diameter.

Grade 4: Definite thrombus present, size >2 times the luminal diameter.

Grade 5: Total occlusion is present. Thrombus burden cannot be evaluated due to this.

2.1 Statistical Analysis

Statistical analyses were performed using SPSS version 22 (SPSS Inc., Chicago, IL) software. The normal distribution of variables was examined using visual methods (histograms and probability plots) and analytical methods (Kolmogorov-Smirnov/Shapiro-Wilk tests). Continuous variables were expressed as mean (±standard deviation) or median (interquartile range) depending on their normality distribution. Non-normally distributed variables were compared using the Kruskal-Wallis test. Pairwise comparisons were made using the Mann-Whitney U test and evaluated with Bonferroni correction. Normally distributed variables were compared using a one-way ANOVA test. The homogeneity of variances was assessed using the Levene test. The chi-square test was used to determine whether there was a difference in categorical variables between the groups. Post-hoc analysis results were considered. A type-1 error level of 5% was used for statistical significance.

3. RESULTS

Two hundred twenty five atients (189 male, 36 female) were included in our study. The mean age of the patients was 55.5±8.3 years, and there was no significant difference between the groups (56.2±7.1 in the clopidogrel group, 55.9±9.4 in the ticagrelor group, 54.1±9 in the prasugrel group; p=0.245). Among these patients, 114 had inferior MI, 79 had anterior MI, 11 had extensive anterior MI, 9 had inferoposterior, 6 had inferolateral, 3 had high lateral, 2 had posterior, and 1 had posterolateral MI diagnosis.

Seventy two patients received clopidogrel, 85 received ticagrelor, and 68 received prasugrel loading in appropriate doses. There was no statistically significant difference between the study groups regarding age, gender, hypertension, diabetes mellitus, smoking status, hyperlipidemia, presence of coronary artery disease (Table 1)

The creatinine levels in the emergency department were higher in the clopidogrel group compared to the other groups (Clopidogrel 0.95 (0.82-1.1), Ticagrelor 0.84 (0.74-0.99), Prasugrel 0.85 (0.71-0.96); p=0.002), and the GFR was lower in the clopidogrel group (Clopidogrel 88.0 (66.0-98.0), Ticagrelor 98.8 (83.2-104.0), Prasugrel 101.5 (88.3-107.0); p<0.001) (Table 2)

Table 1.

Comparison of Baseline Characteristics Among the Study Groups

Parameter	Clopidogrel	Ticagrelor	Prasugrel	p-value
Age (years)	56.2±7.1	55.9±9.4	54.1±9.9	0.245
Gender (Female/Male) %	15.3/84.7	16.5/83.5	16.2/83.8	0.978
Hypertension (%)	45.8	36.5	29.4	0.130
Diabetes Mellitus (%)	29.2	22.4	29.4	0.522
Smoking (%)	63.9	77.6	77.9	0.089
Hyperlipidemia (%)	22.2	25.9	38.2	0.089
Coronary Artery Disease (%)	5.6	7.1	4.4	0.780
Family History (%)	4.2	5.9	5.9	0.867

Table 2.

Comparison of Laboratory Values Among the Study Groups

Parameter	Clopidogrel	Ticagrelor	Prasugrel	p-value
Creatinine (mg/dL)	0.95 (0.82-1.1)	0.84 (0.74-0.99)	0.85 (0.71-0.96)	**0.002***
GFR (mL/min/1.73 m^2)	88.0 (66.0-98.0)	98.8 (83.2-104.0)	101.5 (88.3-107.0)	**<0.001****
WBC ($10^3/mm^3$)	11.0 (9.2-13.6)	11.1 (9.6-14.1)	12.2 (9.6-15.6)	0.446
LDL (mg/dL)	137.1±32.6	142.8±30.8	147.0±36.5	0.150
TG (mg/dL)	95.0 (59.0-187.5)	87.0 (56.5-166.5)	113.0 (65.3-196.5)	0.254
HDL (mg/dL)	42.0 (36.5-48.0)	43.0 (36.5-49.0)	40.0 (36.0-46.0)	0.125
HbA1C (%)	5.8 (5.5-6.2)	5.7 (5.4-6.3)	5.7 (5.5-7.5)	0.109
Initial Troponin (ng/L)	49.2 (11.7-186.0)	34.0 (8.8-154.0)	37.5 (12.3-140.5)	0.286

GFR= Glomerular Filtration Rate , **WBC=** White Blood Count, **LDL=**Low-Density Lipoprotein, **TG=**Triglyserides, **HDL=** High-Density Lipoprotein, HbA1C: Haemoglobin A1C

*: Creatinine is higher in the Clopidogrel group.

**: GFR is lower in the Clopidogrel group compared to other groups.

The culprit lesion in the patients was located in the LAD in 89, RCA in 89, CX in 33, RCA's posterolateral branch in 5, major OM in 4, D1 in 2, IM in 2, and PDA in 1 patient. The door-to-cross time, pain-to-cross time, tirofiban infusion rate, and no-reflow rate were similar among the groups (Table 3).

When initial TIMI flow rates were divided into 0/1 and 2/3 and compared, no significant difference was observed among the groups (Figure 1).

The initial Grade 5 thrombus was significantly lower in the ticagrelor group compared to the other groups (Clopidogrel 77.78%, Ticagrelor 61.18%, Prasugrel 77.94%; p=0.017). (Figure 2).

Table 3.

Angiographic Findings Among the Study Groups

Parameter	Clopidogrel	Ticagrelor	Prasugrel	p-value
Door-to-Cross Time (minutes)	39.0 (27.5-51.0)	38.0 (31.0-48.0)	33.5 (26.5-43.5)	0.057
Pain-to-Cross Time (minutes)	151 (96.25-196.0)	138 (95-208.5)	122 (86.5-171)	0.156
Tirofiban Infusion (%)	2.8	1.2	5.9	0.245
No-Reflow (%)	4.2	4.7	1.5	0.530

Figure 1.

İnitial TIMI Flow in the Study Groups

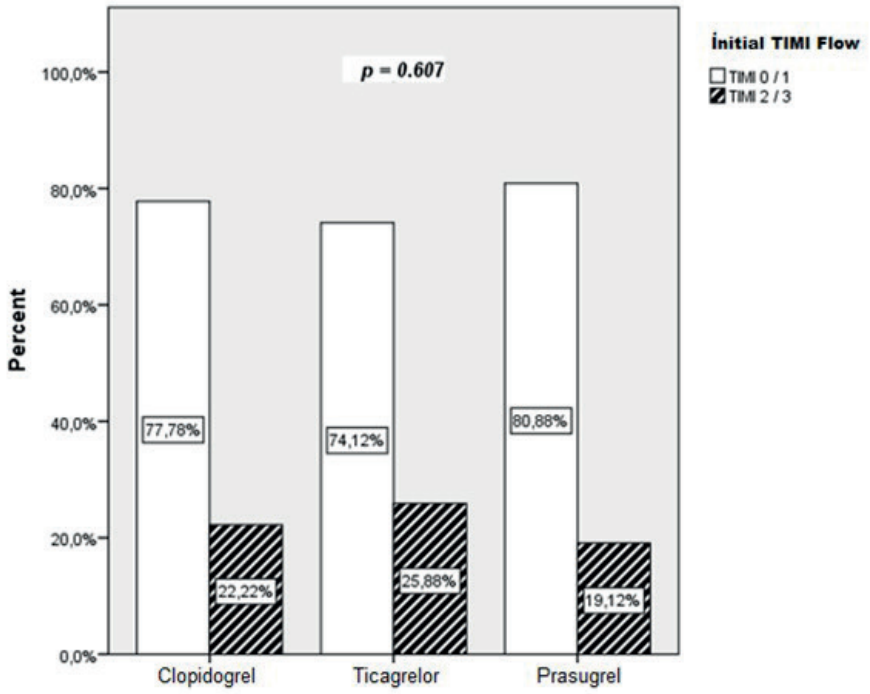
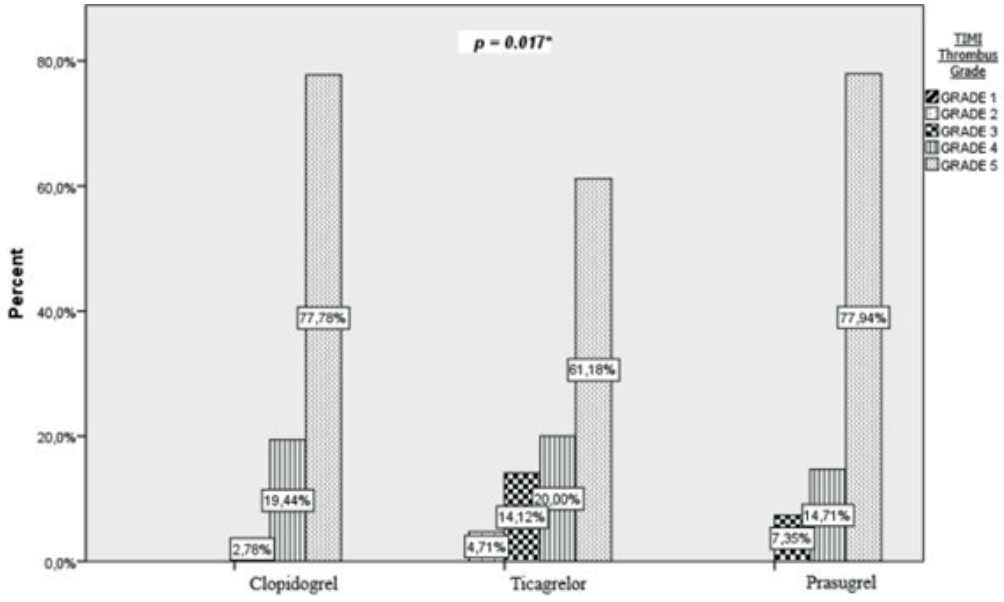


Figure 2.

Thrombus Scores and Grades in the Study Groups



*Grade 5: Lower in the ticagrelor group compared to the other groups
*Grade 3 : Clopidogrel group has a lower incidence of Grade 3 thrombus compared to the ticagrelor group and is similar to the prasugrel group.

4. DISCUSSION

In our study, the pre-procedural thrombus burden in the ticagrelor group was significantly lower than in the other groups. This finding is believed to be related to the early onset of antiplatelet efficacy of ticagrelor. In our study, an evaluation has been made in terms of preoperative thrombus burden, and this is the first study conducted on this subject. Since our study was conducted in 2018, emergency department administered P2Y12 inhibitors according to the 2017 ESC STEMI guidelines.[7] However, the 2023 ESC Acute Coronary Syndrome guidelines have reclassified P2Y12 inhibitor loading as Class 2b.[3]

Ticagrelor inhibits adenosine uptake from red blood cells and increases extracellular adenosine, leading to platelet aggregation inhibition and vasodilation.[8] In healthy volunteers, ticagrelor reached maximum plasma concentration within approximately 1.5 hours after the loading dose.[9] In stable coronary artery patients, after 180 mg of ticagrelor loading, significant antiplatelet effects were achieved within the first 30 minutes, and a nearly complete antiplatelet effect (>80%) was observed within 1 hour.[10] In our study, the door-to-cross time was 38.0 (31.0-48.0) minutes in the ticagrelor group, similar to the other groups, indicating that ticagrelor's early-onset antiplatelet effect reduced thrombus burden more compared to other preparations.

The PLATO study demonstrated the superiority of ticagrelor over clopidogrel in platelet inhibition.[11] Another study comparing ticagrelor and prasugrel in STEMI patients found that ticagrelor had superior platelet inhibition after 5 days.[12] As an active drug, Ticagrelor provides early platelet inhibition compared to prasugrel because of its mechanism.[13] Significant platelet inhibition was reported in the PLATO PLATELET sub-study in 4/5 of STEMI patients and 7/7 of NSTEMI patients within 1 hour after 180 mg of ticagrelor loading.[14] Moreover, in a meta-analysis of 14 studies involving 1822 patients evaluating platelet inhibition, ticagrelor had higher platelet inhibition than prasugrel (High on-treatment platelet reactivity (HTPR) rates were 1.5% for ticagrelor and 9.8% for prasugrel ($p<0.001$)).[15] This earlier onset of platelet inhibition with ticagrelor, compared to clopidogrel and prasugrel, is consistent with the results of our study favoring ticagrelor in terms of thrombus score.

The ATLANTIC study, published in 2014, is the only randomized controlled trial conducted regarding the timing of P2Y12 inhibitors.[16] In this study, ticagrelor was compared in STEMI patients by administering it pre-hospital and in the catheter laboratory. No significant differences were found in pre-procedural TIMI 3 flow presence, ST-segment resolution, or composite endpoints. Major and minor bleedings were similar in both arms. However, when other endpoints of the study were examined, stent thrombosis was significantly less in the pre-hospital group ($p=0.008$). Furthermore, limitations of the study mentioned delayed absorption due to morphine intake, and a significant difference in EKG-based primary endpoint was observed in patients not taking morphine. The study did not include an angiographic evaluation of thrombus burden. In our study, although there was no significant difference among the groups in terms of TIMI flow rates, the favorable difference in thrombus score in favor of ticagrelor may be associated with its early onset effects.

The ISAR-REACT 5 study is the trial comparing ticagrelor and prasugrel in patients with acute coronary syndrome.[17] In this study, the composite of death from cardiovascular causes, myocardial infarction, or stroke occurred in 161 out of 2012 patients (8.1%) in the ticagrelor group and 124 out of 2006 patients (6.3%) in the prasugrel

group (hazard ratio, 1.32; 95% CI, 1.04 to 1.66). Angiographic data were not examined in the study, and one-year clinical outcomes were evaluated. According to the results of this study, despite the early onset of antiplatelet effect with ticagrelor, prasugrel is more effective in the long term.

LIMITATIONS

Our study was limited by its single-center design and a relatively small number of patients, which may have impacted the evaluation of clinical outcomes. Additionally, the study was retrospective and non-randomized and the results of TIMI grade flow and TIMI thrombus assessment conducted by operators could differ from evaluations done by a core lab, which could introduce bias.

CONCLUSION

In our study, the thrombus burden before the procedure was significantly lower in the ticagrelor group compared to the other groups, while no significant difference was observed between the prasugrel and clopidogrel groups. This finding suggests that the early onset of ticagrelor's antiplatelet effect may contribute to its effectiveness in reducing thrombus burden. However, further randomized and prospective studies are needed to confirm these findings.

Financial Support

No financial support was received from any institution for the study.

Conflict of Interest

There is no conflict of interest between the authors.

Author contribution

All authors contributed to substantial contributions to conception and design (EE,MBV), or acquisition of data (DY,EE), or analysis and interpretation of data (MBV-DY), drafting the article or revising it critically for important intellectual content (EE-MBV) and final approval of the version to be published.

Ethical Statement

The study was performed in accordance with the ethical considerations of the Helsinki Declarations. The study was approved by the ethics committee of Sakarya University, with decision number 71522473/050.01.04/77, dated September 18, 2019.

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Research Article

Can Tumor Recurrence Be Predicted by Magnetic Resonance Imaging Findings Before Microwave Ablation in Patients with Hepatocellular Carcinoma?

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Objective: Hepatocellular carcinoma (HCC) is a common cancer. The primary treatment is surgery or liver transplantation. Percutaneous ablation techniques constitute the primary treatment in patients who are not suitable for surgery. Although it gives successful results, some studies report a recurrence rate of up to 50%. This study aimed to obtain an idea about the possibility of possible recurrence by evaluating the lesion characteristics in the pre-procedural MRI images of patients with and without recurrence.

Methods: Forty-eight patients who underwent microwave ablation for HCC in our center between 2018 and 2021 were included in the study. Lesion size, presence of peripheral enhancement, arterial contrast enhancement, and T2 signal characteristics were evaluated on pre-procedural MRI. Subsequently, the relationship of these features with tumor recurrence was evaluated.

Results: The risk of recurrence was higher in patients with lesion sizes with larger than 3 cm diameter and in lesions showing peripheral contrast enhancement (p= 0.036 and p= 0.021, respectively).

Conclusion: Close follow-up will be beneficial in HCCs larger than 3 cm and showing peripheral enhancement since there is a high probability of recurrence after ablation.

Keywords: Hepatocellular carcinoma, Microwave ablation, MRI

1. INTRODUCTION

Hepatocellular carcinoma (HCC) is one of the most common cancers in our country and around the world. It is the most common subtype of primary liver cancer and accounts for 75% of all primary liver cancers. Although it ranks fifth among the most common cancers, it ranks third in cancer-related deaths.[1] Chronic liver disease is the most common cause of HCC. Hepatitis B and C viruses are the most common factors causing chronic liver disease.[2] Other etiological factors are alcohol dependency, non-alcoholic fatty liver disease (NAFLD), obesity, and smoking. Despite the increasing technological developments in diagnosis and treatment options, the desired level of reduction in HCC-related mortality has not yet been achieved. [3]

Barcelona Clinic Liver Cancer (BCLC) staging is the most common staging method used in the management of HCC patients. There are many treatment options for HCC which include surgical resection, percutaneous or laparoscopic ablation, chemoembolization, radioembolization, radiotherapy, systemic tyrosine kinase therapy, systemic immunotherapy, and liver transplantation. Treatment preference varies depending on the location, number, and size of the tumor and the stage of the patient's chronic liver disease, if any. According to the guidelines, surgery or transplantation is still the first option for tumors that are smaller than 3 cm in size and located suitable for resection. However, percutaneous tumor ablation is being used effectively in increasingly more centers as a minimally

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invasive method in patients who cannot tolerate surgery due to comorbidities or in lesions whose location is not suitable for surgery. [4,5]

Currently, radiofrequency ablation and microwave ablation are used as thermal ablation techniques. Both methods are based on creating coagulation necrosis by creating a temperature increase in a determined volume in the target tissue. In suitable patients, ablation therapy is one of the primary treatment methods and offers the chance of curative treatment.[5] However, since the risk of local recurrence is relatively high in these patients, predicting recurrence before the procedure is essential for patient selection and management.

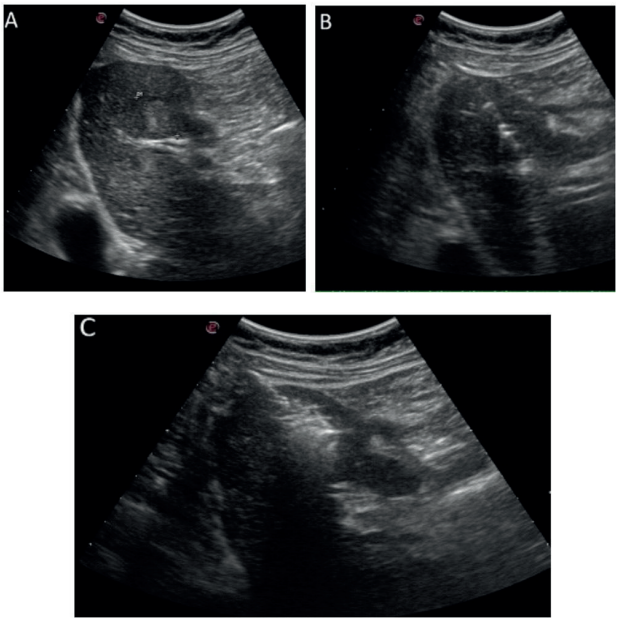
Our aim in this study is to evaluate the potential role of the lesion's pre-procedural magnetic resonance imaging (MRI) features in predicting local recurrence in HCC patients undergoing microwave ablation therapy (MWA).

2. MATERIAL AND METHODS

Ethical approval was obtained from the Local Ethics Committee of the Faculty of Medicine, with the approval number 21457-214. Forty-eight patients who underwent microwave ablation for HCC in our center between 2018 and 2021 were included in the study. The diagnosis of HCC was made by radiographic appearance and high AFP level in cross-sectional imaging using LI-RADS criteria.[6] All procedures were performed under sedoanalgesia and ultrasonography (US) guidance. After the patient was positioned appropriately, antennas of appropriate diameter and length were placed in the center of the lesion under US guidance. As microwave antenna diameter, 14-16-17 Gauge antennas were used, taking into account the location and size of the lesion. Again, ablation was performed at appropriate electrical power (watts) and duration depending on the size and location of the lesion (Figure 1). In cases where a sufficient and homogeneous ablation zone could not be obtained, the antenna was repositioned, and the procedure was continued. The ablation area was visualized simultaneously with the US, and all lesions remained within the ablation zone. Afterward, tract ablation was performed, the antennas were removed, and the procedure was terminated. Twenty-four hours after the procedure, the ablation zone was evaluated with triphasic contrast-enhanced CT, and it was confirmed that the ablation zone covered the tumoral lesion and did not show significant contrast enhancement in all patients.

Figure 1.

A) A mass in the right lobe of the liver (HCC). B-C) The lesion was placed with an antenna, and ablation was performed to cover the entire lesion.



Dynamic contrast-enhanced MRI images and serum AFP values of all patients at least one month before the procedure, in the 1st month, in the 3rd month, and in the 6th month were obtained from the hospital data system. Lesion size, presence of corona enhancement, arterial enhancement, and T2 signal characteristics were evaluated on

pre-procedural MRI, and the differences between recurrent and non-recurrent lesions were evaluated. What is meant by peripheral contrast enhancement? Regardless of its shape, it was defined as parenchymal enhancement observed outside the tumor border in the arterial phase. It became isointense with the background liver parenchyma in subsequent dynamic phase images. Lesion dimensions were measured in three planes in T2 ve contrast-enhanced series, and the most extensive length was defined as the lesion diameter. The MRI sequence that best showed the ablation border was used for border measurements.

MedCalc (version 12, Ostend, Belgium) was used for statistical analysis. Descriptive statistics are given as means. The independent sample test was used to compare continuous variables with normal distribution, and the Mann-Whitney U test was used for data that did not comply with the normal distribution, according to the Kolmogorov-Smirnov test. Kaplan-Meier analysis was used to evaluate primary patency. A value of $P<0.05$ was considered statistically significant.

3. RESULTS

Forty-eight patients were included in the study. All patients had a single lesion. The average age of the patients was 61.1± 10.8 years. Thirty patients were male (62.5%), and 18 were female (37.5%). The majority (83.3%) of the patients were cirrhotic. The most common etiology was viral hepatitis (hepatitis B 62.5%, hepatitis C 12.5%, both hepatitis B and C 4.2%). The patients were mostly Child-Pugh class A (62.5%). The average AFP of the patients was 211.7 ± 101.5. 16G antennas were used in 23 patients, 17G in 18 patients, and 14G in 7 patients, and total ablation times varied according to lesion size and antenna diameter.

Technical success rate was 100%. The most common complication after the procedure was abdominal pain which developed in 29 patients (60.4%). It was ultimately resolved within 24 hours with analgesic support. In 1 patient, a 2-unit hemoglobin drop occurred after the procedure. After erythrocyte suspension and fluid support, hemoglobin levels were stabilized.

In follow-up MRI images, there was local recurrence in 18 patients (37.5%). The ablation zone and its adjacent foci showing contrast enhancement in the arterial phase and wash-out in the venous phase were evaluated in favor of relapse in 3rd-month control MRI (Figure 2). There was no recurrence in 30 patients (62.5%) (Table 1). There was a statistically significant difference between the two groups in terms of tumor size (≥ 3cm) and peripheral contrast enhancement (p 0.036 and p 0.021, respectively). Notably, lesions with recurrence were larger and showed significant peripheral contrast enhancement in the pre-procedural MRI. When arterial contrast enhancement and T2 signal characteristics were evaluated, no statistically significant difference was observed between the groups (p 0.744 and p 0.149, respectively).

Figure 2.

In the pre-ablation MRI examination, a 35 mm diameter peripheral contrast-enhancing lesion in the liver in the arterial phase (A) shows washout in the venous phase (B). In the post-ablation control MRI images, nodular contrast enhancement in the ablation zone in the arterial phase (C) and washout in the venous phase (D) were interpreted in favor of recurrence.

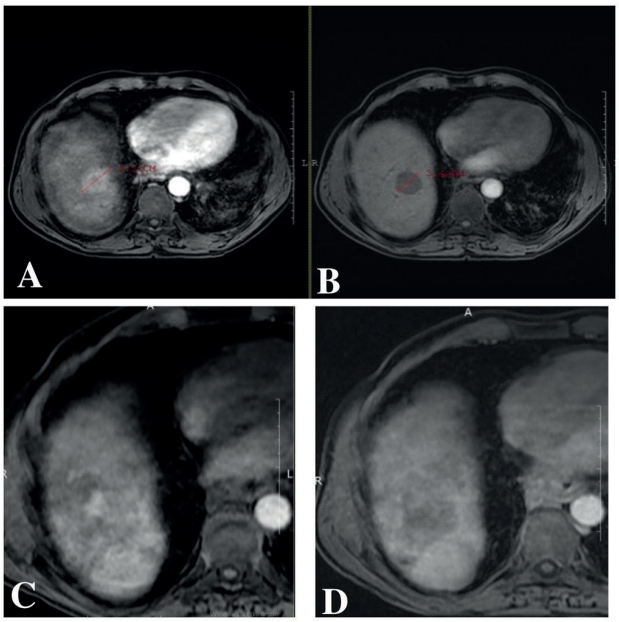


Table 1.

Comparison of parameters on pre-procedural MRI in the groups with and without local recurrences

	With Local Tumor Recurrence n=18 (%37,5)	**Without Local Tumor Recurrence n=30 (%62,5)**	**P**
Age(mean)	63.5±10	59.8±13.4	0.292
Gender(F/M)	6/12	12/18	0.422
Tumor size (≥ 3 cm)	%50	%25	**0.036**
Periferal Enhancement	%83.3	%30	**0.021**
Contrast Enhancement in Arterial Phase	%83.3	%80	0.744
T2 Hyperintensity	%66.6	%60	0.149

4. DISCUSSION

Our study has shown that the probability of recurrence is higher if the ablated lesion is larger than three centimeters and shows peripheral contrast enhancement on preoperative MRI images.

Percutaneous ablation is an effective method used to keep the disease under control until the disease is suitable for surgical resection or liver transplantation or until transplant preparations are made.[7] The most commonly used techniques nowadays are radiofrequency ablation (RFA) and (MWA.) Both methods have their strengths and weaknesses. Microwave ablation offers technical advantages over RFA, including predictable ablation zones, faster ablation times, and insensitivity to current and thermal heat sinks within the ablation area.[8] We included only cases treated with MWA in our study to eliminate technique-related differences.

MRI provides better contrast between soft tissues and higher spatial resolution with higher sensitivity than CT. Recent advances in MRI have made it possible to image the liver with a high spatial resolution during a single breath-hold. In addition, the fact that the patient is not exposed to X-rays is the basis for its increased use. However, CT, with its fast acquisition feature, still constitutes a good alternative in the follow-up of patients who cannot hold their breath and cannot comply with commands.[9,10]

30-55% recurrence rates have been reported in patients treated with thermal ablation.[9,11] When comparing hepatic lesions, it is noteworthy that the recurrence rate is higher in HCCs than in metastases and other lesions.[11] Our study aimed to determine whether pre-procedural MR imaging features of the lesions could effectively predict recurrence.

The study by Chu et al. showed that the probability of recurrence was higher in tumors larger than 2 cm.[12] In a recent study, Dong et al. also showed that the likelihood of recurrence increases as tumor size increases.[13] When the MRI images were evaluated in our study, the tumor was larger than 3cm in 9 (50%) relapsed patients. It was observed that this rate remained at 20% in patients without recurrence (p 0.036). Similar to the literature, it has been shown that the likelihood of recurrence increases as tumor size increases.

Another parameter we examined in our study was peripheral contrast enhancement. Peripheral contrast enhancement was observed in 15 (83.3%) of 18 patients with recurrence. In patients without recurrence, this rate was determined to be 30%, and it was shown that there was a statistically significant difference (p:0.021). It was noted that the findings were compatible with the literature. [14,15]

Arterial enhancement is a common finding in HCCs. Rapid washout in the early venous phase is characteristic of the diagnosis of HCC. Arterial contrast enhancement assessed in the T1 phase of MRI was detected in more than 80% of the patients in both groups. It was not statistically significant in predicting recurrence (p 0.744). When peripheral enhancement and arterial enhancement were compared, it can be speculated that peripheral-enhancing lesions may be more invasive in spreading to the adjacent parenchyma, which may increase the risk of recurrence.

When patient age, gender, and T2 hyperintensity were evaluated, no statistically significant difference was found in predicting the development of recurrence between the two groups.

Our study has many limitations. First of all, it is a single-center study and sample size. Another limitation is that patients were not grouped according to HCC subgroups.

5. CONCLUSION

In conclusion, tumor size and peripheral enhancement on pre-procedural MRI can be used as easily accessible and helpful parameters to predict the local recurrence risk of HCCs before MWA ablation.

Ethical Approval

The study was approved by the Ethics Committee of the Sakarya University Faculty of Medicine, (Number:21457-214 Date: 30.03.2021), and performed by Helsinki Declaration.

Conflict of Interest

The authors declare that they have no conflict of interest.

Informed Consent

Informed consent was obtained from all patients before the procedure.

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Author Contribution Statement

Concept/Design/Analysis/Writing: MÖ

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Research Article

Comparison of Surgery and Stent Application in the Treatment of Tracheal Stenosis

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Introduction: Tracheal stenosis is a pathology that is gradually increasing and requires intervention. Surgical treatment has been used as the gold standard for years, but it is difficult to decide on surgery in patients with comorbidities and high surgical risk. We aimed to evaluate the data of both treatment methods applied in our center.

Materials: Our study was designed as retrospective and observational. The data of 61 patients who underwent resection & reconstruction and Methods or stent due to tracheal stenosis in our center between May 2002 - May 2019 were analyzed. Tracheal stenosis classifications, etiology, demography and treatment data, imaging measurements, and a satisfaction survey were used.

Results: 53 patients who met the inclusion criteria were studied. Both treatment methods were found to be effective in reducing the stenosis and regressing the complaints. The average age in the stent group was higher than in the surgery group. As the intensive care period in the intubated state increases; Severe stenosis and deterioration of cartilage integrity increased. The satisfaction score of the surgery group was higher than the stent group.

Conclusion: Both treatment methods are effective in improving respiratory functions and quality of life. The lesion was located higher in the surgical group and was longer in the stent group. Hospitalization times were longer in patients with severe stenosis and antibiotic changes were more frequent in patients using steroids. No statistically significant difference was found.

Keywords: Trachea, Stenosis, Resection, Reconstruction, Stent implantation

1. INTRODUCTION

Tracheal stenosis is an important pathology that we encounter more frequently in recent years and negatively affects the quality of life. Among the benign causes, stenosis that develops after intubation is the most common one.[1] In addition trauma, various infections and benign tumors can be detected, but sometimes the cause cannot be determined. Cases of tracheal stenosis are increasing as a result of increasing human lifespan, increasing number and use of intensive care and advanced life support units.[2]

The main reason is that the cuff of the intubation tube is inflated with more pressure than it should be and this situation continues for a long time due to prolonged intubation times. Thus, submucosal blood flow decreases, resulting in fibrotic stenosis. If the stenosis narrows the lumen by more than 50%, stridor and exertional dyspnea occur.[3] Various endoluminal treatment methods can be chosen to reduce airway stenosis in patients who are not suitable for surgery or in patients with irresectable pathologies. Nowadays, these treatments are combined to increase their effectiveness.

Tracheal stenosis occurs in 0.6-21% after intubation and tracheostomy, and these become

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clinically significant stenosis in less than 1% of patients.[4 5]

The aim of this study is to investigate the effectiveness of both accepted treatments and to assist in the selection and management of treatment in these life-threatening patients.

2. MATERIAL AND METHOD

The Declaration of Helsinki was complied with throughout the entire study process. Our study was approved to conduct scientific research with the approval of the Scientific Board of the University of Health Sciences and the academic board of our hospital. (See Supplementary File-1)

Our study was designed as a retrospective and observational study. Data of patients who underwent tracheal stent or tracheal resection and reconstruction between May 2002 and May 2019 were examined in the hospital medical database and our clinic bronchoscopy reports. 53 Patients who met the inclusion criteria were included in the study. After examining the data of all patients, surgery and stent patients were examined and compared separately.

In tracheal intervention evaluations reported to date, the number of cases was low or multicenter studies were observed. Surgical and endoluminal complications are important in patient follow-up, and other modalities should be applied in combination when necessary in patients who cannot undergo surgery. In this study, we interpreted the interventions preferred in our clinic with their long-term results. We conducted our multivariate analyzes based on patient age, day of ICU admission, postintubation or posttraumatic stenosis, duration of being intubated , DM, anemia, steroid usage (intravenous and/or inhaler), leukocytosis and antibiotherapy revision, cardiac comorbidity, tracheostomy status, cartilage structure integrity. We applied it on Brichet Myer and McCaffrey classifications.

Patient selection and definitions

Inclusion Criteria

- Intervention (surgery or stent) due to tracheal stenosis in all ages (14-83)
- Access of complete anamnesis, thoracic and tracheal imaging, bronchoscopy and laboratory results in the hospital database

Exclusion Criteria

- Insufficient database of patient who underwent these treatments
- Other procedures in stenosis treatment (balloon dilation, dilatation with rigid bronchoscope)

Limitations of the study include being a single center, limited data access before 2008, patients who stopped follow-up early, and the low number of patients in the stent group.

Operation technique

Silicone stents are placed with a rigid bronchoscope under general anesthesia. The tip of the rigid bronchoscope is placed proximal to stenosis. While stent is being pushed, rigid bronchoscope is kept stationary and the stent is ensured to fit into stenosis area. Position is corrected with forceps. If stent does not fully expand, dilatation is performed with balloons or smaller rigid tubes. Diameter, length and localization of stenosis are determined by tomography and bronchoscopy examinations.

In cases of upper tracheal stenosis, a collar incision is preferred. Control with FOB is made through intubation tube and localization of stenosis is determined. The tube is withdrawn to proximal of stenosis, tracheal lumen is opened with a straight incision distal to stenosis, and distal intubation is performed from surgical area and connected to new sterile ventilation set. Posterior membrane is sutured with continuous 4-0 absorbable sutures,

and tracheal cartilage is sutured with 3-0 or 4-0 absorbable sutures, passing 3-4 mm away from anastomosis line. After suturing, distal intubation tube is withdrawn and orotracheal tube is being pushed without traumatizing the anastomosis, under supervision of surgeon. To reduce tension in anastomosis line, patients chin is sutured to the anterior chest wall, while neck is flexed.[6]

Postoperative follow-up

48 hours after operation, stent site is confirmed and cleaned by control bronchoscopy. Patients should be assisted with nebulizer and importance of humidification should be explained.[7] Risk of contamination from oral flora should not be forgotten and this risk is higher in patients using steroids or patients in DM.[8]

Statistical analysis

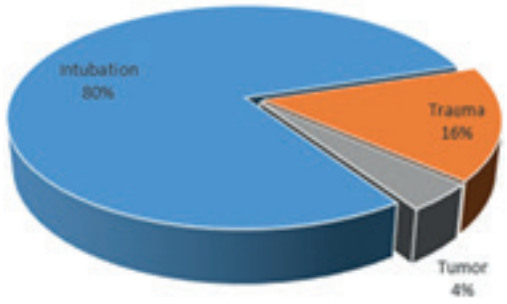
IBM SPSS Statistics 22 software was used for statistical analysis. In this study, nominal variables were given as numbers and percentages, and continuous variables were given as mean and standard deviation. In addition to descriptive statistics, Chi-Square test was used for nominal values when comparing groups, Fisher Exact Chi-Square test was used if expected frequencies were below 5, independent sample t-test was used to compare parametric data, and Mann Whitney U test was used to compare nonparametric data. $P < 0.05$ was accepted for significance in the analyses.

3. RESULTS

40 male and 13 female patients who underwent tracheal resection & reconstruction or stenting were included. There is no significant difference in demographic data for the stent and surgery groups. Resection and reconstruction was performed in 40 patients, and tracheal stent was applied in 13 patients. We applied tracheal stent to one patient who underwent chemoradiotherapy due to primary tracheal tumor. As result of etiological research, stenosis was detected post-intubation in 39 patients (79.6%), post-trauma in 8 patients (16.3%), and due to tumor in 2 patients (Graphic 1).

Graphic 1.

Causes of Tracheal Stenosis in Patients



Considering all patients, average age was determined as 48.45±15.86. Average age of patients who underwent surgery was 47.11±14.23 years, and for stenting group is 53.54±19.62 years. It was determined that surgery was performed in 7 of 8 patients (87.5%) who developed post-traumatic stenosis ($p = 0.212$). In patients who underwent surgery (n:40), cartilage integrity was disrupted in 60.6% of patients, and in those who underwent stenting (n:13), this rate was similar (61.5%) (Table 1).

It was observed that 25 (96.1%) of patients (n: 26) who underwent surgery after intensive care follow-up had prolonged intubation. This rate was 55.5% in patients who underwent stenting after intensive care follow-up ($p=0.003$).

When surgery and stent group patients were examined separately; it was determined that antibiotics were changed in 75% of patients given steroids. This rate is 57.9% in patients who are not being given steroids; it can be interpreted as increased antibiotic change rates in tracheal stenosis patients who are being given steroids, but exact difference could not be shown statistically due to limited number of patients ($p = 0.217$) (Table 1).

According to the Brichet classification, 80.6% of surgical patients have complex stenosis; This rate was found to be 100% in patients who received stents. 97% of surgical patients fall into McCaffrey stage 2, 3 and 97% fall into Myer stage 2, 3. When the intensive care unit stay times of patients with preserved and impaired cartilage structure integrity were compared (16.81±17.45, 18.68±19.92); It was found to be longer in patients with damaged cartilage structure, with a difference of approximately 2 days (p = 0.747) (Table 1).

Table 1.

General Statistical Values

	Surgery (n=40)	Stent (n=13)	p
Age	47.11±14.23	53.54±19.62	0.212
Gender (M/F)	29 (72.5%)/ 11	11 (84.6%)/2	0.480
DM	5 (15.2%)	3 (23.1%)	0.669
Obesity	4 (12.9%)	2 (16.7%)	1.000
Anemia	13 (37.1%)	5 (41.7%)	0.781
Stenosis Etiology			
Intubation	29 (78.4%)	10 (83.3%)	0.508
Trauma	7 (18.9%)	1 (8.3%)	
Tumor	1 (2.7%)	1 (8.3%)	
Impaired Cartilage	20 (60.6%)	8 (61.5%)	0.953
Steroid Usage (+)	19 (57.6%)	9 (69.2%)	0.522
Steroid Usage (-)	14 (42.4%)	4 (30.8%)	0.460
Steroid Usage - IV	4 (12.1%)	4 (30.8%)	
Steroid Usage - Inhaler	5 (15.2%)	1 (7.7%)	
Steroid Usage - IV&Inh	10 (30.3%)	4 (30.8%)	
ICU in patients history	26 (83.9%)	9 (69.2%)	0.414
ICU (day)	19.06±18.61	14.92±17.91	0.422
Prolonged Intubation	25 (67.6%)	5 (38.5%)	0.065
Leukocytosis & Changing Antibiotic	28 (75.7%)	8 (61.5%)	0.329
Stenotic Diameter	6.28±2.20	6.69±2.96	0.970
McCaffrey			
1	0 (0%)	0 (0%)	0.269
2	16 (48.5%)	3 (25%)	
3	16 (48.5%)	9 (75%)	
4	1 (3%)	0 (0%)	
Brichet			
Simple	7 (19.4%)	0 (0%)	0.167
Complex	29 (80.6%)	13 (100%)	
Myer			
1	1 (3.1%)	1 (7.7%)	0.239
2	21 (65.6%)	5 (38.5%)	
3	10 (31.3%)	7 (53.8%)	

According to the Brichet classification, 80.6% of surgical patients have complex stenosis; This rate was found to be 100% in patients who received stents. 97% of surgical patients fall into McCaffrey stage 2, 3 and 97% fall into Myer stage 2, 3. When the intensive care unit stay times of patients with preserved and impaired cartilage structure integrity were compared (16.81±17.45, 18.68±19.92); It was found to be longer in patients with damaged cartilage structure, with a difference of approximately 2 days (p = 0.747) (Table 2).

When patients complying with Myer classification 2 and 3 were compared in terms of ICU hospitalization duration, a significant difference was detected in ICU hospitalization duration for stent, surgery and all patients.

Table 2.

ICU stay duration (days) according to Myer classification

	Myer 2	Myer 3	P
All patients	15.75±16.49	22.31±20.68	0.368
Surgery	18.58±17.26	27.38±22.17	0.287
Stenting	5.00±6.285	18.43±20.35	0.246

In the preoperative period, 8 (15%) of the patients had a tracheostomy cannula, 2 had a tracheal tumor, and 1 patient had a lung lesion causing tracheal stenosis. The distance of the lesions detected in the bronchoscopic examination and tomographic examinations performed on all patients to the vocal cords is shown below (Table 3).

Table 3.

Distance of the stenosis from the vocal cords and average stenotic length (millimeters)

	Surgery n=27	Stenting n=11	P
Distance to vocal cords	24.48 ±9.00	29.18 ± 5.44	0.071
Stenotic length	16.52 ± 9.55	25.64 ± 24.43	0.339

The distance between the vocal cord and the stenotic area in the patients was measured as 13-45 mm. No significant difference was found between the distance in surgical patients (24.48 ± 9.00) and the distance in stenting patients (29.18 ± 5.44) (p = 0.071). Surgical resection was performed in 40 patients, and the resected materials measured between 15 mm and 50 mm in pathological evaluation, with an average of 27.02 mm. The stenotic

segment length in the stent group (25.64 ± 24.43 mm) was found to be longer than the surgery patients (16.52 ± 9.55 mm) (p = 0.339) (Table 3).

In our study, the complication rate after surgery was found to be 22.5%, and the complication rate after stent procedure was 53.6%. Restenosis was observed in 7 of 9 patients who had post-surgical complications, and 5 of these patients underwent dilatation with a rigid bronchoscope and 2 underwent stenting. Temporary unidirectional vocal cord paralysis was detected in 1 patient, and esophageal stenosis was detected in a patient operated for TEF. Of the 7 patients who had complications after the stent procedure, stenosis was detected in 5 due to newly formed hyperplastic granulation tissue in the proximal or distal part of the stent, and migration was detected in 2. In 1 of 5 patients with stenosis, coagulum was observed in the stent lumen and was removed (Table 4). A patient who developed restenosis after being operated on at an external center underwent resection, and a Montgomery T-tube was placed in a patient who had a tracheostomy at the time of admission.

Table 4.

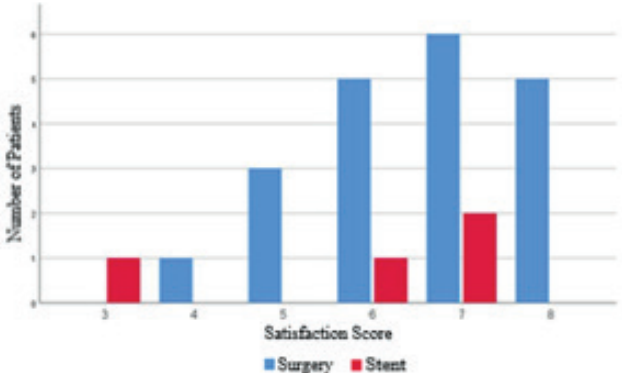
List of Complications

List of Complications
Post Surgery Complications
– Stenosis in anastomosis line (7)
– Temporary unilateral vocal cord paralysis (1)
– Esophageal stenosis (1)
Post Stenting Complications
– Hyperplastic granulation tissue in proximal and distal of the stent (5)
– Migration (2)
– Coagulum in the stent

A satisfaction survey consisting of 8 questions was prepared for all patients to be asked over the phone. Patients were asked about recurrence, rehospitalization, wheezing or stridor, shortness of breath that wakes them up from sleep, post-discharge medication use, post-procedure effort capacity, post-treatment compliance and psychosocial well-being, and a total of 8-point patient satisfaction survey was administered, with each question receiving 1 point. With the data taken from the hospital database, 29 interviews were made and 5 exitus were detected in the patients reached. The satisfaction average of the remaining 24 patients was calculated as 6.41 out of 8, 6.55 for patients who underwent surgery and 5.75 for patients who underwent stenting (p=0.477) (Graph 2).

Graph 2.

Satisfaction Survey Results



One patient who underwent surgery died due to hypertensive pulmonary edema and systemic infection (2.5%), and a terminal cancer patient who received a stent for palliation died within 30 days postoperatively due to immobilization and pneumonia (7.6%).

4. DISCUSSION

According to the Brichet classification, 80.6% of surgical patients have complex stenosis; This rate was found to be 100% in patients who received stents. 97% of surgical patients fall into McCaffrey stage 2, 3 and 97% fall into Myer stage 2, 3. When the intensive care unit stay times of patients with preserved and impaired cartilage structure

integrity were compared; It was found to be longer in patients with damaged cartilage structure, with a difference of approximately 2 days (p = 0.747) (Table 2).

When patients complying with Myer classification 2 and 3 were compared in terms of ICU hospitalization days, a significant difference was detected in ICU hospitalization times for stent, surgery and all patients. (Table 2).

When the surgery and stent group patients were examined separately; It was determined that antibiotics were changed in 75% of patients given steroids. This rate is 57.9% in patients not given steroids; It can be interpreted as increased antibiotic change rates in tracheal stenosis patients given steroids, but the current difference could not be shown statistically due to the limited number of patients (p = 0.217) (Table 1).

In another study with a large series, the average age was measured as 47.4 years, with an age range of 4-86 years.[9,10] In our study, the average age was found to be 48.4, with 16.9% aged >65 and 3.7% aged >80 years. The average age of stent-treated patients was (53.5) higher than surgical patients (47.1) (Table 1).

The first case series regarding tracheal damage after intubation was published in 1995.[11] The incidence of tracheal damage after endotracheal intubation is 5-19 per 10000.[12] There are publications indicating the incidence of tracheal laceration after double-lumen intubation (12/10000).[13] In the publication of Spaggiari et al., the incidence of damage as a result of 800 double-lumen intubations performed in 4 years was 0.37%.[14] Özdemir et al. Of the 42 patients treated for benign stenosis, 23 (54.7%) underwent bronchoscopic intervention (laser, dilation, cryotherapy or stent placement), and 19 (45.3%) underwent surgery, and 6-month results showed success rates of 43.4% and 94.7%.[15] We performed surgery on 74% of our patients and stents on 16%, and achieved similar success results.

In a study published in 1996 on complications after tracheal stent, 17.5% migration, 6.3% granulation, and 6.3% mucostasis were found.[16] In a study dated 2016 investigating the results of bronchoscopic treatment; No complications were observed after treatment for simple tracheal stenosis, except for 16% mucostasis; In complex stenoses, 41% migration, 33.1% granulation at the proximal or distal end, and 43% mucostasis have been reported.[17] In our study, when the patients who received stents were examined, we found 61.5% complex stenosis. When our complication rate after stent application (53.6%) was compared with the literature, no significant difference was detected.

Several risk factors have been shown to increase complication rates. These; reoperation, DM, long resections (>4 cm), laryngotracheal resections, age younger than 17 and the presence of preoperative tracheostomy. In the study published by Marulli et al. in 2007, the total anastomotic complication rate was 8.1% and the separation rate was 5.4%.[18] In Grillo's publication of 503 patients, post-surgical morbidity was 32%, and the most common complications were granulation tissue formation (9.7%), wound infection (3%), glottic dysfunction (2.2%), dehiscence and restenosis (5.7%).[1] In our study, we found the postoperative morbidity rate to be 22.5%. We detected stenosis in the anastomosis line in 17.5%, temporary unidirectional vocal cord paralysis in 2.5%, and esophageal stenosis in 2.5%.

Segmental tracheal resection is the most preferred method in the treatment of postintubation stenosis. In the nonoperative techniques (endoscopic dilatation and stent placement) we applied in 13 cases in our clinic; We found that patient

satisfaction was lower compared to patients who underwent surgery (surgery 6.55, stent 5.75). It was noted that the stent group was in the older age group and required frequent rehospitalization.

The segment length to be removed in tracheal surgery is one of the major problems. As the length increases, the risk of tension and complications in the anastomosis line increases. When the resection length is examined in our study, the average length is 27.02 millimeters (between 15-50 mm). In Grillo et al.'s 1995 study, resection lengths were between 10-75 mm, and in Uluşan et al.'s 2017 study, the average resection length was 25 mm.[1,19] Ashiku et al. They examined 73 patients between 1971 and 2002 and the average resection length was found to be 26 mm (10-50 mm).[20] When compared with current values, it was found compatible with our study data.

Another controversial issue is steroid usage, which negatively affects anastomotic healing. When the effect of steroids on intensive care unit stays was investigated, hospitalization times were observed to be longer in the group using steroids for all patients and surgical patients; When looking at patients who received stents, this period was found to be shorter for those using steroids. It should not be forgotten that the choice of steroid may affect the duration of stay, and it should be used considering its effect on surgical site healing. In our study, it was determined that antibiotics were changed in 21 of 28 patients (75%) who were given steroids, and this rate was 57.9% in patients who were not given steroids; It can be interpreted as an increased antibiotic revision rate in tracheal stenosis patients given steroids, but it could not be shown statistically due to the limited number of patients.

In the literature reviews, postoperative morbidity was found to be 5-15%, mortality was 1-5%, and morbidity was found to be 3% in experienced centers.[1, 21, 22] In our study, we found the post-surgical complication rate to be 22.5% and found it to be compatible with the literature.

During the study, we experienced difficulties such as the study being retrospective and the number of cases not being sufficient to allow detailed analysis. Due to the characteristics of our center, the majority of patients with cardiac comorbidities were admitted. In our study investigating tracheal stenosis treatment preferences and results, we found that the most important factor was the surgeon's experience and appropriate patient selection. Etiology, ICU stay, DM, anemia, steroid usage, leukocytosis and antibiotic therapy, form and localization of stenosis, cartilage structure integrity and surgical techniques are important factors that affect the research but there is no significant values that would affect our preference orientation.

Declaration of conflicting interest

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Meeting presentation

This manuscript has not been published anywhere before

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Research Article

Effectiveness of ACLS Training Programs: A Comparative Study of Pre- and Post-Test Results Across Health Professional Groups

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Objective: The primary aims of our study were to evaluate the fundamental knowledge and skills related to advanced cardiac life support (ACLS) and basic life support (BLS) across different professional groups through a survey-based assessment and to compare pre-test and post-test surveys following theoretical and simulation-based training to assess improvements in knowledge.

Materials and methods: This study was conducted retrospectively between April 1, 2024, and May 15, 2024. The study group consisted entirely of healthcare professionals. The pre-and post-course results of ACLS training provided by 12 emergency medicine specialists with at least five years of experience in ACLS instruction were evaluated. The statistical analyses of the data were performed using the IBM SPSS 25.0 software package.

Results: The study included a total of 456 participants, of whom 48.5% (n=221) were male. Among the participants, 35.5% (n=162) were emergency medicine residents. Analysis based on the participants' roles revealed a statistically significant difference between the pre-test and post-test results (p=0.010). Post-hoc analysis indicated statistically significant differences between general practitioners and nurses, as well as between general practitioners and paramedics (p=0.012 and p=0.029, respectively).

Conclusion: The study found that a guided ACLS training program, which included standard didactic, practical, and simulation methods, resulted in improved ACLS and increased ACLS knowledge levels among all healthcare professionals. However, no single professional group exhibited a more pronounced increase in post-course success levels compared to others.

Keywords: Advanced cardiovascular life support, Cardiopulmonary resuscitation, Education, Interprofessional education

1. INTRODUCTION

Sudden cardiac death affects 350,000 individuals annually in the USA alone. The provision of early and effective basic life support (BLS) and advanced cardiac life support (ACLS) following sudden cardiac arrest, which has a high mortality rate, is closely linked with the return of spontaneous circulation and favorable neurological recovery in patients.[1] Consequently, BLS and ACLS training programs are widely conducted worldwide, not only for emergency and critical care personnel but also for all healthcare professionals.

Several studies have revealed deficiencies in the resuscitation knowledge of healthcare professionals.[2,3] Highlighting the need for BLS and ACLS training. Globally, BLS and ACLS training continues rapidly through both face-to-face and digital platforms. However, it is known that BLS and ACLS training that includes face-to-face practice and simulations is more effective compared to training without simulations.[4] Courses involving simulations or practical applications enhance participants' skills in performing appropriate chest compressions, using defibrillators, recognizing

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lethal rhythms, and intervening accordingly. The quality and effectiveness of the trainers are as crucial as the format of the training itself. In addition, the effect of the training is related to the participants' roles within the healthcare system. A previous study demonstrated that physicians increased their ACLS knowledge and skills more than nurses following an ACLS course,[5] a finding that is associated with social roles.[6] Nevertheless, all healthcare professionals must be able to provide adequate and effective BLS and ACLS during sudden cardiac arrest. A study involving medical students and resident physicians showed significant improvements in success rates for both groups following appropriately conducted ACLS training.[7] Therefore, training programs should be tailored to the knowledge and experience levels of all healthcare professionals .

In Turkey, many associations and organizations conduct ACLS courses, most of which integrate both theoretical and practical training. The primary aims of the current study were to evaluate the fundamental knowledge and skills related to BLS and ACLS among different professional groups through a survey-based assessment and to compare pre-test and post-test surveys following theoretical and simulation-based training to assess improvements in knowledge.

2. MATERIALS AND METHOD

Study design and population:

This study was conducted retrospectively from April 1, 2024, to May 15, 2024. This study was approved by the Atatürk University Clinical Research Ethics Committee with decision number 3/63 and dated May 3, 2024. The study was performed in accordance with the tenets of the Declaration of Helsinki.

The results of ACLS theoretical and simulation training courses, conducted by 12 emergency medicine specialists with at least five years of experience in ACLS instruction, were evaluated. Participants in these courses were healthcare professionals from various occupational groups (specialist doctors, general practitioners, nurses, and paramedics). The ACLS training provided included a total of 12 hours of theoretical lessons. The theoretical lesson topics were as follows:

1. BLS,
2. ACLS and innovations,
3. Airway management,
4. Cardiovascular pharmacology,
5. Myocardial infarction,
6. Dysrhythmias,
7. Lethal dysrhythmias and electrical therapies,
8. Special considerations in resuscitation (pregnancy, trauma, cardiac arrest in asthma)
9. Special considerations in resuscitation 2 (cardiac arrest in toxicological emergencies)
10. Special considerations in resuscitation 3 (environmental emergencies: anaphylaxis, drowning, hypothermia, and cardiac arrest in electric shock and lightning strikes),
11. Special considerations in resuscitation 4 (thrombolytic use in the emergency department and cardiac arrest in stroke and pulmonary embolism),
12. Ethical and legal aspects of resuscitation.

In addition, the participants received eight hours of practical training with appropriate simulation models, allowing them to practice the following:

1. BLS procedures and the use of automatic external defibrillators,

2. Airway management,
3. Rhythm recognition,
4. Electrical therapy for lethal rhythms and defibrillator use,
5. Management of special cardiac arrest scenarios.

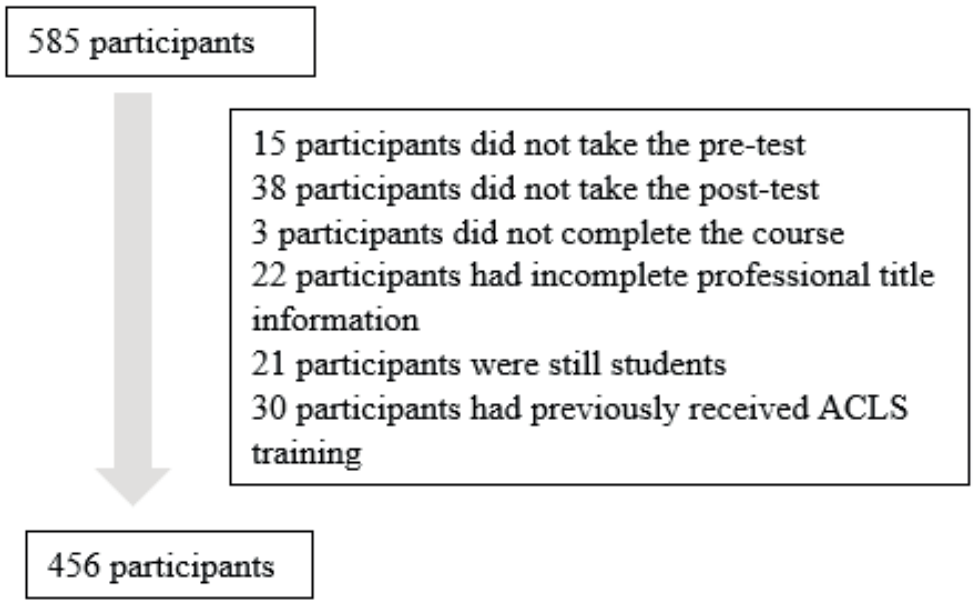
A pre-test was administered to all participants before the lessons began. Following the completion of the theoretical and simulation-based training, a post-test was undertaken. Both the pre-test and post-test consisted of 40 multiple-choice questions, prepared and reviewed by the 12 emergency medicine specialists who provided the ACLS training. The study included all participants from 14 ACLS courses conducted over one year. Excluded from the study were individuals who did not attend the entire course, did not take the pre-test or post-test, were still students, had previously taken an ACLS course, or whose professional titles were not available. A total of 585 participants were initially considered, but only 456 who met the inclusion criteria completed the study. Figure 1 presents the flow chart for the participants.

Statistical analysis:

In this study, statistical analyses were conducted using the IBM SPSS 25.0 software package. The Kolmogorov-Smirnov test was employed to assess the normality of the data distribution. Categorical data were presented as frequencies and percentages, while numerical data were provided as means and standard deviations. For dependent groups, the Wilcoxon test was used to compare two groups. When comparing three or more dependent groups, the Friedman test was utilized. The Dunnett T3 test was employed for the post-hoc analysis of the data. Throughout the study, a p-value of less than 0.05 was considered statistically significant.

Figure 1.

Flow chart for the participants.



3. RESULTS

The study included a total of 456 participants, of whom 48.5% (n = 221) were male. Among the participants, 35.5% (n = 162) were working as emergency medicine residents, and 6.4% (n = 29) were actively working as emergency medicine specialists. The sociodemographic characteristics of the participants are summarized in Table 1.

Examining the pre-test results of the participants included in the study, it was determined that the group of emergency medicine specialists had higher pre-test scores compared to the remaining groups. All groups improved their success levels in the post-test following the course. This increase was also found to be statistically significant (p≤0.001, Table 1).

In the study, when evaluating the differences between the pre-test and post-test scores of the participants, statistical significance was found in terms of gender (p = 0.01 0). Additionally, a statistically significant difference was observed between the pre-test and post-test scores based on the participants' roles (p = 0.010). The post-hoc analysis revealed statistically significant differences between general practitioners and nurses, as well as between general practitioners and paramedics (p = 0.012 and p = 0.029, respectively). No statistical significance was found in the comparison of the remaining groups (p > 0.05) (Table 2).

Table 1.

Pre-test and post-test results according to the participants' sociodemographic characteristics, gender, and professional role.

Variable	n(%)	Pre-test	Post-test	P value
Gender				
Male	221 (48.5%)	54.3 ± 14.9 (12-100)	70.2 ± 14.3 (22.5-97.5)	≤0.001
Female	235 (51.5%)	51.2 ± 13.9 (12-84)	65.5 ± 14.0 (20.2-97.5)	≤0.001
Professional role				
EMS	29 (6.4%)	63.4 ± 11.5 (40-84)	79.3 ± 10.6 (55-97.5)	≤0.001
SD	66 (14.5%)	54.7 ± 12.7 (24-84)	71.1 ± 10 (47.5-92.5)	≤0.001
General practitioner	69 (15.1%)	48.7 ± 12.6 (20-76)	66.1 ± 11.2 (40-95)	≤0.001
Nurse	77 (16.9%)	41.4 ± 13.4 (12-72)	53.2 ± 13 (20-87.5)	≤0.001
Paramedic	53 (11.6%)	45.9 ± 13.1 (24-84)	57.7 ± 15.8 (22.5-92.5)	≤0.001
EMR	162 (35.5%)	59.3 ± 12.2 (24-100)	67.8 ± 9.4 (47.5-97.5)	≤0.001

EMS: Emergency medicine specialist, SD: Specialist doctor in other branches of medicine, EMR: Emergency medicine resident

Table 2.

Comparison of the participants' delta values according to gender and professional role

Variable	Delta test	P value	Post-hoc
Gender			
Male	16.1 ± 13.0 (-27.0-50.5)	0.123	-
Female	14.5 ± 12.8 (-20.0-62.5)		
Professional role			
Emergency medicine specialist[a]	15.9 ± 8.1 (-5.0-30.0)		
Specialist doctor in other branches of medicine[a]	16.4 ± 12.2 (-8.5-41.0)		
General practitioner[a,b]	19.0 ± 122.8 (-12-62.5)	0.010	b > c, d
Nurse[a,c]	11.9 ± 15.5 (-20-51.5)		
Paramedic[a,d]	11.8 ± 14.1 (-27.0-40.5)		
Emergency medicine resident[a]	15.9 ± 11.8 (-19.5-51.0)		

4. DISCUSSION

This study revealed that post-test scores evaluated after the course increased across all groups compared to pre-test scores. However, the increased success rates showed no significant difference among these groups, with almost all healthcare professionals exhibiting a similar level of improvement. Participants should benefit equally from a training program that includes all medical professional groups. For efficient training, it is important to use guided training, as the guide possesses expertise in the subject matter, imparts knowledge, demonstrates its application, and instructs on how to implement it.[8] In addition, standard didactics, face-to-face skill stations, and high-quality simulation training methods should all be implemented during adult education. It has previously been reported in the literature that training with this method increases success rates.[9] The ACLS course provided utilized a full range of guided, standardized didactics, hands-on skills stations, and high-quality simulation training formats and was conducted in small groups, ensuring that all participants were able to equally benefit from them.

The theoretical knowledge provided during school years may be recalled during ACLS courses. However, some participants, such as specialist doctors working in non-emergency medical fields, may not have the opportunity to refresh or practice resuscitation skills sufficiently in their daily work. Therefore, simulations conducted during ACLS training can be instructive for such participants.[10] Simulation is considered the most effective method among educational approaches used to retain knowledge and enhance resuscitation skills.[11] The abundance of professional experience (continuous exposure to resuscitation) may explain why the emergency medicine specialists in the current study scored higher than the remaining professional groups in both pre-tests and post-tests. Emergency medicine specialists are often required to perform resuscitation numerous times

due to the nature of their specialization. Repeated practices ensure the retention of resuscitation knowledge and skills. Thus, although they scored higher than all remaining groups in pre-tests and post-tests due to actively performing resuscitation in their routine work lives, their post-course development did not differ significantly from the other groups. A previous study on determining the frequency of resuscitation training for emergency medicine specialists also reported that the time elapsed after their last training and even the presence of a previous training history did not affect their resuscitation skills.[12] This can also be attributed to the continuous experience these professionals gain in their daily work lives.

Nurses participating in this study had the lowest scores in both pre-tests and post-tests. A study by Botes et al. reported that nurses working in emergency departments and intensive care units had insufficient ACLS knowledge both before and after training.[13] Similarly, Rajeswaran et al. observed that nurses had significantly low levels of resuscitation knowledge before the course. While their post-course knowledge levels increased, a considerable decline was noted when the participants were reassessed after six months.[14] The inadequacy of resuscitation knowledge among nurses in Turkey may be related to their roles in administering medication, preparing materials, etc., during resuscitation. This situation can also be associated with legally binding rules in Turkey's nursing practice, such as the clause requiring nurses to collaborate with physicians in emergency situations and initiate resuscitation in the absence of a physician or a certified practitioner with an unexpired certificate.[15] However, despite these factors, a study conducted with nurse participants in Turkey found that 53.9% of the participants initiated resuscitation without a physician, and nurses with longer work experience were likely more successful in resuscitation, possibly due to their increased experience.[15] In addition, the authors determined that nurses working in emergency departments scored higher on average compared to other nurses. Based on these results, it can be stated that nurses who work in units with constant exposure to resuscitation, such as emergency rooms and intensive care units, have higher success rates compared to their colleagues, most likely due to their greater experience.

The participants working as paramedics in the healthcare system had an increase in their ACLS knowledge levels following the course. This increase could be related to the inclusion of simulations in the training. A previous study found that paramedic students achieved a higher success rate with simulation-based training compared to traditional methods.[16] Furthermore, paramedic participants were observed to perform better than nurses in both pre-tests and post-tests. A study conducted with paramedics in Turkey determined that performing defibrillation or cardioversion during resuscitation significantly increased their knowledge level about resuscitation.[17] The higher scores of paramedics compared to nurses in Turkey may be attributed to their increased exposure to pre-hospital resuscitation protocols due to the frequent solitary nature of their work in ambulances, necessitating the execution of all resuscitation steps prior to hospital admission, thereby facilitating greater experiential gains.

In Turkey, the term "general practitioner" refers to physicians who have graduated from medical school without receiving specialized training in any medical field. Therefore, general practitioners acquire their ACLS-related knowledge during medical school and post-graduation work experience. Consequently, their experience and theoretical knowledge are limited compared to doctors who have undergone specialized training.

In the current study, both groups had increased post-test scores, with similar increases in success rates following training. When comparing general practitioners to doctors working in non-emergency medical fields, specialist doctors scored higher in both pre-tests and post-tests. Similarly, a study undertaken by Stirparo et al. reported that more experienced doctors had higher ACLS knowledge levels compared to new graduates.[18] Our study also indicated that general practitioners scored higher on average in both pre-tests and post-tests compared to nurses and paramedics, which, we believe, is due to the abundance of theoretical education received during school years rather than professional experience.

Our study focused on the benefits gained from the course rather than evaluating participants as successful or unsuccessful. However, we only included participants from the last 14 courses in our study; therefore, our data only reflects the evaluation of the last 14 trainings. We also did not consider the participants' ages or the length of their professional experience. Furthermore, the nursing group was not divided into subgroups based on their encounters with resuscitation processes, such as emergency nurses or intensive care nurses. Lastly, the educational levels of the participants in the nursing group were overlooked, which can be considered another limitation of our study.

5. CONCLUSION

This study revealed that guided ACLS training, involving the utilization of standard didactic, practical, and simulation methods, increased ACLS knowledge levels among all healthcare professional groups. However, the post-course success levels did not significantly differ according to the professional role. The increase in ACLS knowledge levels will also affect the outcomes of resuscitation. To increase survival rates after cardiac arrest, such training should be provided at frequent intervals, especially to healthcare professionals not regularly involved in resuscitation procedures, including emergency medicine specialists and residents.

Ethics Committee Approval

This study was approved by the Atatürk University Clinical Research Ethics Committee with decision number 3/63 and dated May 3, 2024.

Conflict of Interest

The authors declare no conflict of interest in this study.

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Research Article/ Araştırma Makalesi

Migren Profilaksisinde Etkili Bir Ajan; Galcanezumab: Tek Merkez Deneyimleri

An Effective Agent in Migraine Prophylaxis: Galcanezumab: Single-Center Experiences

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Giriş: Migren, tipik olarak 4 ile 72 saat süren, genellikle orta veya şiddetli tekrarlayan başağrısı atakları ile karakterizedir. Başağrısı, genellikle bulantı, kusma ve/veya ışığa ve sese karşı tahammülsüzlük ile birlikte görülür. Migren ile ilgili birçok tedavi modalitesi olmakla birlikte bu çalışmada kliniğimizde migren hastalarının Galcanezumab tedavi deneyimleri ve sonuçlarının sunulması amaçlanmıştır.

Gereç ve Yöntem: Sakarya Üniversitesi Eğitim Araştırma Hastanesi Nöroloji Anabilim Dalı'nda 2021-2023 yılları arasında başvuran, 18 yaşın üzerinde, en az iki yıllık migren öyküsüne sahip olan ve ICHD-3 kriterlerine göre tanı almış olan Galcanezumab tedavisi alan dokuz olgu dâhil edilmiştir.

Bulgular: Olguların ortalama migren süresi dört ve otuz yıl arasında değişmektedir ve ortalama 17,4 (6,8) yıldır. Hastaların Galcanezumab öncesi ortalama aylık migren başağrısı gün sayısı on beş ve yirmi beş gün arasında değişmektedir ve ortalama 18,3 (3,5) gündür. Hastalar Galcanezumab tedavisi sonrası ortalama %86,6 migren başağrısı şiddetinde azalma ve ortalama %90 migren başağrısı sıklığında azalma ve %88,8'i akut ilaç kullanımında azalma bildirmektedir.

Tartışma: Çalışmamızda hastaların Galcanezumab tedavisi ile migren sıklığı, şiddeti ve analjezik tüketiminde önemli bir ölçüde iyileşme gösterdiğini tespit ettik. Çalışmaya, tedaviye en az altı ay devam eden hastalar dâhil edilmiştir. Bu hastalar aylık enjeksiyonun sürekli ilaç kullanımına göre kolaylığı ve klinikte önemli ölçüde fayda görmeleri nedeniyle tedaviye devam ettiklerini bildirdiler. Migrenin patofizyolojik bilgisi ve klinik çalışmalardaki yüksek araştırma standartları, risk altındaki kişilerde hastalığın ilerlemesini önlemeyi mümkün kılabilir.

Sonuç: Bu çalışma, ülkemiz genelinde kullanımı giderek yaygınlaşan Galcanezumab tedavisinin migren başağrısı tedavisinde önemli bir rolü olduğunu göstermek ve klinik deneyimlerimizi paylaşmak amacıyla sunulmuştur.

Anahtar Kelimeler: Başağrısı, Migren, Galcanezumab

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Introduction: Migraine is typically characterized by recurrent attacks of headache lasting between 4 and 72 hours, often of moderate or severe intensity. The headache is usually accompanied by nausea, vomiting, and intolerance to light and sound. Although there are many treatment modalities related to migraine, this study aims to present the experiences and outcomes of Galcanezumab treatment in migraine patients in our clinic.

Materials and Methods: Nine cases who were over 18 years of age, had a history of migraine for at least two years, and were diagnosed according to the ICHD-3 criteria, and received Galcanezumab treatment between 2021-2023 at the Neurology Department of Sakarya University Training and Research Hospital were included.

Results: The average duration of migraine among the cases ranged from four to thirty years, with a mean of 17.4 (6.8) years. The patients' average number of monthly migraine headache days before Galcanezumab treatment ranged from fifteen to twenty-five days, with a mean of 18.3 (3.5) days. After Galcanezumab treatment, patients reported an average of 86.6% reduction in migraine headache severity, 90% reduction in migraine headache frequency, and 88.8% reduction in acute medication use.

Discussion: In our study, we found that patients showed significant improvement in migraine frequency, severity, and analgesic consumption with Galcanezumab treatment. The study included patients who continued the treatment for at least six months. These patients maintained their treatment regimen due to the greater convenience of monthly injections over continuous medication. They also observed significant clinical benefits. Understanding the pathophysiology of migraine and maintaining high research standards in clinical studies may make it possible to prevent disease progression in at-risk individuals.

Conclusion: This study aims to demonstrate the significant role of Galcanezumab treatment, which is becoming increasingly widespread in our country, in the treatment of migraine headaches and to share our clinical experiences.

Keywords: Headache, Migraine, Galcanezumab

EXTENDED ABSTRACT

Introduction

Migraine is typically characterized by recurrent attacks of headache lasting between 4 and 72 hours, often of moderate or severe intensity. The headache is often accompanied by nausea, vomiting, and/or intolerance to light and sound. Migraine is more common among women of all age groups compared to men; 17% of women and 6% of men are affected by headaches annually. Headaches can occur with or without aura, with the non-aura subtype being the most common. The type of migraine can be determined based on the frequency of monthly migraine headache days and monthly headache days. The International Classification of Headache Disorders, Third Edition (ICHD-3) defines chronic migraine (CM) as a headache lasting for more than 3 months, with migraine headache characteristics occurring on at least 8 days per month for a minimum of 15 days per month. Episodic migraine (EM) is defined as a headache occurring on fewer than 14 days per month for at least 3 months, with migraine headache characteristics present on at least 4 days. In the treatment of migraine, both acute and preventive therapies are available. Preventive treatment options include beta-blockers, tricyclic antidepressants, anticonvulsants, occipital nerve blocks, botulinum toxin, and calcitonin gene-related peptide (CGRP) monoclonal antibodies such as erenumab, fremanezumab, galcanezumab, and eptinezumab. This study aims to present the experiences and outcomes of galcanezumab treatment for migraine patients in our clinic.

Material and Methods

Nine cases were included in the study, all of whom were over 18 years old, had at least one year of migraine history, and were diagnosed according to ICHD-3 criteria, and who received galcanezumab

treatment at the Neurology Department of Sakarya University Training and Research Hospital between 2021 and 2023. Retrospectively, the study examined gender, age, education, employment status, comorbid conditions, duration of migraine, average number of painful migraine days per month, and the number of acute medication uses in terms of acute attack and preventive treatment experiences. Patients who received galcanezumab treatment for less than six months were not included in the study.

Results

The study included a total of nine cases, consisting of six women and three men. The age range of the cases varies between 33 and 50 years, with an average age of 39.6 (6.4) years. The average duration of migraine among the cases ranges from 4 to 30 years, with an average of 17.4 (6.8) years. Before starting galcanezumab, the average number of migraine headache days per month ranged from 15 to 25 days, with an average of 18.3 (3.5) days. Before starting galcanezumab, the number of acute medication use days per month ranged from 10 to 50 days, with an average of 20.5 (11.8) days. 33.3% of the patients were diagnosed with chronic migraine, and 66.6% were diagnosed with both chronic migraine and medication overuse headache (MOH). All patients reported experiencing severe headaches that significantly affected their quality of life. All patients have used various treatments for acute migraine attacks, with the average values being 88.8% using triptan medications, 77.7% using nonsteroidal anti-inflammatory drugs (NSAIDs), 55.5% using acetaminophen-containing medications, 33.3% using combination therapies, 22.2% using alternative medicine methods, and 11.1% using ergotamine-containing medications. All patients have used various preventive treatments for migraine, with 88.8% using antidepressant medications and occipital nerve blocks, 55.5% using anticonvulsants, 22.2% using beta-blockers, 11.1% using acupuncture, and 11.1% using botulinum toxin treatment. After galcanezumab treatment, patients reported an average improvement of 77.5% in nausea and osmophobia, 70% in vomiting, 72.2% in photophobia, and 80% in phonophobia and physical activity. Including patients who are still receiving galcanezumab treatment, the average duration of treatment is 9.4 (4.3) months. After galcanezumab treatment, patients reported an average reduction of 86.6% in migraine headache intensity, an average reduction of 90% in the frequency of migraine headaches, and 88.8% reported a decrease in acute medication use. 66.6% of patients reported experiencing no headaches during the treatment period, and 66.6% also reported not needing any acute treatment while receiving galcanezumab therapy.

Discussion

Migraine is a chronic, widespread neurological condition that can significantly impact individuals' lives and lead to disability. It negatively affects quality of life, social functioning, and work life. It is known that calcitonin gene-related peptide (CGRP) plays an important role in the pathophysiology of pain. It has been found that CGRP triggers migraine headaches and is present at high levels during attacks. New migraine pharmacotherapies focus on reducing or blocking CGRP release. The current CGRP monoclonal antibodies are erenumab, fremanezumab, galcanezumab, and eptinezumab. The CGRP monoclonal antibody available in Turkey is galcanezumab. The study included a total of nine patients: three with a diagnosis of chronic migraine (CM) and six with a diagnosis of both chronic migraine (CM) and medication overuse headache (MOH). The average number of migraine headache days per month before starting galcanezumab was 18.3 days. During the treatment period, six patients reported experiencing

no migraine headache attacks. The other three patients reported a reduction in attack frequency of 50-90% and a reduction in migraine headache intensity of 50-80% during the treatment period. After galcanezumab treatment, patients reported an average reduction of 90% in attack frequency and 86.6% in headache intensity, with 88.8% indicating significant benefit from the treatment. After galcanezumab treatment, 88.8% of patients reported a reduction in acute medication use, while 66.6% indicated that they did not use any medication at all. In our study, we found that patients showed significant improvement in migraine frequency, intensity, and analgesic consumption with galcanezumab treatment. These patients reported that they continued the treatment due to the convenience of monthly injections compared to continuous medication use and the significant benefits they experienced. Understanding the pathophysiology of migraine and the high research standards in clinical studies may make it possible to prevent the progression of the disease in at-risk individuals.

Conclusion

This study aims to demonstrate the significant role of Galcanezumab treatment, which is becoming increasingly widespread in our country, in the treatment of migraine headaches and to share our clinical experiences.

1. GİRİŞ

Migren tipik olarak 4 ile 72 saat arası süren, genellikle orta veya şiddetli tekrarlayan başağrısı atakları ile karakterizedir. Bu ağrılar genellikle tek taraflı ve pulsatildir. Başağrısı, genellikle bulantı, kusma ve/veya ışığa ve sese karşı tahammülsüzlük ile birlikte görülür[1]. Migren, dünya çapında insanların %15'ini etkilemektedir. Migren, erkeklerle karşılaştırıldığında tüm yaş gruplarındaki kadınlar arasında daha yaygındır; kadınların yılda %17'si, erkeklerin %6'sı başağrısından etkilenir. Migren, tipik olarak 25-55 yaş arasındaki üreme çağındaki insanlarda daha sık görülmektedir. Başağrısı auralı olabildiği gibi aurasız olan alt tipi en yaygın türüdür[2]. Migren tipi, aylık migren başağrısı günleri ve aylık başağrısı günleri sıklığına göre belirlenebilir. Uluslararası başağrısı sınıflandırma sistemi üçüncü baskı (ICHD-3); aylık olarak en az 15 gün süren, migren başağrısı özelliklerini en az 8 gün boyunca gösteren 3 aydan fazla süren başağrısını kronik migren (KM) olarak tanımlamaktadır. Episodik migren (EM) ise en az 3 ay boyunca ayda 14 günden az başağrısı süren ve en az 4 gün boyunca migren başağrısı özelliklerini gösteren olarak tanımlamıştır[3]. Migren tedavisinde hem atak hem de önleyici (profilaksi) tedaviler mevcuttur. Önleyici tedaviler optimize edilmiş atak tedavilerine rağmen yaşam kalitesi bozulmuş hastalarda düşünülmektedir. Önleyici tedaviler genellikle ayda en az 4 gün boyunca migren nedeniyle olumsuz etkilenen hastalar için önerilir. Ancak bu kural kesin değildir ve migrenin şiddeti, süresi ve günlük yaşam aktiviteleri üzerine olumsuz etkileri gibi diğer faktörler de göz önünde bulundurulmalıdır. Ayrıca akut ilaçları aşırı kullananlar için de önleyici tedavi gerekebilmektedir. Önleyici tedavileri seçenekleri arasında betablokörler, trisiklik antideprasan, antikonvulzanlar, oksipital sinir blokajı, botulinum toksini ve kalsitonin gen ilişkili peptit monoklonal antikoru olan erenumab, fremanezumab, galcanezumab ve eptinezumabtır[4]. Bu çalışmada da kliniğimizde migren hastalarının galcanezumab tedavi deneyimleri ve sonuçlarının sunulması amaçlanmıştır.

2. GEREÇ VE YÖNTEM

Sakarya Üniversitesi Eğitim Araştırma Hastanesi Nöroloji Anabilim Dalı'nda 2021-2023 yılları arasında başvuran, 18 yaşın üzerinde, en az bir yıllık migren öyküsüne sahip olan ve ICHD-3 kriterlerine göre tanı almış olan galcanezumab (başlangıçta 240 mg dozunu takiben aylık 120 mg) tedavisi alan dokuz olgu dâhil edilmiştir.

Retrospektif olarak, cinsiyet, yaş, eğitim, çalışma durumu, eşlik eden hastalıklar, migren süresi, aylık ortalama ağrılı migren gün sayısı ve akut ilaç kullanım sayısı akut atak ve önleyici tedavi deneyimleri yönüyle incelenmiştir. Çalışmaya galcanezumab tedavisine altı aydan az devam eden hastalar dâhil edilmemiştir.

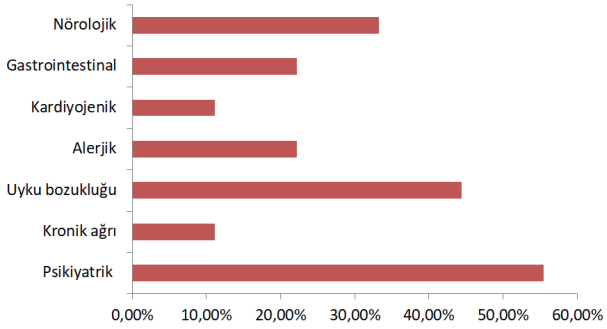
3. BULGULAR

Çalışmaya altı kadın ve üç erkek olmak üzere toplam dokuz olgu dâhil edilmiştir. Olguların yaş aralığı otuz üç ve elli arasında değişmekte olup ortalama değeri 39,6 (6,4) yıldır. Olguların %55,5'i üniversite mezunu ve %55,5'i kendi işinde çalışmaktadır. Hastaların %88,8'inde eşlik eden hastalıklar mevcuttu ve ortalama %55,5'inde psikiyatrik hastalık, %44,4'ünde uyku bozukluğu, %11,1'inde kronik ağrı, %22,2'sinde alerjik hastalık öyküsü, %22,22'sinde gastrointestinal sistem hastalık öyküsü, %11,1'sinde kardiyolojik hastalık öyküsü, %22,2'sinde huzursuz bacak sendromu ve %11,1'inde olguda sinüs ven trombozu öyküsü bulunmaktaydı (şekil-1).

Olguların ortalama migren süresi dört ile otuz yıl arasında değişmektedir ve ortalama 17,4 (6,8) yıldır. Hastaların galcanezumab öncesi ortalama aylık migren başağrısı gün sayısı on beş ve yirmi beş gün arasında değişmektedir ve ortalama 18,3 (3,5) gündür. Hastaların galcanezumab öncesi aylık akut ilaç kullanım gün sayısı on ve elli gün arasında değişmektedir ve ortalama 20,5 (11,8)'dir. Hastaların %33,3'ü kronik migren ve %66,6'sı kronik migren ve ilaç aşırı kullanım başağrısı (İAKB) tanısı almıştır. Hastaların tamamı yaşam kalitesini önemli ölçüde etkileyen şiddetli başağrısı yaşadıklarını bildirdi. Hastaların tamamı akut migren atağı için çeşitli tedaviler kullanmıştır ve bunlar ortalama değer olarak %88,8'si triptan grubu ilaçlar, %77,7'si nonsteroid antiinflamatuar ilaçlar (nsaii), %55,5'i parasetamol içeren ilaçlar, %33,3'ü kombine tedaviler, %22,2'si de alternatif tıp yöntemleri ve %11,1'i ergotamin içeren ilaçlar kullanmıştır (şekil-2). Hastaların tamamı migren için çeşitli önleyici tedaviler kullanmıştır ve bunların %88,8'i antidepresan ilaçlar ve oksipital sinir blokajı, %55,5'i antikonvülzan ilaçlar, %22,2'si betablokör ilaçlar, %11,1'i akupuntur tedavisi, ve %11,1'i botulinum toksini tedavisidir (şekil-3).

Şekil 1.

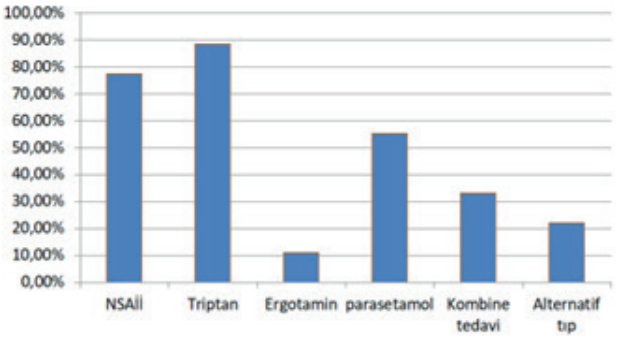
Hastaların migren başağrısına eşlik eden komorbiditeler.



Galcanezumab tedavisi öncesi hastaların hepsi migren başağrısına eşlik eden en rahatsız edici semptomları fotofobi, fonofobi ve günlük yaşam kalitesinde bozulmaya sebep olacak fiziksel aktivitede azalma olarak bildirmişlerdir. Hastaların %88'i bulantı ve osmofobi, %66,6'sı da kusmanın başağrısına eşlik ettiğini bildirdi. Galcanezumab tedavisi sonrası hastalar ortalama olarak bulantı ve osmofobide %77,5, kusmada % 70, fotofobide %72,2, fonofobide ve fiziksel aktivitede %80 iyileşme bildirdi (şekil-4).

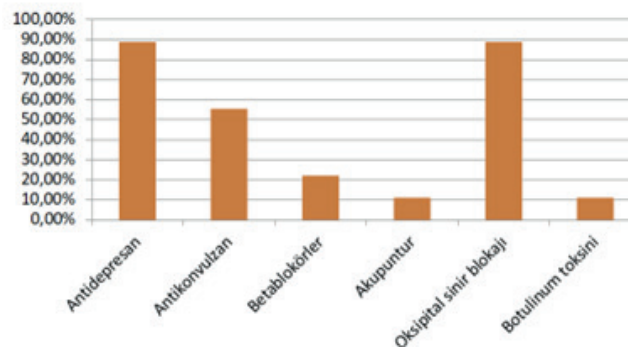
Şekil 2.

Hastaların akut tedavi deneyimleri.



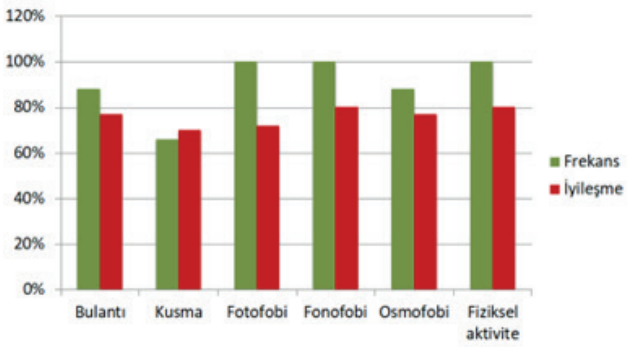
Şekil 3.

Hastaların önleyici tedavi deneyimleri.



Şekil 4.

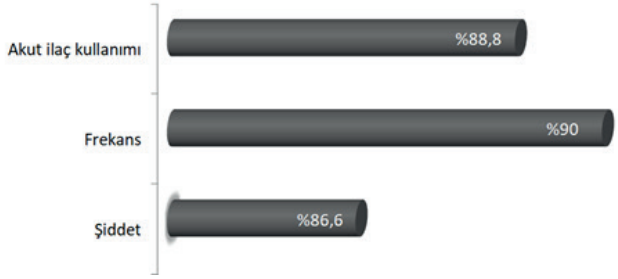
Hastaların galcanezumab öncesi semptomların sıklığı ve galcanezumab sonrası semptomlarda iyileşme oranları.



Galcanezumab tedavisi devam etmekte olan hastalarla beraber ortalama tedavi süresi 9,4 (4,3) aydır. Galcanezumab tedavisi sırasında bir hastada (%11,1) hafif alerjik yan etki dışında başka bir yan etki gözlenmemiştir. Hastalar galcanezumab tedavisi sonrası ortalama %86,6 migren başağrısı şiddetinde azalma ve ortalama %90 migren başağrısı sıklığında azalma ve %88,8'i akut ilaç kullanımında azalma bildirmektedir (**şekil-5**). Hastaların %66,6'sı tedavi süresince hiç başağrısı yaşamadıklarını bildirirken yine %66,6'sı galcanezumab tedavisi alırken hiçbir akut tedaviye ihtiyaç duymadıklarını bildirdiler.

Şekil 5.

Galcanezumab sonrası hastaların migren başağrısı frekansı, şiddeti ve akut ilaç kullanımında azalma yüzdeleri.



4. TARTIŞMA

Primer başağrıları içinde en sık görülenleri gerilim tipi başağrısı ve migrendir[5]. Migren, bireylerin yaşamlarını önemli ölçüde etkileyebilen, kronik, yaygın ve engelliliğe yol açan nörolojik bir hastalıktır[6]. Yaşam kalitesini, sosyal işlevselliği ve çalışma hayatını olumsuz yönde etkilemektedir[7]. Yalnızca başağrısı değil gastrointestinal şikayetler, uyku bozuklukları, duygusal semptomlar ve diğer somatik durumları içeren bir dizi semptomlar da insanları önemli ölçüde rahatsız etmektedir[8]. Ağrının patofizyolojisinde kalsitonin geniyle ilişkili peptitin (CGRP) önemli bir rol oynadığı bilinmektedir. CGRP merkezi ve periferik sinir sisteminde özellikle dorsal kök gangliyonu ve trigeminal gangliyondaki duyusal nöronlarda yaygın bulunan güçlü bir vazodilatatördür. CGRP'nin migren başağrısını tetiklediği ve atak sırasında yüksek düzeyde olduğu tespit edilmiştir. CGRP'nin migren ile ilgili üç ana etkisi olduğu bilinmektedir. Bunlar; arterler duvarındaki düz kas hücrelerindeki reseptörlere bağlanarak vazodilatasyon, beyindeki nöronların aşırı uyarılması ile inflamasyon ve başağrısıdır. Yeni migren farmokoterapileri CGRP salınımını azaltmak veya bloke etmek üzerinedir[10]. Mevcut CGRP monoklonol antikorları erenumab, fremanezumab, galcanezumab ve eptinezumabtır.

Türkiye'de bulunan CGRP monoklonal antikoru galcanezumabtır. Migrenin dünya genelinde %14,4'lük bir kesimi etkilediği tahmin edilmekte ve kadınlarda daha sık görüldüğü bilinmektedir[11]. Bizim çalışmamızda da %66,6 ile kadın hastalar daha fazlaydı. Çalışmaya KM tanısı olan üç hasta, KM ve İAKB tanısı alan altı hasta olmak üzere toplam dokuz hasta dâhil edilmiştir. Hastaların galcanezumab öncesi aylık ortalama migren başağrısı gün sayısı 18,3 gün olup altı hasta tedaviye devam ettikleri süre boyunca hiç migren başağrısı atağı yaşamadıklarını bildirdiler. Diğer üç hasta ise tedavi süresince %50-90 arasında atak sıklığında azalma, %50-80 arasında da migren başağrısı şiddetinde azalma bildirmiştir. Hastalar galcanezumab sonrası ortalama olarak %90 atak sıklığında ve %86,6 da başağrısı şiddetinde azalma bildirmiş olup %88,8'i tedaviden belirgin fayda gördüğünü ifade etmiştir. Migren anksiyete, depresyon, uyku bozukluğu ve kronik ağrı ile de ilişkilidir. Bu ilişkiler kronik migren hastalarında epizodik migren hastalarına göre daha belirgindir[4]. Bizim hastalarımızda %55,5 ile en fazla komorbidite psikiyatrik hastalıklar olup %44,4 ile uyku bozukluğu izlemiştir. Migrende komorbid durumların tanınması önemlidir çünkü bunlar ilaç seçimini de etkilemektedir[4]. Bu çalışmada hastalar, migren başağrısına eşlik eden en sık semptom olarak fotofobi, fonofobi ve yaşam kalitesini bozan günlük fiziksel aktivitenin azalmasından yakınıyorlardı. Hastalar %66,6 ile en az eşlik eden semptomu kusma olarak bildirmişlerdi. Takizawa ve ark. yaptığı bir çalışmada galnacezumab tedavisi sonrasında hastaların %61,5'inin migren sıklığında %50 veya daha fazla azalma olduğu ve %64,9'unun fotofobide, %50'sinin osmofobide, %63,9'nun bulantı ve kusmada iyileşme gösterdiğini bildirmişlerdir[12]. Bizim çalışmamızda da hastalar ortalama %80 ile en iyi iyileşmeyi fonofobi ve fiziksel aktivitede artış bildirildi. Bizim çalışmamızda %70 ile en az iyileşmeyi kusmada bildirmiş olsalar da tüm semptomlarda ortalama %70-80 iyileşme ile genel olarak belirgin düzeyde iyileşme tespit edilmiştir. Galcanezumab öncesi hastaların %88,8 oranında akut ilaç tedavisi olarak en sık triptan grubu ilaçlar ve yine %88,8 oranında en sık önleyici tedaviler olarak antidepresanlar ve oksipital sinir blokajı tedavilerini tercih ettikleri görüldü. Galnacezumab tedavisi sonrası hastaların %88,8'i akut ilaç kullanımında azalma bildirirken %66,6'sı hiçbir ilaç kullanmadıklarını bildirmişlerdir. Çalışmamızda hastaların galcanezumab tedavisi ile migren sıklığı, şiddeti ve analjezik tüketiminde önemli bir ölçüde iyileşme gösterdiğini tespit ettik. Çalışmamıza, tedaviye en az altı ay devam eden hastaları dahil etmiştik. Bu hastalar aylık enjeksiyonun sürekli ilaç kullanımına göre kolaylığı ve gördükleri önemli ölçüde fayda sonucunda tedaviye devam ettiklerini bildirdiler. Migreninin patofizyolojik bilgisi ve klinik çalışmalardaki yüksek araştırma standartları, risk altındaki kişilerde hastalığın ilerlemesini önlemeyi mümkün kılabilir[2].

5.SONUÇ

Migren dayanılması güç bir başağrısıdır ve bu durum hem hasta ve aile hem de toplum için bir yük oluşturmaktadır. Hasta geçmişinin anlaşılması zaman alıcıdır, ancak doğru anketin yapılması, doğru teşhisin bulunması, doğru tedavinin doğru zaman içinde verilmesi tedavi başarısını artırmaktadır. Bu çalışma ülkemiz genelinde kullanımı giderek yaygınlaşan galcanezumab tedavisinin migren başağrısı tedavisinde önemli bir rolü olduğunu göstermek amacıyla sunulmuştur.

Limitasyonlar:

Çalışmanın en önemli limitasyonu hasta sayısının azlığıdır. Ancak ilerleyen yıllarda özellikle tedavi maliyetinin azaltılmasıyla daha fazla veri sunulabilecektir.

Bu araştırma; kamu, ticari veya kâr amacı gütmeyen

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Research Article

Comparative Clinical and Functional Results of Microfracture and Mosaicoplasty in Medial Talus Osteochondral Lesions

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Introduction: This study aims to compare the early clinical and functional outcomes of two surgical interventions, microfracture and mosaicoplasty, in the treatment of medial talus osteochondral lesions (OCLs).

Materials and Methods: This retrospective study included patients treated in the Department of Orthopaedics and Traumatology, Faculty of Medicine, Düzce University from January 2016 to January 2022. Patients were divided into two groups as those who underwent arthroscopic microfracture (Group 1, n=20) and those who underwent mosaicoplasty (Group 2, n=17). Preoperative and postoperative follow-up data were evaluated with visual analogue scale (VAS) and American Orthopaedic Foot and Ankle Society (AOFAS) scores at baseline, 6 months and 12 months.

Results: The mean age was 37.9±12.5 years in the microfracture group and 38±12.46 years in the mosaicoplasty group (p=0.981). Both groups showed significant improvement in VAS scores from baseline to the 6th and 12th months, and pain reduction was more significant in the mosaicoplasty group (p<0.001). AOFAS scores improved significantly in both groups and the mosaicoplasty group had better functional results at 12 months (p=0.069).

Conclusions: Microfracture and mosaicoplasty are effective in the treatment of medial talus OCLs to reduce pain and improve clinical status in the early period.

Keywords: Talus, Osteochondral lesions, Microfracture, Mosaicplasty

1. INTRODUCTION

Medial talus osteochondral lesions (OCLs) are characterized by the separation or degeneration of subchondral bone and articular cartilage [1,2]. These lesions typically result from trauma and are most commonly observed in the knee joint, with the ankle joint being the second most frequently affected site. Medial talus osteochondral lesions (OCLs) are disruptions of the cartilage and underlying bone, often resulting from trauma and leading to significant pain and impaired joint function. These lesions can progress to osteoarthritis if not addressed promptly. Timely diagnosis and intervention are essential to avert long-term complications. Early management of talus OCLs is crucial for maintaining joint function, reducing pain, and halting the progression to osteoarthritis. Various treatment options, both conservative and surgical, are available [3-5].

Surgical options for treating talus OCLs encompass debridement, bone marrow stimulation (microfracture), scaffold implants, autologous chondrocyte implantation, matrix-associated autologous chondrocyte implantation, autologous osteochondral transplantation (mosaicplasty), and allograft transplantation. Among these, microfracture and mosaicplasty are frequently used procedures [5,6].

In the literature, various methods for treating talus OCLs have been examined. The microfracture

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technique involves creating small perforations in the subchondral bone to allow bone marrow elements to access the defect area, thereby promoting the formation of new cartilage tissue [7]. This method is generally recommended for small- to medium-sized lesions and has shown favorable short-term results. However, newly formed fibrocartilage is less durable than native hyaline cartilage in the long term. According to the current recommendations for 2024, the German Society of Orthopedics and Traumatology reported that while microfracture effectively reduces pain in the short term, it fails to maintain cartilage integrity over time [8].

Mosaicplasty, on the other hand, involves the transplantation of healthy cartilage and bone from a non-weight-bearing area to the defect site. This technique is typically preferred for larger and deeper lesions and provides results more comparable to those of natural cartilage [9]. Solheim et al. demonstrated that mosaicplasty yields better long-term outcomes than microfracture in knee cartilage repair [10]. Kılınççıoğlu and Kalacı reported that mosaicplasty, particularly in young and active patients, is superior to microfracture for treating talus OCLs [11].

Despite these findings, most existing studies have focused on knee joints, and specific data on medial talus OCLs are limited. This study aimed to fill this gap by comparing the early clinical and functional outcomes of microfracture and mosaicplasty in treating medial talus OCLs.

2. MATERIALS AND METHODS

The study design was approved by the Düzce University Clinical Research Ethics Committee (Düzce, Türkiye) (No. 2024/138), and the study was performed in accordance with the principles of the Declaration of Helsinki. Informed consent was obtained from the parents or guardians of the patients included in the study.

Study Design and Participants

This retrospective study was conducted at the Orthopedics and Traumatology Department of Düzce University Medical Faculty. Patients who were diagnosed with medial talus osteochondral lesions between January 2016 and January 2022 were reviewed. The study included patients who underwent either microfracture (Group 1, n=20) or mosaicplasty (Group 2, n=17) procedures. The inclusion criteria included complete preoperative and postoperative follow-up data. Patients with incomplete follow-up data, who were diagnosed with diabetic neuropathy, or who developed posttraumatic ankle arthritis were excluded from the study. Figures 1 and 2 illustrate the anteromedial osteochondral lesion of the medial talus with the perioperative application of microfracture and the preoperative and postoperative application of mosaicplasty for an anteromedial osteochondral lesion of the medial talus, respectively.

Figure 1.

Arthroscopic microfracture of an anteromedial osteochondral lesion of the talus

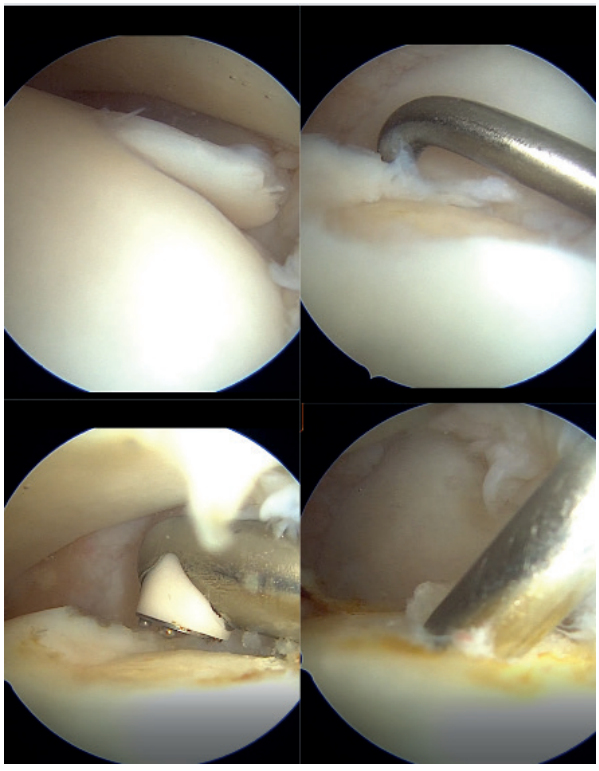
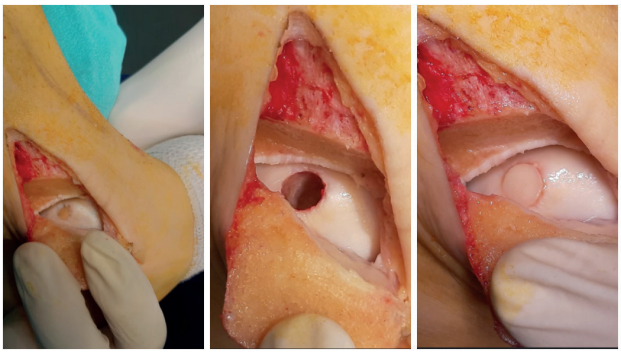


Figure 2.
Mosaicoplasty of the anteromedial osteochondroplasty lesion of the talus



Data collection and evaluation

Demographic data and clinical outcomes, including visual analog scale (VAS) and American Orthopedic Foot and Ankle Society (AOFAS) scores, were collected at preoperative and postoperative intervals (baseline, 6 months, and 12 months).

VAS score: The VAS score was used to measure pain intensity. It is a 10 cm line anchored by 0 (no pain) and 10 (worst imaginable pain). Patients marked a point on the line that represented their pain level, which was then measured in centimeters.

AOFAS score: The AOFAS score evaluates pain (40 points), function (50 points), and alignment (10 points), with a total possible score of 100. Higher scores indicate better functional status.

Statistical analysis

The statistical analysis was performed using NCSS (Number Cruncher Statistical System) 2007 Statistical Software (Utah, USA). The data distribution was assessed using the Shapiro–Wilk normality test. For normally distributed variables, a paired one-way ANOVA was used for within-group comparisons over time, while the Newman–Keuls multiple comparison test was employed for subgroup analyses. Independent t tests were utilized for between-group comparisons. For nonnormally distributed variables, the Friedman test was applied for within-group comparisons over time, and Dunn's multiple comparison test was used for subgroup analyses. The Mann–Whitney U test was used for between-group comparisons. Categorical data were analyzed using the chi-square test. A p value less than 0.05 was considered to indicate statistical significance.

3. RESULTS

The study included 37 patients divided into two groups: the microfracture group (n=20) and the mosaicplasty group (n=17). The demographic and clinical characteristics are summarized in Table 1.

According to Table 2, there were no statistically significant differences in age or sex distributions between the microfracture and mosaicplasty groups (p=0.981, p=0.630). Similarly, no significant differences were observed in terms of side (right/left) or etiology distributions (p=0.666, p=0.302). The mean BMI values were also not significantly different between the two groups (p=0.713). However, the mean symptom duration was significantly greater in the mosaicplasty group than in the microfracture group (p=0.009). The follow-up duration was not significantly different between the two groups (p=0.680).

Table 3 shows that VAS scores at baseline, 6 months, and 12 months were significantly lower in the mosaicplasty group than in the microfracture group (p=0.011, p=0.0001, p=0.001). Both groups showed significant improvements in VAS scores over time (p=0.0001 for both groups). The AOFAS score also improved significantly in both groups, with the mosaicplasty group showing better functional outcomes at the 12-month follow-up (p=0.069).

Table 1.

Demographic and Clinical Characteristics

Characteristic	Microfracture Group (n=20)	Mosaicplasty Group (n=17)	p value
Age (years)	37.9 ± 12.5	38 ± 12.46	0.981*
Gender			0.630+
Male	11 (55.00%)	8 (47.06%)	
Female	9 (45.00%)	9 (52.94%)	
Side			0.666+
Right	12 (60.00%)	9 (52.94%)	
Left	8 (40.00%)	8 (47.06%)	
Etiology			0.302+
Sprain	4 (20.00%)	2 (11.76%)	
No Trauma	14 (70.00%)	10 (58.82%)	
Sports	2 (10.00%)	5 (29.41%)	
BMI (kg/m^2)	26.65 ± 3.28	27.08 ± 3.68	0.713*
Symptom Duration	9.20 ± 2.55	12.59 ± 4.76	0.009*
Follow-up Duration	28.6 ± 10.89	32 ± 14.35	0.680†
Median (IQR)	25.5 (19.25-35.75)	31 (18.5-47.5)	

*Independent t test, †Mann–Whitney U test, +Chi-square test

Table 2.

VAS and AOFAS Scores

Score	Microfracture Group (n=20)	Mosaicplasty Group (n=17)	p value
VAS			
Baseline	9.1 ± 0.79	8.12 ± 1.27	0.011†
	Median (IQR)	9 (9-10)	8 (7-9)
6 Months	8.00 ± 1.12	3.82 ± 1.38	0.0001†
	Median (IQR)	8 (7-9)	4 (3-5)
12 Months	3.75 ± 2.25	1.53 ± 1.23	0.001†
	Median (IQR)	4 (2-5)	1 (1-2)
p‡	0.0001	0.0001	
AOFAS			
Baseline	41.3 ± 13.98	38.41 ± 13.13	0.524*
6 Months	75.95 ± 12.1	77.76 ± 13.3	0.667*
12 Months	90.7 ± 7.37	94.59 ± 4.68	0.069*
p⁑	0.0001	0.0001	

*Independent t test, †Mann–Whitney U test, ‡Friedman test, ⁑Paired one-way ANOVA

Table 3.

Multiple Comparison Tests for VAS and AOFAS Scores

Comparison	Microfracture Group	Mosaicplasty Group
VAS		
Baseline/6 Months	0.0001	0.0001
Baseline/12 Months	0.0001	0.0001
6 Months/12 Months	0.0001	0.0001
AOFAS		
Baseline/6 Months	0.0001	0.0001
Baseline/12 Months	0.0001	0.0001
6 Months/12 Months	0.0001	0.0001

Table 4.

Changes in the VAS and AOFAS Scores

Change Difference	Microfracture Group (n=20)	Mosaicplasty Group (n=17)	p value
VAS			
6 Months - Baseline	-1.1 ± 1.02	-4.29 ± 1.11	0.0001
	Median (IQR)	-1 (-2-0)	-4 (-5--3.5)
12 Months - Baseline	-5.35 ± 2.18	-6.59 ± 1.46	0.068
	Median (IQR)	-5 (-7--3.25)	-6 (-7.5--5)
AOFAS			
6 Months - Baseline	34.65 ± 18.45	39.35 ± 16.22	0.432
	Median (IQR)	39 (14-55)	43 (27-55)
12 Months - Baseline	49.4 ± 18.02	56.18 ± 10.68	0.357
	Median (IQR)	54 (29.5-65.25)	59 (53-66)

†Mann–Whitney U test

The Dunn multiple comparison test for VAS scores and the Newman–Keuls multiple comparison test for AOFAS scores indicated significant improvements within both groups over time.

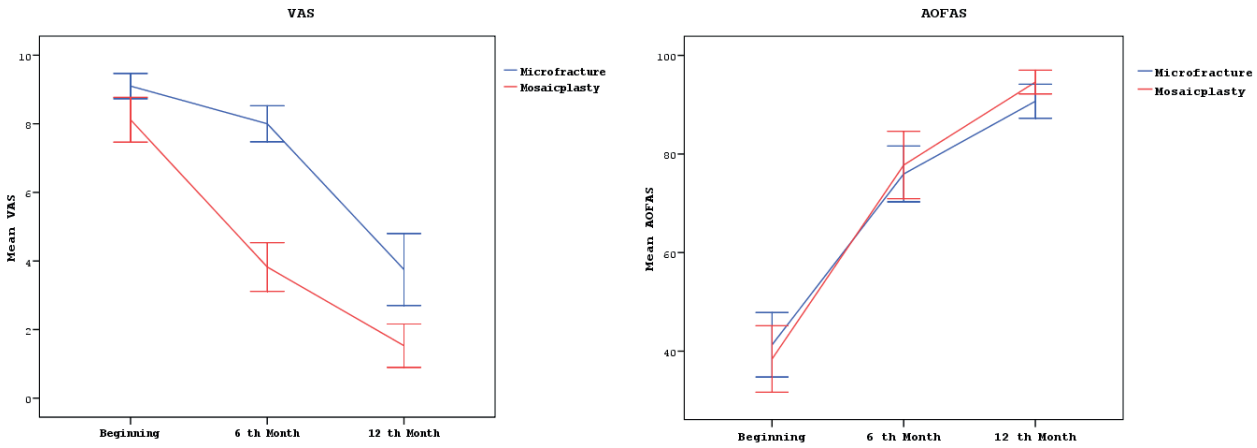
As shown in Table 4, the change in VAS score from baseline to 6 months was significantly greater in the mosaicplasty group than in the microfracture group (p=0.0001). However, there was no significant difference between the two groups in terms of VAS score change from baseline to 12 months (p=0.068). Similarly, there were no significant differences between the groups in the change in AOFAS score from baseline to 6 and 12 months (p=0.432, p=0.357).

Figure 3 illustrates the changes in the visual analog scale (VAS) and American Orthopedic Foot and Ankle Society (AOFAS) scores over time for the microfracture and mosaicplasty groups. The

graph on the left shows the mean VAS scores at baseline, 6 months, and 12 months, indicating a more significant reduction in pain for the mosaicplasty group than for the microfracture group. The graph on the right presents the mean AOFAS scores at the same time intervals, demonstrating an improvement in functional outcomes for both groups, with the mosaicplasty group achieving higher scores at 12 months.

Figure 3.

Changes in VAS and AOFAS scores at 6th and 12th months



4. DISCUSSION

The findings of this study provide valuable insights into the comparative effectiveness of microfracture and mosaicplasty in the treatment of medial talus osteochondral lesions (OCLs). Our study highlights the comparative effectiveness of microfracture and mosaicplasty in treating medial talus osteochondral lesions. Both techniques showed significant improvements in pain and function; however, mosaicplasty demonstrated superior outcomes in several areas, suggesting its potential as a more effective long-term treatment, especially for larger lesions.Both surgical interventions demonstrated significant improvements in pain and functional outcomes over time; however, mosaicplasty showed superior results in several key areas, suggesting that it may be a more effective long-term treatment option for certain patients.

The significant reduction in VAS scores observed in the mosaicplasty group compared to the microfracture group at 6 and 12 months indicates that mosaicplasty may offer better pain relief for patients with medial talus OCLs. Similarly, in the literature, mosaicplasty provides better long-term pain management than does microfracture of the joint [12,13]. This finding may be attributed to the ability of mosaicplasty to create a more durable and congruent cartilage surface [14].

Both groups showed significant improvements in the AOFAS score; however, the mosaicplasty group demonstrated better functional outcomes at 12 months. This suggests that mosaicplasty may be more effective not only for pain management but also for preserving and enhancing joint function. Kılınççıoğlu and Kalacı [11] also noted that mosaicplasty yielded superior outcomes, particularly in young and active patients.

Other studies in the literature support these

findings [15,16]. Guney et al.[17] indicated that mosaicplasty is more successful for larger and deeper lesions and promotes faster patient recovery. Similarly, Mukai et al. reported that mosaicplasty is more effective than microfracture in maintaining cartilage integrity and improving long-term joint function [18,19].

Pallamar et al. evaluated different surgical procedures for treating atraumatic osteochondrosis dissecans in young and adolescent patients [20]. They found that advanced fixation and reconstruction procedures resulted in lower clinical scores and a greater incidence of joint degeneration than did drilling procedures applied for stable lesions. This highlights the advantages of mosaicplasty in terms of stabilization and functional recovery.

Kim et al. investigated the long-term outcomes of arthroscopic microfracture in talar osteochondral lesions and reported that symptomatic improvement was maintained for up to three years [21]. This suggests that while microfracture is effective initially, its results may stabilize over the long term. Additionally, Rikken et al. emphasized that microfracture is more effective for smaller and superficial lesions, whereas larger and deeper lesions should preferably be treated with mosaicplasty [22].

This study has several limitations. First, it was designed as a retrospective study, which does not provide as strong evidence as prospective, randomized controlled trials. Additionally, the sample size was relatively small, limiting the generalizability of the findings. The follow-up period was also short, providing limited information on long-term outcomes. Future studies with larger sample sizes and longer follow-up periods are needed to confirm and expand upon these findings.

5. CONCLUSION

In conclusion, this study demonstrated the comparative effectiveness of microfracture and mosaicplasty in the surgical treatment of medial talus OCLs that do not heal with conservative treatment. Although mosaicoplasty provides clinically and functionally better results than microfracture, both treatments have been shown to be beneficial in the early period. However, more research is needed to confirm and extend these findings. Future studies should focus on different patient populations and longer follow-up periods to provide more comprehensive information about the effectiveness of these two methods.

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Conflict of Interest

The authors declare no conflicts of interest with respect to the authorship and/or publication of this article.

Ethics Committee Approval

The study protocol was approved by the local ethics committee (No: 2024/138). The study was conducted in accordance with the principles of the Declaration of Helsinki.

Author Contributions

SS, MA, MOY and ZOK contributed to the analysis and interpretation of the data and to the writing and revision of the manuscript. SS and MA performed the surgical operations. ZOK, RED, MOY and SS contributed to data analysis, interpretation and writing. RED and MOY contributed to data collection, analysis and methodology. ZOK, MA,SS and RED contributed to experimental design, data collection and data revision.

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Research Article

Comparison of Intramedullary Nail Fixation and Minimally Invasive Plate Osteosynthesis in Distal Tibial Fractures in Geriatric Patients

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Introduction: Minimally invasive plate osteosynthesis (MIPO) and intramedullary nails are two accepted and effective methods in the treatment of tibial fractures. This study was aimed to evaluate the surgical treatment and complications of distal tibial fractures not related to the ankle joint with MIPO and intramedullary nails in the geriatric group retrospectively.

Materials and Methods: Between 2019 and 2020, 42 patients in the geriatric group with distal tibia fractures that did not extend to the ankle joint and who underwent surgical treatment were evaluated retrospectively. The patients were divided into two groups: those who underwent MIPO and those who underwent osteosynthesis with an intramedullary nail. Patients were evaluated according to JoVVhner Wrush criteria.

Results: This study enrolled 42 patients. The mean age of the patients was 70±3.4 years. 22 of these patients underwent osteosynthesis with intramedullary nailing. MIPO was performed in the treatment of 20 patients. Based on the Johner Wrush criteria, the intramedullary nail group evaluated 16 patients as very good, 5 as good, and 1 as bad. The MIPO group evaluated 15 patients as excellent, 3 as good, 1 as moderate, and 1 as poor.

Conclusion: In geriatric age groups, there was no significant difference in clinical outcomes or complications from surgical treatment of closed tibial distal fractures that do not extend to the ankle joint. Both surgical treatment methods can be applied effectively to geriatric patients.

Keywords: Fracture, Geriatric, Tibia

1. INTRODUCTION

Distal tibia fractures are commonly seen fractures and their incidence is 10-13% among all tibial fractures.[1,2] Distal tibia fractures occur after high-energy trauma. Torsional forces are effective in the formation of distal tibia fractures. After treatment of these fractures, many complications such as malunion, delayed union, nonunion, and wound infection may occur.[3]

Minimally invasive plate osteosynthesis (MIPO) and intramedullary nails are two accepted and effective methods in the treatment of tibial fractures. Both treatment methods have complications. Alignment disorders and anterior knee pain are the most common complications after osteosynthesis with intramedullary nailing. Wound complications can be seen after plate osteosynthesis.[4,5]

The purpose of this study was to evaluate the surgical treatment and complications of distal tibial fractures not related to the ankle joint with MIPO and intramedullary nails in the geriatric group retrospectively.

2. Material Method

This study was approved by the Ethics Committee of Bahcesehir University (Decision No 2022-11/02). All patients provided informed consent. The study includes patients in the geriatric age

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group who were operated on between 2019 and 2020 with a fracture of the distal part of the tibia that did not extend to the ankle joint. Inclusion criteria for the study were geriatric patients with closed distal tibia fractures that did not extend to the ankle joint and who were treated surgically and evaluated with Johner Wrush criteria in their follow-up files. 42 patients who met the criteria of the study were included in the study.[6]

2.1.Surgical technique
2.2.Fixation with intramedullary nail

Surgeries of the patients were performed under a pneumatic tourniquet, and prophylaxis was performed with 1 gram of cefazolin sodium before the surgery. With the knee flexed, longitudinal incisions were made from the midline of the patellar tendon, and the patellar tendon fibers were dissected longitudinally. The entry hole of the nail was opened from the proximal end of the tibia, and the fracture was reduced under fluoroscopy control, the guide wire was sent from the medulla, and the fracture line was passed and sent distally. Appropriate nail lengths were determined over the guide wire. The reaming was performed by sending the medullary reamers over the guide wire. After the reaming process was completed, the appropriate nail was adapted to the medulla. Fixation is completed with locking screws.

2.3.Surgical treatment of MIPO

Surgeries of the patients were performed under a pneumatic tourniquet, and prophylaxis was performed with 1 gram of cefazolin sodium before the surgery. A distal incision was made approximately 4 cm long from the distal medial of the anterior border of the tibia to fit the proximal end of the plate. The plate was retrogradely adapted from distal to proximal subperiostally. After checking the compatibility of the bone and plate under the fluoroscope. Distal and proximal screws were locked, then the other screws were adapted to the plate through 1 cm incisions.

2.4.Post-operative period

Cefazolin sodium and low molecular weight heparin were administered prophylactically to the patients after surgery. Wound care was performed every other day and sutures were removed 15 days after surgery. Isometric quadriceps exercises were started on the first postoperative day. Exercises to provide knee and ankle joint range of motion were started. The patients were evaluated in the outpatient clinic monthly with radiography controls. The presence of callus tissue in 3 cortices was considered a union. During the follow-ups, dynamization was performed between 8 and 16 weeks in 4 patients treated with intramedullary nails. The clinical evaluations of the patients were made according to the Johner Wrush criteria at the last follow-up.

2.5.Statistical analysis

The compliance of the data to normal distribution was tested, and since they were not normally distributed, the Mann-Whitney U test, which is a non-parametric method, was used to compare numerical variables, and the Chi-square-Fisher Exact test was used for categorical data. The value of $p<0.05$ was considered statistically significant in the 95% confidence interval.

3.RESULTS

This study enrolled 42 patients, 16 were female and 26 were male. The mean age of the patients was 70±3.4 years. Patients were divided into two according to treatment intramedullary nail and MIPO group and evaluated retrospectively. 22 of these patients underwent osteosynthesis with intramedullary nailing. MIPO was performed in the treatment of 20 patients.

The mean age in the intramedullary nail group was 72±3.6, and the mean age in the MIPO group

was 68±3.1. The mean follow-up period of the patients was determined as 14.9±2.1 months. According to the Johner Wrush criteria, 31 patients were evaluated as very good, 8 patients as good, 1 patient as moderate, and 2 patients as bad. In the radiological evaluation, union was detected in all but one patient who did not. The patient without union was in the intramedullary nail group and re-operated, debridement was performed for the fracture ends, autografting was performed and fixed with a plate. Union was achieved in the further follow-up of this patient. The mean radiological union time was determined as 11.9±3.1 weeks.

According to Johner Wrush criteria, 16 patients were evaluated to be very good, 5 patients were good and 1 patient was bad in the intramedullary nail group. The mean radiological union time was determined to be 11.7±3 weeks. Nail removal was performed in 4 patients in advanced follow-up. A pulmonary embolism was detected in 1 patient. Superficial infection was seen in 3 patients and they were treated with antibiotics, and no additional surgical intervention was needed. (Table 1)

The union time was determined as 12.4±1.9 months in the MIPO group. According to the Johner-Wrush criteria, 15 patients were evaluated as excellent, 3 patients as good, 1 patient as moderate, and 1 patient as poor. Superficial infection was detected in 4 patients and the patients were treated with antibiotics. Delayed union was detected in 2 patients.

There was no statistically significant difference between the fixation with intramedullary nail and fixation with MIPO in terms of clinical outcomes, infection rates, and union times (p>0.05 for all).

Table 1.
Demographic and clinical parameters of the patients

	All patients (n: 42)	**Intramedullary nail (n: 22)**	**MIPO (n: 20)**
Mean age (years)	70 ± 3.4	72±3.6	68±3.1.
Healing time (weeks)	11.9±3.1	11.7±3	12.4±1.9
Johner Wrush criteria (very good)	31	16	15
Johner Wrush criteria (good)	8	5	3
Johner Wrush criteria (moderate)	1	0	1
Johner Wrush criteria (bed)	2	1	1

MIPO: Minimally invasive plate osteosynthesis.
**p >0.05 for all*

4.DISCUSSION

Mioc et al. showed no statistically significant difference between the two fixation methods according to the results of intramedullary nailing and MIPO comparison in extra-articular distal tibia fractures, but it was stated that the clinical results of the group treated with MIPO were better.[7] Daolagupu et al. compared the results of osteosynthesis with intramedullary nails and plates in extra-articular distal tibia fractures. While the mean time to union was 18.26 weeks in the group fixed with the intramedullary nail, the mean union time was determined as 21.70 weeks in the group fixed with the plate, and there was a statistically significant difference. There were fewer complications in terms of implant irritation, ankle stiffness, and infection in the group that underwent intramedullary nailing compared to the group that underwent osteosynthesis with a plate.[8] According to the results of our study, no significant difference was found between the two techniques in terms of clinical outcomes and complications.

A retrospective comparison of patients with extra-articular distal tibia fractures and those who underwent MIPO fixation and intramedullary nailing were compared. As a result of the study, it was determined that the union time was earlier, the complication rates were lower, and the functional results were better in patients who were fixed with intramedullary nails compared to the MIPO group.[9] As a result of a meta-analysis that evaluated studies with large series, it is stated that intramedullary nail fixation has fewer postoperative complications and may result in faster recovery compared to plate fixation.[10] According to the results of our study, no significant difference was found in terms of union times and complications in both methods.

Skin entrapment is an important problem in distal tibial fractures treated surgically with MIPO, and when such complications occur, plate extraction can be performed after a union is detected.[11] In our follow-ups, no complications related to the entrapment of the skin were detected in the group that underwent osteosynthesis with MIPO, and therefore plate extraction was not performed. The fact that the patients in the group included in our study were a geriatric group and their skin elasticity was high and this may be the reason that there was no skin entrapment complication.

In extra-articular distal tibia fractures after fixation with an intramedullary nail, it causes minimal alignment changes when weight-bearing is applied in the early period and is a reliable method for patients.[12] In the study, early weight bearing was allowed in patients who were fixed with intramedullary nails, and there was no need for surgical treatment secondary to malalignment in follow-ups.

The proximity of tibial intramedullary nail distal locking screw holes to anterior tibial artery variations carries a risk of iatrogenic vascular injury during distal locking. Coronal locking screws carry the greatest risk of iatrogenic injury for laterally located anterior tibial artery variation.[13] We did not detect any anterior tibial artery iatrogenic injury while distal locking was performed during fixation with an intramedullary nail.

Alignment disorders in distal tibia fractures fixed with intramedullary nails may cause limitations in knee and ankle functions. It has been reported that fracture fixation stability is better and malalignment rates are lower after reaming intramedullary nailing and multi-planed distal locking.[14] In our study, reamed nails were used in all surgeries performed using intramedullary nails, and distal locking was multiplanned. We did not detect any malalignment in geriatric patients.

It has been reported that the probability of malunion in tibial distal end fractures with surgical fixation with MIPO is lower than in patients with intramedullary nail fixation.[15] Malunions, which are likely to cause functional problems, require surgical treatment again. In another study, high malrotation rates were found in tibial metaphyseal-diaphyseal fractures treated with the MIPO technique, but it was determined that this finding did not have a significant negative effect on knee and ankle joint functions.[16] No malunion was detected that would require reoperation after the follow-up of the patients treated with both fixation methods. Re-surgery in geriatric patients makes surgical fixation with MIPO superior because it is likely to cause problems in the general condition of the patients, but it is not compatible with the results of this study.

Song et al. mentioned that MIPO would be associated with better functional results and fewer complications.[17] No significant difference was found between complications and functional outcomes in both groups as a result of this study.

Jain et al. detected soft tissue problems in 10 patients at a rate of 22% among 45 patients treated with MIPO.[18] Lau et al. detected late infection in 7 patients among 48 patients treated with MIPO.[19] There was no statistically significant difference between superficial tissue infections of both groups. As a result of this study soft tissue problems are not a disadvantage of fixation with MIPO.

As a result of a study that compared intramedullary nailing and MIPO technique in open tibial fractures, it was determined that the MIPO technique has the same safety as intramedullary nail fixation technique in the treatment of Gustilo-Anderson type I, II, and III-A open tibial shaft fractures.[20] Since open fractures were not included in this study inclusion criteria of the study is limited in determining the effectiveness of both fixation methods on open fractures.

It has been reported that during surgery of the distal tibia with intramedullary nails are exposed to significantly more radiation than those treated with MIPO.[21] Flourocope was used during the surgeries, but the lack of dose measurements limits our study.

5.CONCLUSION

There was no significant difference in clinical outcomes and complications of surgical treatment of closed tibial distal fractures that do not extend to the ankle joint in geriatric age groups with intramedullary nailing and the MIPO method.

Ethics Committee Approval

This study was approved by the Ethics Committee of Bahçeşehir University with decision number 2022-11/02. It is conducted in accordance with the principles of the Helsinki declaration. Informed consent was obtained from patients.

Conflict of Interest

The authors declare that they have no conflict of interest.

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Research Article

The Efficacy of Prismatic Bifocal Spectacle Lenses in Controlling Myopia Progression in Children

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Objective: The progression of myopia can lead to vision impairment and increase the risk of sight-threatening complications. Various treatment methods have been described to control the progression of myopia, including the use of specialized spectacle lenses. This retrospective study aimed to evaluate the efficacy of prismatic bifocal spectacle lenses in controlling the progression of myopia in pediatric patients.

Materials and Methods: Fifty-two eyes of 26 patients who used prismatic bifocal spectacle lenses were retrospectively analyzed. Patients who showed an increase in myopia greater than 0.50 D during the last year of follow-up with single-vision spectacle lenses and whose eyes had a cycloplegic objective refraction measurement of ≥-2.00 D were included in the study. Demographic data of the patients such as age and gender were recorded. The increase in objective spherical equivalent and axial length after one year of using single-vision spectacle lenses were compared with the increase observed after one year of using prismatic bifocal spectacle lenses. The effects of potential variables such as age, sex, baseline myopia degree, and increase in axial length on myopia treatment were investigated.

Results: The mean age of the patients was 11.65 ± 2.70 years. Sixteen patients were male, and 10 patients were female. The increase in mean spherical equivalent after using single-vision spectacle lenses was 1.25 ± 0.76 D, whereas it was 0.24 ± 0.14 D after using prismatic bifocal spectacle lenses and this difference was statistically significant. The increase in mean axial length with single-vision spectacle lenses was 0.66 ± 0.31 mm, whereas with bifocal spectacle lenses it was 0.014 ± 0.015 mm. The difference was also statistically significant. Prismatic bifocal spectacle lenses were found to be more effective in myopia treatment in eyes with high baseline myopia and a higher increase in axial length.

Conclusion: Prismatic bifocal spectacle lenses have been found to be an effective in myopia control, particularly in children with rapid myopia progression. However, further studies with larger sample sizes and longer follow-up periods are needed to fully assess the long-term effects of this treatment method.

Keywords: Axial length, Myopia progression, Prismatic bifocal spectacles, Spherical equivalent

1. INTRODUCTION

Myopia, also known as nearsightedness, presents a significant and growing global health concern. The World Health Organization estimates that by 2050, nearly half of the world's population will be affected by this refractive error.[1] The increasing prevalence of myopia is influenced by various factors, including genetic predisposition, environmental influences such as increased near-work activities and decreased outdoor time.[2] Uncorrected myopia can lead to significant vision impairment and increase the risk of developing sight-threatening complications, such as myopic maculopathy and optic neuropathy.[1,2]

Addressing this issue has become a priority, and researchers have explored various treatment methods to control the progression of myopia, including the use of specialized spectacle lenses, orthokeratology, contact lenses and low-dose

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atropine.[3] Specialized spectacle lenses, such as multifocal and peripheral defocus lenses, work by altering the optical properties of the eye, which effectively slows the elongation of the eyeball and the progression of myopia.[3–5] Extensive research has confirmed the efficacy of these lenses, with major ophthalmic organizations, such as the American Academy of Ophthalmology, recognizing them as a safe and effective intervention.[3]

These lenses are anticipated to play a crucial role in addressing the global challenge of myopia. Bifocal spectacles with a prism component have shown promise in slowing myopia progression by manipulating the optical focus and reducing peripheral hyperopic defocus, a contributor to axial elongation.[6] By creating myopic defocus in the peripheral retina, these specialized bifocal lenses with prisms inhibit elongation of the eyeball and the subsequent increase in myopia.[7–9]

Aim of this study was to evaluate the efficacy of prismatic bifocal spectacle lenses to control the progression of myopia.

2. MATERIALS AND METHODS

The study retrospectively analyzed 52 eyes of 26 patients who used prismatic bifocal spectacle lenses to control the progression of myopia. The study was approved by the Ethics Committee of Sakarya University Faculty of Medicine (10.04.2023/262) in accordance with the Declaration of Helsinki. Informed consent was obtained from all patients' parents.

A prismatic bifocal spectacle lenses made of polycarbonate material were used in the study. The lenses featured a +3.25 D front base curve and a conventional executive bifocal design with a +2.00 D add power. The prescription range encompassed plano to -6.00 D sphere and up to 4.00 D cylinder. A 3-Δ base-in prism was incorporated into the near segment of each lens, resulting in a total of 6 Δ base-in prism (Essilor Myopilux Max, Essilor International S.A.).[10] Incorporating a 6-Δ base-in prism into the near segment effectively neutralized lens-induced exophoria.[6]

Patients who showed an increase in myopia greater than 0.50 D during the last year of follow-up with single-vision spectacles, who were compliant with axial length measurements and whose eyes had a cycloplegic objective refraction measurement of ≥-2.00 D were included in the study. Patients with strabismus, any retinal or anterior segment diseases, or those who had previously undergone other treatment methods for myopia control were excluded from the study. The demographic data of the patients, including age and gender were recorded. During all follow-ups, patients underwent best-corrected visual acuity measurements with Snellen chart, detailed anterior and posterior segment examinations with slit-lamb biomicroscope, as well as cycloplegic refraction and axial length measurements.

The primary outcome variable was the progression of myopia, determined by calculating the change in objective cycloplegic spherical equivalent using an automated refractor (average of 5 measurements, Tonoref II, Nidek Co. Ltd., Japan). Cycloplegia was induced by administering two drops of 1% cyclopentolate, spaced 5 minutes apart. Refraction was measured 30 minutes after the cycloplegia. The increase in objective spherical equivalent after one year of using single-vision spectacle lenses were compared with the increase observed after one year of using bifocal prismatic spectacle lenses. Axial length was measured with optical biometry (average of 5 measurements, IOL Master 500, Zeiss, Carl Zeiss Meditec, Germany) at baseline, after one year of using single-vision spectacle lenses and after one year of using prismatic bifocal spectacle lenses. The change in axial length served

as the secondary outcome variable. To assess the compliance with spectacle lenses, both children and parents were asked whether they paid attention to the child's spectacle-wearing habits.

IBM SPSS Statistics version 24.0 (IBM Corp., Armonk, NY, USA) package software was used for all statistical analyses. The normality of the variables was assessed with the Shapiro-wilk test. As the variables did not show a normal distribution, nonparametric tests such as the Mann–Whitney U test were used to compare changes in spherical equivalent and axial length. The chi-square test was employed to evaluate differences in non-continuous variables. A multiple linear regression analyze was used to evaluate the effects of potential variables such as age, sex, baseline myopia degree, and increase in axial length on myopia treatment. The Pearson correlation test was used to evaluate the relationship between changes in axial length and the progression of myopia. For all statistical analyses, a p value < 0.05 was considered statistically significant. Data were presented as mean ± standard deviation (SD).

3. RESULTS

The mean age of the patients was 11.65 ± 2.70 years (range: 6 to 15). Sixteen (61.5%) patients were male, and 10 (38.5%) patients were female. The mean objective spherical equivalent was 2.53 ± 1.14 D at baseline. After one year of using single-vision spectacle lenses, it was 3.83 ± 1.32 D and after one year of using prismatic bifocal spectacle lenses, it was 4.04 ± 1.27 D. The increase in mean spherical equivalent was 1.25 ± 0.76 D after one year of using single-vision spectacle lenses, compared to 0.24 ± 0.14 D after one year of using prismatic bifocal spectacle lenses, This difference was statistically significant (p<0.001). The increase in spherical equivalent was 0.250 D in 26 (50%) eyes, 0.125 D in 9 (27.3%) eyes, 0.0 D in 6 (11.5%) eyes, 0.375 D in 4(7.7%) eyes and 0.50 D in 7(13.5%) eyes. No eyes experienced an increase exceeding 0.50 D.

The mean axial length was 23.47 ± 0.36 mm at baseline. After one year of using single-vision spectacle lenses, it was 24.13 ± 0.07 mm and after one year of using prismatic bifocal spectacle lenses, it was 24.15 ± 0.07 mm. Similarly, the increase in mean axial length was 0.66 ± 0.31 mm with single-vision spectacle lenses and 0.014 ± 0.015 mm with prismatic bifocal spectacle lenses. This difference was also statistically significant (p<0.001). The increase in axial length was 0.0125 mm in 25 (48.1%) eyes, 0.0163 mm in 9 (17.3%) eyes, 0.050 mm in 7 (13.5%) eyes, 0.200 mm in 6 (11.5%) eyes, and 0.11 mm in 1 (1.9%) eyes. Figures 1 and 2 show the changes in objective spherical equivalent and axial length.

Multiple linear regression analysis revealed that baseline myopia (higher baseline myopia was associated with a greater treatment effect, p=0.016) and increase in axial length (a higher increase in axial length was associated with greater treatment effect, p=0.036) were both statistically significantly associated with the treatment effect. Age and sex did not show a significant association with the effect of treatment. As expected, the progression of myopia showed a significant correlation with increase in axial length (p<0.001, r=0.52).

4. DISCUSSION

The management of myopia, a prevalent and potentially sight-threatening refractive error, has been a subject of extensive research in recent years.[11,12] Among the various interventions explored, prismatic bifocal spectacle lenses have emerged as a promising option for slowing the progression of myopia, particularly in children.[11] Numerous studies have demonstrated the effectiveness of prismatic bifocal spectacle lenses in controlling the progression of myopia.[6,8–10,12,13]

Figure 1.

The changes in mean objective spherical equivalent

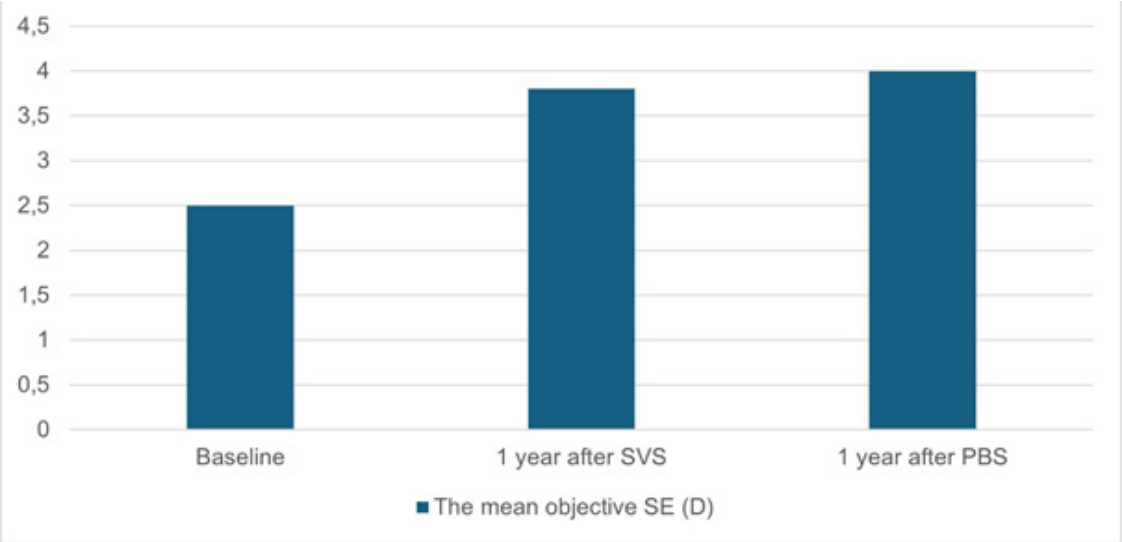
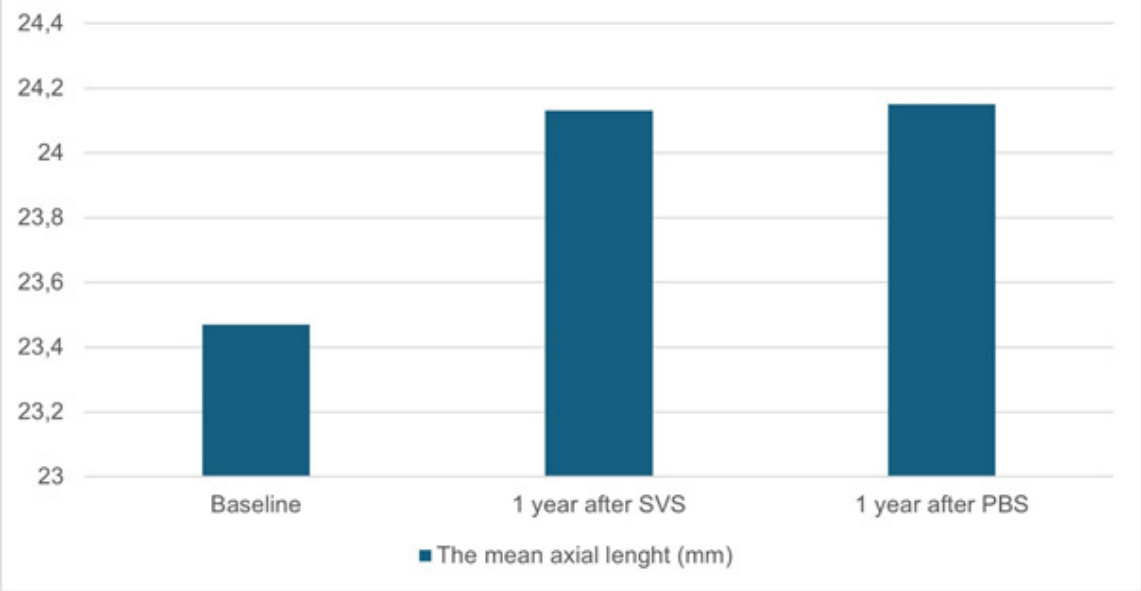


Figure 2.

The changes in mean axial length



Similar to previous studies, prismatic bifocal spectacle lenses were found to be effective in controlling myopia progression after one year of using, compared to single-vision spectacle lenses in same patients in our study.

Axial length measurement provides a quick and objective assessment of myopia progression. Studies have demonstrated that bifocal spectacles are particularly effective in treating myopia in eyes with rapid axial elongation.[10,14] Our results align with these findings, showing that axial elongation is a crucial factor in myopia progression. The treatment effect of prismatic bifocal spectacle lenses was found to be most pronounced during the first year in slowing myopia progression.[10] Huang et al. [15] reported a treatment effect of 0.34 D with prismatic bifocals in the first year.

Similarly, Leung at all[16] and Cheng at all.[10] observed comparable treatment effects with prismatic bifocal spectacles. Our findings were consisted with these results, showing that prismatic bifocals are effective in managing rapid myopia progression during the initial year of treatment. Executive bifocal lenses may be more effective than multifocal lenses in controlling myopia[10]. This could be because the distinct segment line in executive bifocals encourages children to use the appropriate portion of the lens for near work. In contrast, children wearing multifocal lenses may not consistently use the near-addition portion for reading.[17] Additionally, the full-width positive power in the lower portion of executive bifocal lenses might contribute to their effectiveness by creating a wider field of peripheral myopic defocus.[7,8]

The mechanisms through which bifocal prismatic lenses work to control myopia progression are multifaceted. The prismatic component of these lenses induces a relative peripheral hyperopic defocus, which has been shown to inhibit axial elongation.[6,8,10] This peripheral defocus acts to counteract the myopic peripheral defocus that is often associated with the development of myopia. Additionally, the bifocal design of these lenses can reduce the demand for accommodation, which has also been linked to myopia progression.[9,18,19] By addressing both the peripheral defocus and accommodation aspects, bifocal prismatic lenses effectively target key factors contributing to the development and progression of myopia. In our study similar to previous studies, we found that axial elongation was slower in those using prismatic bifocal spectacle lenses compared to those using single vision spectacle lenses.

Given the high accommodation convergence to accommodation ratios observed in myopic children, those with orthophoria and exophoria who wear positive lenses may experience a significant shift towards exophoria.[20,21] This shift increases the demand for positive fusional vergence. Research suggests that this disrupted oculomotor balance could diminish the effectiveness of positive-lens treatments.[6] Subsequent studies have indicated that incorporating near base-in prism when prescribing near additions for myopic children can mitigate the exophoria induced by positive lenses.[6] Therefore, we chose to use bifocal glasses with added prisms.

The limitations of the study were the absence of accommodation measurement, which could have provided insights into the adaptive responses of participants using prismatic bifocal lenses and the lack of measurement of outdoor activities and near work durations. Additionally, the study solely focused on prismatic bifocal spectacle lenses, limiting the exploration of other types of lenses or interventions that could potentially affect myopia control differently. One strength of the study was the use of the same patients throughout the investigation. This approach helped to control for variables such as outdoor activities and near work, which were assumed to have similar characteristics.

In conclusion, the findings indicated that prismatic bifocal spectacle lenses have the potential to decelerate myopia progression in children with high rates of myopic progression. However, prospective studies with larger sample sizes and longer follow-up periods are needed to further investigate this topic.

Ethical Approval

Ethics committee approval dated 10.04.2023 and numbered 262 was obtained from Sakarya University Faculty of Medicine Non-Interventional Ethics Committee.

Conflict of Interest

The authors declare that they have no conflict of interest.

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Case Report

A Case of Autoimmune Encephalitis Presenting with CASPR-2 Antibody Positivity

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Objective: In parallel with the increase in awareness about the disease the number of patients diagnosed with autoimmune encephalitis has been increasing in recent years. Diagnosis is delayed in cases of autoimmune encephalitis where symptoms such as fever, neck stiffness, nausea, vomiting and confusion, which we are used to seeing in central nervous system infections, are more in the background and cognitive disorders, behavioral problems and psychiatric findings are at the forefront. The prognosis is good with early diagnosis and treatment especially in cases with the formation of antibodies against cell surface antigens.

Methods: In this article a case of autoimmune encephalitis with Contactin-related protein-2 (CASPR-2) antibody positivity, which is in the group of autoimmune encephalitis with the formation of antibodies against cell surface antigens is presented.

Results: Our patient responded well to immunotherapy, no recurrence was observed during the following 1 year and no malignancy was detected.

Conclusion: In patients presenting with confusion, epileptic seizures, hallucinations and non-specific sensory symptoms during a subacute process autoimmune encephalitis should be considered in the differential diagnosis. The chance for early diagnosis and treatment should not be missed.

Keywords: Autoimmune encephalitis, Contactin-Related Protein-2 (CASPR-2), Early diagnosis and treatment

1. INTRODUCTION

Central nervous system (CNS) infections can be grouped under four headings: inflammation of the meninges (meningitis), inflammation of the brain parenchyma (encephalitis), inflammation of the brain parenchyma with a limited area around it (abscess) and inflammation of vascular structures (vasculitis/phlebitis). Encephalitis is mainly divided into two categories: infectious and autoimmune. Fever, headache, nausea, vomiting, altered consciousness, neck stiffness, meningeal irritation findings, focal neurological findings, epileptic seizures which are frequently seen in CNS infections may have an insignificant course in autoimmune encephalitis.[1,2] Subacute course, vagueness of clinical findings, difficulties in differential diagnosis, occasional confusion with psychiatric diseases and the late results of related antibody panels cause delays in the diagnosis and treatment of autoimmune encephalitis. Autoimmune encephalitis is divided into two main groups: syndromes associated with antibodies against neuron surface antigens or intracellular antigens. There are some differences between these two groups. Forms associated with neuron surface antigens are less associated with malignancy and respond better to immunotherapy. Autoimmune encephalitis with contactin-associated protein-2 (CASPR-2) antibody positivity are among the syndromes associated with neuron surface antigens and their prognosis is generally good.[3]

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This case report aims to draw attention to encephalitis with CASPR-2 antibody positivity due to delays in diagnosis.

2. CASE REPORT

A 39-year-old male patient was admitted to the emergency room on July 15, 2023 with complaints of meaningless speech, confusion and seizures. His complaints started approximately 1 month before he applied to our hospital. He had difficulty in finding words. Then absence seizures lasting for a few seconds were added and progressed over the days. His communication with his environment decreased, his reaction time increased, memory problems were added, absence seizures became more frequent, meaningless speech and complaints of repeating the same word were added. 2-3 weeks after the onset of complaints, he had a short-term attack accompanied by involuntary contractions in the arms and legs and loss of consciousness after screaming in his sleep. He applied to various polyclinics with these complaints. He was referred to the Internal Medicine unit upon detection of high blood sugar and was diagnosed with Diabetes Mellitus (DM). During this period, he applied to the Brain Surgery unit due to pain starting from his left arm and radiating to his neck, cranial and cervical Magnetic Resonance Imaging (MRI) were performed, no pathology was detected. Electroencephalography (EEG) performed at an external center on 12.07.2023 revealed "15-20 seconds 1-2 Hz spike slow wave activity" after hyperventilation (Figure-1) and anti-seizure treatment (valproate 1000 mg/day) was started. His medical history included newly diagnosed DM, hypertension (HT) and smoking 1 pack/day for 10 years. He did not describe substance use or exposure to toxins.

On his first admission to the emergency room, his fever was 36.7 C°, his blood sugar was 197 mg/dl and his electrocardiogram (ECG) was in normal sinus rhythm. His neurological examination revealed confusion. He was able to produce words but he was repeating the same words. He did not understand simple commands. His naming was impaired. There was no neck stiffness. Cranial nerves were intact. His motor examination was normal. Deep tendon reflexes (DTR) were normoactive. The plantar reflex was bilaterally flexor. Routine laboratory tests were normal. Sedimentation and C reactive protein (CRP) were within normal values. No pathology was detected in the first brain computed tomography taken in the emergency room on 15/07/2023. In the cranial MRI, a hyperintense area was seen in the medial part of the left temporal lobe in the diffusion sequence. The image was isointense in the Apparent Diffusion Coefficient (ADC) sequence (Figure-2). Lumbar puncture was unremarkable. No cells were seen in the cerebrospinal fluid (CSF). Glucose in CSF was 104 mg/dl (simultaneous blood sugar was 122 mg/dl), protein was 21 mg/dl, Na was 144 mmol/liter, K was 2.6 mmol/liter. Viral meningitis and autoimmune encephalitis panels were performed. After the evaluation in the emergency room, CNS infection, autoimmune encephalitis, post-ictal confusion, metabolic encephalopathy due to hyperglycemia, encephalopathy due to substance use, exposure to toxic substances, cerebrovascular disease and conversion disorder were considered, and the patient was admitted to the Neurology ward. No significant pathology was seen in the first contrast-enhanced cranial MRI taken on 17/07/2023. In the 2nd contrast-enhanced cranial MRI taken on 21/07/2023, mild contrast enhancement was seen in the medial part of the left temporal lobe (Figure-3). Both EEG's taken in our hospital were normal. On the 3rd day of his admission to our clinic his comprehension was completely impaired, agitation developed and his speech consisted entirely of word repetitions.

Visual hallucinations were added to the picture during his hospitalization. During the morning visit he stated that someone he did not know sat in the chair next to him and then got up and left. The patient was evaluated by the Psychiatry unit. Since the content of the hallucinations were "vivid hallucinations incompatible with psychotic hallucinations" psychotic disorder was not considered at the forefront. It was recommended to continue investigating organic causes. During his follow-up in the clinic complex partial seizures accompanied by oroalimentary automatism in the mouth and forced head-eye deviations of less than 1 minute were observed. After the adjustment of anti-seizure medication the seizures decreased and stopped. He complained of a burning sensation in his head. 1000 mg/day intravenous methylprednisolone treatment for 5 days was given with a preliminary diagnosis of possible autoimmune encephalitis. After the symptoms improved, the patient was discharged with recommendations. Contrast-enhanced thoracic and abdominal computed tomography (CT) scans for malignancy screening were normal. Tumor markers were negative. In the outpatient clinic follow-up his clinical condition was good, he had no new complaints and no treatment was given. Cranial MRI and EEG taken during the follow-up were normal. The viral and bacterial meningitis panel that ended after discharge was negative. CASPR2 positivity was detected in the autoimmune encephalitis panel studied from the serum.

Figure 1.

In the EEG taken in an external center, "15-20 seconds of 1-2 Hz spike slow wave activity after hyperventilation" was detected

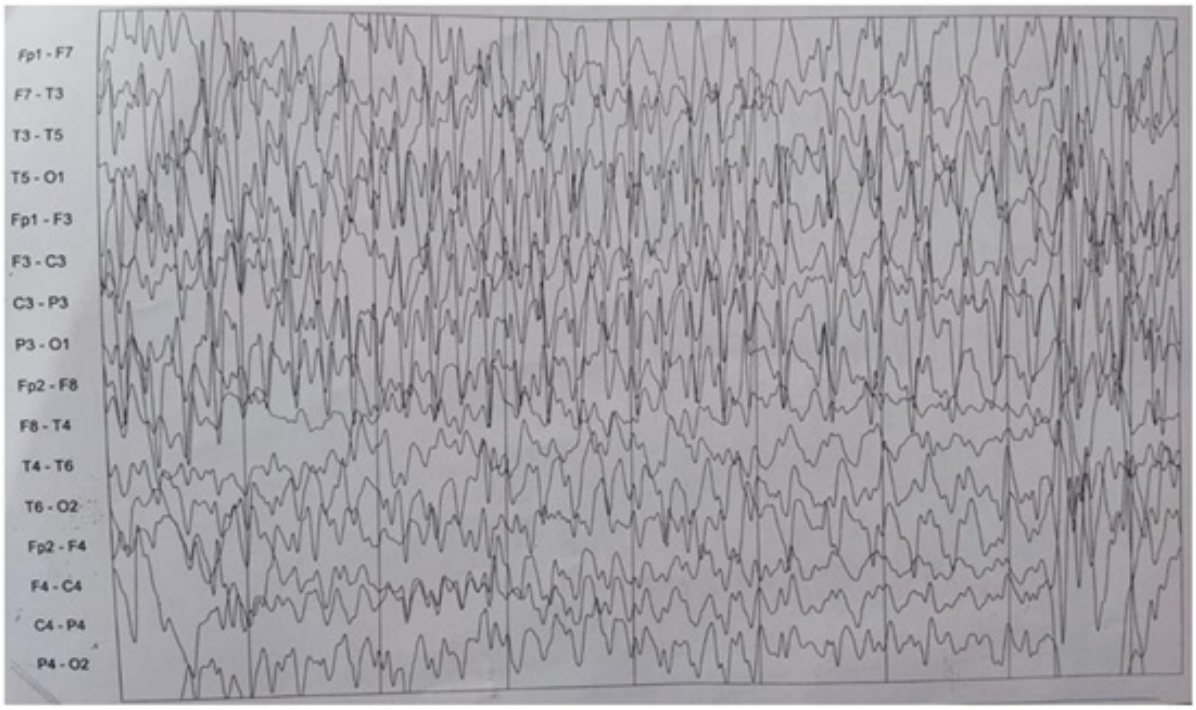


Figure 2.

A hyperintense area was seen in the medial part of the left temporal lobe in diffusion MRI. Its counterpart was isointense in the ADC sequence

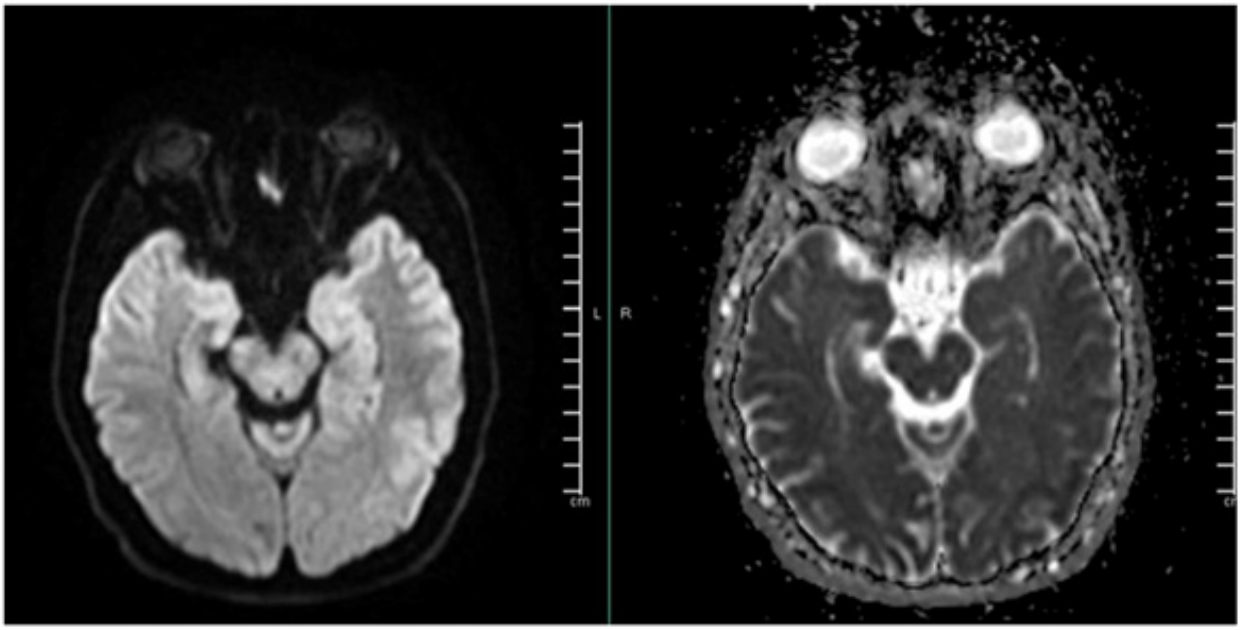
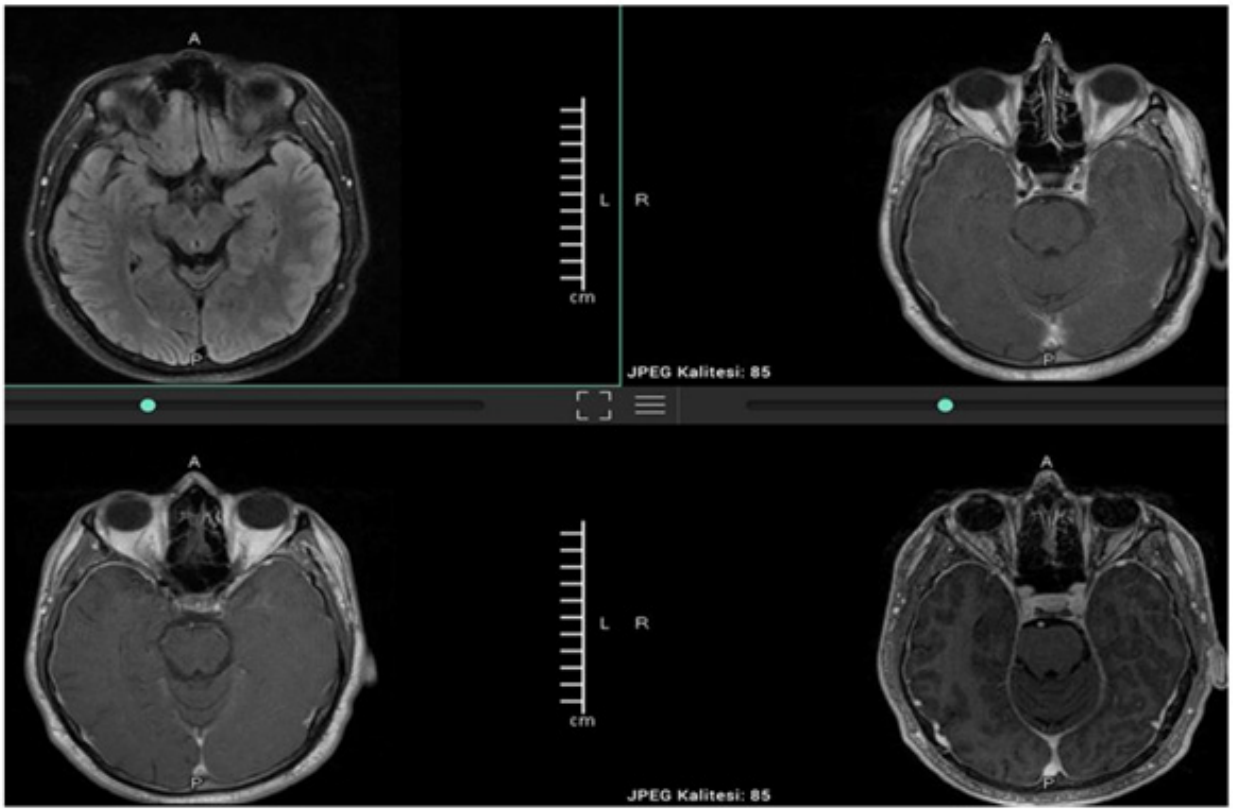


Figure 3.

Contrast-enhanced MRI showed mild contrast enhancement in the medial part of the left temporal lobe



3. DISCUSSION

Delays in the diagnosis and treatment of autoimmune encephalitis have brought the definition of "possible autoimmune encephalitis" to the agenda. Possible autoimmune encephalitis diagnostic criteria can be grouped under three main headings. The first is subacute (less than 3 months) memory loss, mental status change or psychiatric findings. For the second item, new focal CNS findings, new-onset seizures, CSF pleocytosis (WBC>5 cells/mm^3) and at least one of the encephalitis findings on cranial MRI must be present. The third item includes the exclusion of other causes that would cause these findings.[4]

CASPR2 is a cellular adhesion molecule in the neuroxin family. It is associated with ankyrin protein called 4.1B and PDZ binding motif with its C-terminal end.[5] It is located in the juxta-paranodal region of Ranvier node on the axon. CASPR2, contactin2 protein and potassium (K) channels form the voltage-sensitive K channel complex.[5–7] It is thought that the blockage of the relationship between CASPR2 and contactin-2 due to the formation of antibodies is involved in the pathogenesis of the disease. Due to this blockage the expression of K channels is impaired. This causes a an increase in the expression of K channels in some regions such as hippocampus and decrease in the expression of K channels in some regions such as the dorsal root ganglion. This is thought to lead to hyperexcitability and seizures.[8] Voltage-gated potassium channels (VGKC) are associated with the repolarization of the synaptic membrane. Blockage of these channels causes excitability in the nerves.[9] CASPR2 is abundant in the limbic system, basal ganglia, other motor areas, sensory pathways and especially the temporal lobe. The widespread presence of CASPR2 in both the CNS and peripheral nervous system (PNS) leads to the observation of different clinical findings related to the disease. These findings can be listed as ataxia, epilepsy, psychiatric symptoms, encephalitis, Morvan syndrome, neuropathic pain and Isaac syndrome.[10] Morvan Syndrome is an autoimmune disease that can affect the CNS, PNS and autonomic nervous system (ANS). Symptoms such as neuromyotonia (cramps, rigidity, fasciculation), seizures, fever, encephalopathy, insomnia, dysautonomic signs, especially hyperhidrosis and cardiovascular instability, neuropathic pain, skin lesions or pruritus may be observed.[11-12] Isaac syndrome is an acquired peripheral nerve hyperexcitability. Its main findings can be summarized as myokymia, cramps, fasciculation, twitching, rigidity and pseudomyotonia. Muscle activity may continue even when the patient is asleep. This condition can cause muscle hypertrophy. Dysautonomia (hyperhidrosis, sialorrhea), Trousseau and Chvostek signs may also be present, sensory findings are rare, reflexes are usually normal. Symptoms are usually insidious and develop over years.[13,14]

In a multicenter retrospective study of 25 cases of CASPR encephalitis, it was seen that the disease was mostly seen in men (68%), and the age of symptom onset was 42. The average time from the onset of complaints to admission of hospital was 17 days, ranging from 2 days to 6 months. Fever was the initial symptom in 6 of the patients. The most common symptom was cognitive impairment, seen in 17 of 25 patients. 8 patients met the criteria for limbic encephalitis. 6 of the 8 patients diagnosed with limbic encephalitis had epileptic seizures. 4 patients were diagnosed with Morvan syndrome. All patients had positive anti-CASPR-2 antibodies in serum. Antibodies were shown in both CSF and blood in 6 patients. White blood cells were high in CSF in 8 patients. While 10 patients had high protein levels in CSF, 7 patients had low protein levels and

8 patients had normal protein levels in CSF. Slow background activity and epileptic patterns were observed as EEG findings. Cranial MRI showed abnormal signal increase in bilateral hippocampus in 3 patients with cognitive impairment. Positron emission tomography (PET-CT) showed increased metabolism in bilateral basal ganglia and mesial temporal lobe in 1 patient with limbic encephalitis. Relapse was observed in 4 out of 25 patients after 2 months. This study showed that both CNS and PNS findings are seen in CASPR-2 encephalitis. Lung tumor was detected in only 1 patient and there was a good response to immunotherapy.[10] In our case confusion, hallucinations, epileptic seizures and sensory symptoms such as numbness in the left arm at the beginning of the complaints, burning in the head were observed during the hospitalization, and these were consistent with the literature. It is known that the diagnosis process of the disease can take up to 6 months. Our patient who applied to our clinic 1 month after the onset of his complaints was diagnosed quickly. The patient responded well to immunotherapy, no recurrence was observed during the following 1 year and no malignancy was detected.

In patients presenting with confusion, epileptic seizures, hallucinations and non-specific sensory symptoms during a subacute process autoimmune encephalitis should be considered in the differential diagnosis. It should be remembered that the prognosis is good especially in those with antibody formation against surface antigens. The chance for early diagnosis and treatment should not be missed. Due to the late results of autoimmune encephalitis-related antibody panels the diagnostic criteria for "possible autoimmune encephalitis" should be known and treatment should be started before the antibody panel is completed in clinically appropriate cases. Due to its association with malignancies, malignancy screening should also be performed while the diagnosis and treatment process is ongoing. It should not be forgotten that relapses may be seen and tumors may be detected in the post-disease period, patients should be closely monitored in this regard during outpatient clinic follow-up and it should not be forgotten that there may be cases where immunotherapy should be continued for a long time.

There is no conflict of interest between the authors. The type of the study is case report so we did not get ethical approval. The informed consent form was signed by the patient. All off the authors have participated in the design and writing of the manuscript.

Ethical Approval

Presented as an electronic poster (EP-627) at the 59th National Neurology Congress held at Kaya Plaza Hotel, Antalya, December 13-18, 2023.

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