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REVIEW ON ONE HEALTH BENEFITS OF RECENTLY LAUNCHED ETHIOPIAN GREEN LEGACY

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ABSTRACT

Ethiopia, a country known for its rich cultural heritage and diverse natural landscapes, has a long-standing tradition of environmental stewardship deeply rooted in its history. Recognizing the urgent need for conservation and sustainable practices in the face of modern challenges, the Ethiopian government launched the Green Legacy Initiative in 2019. The Ethiopian Green Legacy initiative holds great importance as a comprehensive reforestation and conservation program aimed at addressing environmental, human health, and socio-economic challenges. This article presents a review of the one health benefits associated with the Ethiopian Green Legacy initiative. By exploring the various dimensions of this initiative, including its environmental impact, influence on human health and well-being, biodiversity enhancement, economic opportunities, challenges, and future prospects, we aim to highlight the significance of this ambitious project in promoting sustainable development and improving the overall quality of life in Ethiopia.

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Key words: Animal, Environment, Ethiopian, Green Legacy, Public Health

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INTRODUCTION

Ethiopia is a country known for its stunning landscapes and rich biodiversity. The Green Legacy initiative is a massive national effort in Ethiopia aimed at tackling environmental issues and promoting sustainable development. However, like many other places around the world, it has been faced with numerous environmental challenges such as deforestation, soil erosion, and water scarcity.[1] The Green Legacy initiative was born out of the need to address these issues and ensure a greener future for the country. The main objective of this initiative is to plant a whopping 20 billion trees by 2024.

The initiative aims to increase forest coverage, restore degraded ecosystems, and improve water resource management.[2] By doing so, it hopes to mitigate the effects of climate change, enhance soil conservation, and promote sustainable land use practices. On the other hand, the Green Legacy is initiative that integrating environmental, human and animal health concerns, which brings us to the next section.[3] The interconnectedness of public, animal, and environmental health is recognized as a fundamental principle in the field of One Health. This concept acknowledges that the health of humans, animals, and ecosystems are all intertwined and dependent on one another.[4] The close proximity between humans and animals in various settings like agriculture, wildlife populations, and domestic pets creates opportunities for the transmission of pathogens between species. For example, zoonotic diseases such as avian influenza or Ebola can cross over from animals to human populations.[5]

Additionally, environmental degradation resulting from factors like pollution or deforestation can negatively impact human and animal health alike by exposing them to harmful toxins or disrupting delicate ecosystems.[6] A holistic approach is necessary to mitigate these risks, involving collaboration among professionals from different fields including veterinarians, medical doctors, ecologists, and policymakers. Efforts must be made to promote research, education, surveillance systems, and policies that recognize this interconnectedness to effectively protect public health while also preserving animal welfare and sustaining healthy environments for all beings involved.[7]

Moreover, Ethiopian Green Legacy initiative is highly important to the One Health approach through planting billions of trees and restoring ecosystems. Also the initiative is not just improving the environment; it's also promoting better human and animal health. Trees act as natural air filters, helping to reduce air pollution and improve respiratory health. They provide shade, which can help prevent heat-related illnesses during scorching summers. In addition, forests create habitats for a diverse range of species, contributing to biodiversity conservation and ecological balance.[2] By adopting a One Health approach, the Green Legacy initiative recognizes that a healthier environment leads to healthier communities.

LITRATURE REVIEW

Historical Background of Ethiopian Environmental Practices

Ethiopia's environmental consciousness has deep roots in its history. From ancient times, Ethiopians recognized the value of their natural surroundings and practiced environmental stewardship. They understood that their well-being was intricately connected to the health of the land and its resources.[8,9] Ethiopians developed innovative conservation techniques that have stood the test of time. One example is the use of terracing to combat soil erosion, prevent floods, and retain moisture for agriculture. Indigenous communities also implemented rotational grazing

systems to protect grazing lands and ensure their sustainability. These practices, passed down through generations, demonstrate the wisdom of traditional conservation techniques.[10]

The Green Legacy Initiative was officially launched in 2019 by Prime Minister Abiy Ahmed. Its primary objective is to tackle deforestation and land degradation, which pose significant threats to Ethiopia's biodiversity, water resources, and climate regulation. The initiative seeks to restore landscapes, revitalize ecosystems, and enhance resilience to climate change through massive tree planting campaigns and sustainable farming practices.[11]

Benefits of Green Legacy for Human Health and Well-Being

Reduction of air pollution and respiratory health benefits

By planting millions and millions of trees, the initiative is helping to reduce air pollution and improve respiratory health. Trees act as natural air filters, absorbing pollutants such as carbon dioxide, nitrogen dioxide, and particulate matter.[12] In urban areas, where air pollution often reaches alarming levels, the presence of trees can make a significant difference.[13] Cleaner air means a lower risk of respiratory diseases and improved overall well-being.[14] Moreover, Non-communicable Diseases such as diabetes and cardiovascular conditions are on the rise worldwide.[15] By promoting an active lifestyle and providing opportunities for exercise in green spaces, the movement aims to reduce the risk of these diseases and keep the population healthier for longer.

Improvement in mental health and well-being

Nature has a way of soothing our personalities and lifting our spirits. The Green Legacy initiative understands this and aims to improve mental health and well-being through its reforestation efforts. Spending time in green spaces has been shown to reduce stress, alleviate anxiety, and improve overall mental health.[16] The initiative seeks to create more of these green spaces by planting trees in urban areas, parks, and communities. This allows people to connect with nature and reap the psychological benefits that come with it.

Access to clean water and sanitation

Clean water is not just a luxury; it's a basic human right. The Green Legacy initiative recognizes this and aims to improve access to clean water and sanitation through its environmental restoration efforts. By protecting watersheds and ensuring healthy water sources, the initiative contributes to the availability of clean water for communities.[17] This helps prevent waterborne diseases and promotes better hygiene and sanitation practices. After all, it's hard to stay healthy without access to clean water.[18] Moreover, the Ethiopian Green Legacy initiative is not only just about planting trees; it's about paving the way towards a greener and healthier future. By taking a One Health approach and focusing on the environment and human health, the initiative is tackling multiple

Animal Health Benefits of Ethiopian Green Legacy

The Ethiopian green legacy initiative has proven to be a game-changer for animal health. It has addressed critical aspects such as water availability, air pollution, and biodiversity, all of which directly impact the well-being of our

beloved animals. By ensuring adequate water access and improving its quality, animals stay hydrated and healthy. Reduced air pollution leads to better respiratory health for our furry friends.[19] Also enhanced biodiversity not only maintains ecosystem balance but also indirectly prevents diseases.

Improved Shade and Its Benefits for Animals

As trees flourish under the Green Legacy Initiative, they provide valuable shade for animals in Ethiopia. This increased shade has numerous benefits for the well-being of livestock and wildlife. Shade helps animals regulate their body temperature, protecting them from extreme heat and reducing the risk of heat stress-related health issues.[20] By seeking shelter under these newfound canopies, animals can find relief from the scorching sun, resulting in happier and healthier creatures.[21] Ethiopia's tropical climate poses challenges for animal health, especially in livestock farming. Heat stress is a major concern, leading to reduced productivity and increased susceptibility to diseases.[22] The Green Legacy Initiative addresses this issue by replenishing the environment with trees, creating microclimates that offer cooling effects and relief from excessive heat. As a result, animals experience less heat stress, leading to improved health, higher milk production, and enhanced fertility rates.[23]

Increased Availability and quality of Nutritious Forage for Livestock

One of the significant benefits of the Green Legacy Initiative is the increased availability of nutritious forage for livestock. Reforestation efforts contribute to the growth of diverse plant species, including grasses and legumes, which serve as excellent sources of feed for animals. These nutrient-rich forage options improve the quality of their diet, leading to better animal nutrition and overall health.[24] With a more abundant and varied forage supply, livestock reared in areas affected by the Green Legacy Initiative experience improved growth rates and productivity. Nutritious forage promotes proper development, allowing animals to reach their full genetic potential.[25] Additionally, a well-balanced diet contributes to stronger immune systems, reducing the risk of disease and leading to healthier, more resilient livestock.[26]

Prevention of Soil Erosion and Its Impact on Animal Well-being

Soil erosion can have detrimental effects on animal well-being. It leads to the loss of fertile topsoil, reducing nutrient availability in pastures and affecting the quality of grazing areas. This degradation of grazing lands can result in inadequate nutrition for animals, impacting their health and productivity.[27] With the Green Legacy Initiative's focus on preventing soil erosion, the quality and quantity of available grazing areas can be safeguarded for the benefit of both domestic and wild animals. Soil erosion often leads to the contamination of water sources with sediment and pollutants, posing risks to animal health.[28] So by preventing erosion and promoting reforestation, the Green Legacy Initiative helps to safeguard water quality, reducing the exposure of animals to harmful contaminants. Access to clean water is crucial for maintaining optimal health and preventing waterborne diseases, ensuring the well-being of animal population.

Improved water availability and its significance for animal health

With the Ethiopian green legacy initiative, there has been a significant improvement in water availability for animals. Adequate water access ensures that our four-legged buddies stay hydrated, aiding in digestion, temperature regulation, and overall well-being.[29] Moreover it has also focused on improving water quality. Clean and uncontaminated water sources have a direct impact on animal health through reducing the risk of waterborne diseases and infections, animals can drink without worry.[28]

Enhancing biodiversity and its indirect effects on animal health

Biodiversity plays a vital role in maintaining the delicate balance of ecosystems.[30] With the Ethiopian green legacy promoting reforestation and conservation efforts, biodiversity is thriving. This diverse range of plants and animals ensures a healthy ecosystem, which directly affects animal health. When natural habitats are restored, animals can flourish in their intended environments, free from stress and disturbance.[31] Also a healthy ecosystem translates to healthier animals. With an increase in biodiversity, the chances of disease transmission are reduced. When nature's web is intact, natural checks and balances keep diseases at bay. By promoting biodiversity through the green legacy initiative, animals are better equipped to fend off pesky illnesses, ensuring their well-being and survival.[32]

Environmental benefits of the Ethiopian Green Legacy

Reforestation and restoration of degraded ecosystems

The Ethiopian Green Legacy initiative aims to bring that feeling to the whole country. By planting billions of trees, the initiative is restoring degraded ecosystems, increasing forest coverage, and creating new habitats for wildlife. Reforestation not only helps combat climate change by absorbing carbon dioxide, but it also reduces soil erosion and improves water regulation.[33] Trees act as anchors, preventing soil from being washed away by heavy rains and maintaining the stability of slopes and hillsides. This means less runoff, which translates to increased water availability in rivers and underground reserves[34]

Soil conservation and prevention of erosion

Erosion can devastate landscapes, destroy fertile soil, and even threaten human settlements. Thankfully, the Green Legacy initiative is tackling this issue head-on. By planting trees and implementing sustainable land use practices, the initiative is promoting soil conservation and preventing erosion. The roots of trees help bind the soil together, making it less prone to erosion caused by wind or water.[35] This not only protects the environment but also safeguards agricultural lands and ensures food security for local communities.

Water resource management and watershed protection

The Green Legacy initiative recognizes the importance of water resource management and watershed protection. By restoring ecosystems and increasing forest coverage, the initiative helps regulate water flow and maintain healthy watersheds. Forests act as natural sponges, absorbing rainfall and gradually releasing it into rivers and underground aquifers. This ensures a steady

supply of clean water for both humans and wildlife, and also reduces the risk of floods and droughts.[36]

Enhancing Biodiversity and Conservation Efforts through the Green Legacy

Contribution to climate change adaptation and mitigation

In the face of climate change, the Green Legacy initiative plays a crucial role in both adapting to and mitigating its impacts. Trees absorb carbon dioxide, a major greenhouse gas, and release oxygen, helping to combat global warming.[1] The increased forest cover creates microclimates, aiding in temperature regulation and reducing the risk of extreme weather events.[2] This initiative aligns with Ethiopia's commitment to climate change adaptation and mitigation strategies, making it an essential tool in addressing this pressing global issue.

Preservation of endangered species and habitats

Ethiopia's Green Legacy initiative is not only about planting trees, but it also plays a crucial role in preserving endangered species and their habitats. By creating more green spaces, the initiative provides a safe haven for wildlife, helping to protect their populations from further decline. This effort is vital for maintaining the rich biodiversity that Ethiopia is known for.[9]

Promotion of ecosystem services and ecological balance

The Green Legacy project contributes to the promotion of ecosystem services and the restoration of ecological balance. Trees and plants improve air and water quality, enhance soil fertility, and help regulate temperature.[14] With more trees being planted, there is an increased potential for carbon sequestration, which can mitigate the effects of climate change.[13] This initiative goes beyond beautifying the landscape; it actively supports the health and well-being of both humans and the environment.

CONCLUSION AND RECOMMENDATIONS

The Ethiopian Green Legacy initiative showcases the power of a one health approach to address pressing environmental and health issues. Through its reforestation efforts, the initiative not only enhances the natural ecosystems but also improves human health, fosters biodiversity, and offers sustainable economic opportunities. Despite the challenges it may face, the Green Legacy initiative has the potential to create a lasting positive impact on Ethiopia's environment and society. By continuing to invest in this initiative, Ethiopia can pave the way for a greener, healthier, and more prosperous future for its people and the planet as a whole. The success of the Green Legacy initiative calls for scaling up and expanding its reach. By increasing the number of trees planted and extending the project into other areas, Ethiopia can make an even greater impact on biodiversity conservation, climate change mitigation, and sustainable development. The initiative has the potential to inspire other countries to embark on similar tree planting efforts, creating a global movement for environmental preservation.

- ✓ Collaboration and partnerships are key to the sustained success of the Green Legacy initiative. By fostering strong partnerships, the initiative can build a solid foundation for long-term success and create a network of support for its future endeavors.
- ✓ Scientific research and monitoring efforts are essential for evaluating the effectiveness of the Green Legacy initiative and making evidence-based decisions.

- ✓ By incorporating scientific studies into the planning and implementation processes, the initiative can refine its strategies and ensure the best possible outcomes. Regular monitoring of planted trees' health and growth will provide valuable insights to inform future tree planting campaigns and conservation efforts.

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AİLE HEKİMLİĞİ POLİKLİNİĞİNDE HİPOTİROİDİ TANISI ALAN HASTALARDA TİROİD OTO-ANTİKORLARININ POZİTİFLİK ORANLARININ RETROSPEKTİF OLARAK DEĞERLENDİRİLMESİ

RETROSPECTIVE EVALUATION OF THYROID AUTOANTIBODIES POSITIVITY RATES IN PATIENTS DIAGNOSED WITH HYPOTHYROIDISM IN A FAMILY MEDICINE OUTPATIENT CLINIC

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ABSTRACT

Background: The aim of this study was to determine the thyroid autoantibody positivity of patients with hypothyroidism admitted to the Family Medicine Outpatient Clinics of Kartal Dr. Lütfi Kırdar City Hospital between 1.01.2022-31.12.2022.

Method: The population of our descriptive study consisted of patients diagnosed with hypothyroidism admitted to the Family Medicine Outpatient Clinics of Kartal Dr. Lütfi Kırdar City Hospital between 1.01.2022-31.12.2022. Patients were scanned through the hospital information system. Age and gender information of the patients were recorded on the hospital information system. Thyroid autoantibodies were evaluated as positive or negative based on reference values..

Results: As a result of the study, 56.7% of the patients were anti TPO positive and 20.9% (n=89) were anti TG positive. The rate of isolated anti TPO positivity was 37.6% and isolated anti TG positivity was 1.7%. The rate of patients positive for both antibodies was 19.2%.

Conclusion: Thyroid autoantibody positivity depends on genetic and environmental factors. In this respect, different values may be obtained in different populations. There is a need for broad-based studies on this subject in our country.

Key words: Thyroid antibody, anti TPO, anti TG

GİRİŞ

Aile hekimliğinin günlük uygulaması içinde tiroid hastalıkları sık takip edilen hastalıklardan biridir. Hipotiroidi vücutta tiroit hormonlarının yeterince üretilememesi veya nadiren hedef dokulara etki edememesi sonucu ortaya çıkan kronik bir durumdur.[1] Hipotioidinin en sık sebebi ise kronik otoimmun tiroidittir. Kronik otoimun tiroidit anti TPO ve/veya anti TG pozitifliğinin bulunduğu bir klinik durumdur. Epidemiyolojik açıdan genel popülasyonda sıklığı %2 civarındadır, olguların büyük çoğunluğu kadın ve 30-50 yaş aralığındadır.[2] Tiroid oto antikor pozitifliği hipotiroidizme eşlik eder, bu durum Haşimato tiroiditi olarak adlandırılmaktadır.[3]

Kronik otoimun tiroidit olgularının %90-100'ünde anti TPO pozitifliği mevcut iken bu oran Basedow-Graves hastalığında %65-80 civarındadır (c). Otoimun tiroid hastalığı olgularında anti TG pozitifliğinin yüksek oranlarda anti TPO pozitifliğine eşlik ettiği gösterildiğinden anti TG pozitifliğinin tanısal bir öneminin olmadığı düşünülmektedir. Ancak anti TG pozitifliği kronik otoimun hepatit olgularında %60-70 ve Graves hastalığında %20-40 arasında pozitiftir.[4]

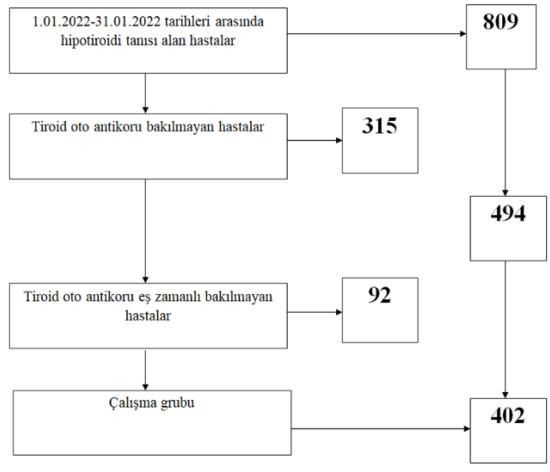
Otoimmun tiroid hastalıklarında tanı antikor pozitifliği ile konsada titrenin hatalığın ciddiyeti ile ilişkisi yoktur. Genetik yatkınlığın ve iyot alımının anti TPO ve anti TG pozitifliği için önemli risk faktörleri olduğu bildirilmektedir.[5]

Bu çalışmanın amacı Kartal Dr Lütfi Kırdar Şehir Hastanesi Aile Hekimliği Polikliniklerine 1.01.2022-31.12.2022 tarihleri arasında başvurmuş hipotiroidi tanılı hastaların tiroid otoantikor pozitifliğini saptamaktır.

YÖNTEM

Tanımlayıcı desendeki çalışmamızın evrenini Kartal Dr Lütfi Kırdar Şehir Hastanesi Aile Hekimliği Polikliniklerine 1.01.2022-31.12.2022 tarihleri arasında başvurmuş hipotiroidi tanılı hastalar oluşturmaktadır.

Hastaların hastane bilgi sistemi üzerinden taranmışlardır. Bu dönem içerisinde polikliniklerde hipotiroidi tanısı alan kişi sayısı 809'dur. Bu kişilerin tiroid otoantikor düzeyleri merkezi laboratuar sistemi kayıtları üzerinden retrospektif olarak taranmış, son 6 ay içinde en son yaptırdıkları otoantikor ve TSH değeri ile beraber kaydedilmiştir. Bu dönemde başvuran 315 hastanın tiroid otoantikoru sonucu yoktur. Anti TPO ve anti TG tetkiklerinin eş zamanlı olarak yapılmadığı 92 hasta da çalışma dışı tutulmuştur. Hastaların öyküleri incelenmiş cerrahi sonrası hipotiroidi gelişen hastalar ve Tiroid malignitesi olan olgular çalışmaya dahil edilmemiştir. Bu grup dışında kalan 402 kişi çalışma grubumuz olarak kabul edilmiştir (Şekil 1).



Şekil 1: Çalışma algoritması

Hastalara ait yaş ve cinsiyet bilgileri hastane bilgi sistemi üzerinden kaydedilmiştir. Tiroid otoantikorlarının titresinin klinik önemi olmadığından titreler laboratuar referans değerleri dikkate alınarak pozitif veya negatif olarak değerlendirilmiştir. Hastaların TSH değerleri ise mU/ml cinsinden kaydedilmiştir. 0,350-4,500 mU/ml değeri normal olarak kabul edilmiştir.

Çalışma için Sağlık Bilimleri Üniversitesi Hamidiye Bilimsel Araştırmalar ve Etik Kurulundan etik kurul onayı alınmıştır (Tarih:7.04.2023 No:23/248). Çalışma verileri SPSS 18.0 paket programında analiz edilmiştir. Analizlerde kategorik veriler için frekans ve yüzde, nicel veriler için ise ortalama ve standart sapma kullanılmıştır. Kategorik verilerin analizi için ki kare analizi kullanılmış ve p değeri 0.05 altında olan değerler anlamlı olarak kabul edilmiştir.

BULGULAR

Çalışmaya 402 kişi dahil edilmiştir. Hastaların %10,4 (n=42) erkek ve %89,6 (n=360)'sı kadındır. Hastaların yaş ortalamaları 49,2±13,9 yıldır. Erkek ve kadın hastaların yaş ortalamaları arasında anlamlı bir farklılık yoktur (Sırasıyla 49,0±14,5 vs 49,2±13,9; p=0,936). Hastaların büyük çoğunluğu 36-64 yaş aralığındadır (%71,6;n=288).

Hastaların ortalama TSH değerleri 6,0±8,7 mU/ml dir. Bu değer dikkate alındığında hastaların sadece %64,4 (n=259)'unun normal TSH değerine sahip olduğu görülmektedir. Cinsiyet, yaş grupları ve hastaların TSH değerleri arasında anlamlı bir farklılık yoktur (sırasıyla p=175; p=0,476). Hastaların genel özellikleri tablo 1'de verilmiştir.

Tablo 1: Katılımcıların genel özellikleri

		% (n)
Yaş (yıl)		49,2±13,9
	35 yaş ve altı	15,4 (62)
	36-64 yaş	71,6 (288)
	65 yaş ve üstü	12,9 (52)
Cinsiyet	Erkek	10,4 (42)
	Kadın	89,6 (360)
TSH (mU/ml)		6,0±8,7
	Hipertiroid	2,7 (11)
	Normal	64,4 (259)
	Hipotiroid	32,8 (132)

Hastaların tiroid otoantikor pozitiflikleri incelendiğinde hastaların %56,7 (n=228) anti TPO pozitifliği mevcuttu. Anti TG pozitif olan hasta oranı ise 20,9 (n=89)'dur. Tiroid otoantikor pozitiflik durumları tablo 2'de derlenmiştir.

Tablo 2: Hastaların tiroid otoantikor pozitiflik durumları

	% (n)
İzole anti TPO (+)	37,6 (151)
İzole anti TG (+)	1,7 (7)
Her iki antikor (+)	19,2 (77)
Her iki antikor (-)	41,5 (167)

Yaş grupları arasında tiroid otoantikor pozitifliği açısından anlamlı farklılık yoktur (p=0,360). Kadın ve erkekler arasında da tiroid otoantikor pozitifliği arasında anlamlı farklılık saptanmamıştır (p=0,825) (Tablo 3).

Tablo 3: Katılımcıların yaş grupları ve cinsiyetlerine göre tiroid otoantikor pozitifliği

		İzole anti TPO (+) % (n)	**İzole anti TG (+) % (n)**	**Her iki antikor (+) % (n)**	**Her iki antikor (-) % (n)**	**p**
Cinsiyet	Erkek	9,3 (14)	14,3 (1)	9,1 (7)	12,0 (20)	0,825
	Kadın	90,7 (137)	85,7 (6)	90,9 (70)	88,0 (147)	
Yaş	<35	14,6 (22)	28,6 (2)	15,6 (12)	15,6 (26)	0,360
	36-64	75,5 (114)	71,4 (5)	74,0 (57)	67,1 (112)	
	>65	9,9 (15)	0 (0)	10,4 (8)	17,4 (29)	

TARTIŞMA

Çalışma sonucunda hastaların %56,7; anti TPO pozitifliği ve % 20,9 (n=89)'unda ise anti TG pozitifliği olduğu belirlenmiştir. İzole anti TPO pozitifliği oranı %37,6, izole anti TG pozitifliği ise %1,7'dir. Her iki antikoruda pozitif olan hasta oranı %19,2 dir. Tiroid antikorları ile ilgili olarak ilk toplum temelli tarama 1969 yılında yapılmıştır. Bu çalışmada 21 yaş üstü erişkinlerde anti TG pozitifliği oranı kadınlarda %16,2 ve erkeklerde %4,3 olarak belirlenmiştir. Bu oranlar daha sonra yapılan çalışmamalarda da yakın oranlarda bulunuştur.[7] Finlandiya'da yapılan çalışmalarda anti TG pozitifliği oranları %7,8-10,6 arasında belirlenmiştir.[8] Yine Norveç'te yapılan bir çalışmada anti TG pozitifliği kadınlarda %10,8 erkeklerde ise %3,7 olarak bulunmuştur.[9] Bizim çalışmamızda izole anti TG ve her iki antikor pozitifliği olan kişiler birlikte değerlendirildiğinde anti TG pozitif kişi oranı %20,9'dur. Bu oran yapılan çalışmalardan biraz yüksek olmakla beraber ölçüm tekniğindeki farklılıklar ve çalışma gruplarının farklılığından kaynaklanıyor olabilir. Bizim çalışmamız sadece hipotiroidik hastaları çalışma grubu olarak alırken birçok çalışma tüm tiroid hastalıklarını veya toplumu çalışma grubu olarak ele almaktadır. Öte yandan tiroid otoantikor pozitifliğinin genetik ve çevresel etmenlerle ilişkili olması da bu oranlardaki farklılığın bir sebebi olabilir.

İngiltere'de kadınlarda yapılan toplum temelli bir çalışmada anti TPO pozitifliği %20.2 olarak belirlenmiştir.[10] Öte yandan çalışmamıza benzer şekilde sadece hipotiroidikler ele alındığında anti TPO pozitiliğinin bu grupta %85'e ulaştığını bildiren çalışmalarda mevcuttur.[11] Bizim çalışmamızda TPO pozitifliği oranı %56,8'dir. Yapılan bir çalışma da anti TPO pozitifliği %11,9; erkek katılımcılarda %6,8 ve kadın katılımcılarıda %17 olarak belirlenmiştir.[12] Literatürdeki bu farklılıklar ve çalışmamızla olan farklılık çalışma yöntemlerinin farklılığından kaynaklanmaktadır. Bizim çalışmamızda cerrahi nedenli hipotiroidik olgular dışlanmamış bunlarda anti TPO oranlarında farklılığa yol açmış olabilir. Tiroid antikor pozitifliği birçok çalışmada yaşla birlikte artış göstermektedir.[13]Ancak bu çalışmalarının çoğunun kohort tipinde olması ve toplum temelli yapılması nedeniyle çalışmamızdaki verilerle kıyaslanması mümkün değildir.

İtalya'da yapılan bir çalışmada anti TPO ve anti TG pozitifliği incelenmiş ve kadınların %17,3 erkeklerin %7'sinde hem anti TPO ve hem de anti TG pozitifliği olduğu belirlenmiştir.[14] Yine aynı çalışmada antikor pozitifliğinin yaşla beraber artış gösterdiği ancak 45-55 yaşlarından itibaren sabit kaldığı görülmüştür. Bizim çalışmamızda erkeklerin %16,7'isinde ve kadınların %19,4'ünde her iki antikorda pozitifti. Kadın katılımcılarda bezer sonuçlar elde edilmiş olmakla beraber bizim çalışmamızda erkek katılımcılarda her iki antikor pozitifliği daha yüksektir. Bizim çalışmamızda yaş grupları arasında anlamlı farklılık gösterilmemiştir. Bu durum çalışmamızın toplum temelli bir çalışmadan çok sadece hipotiroidi tanısı olan hastalarda yapılmasından kaynaklanıyor olabilir.

Çalışmanın tanımlayıcı doğası nedeniyle nedensellik ilişkileri tam olarak gösterilememektedir. Yine çalışma grubunun sadece hipotiroidik olguları içine alması ve hipotiroidi etiyolojisine göre bir ayrıma gidilmemi olmaması önemli bir kısıtlılığıdır.

Çalışma sonucunda hipotiroidik hastaların %56,7; anti TPO pozitifliği ve % 20,9'unda ise anti TG pozitifliği olduğu belirlenmiştir. Her iki antikoruda pozitif olan hasta oranı %19,2 dir. Tiroid otoantikor pozitifliği genetik ve çevresel faktörlere bağlıdır. Bu açıdan farklı topluluklarda farklı değerler elde edilebilir. Ülkemizde bu konuda yapılmış geniş tabanlı çalışma yoktur.

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AİLEVİ AKDENİZ ATEŞİ HASTALARINDA MEFV GEN MUTASYONLARI SIKLIĞININ İNCELENMESİ

INVESTIGATION OF THE FREQUENCY OF MEFV GENE MUTATIONS IN PATIENTS WITH FAMILIAL MEDITERANEAN FEVER

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ABSTRACT

Background: The aim of this study was to investigate the types and distribution of MEFV gene mutations in patients with Familial Mediterranean Fever (FMF) who were followed up in the Rheumatology outpatient clinics of Kartal Dr. Lütfi Kırdar City Hospital.

Method: A total of 282 unrelated patients who were admitted to rheumatology outpatient clinics between 2020 and 2022, diagnosed with FMF according to Tel-Hashomer criteria or newly diagnosed during this period were included in the study. The data of the patients were retrospectively screened through the hospital database. MEFV gene mutations of the patients were identified and recorded.

Results: As a result of the study, only 26.1% of the patients were found to carry homozygous mutations. There was no significant difference between mutation type and gender, age at diagnosis and symptoms at the time of diagnosis. There was no significant difference between the number of attacks in the last year and mutation type. The most common mutations found in FMF patients were M694V, R202Q, M680I, V726A, E148Q and K695R in order of frequency.

Conclusion: The most common mutations found in patients with FMF are M694V, R202Q, M680I, V726A, E148Q and K695R. However, no correlation has been shown between mutations and clinical findings.

Key words: Familial Mediterranean Fever, mutation, MEFV

GİRİŞ

Ailevi Akdeniz Ateşi, ateş, peritonit, plörit, artrit veya erizipel benzeri eritem şeklinde cilt lezyonları ve tekrarlayan ataklarla karakterize bir hastalıktır. Bu hastalık ülkemizin de içinde olduğu kuşakta yaygın bir biçimde görülmektedir. FMF' in ülkemizde görülme sıklığı 1/1000 ve taşıyıcılık oranı ise %15-34 arasında bildirilmektedir.[1,2]

FMF ile ilişkili olan gen ilk defa 1997 yılında tanımlanmıştır. Mediterranean Fever (MEFV) geni olarak adlandırılan bu gen 16. kromozomun kısa kolunda (16p13.3) lokalizedir. Fransız FMF Konsorsiyumu 1997 yılında yaptıkları çalışmada taşıyıcı kromozomların %85'inde hastalıkla ilgili 4 mutasyonu göstermiştir. Bu mutasyonlar; M694V, M680I, M694I, V726A'dır. Daha sonra bu mutasyonlara ek olarak 1998 yılında ekson10'da dört tane daha nadir görülen mutasyon tanımlanmıştır.[3] MEFV geni 781 aminoasitlik bir protein olan pirin/marenostrin'i kodlamaktadır.[4,5] Pirin proteininin net görevi bilinmemekle beraber inflamasyon mediatörlerinin baskılanması ile ilişkisi olabileceği düşünülmektedir.[6]

FMF tanılı hastaların fenotip ve genotip arasındaki bağlantı değerlendirildiğinde MEFV gen mutasyonları ile klinik ilişkiler net bir biçimde gösterilememiştir. Yapılan çalışmalarda amiloidozlu hastalarda en sık M694V homozigotluğunun olması, bu mutasyonun amiloidoza yatkınlık oluşturduğu, bunun aksine V726A mutasyonun tanımlandığı gruplarda amiloidoz sıklığının daha düşük olduğu bulunmuştur.[7]

Ülkemizdeki farklı bölgelerde değişik oranlarda MEFV gen mutasyonları bulunmaktadır. Bu çalışmanın amacı, Kartal Dr Lütfi Kırdar Şehir Hastanesi Romatoloji polikliniklerinde takip edilen FMF tanısı almış hastalardaki MEFV gen mutasyon tipleri ve dağılımını incelemektir.

YÖNTEM

Romatoloji polikliniklerine 2020-2022 yılları arasında başvuran, Tel-Hashomer kriterlerine göre FMF tanısı almış veya bu dönem içerisinde yeni tanı alan birbiriyle akrabalık ilişkisi olmayan 282 hasta çalışmaya dahil edilmiştir. *Tel- Hashomer Kriterleri*'ne göre 2 major veya 1 major +2 minör kriteri karşılayan hastalar kesin tanı alırken, 1 major +1 minör kriter varlığı olası tanıyı düşündürmektedir. *Major kriterler*; poliserozit ile seyreden tekrarlayan ateş atakları, başka bir nedene bağlanamayan AA tipi amiloidoz ve sürekli Kolşisin tedavisine iyi yanıt alınması iken *Minör kriterler*; yineleyen ateşli atakları, erizipel benzeri döküntü ve birinci derece akrabada FMF varlığıdır.

Hastaların verileri hastane veri tabanı üzerinden retrospektif olarak taranmıştır. Hastaların MEFV gen mutasyonları sistemden belirlenerek kaydedilmiştir. Çalışma verileri SPSS 21.0 programında analiz edilmiş, mutasyon sıklıkları frekans ve yüzde olarak sunulmuştur. Verilerin normal dağılma uygunluğu Kolmogrov Smirnov ve Shapiro Wilk testleri ile sınanmıştır. Kategorik verilerin analizinde "ki kare" analizi yapılmıştır. Normal dağılım gösteren nicel verilerin ortalamaları bağımsız gruplarda "t testi" ve "tek yönlü ANOVA testi" ile analiz edilirken, normal dağılıma uymayan veriler, "Mann Whitney U" ve "Kruskall Wallis testi" ile analiz edilmiştir. P değeri 0.05 altında anlamlı kabul edilmiştir.

Çalışma için Sağlık Bilimleri Üniversitesi Hamidiye Tıp Fakültesi Klinik Çalışmalar Etik Kurulu'ndan izin alınmıştır.

BULGULAR

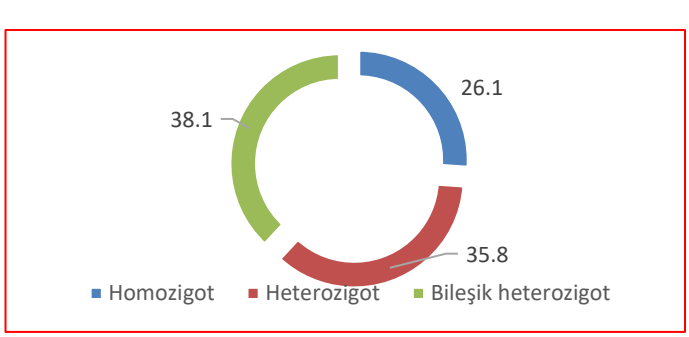
Çalışmaya FMF tanısı ile izlenen 282 hasta dahil edilmiştir. Bu hastaların 134'ünde (%47,5) genetik analiz yapılmıştır. Genetik analiz yapılan bireylerin %38,8'i (n=52) erkek ve %61,2'si (n=82) kadındır.

Çalışma grubunun yaş ortalaması 37,3±11,4 yıldır. Hastaların tanı yaşı ortalaması 26,8±13,2 idi. Hastaların tanı anında en sık görülen semptom karın ağrısıdır (%86,6; n=116). Diğer semptomlar sırasıyla eklem ağrısı (%70,1; n=94), ateş (%59,0; n=79) ve yan ağrısıdır (%25,4; n=34). Tek semptomu olan hasta oranı %11,3 (n=1 iken, 2 semptomu olan hasta oranı %44,8 (n=60) ve 3 ve üstü semptomu olan hasta oranı %41,8'dir (n=56). Hastaların %6,7'sinin (n=9) annesinde, %6,7'sinin (n=9) babasında ve %18,7'sinin (n=25) kardeşinde FMF tanısı vardı. Hastaların genel özellikleri tablo 1'de verilmiştir.

Tablo 1: Hastaların genel özellikleri

		% (n)
***Yaş** (yıl) (ort±SS)*		37,3±11,4
***Tanı yaşı** (yıl) (ortanca)*		24 (0-60)
Cinsiyet	Erkek	38,8 (52)
	Kadın	61,2 (82)
Tanıdaki semptomlar	Karın ağrısı	86,6 (116)
	Ateş	59,0 (79)
	Yan ağrısı	25,4 (34)
	Eklem ağrısı	70,1(94)
Aile öyküsü	Anne	6,7 (9)
	Baba	6,7 (9)
	Kardeş	18,7 (25)
	Diğer	35,8 (48)
Atak sayısı (yıl)		6 (0-46)

Hastaların %26,1'i(n=35) homozigot; %35,8'i (n=48) heterozigot iken; %38,1'i (n=51) bileşik heterozigot idi (Şekil 1).



Şekil 1: Çalışmaya katılan hastaların mutasyonlarının durumu

Hastaların mutasyon durumlarına göre tanı yaşı ortancaları arasında anlamlı bir fark yoktu (p=0,521). Kadın ve erkekler arasında mutasyon durumları arasında anlamlı farklılık bulunamamıştır (p=0,860). Benzer şekilde tanı anındaki semptomlar ile mutasyon durumları arasında anlamlı farklılık mevcut değildi (karın ağrısı için p=0,943; eklem ağrısı için p=0,869; ateş için p=0,363 ve yan ağrısı için p=0,982). Hastaların mutasyon durumları ile tanı anındaki şikâyet sayısı ortancaları arasında farklılık yoktu (p=0,541).

Homozigot hastaların son bir yıl içinde geçirdikleri atak ortancası 5,5 (0-30) iken, heterozigot hastaların atak sayısı 5,0 (0-46) ve bileşik heterozigotların atak sayısı 6 (0-24) olarak saptandı (p=0,574).

Çalışmaya katılanların % 61,9'unda (n=83) tek gen mutasyonu var iken, %32,1 (n=43)'inde iki ve %6,0'ında (n=8) üç ve üstü mutasyon mevcuttu. Hastalarda en sık görülen mutasyon M694V (%69,4; n=92) idi. FMF tanısı alan hastalarda gen mutasyon sıklıkları tablo 2'de verilmiştir. Kadın hastalar ve erkek hastalar ayrı ayrı ele alındığında erkek hastalarda en sık görülen ilk üç mutasyon M694V (%65,4; n=34), M680I (%21,2; n=11) ve R202Q (%15,4; n=8) iken; N694V, R761H, R408Q, P396S, A726S mutasyonlarına rastlanmamıştır. Kadınlarda ise en sık görülen ilk üç mutasyon sırasıyla M694V (%72,0; n=59), M680I (%20,7; n=17) ve V726A (%12,2; n=10) ile R202Q (%12,2; n=10) mutasyonlarıdır. Kadınlarda M694I ve G2282 mutasyonları mevcut değildi. Mutasyonlar ile cinsiyet arasında farklılık mevcut değildi (her biri için p>0,05).

Mutasyonlar ile tanı anındaki semptomlar arasındaki ilişki tablo 3' de verilmiştir. Tanı anındaki semptomların hiçbirisi ile mutasyonlar arasında anlamlı farklılık saptanmamıştır. Her semptom için M694V en sık görülen mutasyondur. Karın ağrısı ve eklem ağrısı için ikinci en sık görülen mutasyon R202Q iken, ateş ve yan ağrısı için ikinci en sık mutasyon M680I' dır.

Tablo 2: Hastalarda görülen mutasyonların sıklıkları

Mutasyon	% (n)	Mutasyon	% (n)
M694V	69,4 (92)	N694V	0,7 (1)
R202Q	23,1 (31)	M694I	0,7 (1)
M680I	20,9 (28)	R408Q	0,7 (1)
V726A	13,4(18)	P396S	0,7 (1)
E148Q	9,0 (12)	G2282	0,7 (1)
K695R	3,0 (4)	A726S	0,7 (1)
R761H	2,2(3)		

TARTIŞMA

Çalışma sonucunda hastaların sadece %26,1'nin homozigot olduğu görüldü. Mutasyon tipi ile cinsiyet, tanı yaşı ve tanı anındaki semptomlar açısından anlamlı bir farklılık gösterilmemiştir. Hastaların son bir yıl içinde yaşadıkları atak sayısı ve mutasyon tipi arasında da anlamlı farklılık yoktu. Hastalarda her iki cinsiyet içinde en sık saptanan mutasyon M694V idi. Tanı anındaki semptomların mutasyon ile ilişkisi saptanmamıştır.

Çalışmaya dahil edilen hastalarımızın yaklaşık 2/3'ü (%61,2) kadındı. Yapılan çalışmalarda hastalığın her iki cinsiyette eşit oranda olduğunu gösteren çalışmalar ağırlıklı olmakla beraber kadın cinsiyet lehine baskın çalışmalar da mevcuttur.[8,9] Çalışmaların yapıldığı yerlerin farklılığının yanı sıra çalışmada tüm hastalar yerine sadece genetik analiz yapılmış hastaların dahil edilmesi böyle bir farklılığın oluşmasına yol açıyor olabilir.

Ailevi Akdeniz ateşi tanılı hastalarda klinik bulgular, ırklar arasında, hatta aynı coğrafi bölgede yapılan farklı çalışmalarda dahi farklılık gösterebilmektedir. Bizim hastalarımızda en sık karşılaşılan klinik bulgu karın ağrısı ve eklem ağrısı idi. Türkiye'de yapılan birçok çalışmada da karın ağrısı baskın klinik bulgu olarak ortaya çıkmaktadır.[10] Eklem ağrısı bizim çalışmamızda %70,1 olarak belirlenmiştir. Türk FMF çalışmasında artrit oranı %47,4 olarak belirtilmiştir.[10] Çalışmamızın dosya üzerinden olması nedeniyle eklem ağrısı olarak sisteme girilmiş her bir hastada artrit olmayabilir bu açıdan sonuçlarımız ulusal çalışmalara göre daha yüksek düzeyde saptanmış olabilir.

Tablo 3: Mutasyonlar ile tanı anındaki semptomlar arasındaki ilişki

	Karın ağrısı % (n)	Eklem ağrısı % (n)	Ateş % (n)	Yan ağrısı % (n)
M694V	69,0 (80)	72,3 (68)	73,4 (58)	70,6 (24)
R202Q	25,9 (30)	24,5 (23)	17,7 (14)	17,6 (6)
M680I	20,7 (24)	17,0 (16)	21,5 (17)	29,4 (10)
V726A	13,8 (6)	9,6 (9)	13,9 (11)	11,8 (4)
E148Q	7,8(9)	9,6 (9)	6,3 (5)	8,3 (3)
K695R	3,4 (4)	4,3 (4)	3,8 (3)	2,9 (1)
R761H	1,7 (2)	2,2 (2)	2,5 (2)	2,9 (1)
N694V	0,9 (1)	1,1 (1)	0 (0)	0 (0)
M694I	0,9 (1)	1,1 (1)	1,3 (1)	0 (0)
R408Q	0,9 (1)	1,1 (1)	1,3 (1)	0 (0)
P396S	0,9 (1)	1,1 (1)	1,3 (1)	0 (0)
G2282	0,9 (1)	1,1 (1)	0 (0)	0 (0)
A726S	0,9 (1)	1,1 (1)	1,3 (1)	0 (0)

Hasta grubumuzda en sık görülen mutasyon M694V idi. Bu mutasyon Türkiye'de yapılan diğer çalışmalarda da en sık bulunan mutasyondur.[10] Öte yandan klinik açıdan

bakıldığında homozigot olarak bulunmasının hastalık ciddiyetini arttırdığı söylenebilir. Bu hastalarda hastalık başlangıcı daha erken olmakta, amiloidoz ve artrit eşlik etmektedir.[9]

Çalışmamızda ikinci en sık rastlanılan mutasyon R202Q mutasyonu idi. Bu mutasyon heterozigotluğun ağırlıklı olduğu ve hafif klinik bulgularla ilişkilendirilmiş bir mutasyondur.[11] Yapılan bir çalışmada heterozigot grup içinde R202Q mutasyon sıklığı %31 olarak bildirilmektedir.[9]

Ülkemizde yapılan çalışmalarda ikinci en sık görülen mutasyon M680I mutasyonudur.[9,10] Ancak bu mutasyon bizim çalışmamızda üçüncü sıklıkta olan mutasyon olarak bulunmuştur. Bu mutasyonunun yurdumuzdaki FMF hastaları arasındaki alel frekansının %14 olduğu belirtilmektedir. M694V mutasyonu ile benzer etkilere sahip olduğunu rapor eden çalışmalar vardır.[12]

İtalyan kohortunda en sık, İspanyol kohortunda ikinci en sık görülen mutasyon olan E148Q mutasyonunun bizim kohortumuzdaki sıklığı %9,0 idi. Ülkemizde yapılan çalışmalarda bu mutasyonun sıklığı %3,5-18 arasında değişen oranlarda bildirilmektedir.[13,14] Bulduğumuz bu oran daha önceki kohortlara kıyasla bir miktar düşüktür. Zira bu mutasyonun Türkiye'deki sıklığı, sağlıklı popülasyonda dahi %8 olarak rapor edilmiştir.[15]

V726A mutasyonu, Araplar ve Askenazi Yahudi'lerinde M694V mutasyonundan sonra en sık 2. mutasyon olarak bildirilmektedir. Bu mutasyon, sıklıkla plörit ile ilişkilendirilmektedir. Çalışmamızda bu mutasyonun sıklığı %13,4 olarak belirlenmiştir. Yine ulusal çalışmalarda bizim çalışmamızda bulduğumuz oranlara yakın sonuçlar verilmektedir.[9,10]

K695R mutasyonu sıklığı çalışmamızda %3,4 sıklığında bulunmuştur. Bu oran ulusal verilere (%2,4) yakındır.[9] Türklerde ve Ermenilerde daha sık görülen mutasyonlardan olan R761H mutasyonunun çalışmamızdaki sıklığı %2,2 idi. Bu oran da ulusal çalışmalarda saptanmış sonuçlara yakındır.[9]

Sonuç olarak polikliniklerimizde izlediğimiz FMF tanılı hatalarda en sık rastlanılan mutasyonlar sıklık sırasına göre; M694V, R202Q, M680I, V726A, E148Q ve K695R' dir. Hastaların tanı sırasındaki semptomları ve son bir yıl atak içindeki atak sayıları ile mutasyonlar arasında anlamlı bir farklılık saptanamamıştır. Ulusal mutasyonların tespiti ve klinik ile ilişkisi için daha büyük hasta grupları ile çalışma yapılması yararlı olabilir.

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PERSISTING THROAT PAIN AFTER COVID-19 INFECTION: A CASE REPORT OF SUBACUTE THYROIDITIS

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ABSTRACT

A 25-year-old female patient was admitted to the family medicine clinic with complaints of sore throat, fever, and right ear pain that persisted for 15 days despite receiving ant biotherapy treatment. In her medical history, she had a COVID-19 infection 30 days ago. The thyroid examination revealed painful palpation with a slight increase in the size of the thyroid gland. The patient's blood tests and thyroid ultrasonography were evaluated as subacute thyroiditis. Although it is impossible to establish a definite causal relationship between COVID-19 and subacute thyroiditis in this case, we think such a relationship is possible. Since thyroid-related diseases should also be considered in case of sore throat that persists despite treatment and thyroid examination should not be skipped during a physical examination, it is deemed appropriate to present this case with literature.

Key words: COVID-19; SARS-CoV-2; Thyroiditis; Subacute thyroiditis

INTRODUCTION

Subacute thyroiditis is a self-limiting inflammatory thyroid disease with thyroid dysfunction, fever, and neck pain. It usually develops after a viral upper respiratory tract infection.[1] Many viruses, such as coxsackie, influenza, and adenovirus, were blamed for the etiology of subacute thyroiditis.[2]The SARS-CoV-2 virus led to the ongoing Coronavirus disease 2019 (COVID-19) pandemic, which started in 2019 and rapidly spread worldwide. Numerous reports were published on COVID-19's extrapulmonary involvement and clinical findings.[3] In the literature, many cases of subacute thyroiditis developing after COVID-19 infection are reported.[4,5] The mechanisms by which SARS-CoV-2 causes thyroid dysfunction are not fully known.[5]

The diagnosis of subacute thyroiditis is mostly made by clinical and laboratory examinations. The patient describes increasing pain with swallowing and severe pain and tenderness with palpation in the thyroid gland region to the ear. During thyroid examination, the thyroid gland was large, painful, tender, and hard. Sedimentation rate and CRP are usually found to be significantly higher, and serum fT4 and fT3 levels are found to be high in blood tests. Ultrasonographic findings of subacute thyroiditis are well-defined. The natural clinical course of subacute thyroiditis includes an initial thyrotoxic phase followed by a hypothyroid phase with a return to a euthyroid state. Cases of subacute thyroiditis are expected to recover within six months at the latest.[6]The diagnosis of subacute thyroiditis cases may still be delayed, and it is usually diagnosed and treated as hyperthyroidism at the initial stage of the disease.[7] In this article, a case who was diagnosed with subacute thyroiditis after admission with a persistent sore throat despite treatment after COVID-19 infection is presented.

CASE

Medical Background

A 25-year-old female patient with no known disease, operation, or regular medication applied to the family medicine outpatient clinic with complaints of sore throat and sub-febrile fever going on for 15 days and persisting despite treatment. The patient was admitted to an external center twice for 15 days with a similar complaint. She was diagnosed with acute upper respiratory tract infection and prescribed oral paracetamol 1000 mg/day together with oral amoxicillin 1000 mg/day. She stated that, after applying for the second time with the same complaint, the same treatment was repeated. However, despite the regular medication, she stated that there was no regression in her complaints. In the patient's history, she stated that she applied to an external center 30 days ago with the complaint of mild weakness and mild cough and her Covid-19 PCR combined nasopharyngeal swab result was positive. She had mild symptoms that lasted five days, and she got through as an outpatient and without treatment. Her complaints increased gradually in the last two days, especially when swallowing. She suffered from severe sore throat and right ear pain. The patient stated that her current complaints started after approximately ten days of symptom-free well-being after the COVID-19 infection.

Physical Examination

Her body temperature was measured to be 37.5 degrees, blood oxygen saturation was 99%, respiratory rate was 18/min, blood pressure was 130/80 mmHg, and pulse was 85/min. In the physical examination, the oropharynx and tonsils were normal in appearance and size in the throat, with a painful 2x1 mm lymph node located in the right cervical region. During the thyroid examination, the thyroid gland was found to be painful by palpation, with a slight increase in size.

During an in-ear examination with an otoscope, both ears looked normal. Examination findings on other systems were found to be normal.

Laboratory and Pathological Results

Blood tests and electrocardiography were requested from the patient. In blood test results, white blood cell was 10.030/mm3, neutrophil rate 74.2%, C-reactive protein (CRP) 2.42 mg/dL (reference range 0-0.5), Free T4 hormone (fT4) level 1.00 ng/dl (reference range 0.89 - 1.76), and Thyroid Stimulating Hormone (TSH) level 0.73 mud/L (reference range 0.55-4.78). The patient's electrocardiography was in normal sinus rhythm and no signs of myocardial ischemia were detected. The patient was referred to the emergency department with a preliminary diagnosis of subacute thyroiditis and peritoneal abscess. Thyroid ultrasonography in the emergency department reported, "The thyroid parenchyma in an area of 16x22 mm in the right lobe has a heterogeneous appearance, and its blood supply has increased (acute thyroiditis?)". During her discharge, she was prescribed NSAID, and an outpatient clinic control application was recommended to the endocrinology department.

Medical Follow-up

The patient's complaints persisted ten days after discharge from the emergency department despite the treatment, and she applied to the endocrinology department. In the blood test results, higher than normal levels of CRP, fT4, fT3,and TSH were determined. Thyroid ultrasonography under elective conditions reports resulted in subacute thyroiditis. The endocrinology specialist started prednisolone therapy. About two months have passed since the patient's complaints, and the endocrinology outpatient controls and treatment process continue at regular intervals. However, full well-being has not been achieved yet.

DISCUSSION

Despite the recent developments in diagnostic methods, subacute thyroiditis diagnosis is often missed because it is a rare disease and is confused with different infective processes, and there are still great delays in diagnosis.[8,9] According to the results of a retrospective study, it was found that the time until diagnosis was 2 weeks or longer in 81.8% of patients with subacute thyroiditis, and subacute thyroiditis diagnosis was often delayed. In addition, in the same study, it was found that three-quarters of the patients with subacute thyroiditis consulted at least 2 other physicians before their last admission, and 58.7% of them used antibiotics at least once before the diagnosis of subacute thyroiditis. It was found that physicians of primary care and other branches do not sufficiently consider the possibility of subacute thyroiditis in the differential diagnosis of neck pain.[8] High-quality primary care in society can reduce the likelihood of missed cases of subacute thyroiditis.[9]

Patients with mild symptoms should be initially treated with NSAIDs.When patients are unresponsive or initially present with moderate to severe pain and/or thyrotoxic symptoms, corticosteroids should be used instead of NSAIDs.[6]However, sometimes patients may receive inadequate treatment due to the hypersensitivity of physicians to corticosteroids and sometimes due to dosing or time problems.[10]

Firstly, Brocatelle et al. reported a case of an 18-year-old female patient with a diagnosis of subacute thyroiditis after two weeks of SARS-CoV-2 infection.[1] In a study that compiled 22 cases of developing subacute thyroiditis after COVID-19 infection, after about 35±12 days, most patients

reached euthyroid status after short-term subclinical hypothyroidism.[4,5]In this case, it is noteworthy that the patient applied to two separate centers before she applied to our unit, and in both cases, the patient was evaluated as having an upper respiratory tract infection, and antibiotherapy was started and continued, and no NSAIDs were prescribed.

In conclusion, primary care physicians should not forget that in their clinical practice, unusual clinical symptoms may be seen due to SARS-CoV-2 infection. Although it is not possible to establish a definite causal relationship between COVID-19 and subacute thyroiditis in this case, we think that such a relationship is possible. Thyroid-related diseases should also be considered in case of a sore throat that persists despite treatment, and thyroid examination should not be skipped during a physical examination in primary care.

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