Mehmet Akif Ersoy Üniversitesi
Sağlık Bilimleri Enstitüsü Dergisi

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I- Mehmet Akif Ersoy Üniversitesi Sağlık Bilimleri Enstitüsü Dergisi Genel Bilgiler

Mehmet Akif Ersoy Üniversitesi (MAKÜ) Sağlık Bilimleri Enstitüsü Dergisi, Mehmet Akif Ersoy Üniversitesi Sağlık Bilimleri Enstitüsü'nün yayın organıdır. Derginin kısaltılmış adı "MAKÜ Sag. Bil. Enst. Derg" dir. Yılda 2 kez yayınlanır. MAKÜ Sağlık Bilimleri Enstitüsü Dergisi sağlık bilimleri, (veteriner, tıp, diş hekimliği, hemşirelik ve spor bilimleri) alanlarında temel ve klinik hakemli bilim yazılarının yayınlandığı hakem-denetimli bir dergidir. Derginin dili İngilizce'dir. Dergiye gönderilen yazıların başka herhangi bir dergide yayınlanmamış, yayına kabul edilmemiş ya da yayınlanmak üzere değerlendirme aşamasında olmaması gerekir. Bu kural bilimsel toplantılarda sunulan ve özeti yayınlanan bildiriler için geçerli değildir. Ancak, bu gibi durumlarda bildirinin sunulduğu toplantının adı, tarihi ve yeri bildirilmelidir. Makalelerin formatı "Uniform Requirements for Manuscripts Submitted to Biomedical Journals: Writing and Editing for Biomedical Publication (http:/www.icmje.org/)" kurallarına göre düzenlenmelidir.

Gönderilen yazılar yayın kuruluna ulaştıktan sonra öncelikle, yazım kurallarına uygunluğu yönünden değerlendirilir; sonucu yazara dört hafta içinde bildirilir. Yazının, gerek teknik özellikleri gerekse genel kapsamı açısından derginin genel yayın ilkelerine uygun bulunmaması durumunda yazı reddedilir. Ya da, gerekirse, yazar(lar)ın yazıyı yazım kurallarına uygun biçimde yeniden göndermeleri istenebilir. Yeniden gönderilen yazılar benzer bir teknik incelemenin ardından yazım kurallarına uygun ise danışman denetimi sürecine alınır. Yazı, editör ve yardımcı editörler ile yazının başlık sayfasını görmeyen en az iki danışmana gönderilerek incelenir. Yazı, yayın kurulunun belirlediği ve bilimsel içerik ve yazım kuralları açısından değerlendirilir. Editör ve yardımcı editörler gerek gördüğünde makaleyi üçüncü bir danışmana gönderebilir. Hakem belirleme yetkisi tamamen editör ve yardımcı editörler ve yayın kuruluna aittir. Danışmanlar belirlenirken derginin uluslararası yayın danışma kurulundan isimler seçilebileceği gibi yazının konusuna göre ihtiyaç duyulduğunda yurt içinden veya yurt dışından bağımsız danışmanlar da belirlenebilir. Daha sonra, danışman raporları dikkate alınarak ve gerekirse yazar(lar)la tekrar iletişim kurularak yayın kurulunca son redaksiyon yapılır. Yazıların kabulüne editör karar verir.

Editör yayın koşullarına uymayan yazıları; düzeltmek üzere yazarına geri gönderme, biçimce düzenleme veya reddetme yetkisine sahiptir. Yazılarını geri çekmek isteyen yazarlar bunu yazılı olarak editöre bildirmek durumundadır. Editör görülen lüzum halinde bazı makaleler hakkında yayın yürütme kurulunun görüşüne başvurur. Bu değerlendirme süreci dergiye gönderilen yazı türlerinden araştırma yazılarını, olgu sunumlarını ve özgün yazıları kapsar. Diğer yazı türlerindeki yazılar doğrudan yayın kurulunca değerlendirilir. Dergiye gönderilen yazılar yayınlansın ya da yayınlanmasın geri gönderilmez. Tüm yazarlar bilimsel katkı ve sorumluluklarını ve çıkar çatışması olmadığını bildiren toplu imza ile yayına katılmalıdır. Araştırmalara yapılan kısmi de olsa nakdi ya da ayni yardımların hangi kurum, kuruluş, ilaç-gereç firmalarınca yapıldığı dip not olarak bildirilmelidir. Dergide yayınlanan yazılar için herhangi bir ücret ya da karşılık ödenmez.

Yayın kurulu yazar(lar)ın dergiye gönderdikleri yazıları değerlendirme süreci tamamlanmadan başka bir dergiye göndermeyeceklerini taahhüt ettiklerini kabul eder. İnsanlar ve hayvanlar üzerinde yapılan deneysel araştırmaların bildirildiği yazıların gereç ve yöntem bölümünde, bu araştırmanın yapıldığı gönüllü ya da hastalara uygulanan işlemler anlatıldıktan sonra kendilerinin onaylarının alındığını (informed consent) gösterir bir cümle bulunmalıdır. Yazar(lar), bu tür araştırmalarda, uluslararası alanda kabul edilen kılavuzlara (2002 yılında revize edilen 1975 Helsinki Deklarasyonu- http://www.wma.net/e/policy/b3.htm, Guide for the care and use of laboratory animals - www.nap.edu/catalog/5140.html), T.C. Sağlık Bakanlığı tarafından getirilen, 29 Ocak 1993 tarih ve 21480 sayılı Resmi gazetede yayınlanan "İlaç Araştırmaları Hakkında Yönetmelik" ve daha sonra yayınlanan diğer yönetmeliklerde belirtilen hükümlere uyulduğunu belirtmeli ve kurumdan aldıkları Etik Kurul Onayı'nın bir kopyasını göndermelidir. Metin içinde standart kısaltmalar kullanılır, bunlar ilk geçtikleri yerde açık olarak yazılır. İlaç adları kullanımında ilaçların jenerik adları Türkçe okunuşlarıyla yazılır. Ölçüm birimleri metrik sisteme uygun olarak verilir; örneğin, "mg" olarak yazılır, nokta kullanılmaz; ek alırsa („) ile ayrılır. Laboratuar ölçümleri Uluslararası Sistem (US; Systéme International: SI) birimleri ile bildirilir.

Bilimsel sorumluluk

Makalelerin tüm bilimsel sorumluluğu yazarlara aittir. Gönderilen makalede belirtilen yazarların çalışmaya belirli bir oranda katkısının olması gereklidir. Yazarların isim sıralaması ortak verilen bir karar olmalıdır. Sorumlu yazar, yazar sıralamasını "Yazar Sorumluluk ve Yayım Hakkı Devir Formu'nu" doldurarak tüm yazarlar adına kabul etmiş sayılır. Yazarların tümünün ismi makale başlığının altındaki bölümde yer almalıdır.

Yayın Ücretleri

Bu dergide yayın tamamen ücretsizdir. Yayın ücreti, başvuru ücreti, makale işleme ücreti ve bir figürün, rakamın veya tamamlayıcı verinin uzunluğuna göre ek ücret ödenmesi gerekmez. İçerik öğeleri (Editörler, Düzeltmeler, İlaveler, Geri Çekmeler, Mektuplar, Yorumlar vb.) tamamen ücretsizdir.

Etik sorumluluk

Makalelerin etik kurallara uygunluğu yazarların sorumluluğundadır. Hayvanlar üzerinde yapılan deneysel çalışmalarda, çalışma protokolünün çalışmanın yapıldığı kurumdaki hayvan deneyleri etik kurulu tarafından onaylandığı belirtilmelidir. Yazarlar etik kurul onayını makale ile birlikte göndermelidir. Eğer makalede daha önce yayımlanmış alıntı yazı, tablo, resim vs. var ise yazarlar; yayım hakkı sahibi ve yazarlarından yazılı izin alarak bu durumu makalede belirtmek zorundadır. Makalenin değerlendirilmesi aşamasında yayın kurulunun gerek görmesi halinde, makale ile ilgili araştırma verilerinin ve/veya etik kurul onayı belgesinin sunulması yazarlardan talep edilebilir.

İntihal politikası

Mehmet Akif Ersoy Üniversitesi Sağlık Bilimleri Enstitüsü Dergisi'ne (MAKÜ Sag. Bil. Enst. Derg.) Gönderilen yazılar intihal açısından değerlendirilir. Her gönderilen makale, iThenticate ve Turnitin yazılımı ile intihal için kontrol edilir. Makalenin benzerlik oranı %20'nin üzerinde ise, revize edilmesi için ilgili yazara geri gönderilir. Eğer makalenin yayınlanmasından sonra intihal kanıtlanırsa, bu makale derhal web sitesinden kaldırılır ve ilgili yazarlara makalelerinin MAKÜ Sag. Bil. Enst. Derg.'de yayınlanmasının uygun olmadığı bildirilecektir.

II- Dergiye Gönderilecek Yazı Türleri ve Özellikleri

a) Araştırma Makaleleri: Bu yazılar daha önce yayınlanmamış özgün araştırma verilerinin değerlendirildiği net anlam taşıyan bilimsel çalışmaları kapsar. Araştırma makaleleri "Öz, Giriş, Gereç ve Yöntem, Bulgular, Tartışma ve Kaynaklar" bölümlerinden oluşmalıdır. Dergide yayınlanmak üzere gönderilen araştırma makaleleri kapak sayfası hariç en fazla 20 sayfa olmalıdır. Araştırma makalelerinde kullanılacak tablo, çizim ve resim sayısı toplam 10'u geçmemelidir. Yazarlar gerek duydukları takdirde "Tartışma" bölümünden sonra "Teşekkür" bölümü açarak gerekli açıklamaları yapabilirler.

b) Derleme Makaleleri: Derleme makaleleri dergi editör/yayın kurulu tarafından "çağrılı derlemeler" başlığı altında oluşturulan alnında katkı sağlama potansiyeli olan yazıları içerir. Kaynakça bölümü en fazla 30 kaynakçadan oluşturulmalıdır. Derlemelerde kullanılacak tablo, çizim ve resim sayısı toplam 10'u geçmemelidir. Kapak sayfası hariç en fazla 20 sayfa olarak hazırlanmalıdır. Derlemelerde mutlaka "Öz, Giriş, Sonuç ve Kaynaklar" bölümleri bulunmalıdır.

c) Olgu Sunumları: Yazarların, herhangi planlanmış bir araştırmaya dayanmayan ancak karşılaştıkları yeni veya ender gözlemlenen olguların ele alındığı, bilimsel değere sahip bilgileri içeren eserlerdir. Bu eserlerde gereksiz uzatmaları önlemek amacıyla en fazla 15 kaynak kullanılmalı ve bu kaynakların güncel olmasına özen gösterilmelidir. Kapak sayfası hariç en fazla 5 sayfa olmalı; "Öz, Giriş, Olgu, Tartışma ve Kaynaklar" bölümlerinden oluşmalıdır.

d) Kısa Araştırma Raporu: Dar kapsamlı ele alınmış (sınırlı sayıda örneğin analiz edildiği çalışmalar vb.) ancak önemli ve yeni bilgiler sunan bilimsel araştırmaya dayalı makalelerdir. Kısa bildiriler araştırma makalesi formatında hazırlanmalı ve kapak sayfası hariç en fazla 10 sayfa olmalıdır. Bu eserlerde kullanılacak tablo ve şekil sayısı beşi geçmemelidir.

e) Özel Bölümler:

1. Editöre mektuplar: Dergide yayınlanan yazılara ilişkin değerlendirme ve eleştirileri içeren yazılardır. Mümkün olduğunca eleştirilen yazının yazar(lar)ınca verilen yanıtlar ile birlikte yayınlanır. Editöre mektuplar 3 sayfayı geçemez.

2. Toplantı haberleri/izlenimleri: Derginin yayın alanıyla ilgili konularda yapılmış ya da yapılacak olan bilimsel toplantıları tanıtıcı yazılardır. 1 sayfayı geçemez.

3. Dergi haberleri: Derginin yayın alanıyla ilgili konularda yayınlanmakta olan bilimsel dergileri tanıtıcı yazılardır; 1 sayfayı geçemez.

4. Web siteleri tanıtımı: Derginin yayın alanıyla ilgili konulardaki web sitelerini tanıtıcı yazılardır; 1 sayfayı geçemez.

5. Kitap/tez tanıtımı: Derginin yayın alanıyla ilgili konularda yayınlanmış bulunan kitapları/tezleri tanıtan yazılardır; 3 sayfayı geçemez.

III- Makalelerin Düzenlenmesi

Dergiye gönderilecek yazılar türlerine göre, başlık sayfası, İngilizce ve Türkçe özetler, ana metin, kaynaklar, tablo/şekil/resim bölümlerini içerir. Dergiye yayınlanması için gönderilen makalelerde aşağıdaki biçimsel esaslara uyulmalıdır: Yazı Microsoft Word programında Times New Roman yazı stilinde 12 punto büyüklüğünde, siyah renkte, 1,5 satır aralığında hazırlanmalıdır. Kenarlardan 2,5 cm boşluk bırakılmalıdır. Her sayfaya satır numarası eklenmelidir.

Anatomik terimler Latincede yazıldığı gibi kullanılmalıdır. Günlük tıp diline yerleşmiş terimler ise okundukları gibi Türkçe yazım kurallarına uygun olarak yazılmalıdır. İngilizce veya başka bir yabancı dildeki şekli ile yazılan terimler tırnak içinde belirtilmelidir. Yazının başlık sayfasında, yazının Türkçe ve İngilizce başlığı ve sayfa üstünde kullanılmak üzere boşluklar da dahil 40 karakteri aşmayacak şekilde Türkçe ve İngilizce kısa başlık önerisi bulunmalı. Çalışmaların yapıldığı klinik, anabilim dalı/bilim dalı, enstitü ve kuruluşun adı belirtilmelidir.

a) Başlık Sayfası: Gönderilen makalenin kategorisini, başlığını (Türkçe-İngilizce ve sadece ilk sözcüğün baş harfi büyük), yazarların adlarını (sadece baş harfleri büyük yazılır), çalıştıkları kurumları (rakamla dipnot olarak belirtilmeli), yazışmaların yapılacağı sorumlu yazarın adı, açık adresi, telefon ve faks numaraları ile e-posta adresini içermelidir. Sorumlu yazar yıldız (*) ile belirtilir. Makale daha önce bilimsel bir toplantıda sunulmuş ise toplantının adı, tarihi ve yeri belirtilerek yazılmalıdır.

b) Ana Metin Bölümü: Yazının ana metni Öz ve Anahtar Kelimeler, Giriş, Gereç ve Yöntem, Bulgular ve Tartışma başlıkları içinde düzenlenir. Özler ve anahtar sözcükler: Türkçe ve İngilizce olmak üzere iki dilde yazılır ve yazının başlığını da içerir.

Öz 200 kelimeyi geçmemeli, çalışmanın ana noktaları olan amacını, hayvan ve örnek popülasyonunu, metodunu ve önemli sonuçlarını, çalışmadan elde edilen çıkarımı klinik olarak uygulanabilirliğini içermelidir. Yayını okumadan okuyucular için anlaşılır olmalıdır ve özet içinde kaynaklara atıf yapılmamalıdır. Türkçe ve İngilizce özetler ayrı sayfalarda yazılmalı ve özetlerin sonunda her iki dilden en az 3, en çok 5 anahtar sözcük yer almalıdır. Anahtar kelimeler Index Medicus Medical Subject Headings (MeSH)'e uygun olmalıdır. Anahtar kelimeler için www.nlm.nih.gov/mesh/MBrowser.html adresine başvurulmalıdır.

Giriş bölümünde yazının dayandığı temel bilgilere ve gerekçelere kısaca değinildikten sonra, son paragrafında amaç açık bir anlatımla yer alır. Gereç ve yöntem bölümü gerekirse araştırma/hasta/denek grubu, araçlar, uygulama ve istatistik değerlendirme gibi alt başlıklara göre düzenlenebilir. Bu bölüm çalışmaya katılmayan birisinin de rahatlıkla anlayabileceği açıklıkta yazılmalıdır. Bulgular bölümü çalışmanın sonuçlarını özetler ve temel bulgular gerekirse tablo ve şekillerle desteklenir. Tartışma bölümünde çalışmanın bulguları ilgili yurt içi ve yurt dışı çalışmaların sonuçları bağlamında tartışılır; genel bir gözden geçirmeyi değil, özgün bulguların tartışılmasını içerir. Yayın sisteme yüklenirken ana metin bölümü ana dosya olarak yüklenmelidir.

c) Teşekkür: Yazarlar çalışmalarında vermek istedikleri ek bilgiler ile katkı sağlayan destekçi kurumlara ve/veya şahıslara teşekkür yazılarını bu bölümde belirtebilirler.

d) Kaynaklar: Kaynaklar listesi alfabetik sıraya göre yazılmalıdır. Sadece yayınlanmış veya yayına kabul edilmiş kaynaklar yer almalıdır. Kabul edilmiş ancak henüz yayınlanmamış kaynaklar için "baskıda" ifadesi kullanılmalıdır. Yazarlar kaynaklar listesinde bulunan bütün kaynakların metin içinde kullanılmış olduğunu kontrol etmelidirler.

Yayındaki bütün kaynaklar kullanılmalıdır. Makale içinde referans kullanma şekline örnekler.

Metin içinde doğrudan atıf yapılırken yazar veya yazarların soyadından sonra parantez içinde kaynağın yayın yılı belirtilmelidir.

Örnekler: Bell (2005) tarafından; Nielsen ve Engberg (2006) tarafından; Doyle ve ark. (2007) tarafından

Cümlenin sonunda atıf yapıldığında ise yazar ismi ve yayın yılı parantez içinde belirtilmelidir.

Örnekler: ...bildirilmiştir (Bell, 2005); ....bildirilmiştir (Nielsen ve Engberg, 2006); .....bildirilmiştir (Doyle ve ark., 2007).

Birden çok kaynağa atıf yapılması durumunda kronolojik sıralama yapılmalıdır.

Örnekler: ….bildirilmiştir (Bell, 2005; Nielsen ve Engberg, 2006; Doyle ve ark., 2007).

Aynı yazarın aynı yıl yayınları söz konusu ise her biri "a" harfinden başlayarak küçük harflerle işaretlenmelidir.

Örnek: …. (Bell, 2005a; Bell, 2005b; Bell, 2005c …). Atıf yapılırken aşırı kaynak kullanımından kaçınılmalıdır.

Kaynaklar listesinin düzenlenmesi:

Mendeley programı kullanan yazarlar aşağıda linki verilen dergi format stilini kullanarak çalışmalarını düzenleyebilir:
https://csl.mendeley.com/styles/529990351/makusagbilensderg

Kaynaklar listesinde yazar isimleri ve yayın yılı koyu harflerle yazılmalıdır. Kaynak listesi şu şekilde hazırlanmalıdır:

i) Kaynak makale ise

Yazarların soyadları ve adlarının ilk harfi yazılmalıdır. Devamında sırasıyla makalenin yayın yılı, makalenin adı, yayınlandığı derginin açık adı, cilt, sayı ve sayfa numaraları belirtilmelidir.

Örnekler:

Cohen, N.D., Vontur, C.A., Rakestraw, P.C., 2000. Risk factors for enterolithiasis among horses in Texas. Journal of the American Veterinary Medical Association 216, 1787-1794.

Rajmohan, S., Dodd, C.E., Waites, W.M., 2002. Enzymes from isolates of *Pseudomonas fluorescens* involved in food spoilage. Journal of Applied Microbiology 93, 205-213.

Ono, K., Yamamoto, K., 1999. Contamination of meat with *Campylobacter jejuni* in Saitama, Japan. International Journal of Food Microbiology 47, 211-219.

Yayınlanmak üzere kabul edilen ve DOI numarası bulunan, ancak henüz basılmamış makaleler için; makale künyesinin sonunda DOI numarası belirtilmelidir.

McGregor, B.A., Butler, K.L., 2014. The value of visual fleece assessment in addition to objective measurements in identifying Angora goats of greater clean mohair production. Small Ruminant Research, in press (DOI: 10.1016/j.smallrumres.2014.04.001).

ii) Kaynak kitap ise

Yazarların (veya editörün) soyadları ve adlarının ilk harfi yazılmalıdır. Devamında sırasıyla kitabın yayın yılı, adı, yayınevi veya yayınlayan kuruluş ve yayınlandığı yer belirtilmelidir. Kaynak, kitaptan bir bölüm ise bölüm yazarlarının isminden sonra sırasıyla kitabın yayın yılı, bölümün adı, editörün soy ismi ve adının ilk harfi, bölümün alındığı kitabın adı, yayınevi veya kuruluş, yayınlandığı yer, bölümün sayfa numaraları yazılmalıdır.

Örnekler:

Combs, G.F., 1992. The Vitamins: Fundamental Aspects in Nutrition and Health. Academic Press, San Diego.

Concannon, P.W., 1986. Physiology and Endocrinology of Cannine Pregnancy. In: Marrow, D.A. (Ed.), Current Therapy in Theriogenology. Philadelphia, W.B. Saunders Company, pp. 491-497.

Perkins, J.B., Pero, J., 2002. Vitamin biosynthesis. In: Sonenshein, A., Hoch, J., Losick, R. (Eds.), Bacillus subtilis and Its Closest Relatives: from Genes to Cells. ASM Press, Washington D.C., pp. 271-286.

Kramer, J.M., Gilbert, R.J., 1989. Bacillus cereus. In: Doyle, M.P. (Ed.), Foodborne Bacterial Pathogens. Marcel Dekker, New York, pp. 22-70.

iii) Kaynak bir tez ise

Tezi yazan kişinin soyadı ve adının ilk harfi koyu olarak yazılmalı, kabul edildiği yıl, tezin başlığı, tezin cinsi (yüksek lisans veya doktora), üniversitesi ve enstitüsü belirtilmelidir.

Örnek:

Bacınoğlu, S., 2002. Boğa spermasında farklı eritme süreleri ve eritme sonrasında oluşturulan soğuk şoklarının spermatolojik özelliklere etkisi. Doktora Tezi, İstanbul Üniversitesi Sağlık Bilimleri Enstitüsü, İstanbul.

iv) Kaynak internette bulunan bir web sitesi ise

Yazarların soyadları ve adının ilk harfi (Yazar adı yoksa web sitesinin veya kaynağın adı) yazılır. Daha sonra sırasıyla yılı, makalenin adı, varsa yayıncı, internet adresi ve erişim tarihi belirtilir.

Örnekler:

FDA, 2001. Effect of the use of antimicrobials in food-producing animals on pathogen load. Systematic review of the published literature. http://www.fda.gov/cvm/antimicrobial/PathRpt.pdf (Erişim 14.12.2001)

Cleveland, C.W., Peterson, D.S., Latimer, K.S., 2005. An Overview of Canine Babesiosis. Clinical Pathology. College of Veterinary Medicine, The University of Georgia: http://www.vet.uga.edu/vpp/clerk/Cleveland (Erişim 17.12.2005).

Thierry, F., 2006. Contagious equine metritis: a review. Equine Reproductive Infections: http://www.equinereproinfections.com (Erişim 07.07.2006].

FSAI, 2008. Report of the Implementation Group on Folic Acid Food Fortification to the Department of Health and Children. Food Safety Authority of Ireland: http://www.fsai.ie/assets/0/86/204/cc3c2261-7dc8-4225-bf79-9a47fbc2287b.pdf (Erişim 20.06.2008)

v) Kaynak bilimsel toplantıda sunulmuş bir bildiri ise

Yazarların soyadı ve adının baş harfinden sonra sırasıyla toplantının yılı, bildirinin başlığı, toplantının adı, toplantı yeri, bildiri kitabındaki sayfa no yazılmalıdır.

Örnekler:

Cardinali, R., Rebollar, P.G., Mugnai, C., Dal Bosco, A., Cuadrado, M., Castellini, C., 2008. Pasture availability and genotype effects in rabbits: 2. development of gastro-intestinal tract and immune function of the vermiphorm appendix. In: Proc. 9th World Rabbit Congress, Verona, Italy, 1159-1164.

Mauget, R., Legendre, X., Comizzoli, P., 1998. Assisted reproductive technology in sika deer: a program to preserve endangered deer subspecies. In: Proc. 4th Int. Deer Biology Congress, Kaspovar, 185-186.

e) Tablolar: Kullanım sırasına göre numaralandırılmalı, kısa başlıklarla ifade edilmeli ve metin içinde tablo numarası verilerek (örneğin Tablo 1) atıfta bulunulmalıdır. Tablo başlıkları tablonun üst bölümüne yazılmalıdır. Tabloda kullanılan kısaltmalar ve gerekli açıklamalar tablo altında verilmelidir.

f) Şekil ve Resimler: Metinde kullanılan fotoğraflar, grafikler ve çizimler metin içinde şekil adı ile kullanılmalıdır. Şekiller kullanım sırasına göre numaralandırmalı ve kısa başlıklarla ifade edilmeli, metin içinde şekil numarası verilerek (örneğin Şekil 1) atıfta bulunulmalıdır. Şekil başlıkları şekillerin altında yer almalıdır. Şekillerde istenilen noktaya dikkat çekmek amacıyla; üzerlerine işaret konulmalı ve başlıklardan sonra yer alacak olan şekil altı notta kullanılan işaretler belirtilerek gerekli açıklamalar yapılmalıdır.

IV- Makale Süreci (Kör hakemlik)

Makale başvurusu yalnızca online olarak http://dergipark.gov.tr/maeusabed adresi üzerinden kabul edilmektedir. Sorumlu yazar, makale ile birlikte göndereceği tüm dosyaları yukarıdaki internet adresinde bulunan yeni makale gönder ikonunu tıklayarak sisteme ekleyebilir. Yazarlar dergiye gönderi yapmadan önce kayıt olmalıdır. Kaydolduktan sonra, ana sayfadaki Mehmet Akif Ersoy Üniversitesi Sağlık Bilimleri Enstitüsü Dergisi ikonuna tıklayarak; yazım kurallarına göre düzenlenmiş bilimsel çalışmayı dergi panelindeki Makale Gönder kısmından 4 basamaklı (başlarken, yükleme, kaynaklar, önizleme&gönder) gönderi işlemini yapabilir. Gönderilen makalede ön değerlendirme aşaması sırasında yazar künyeleri, çalışmanın yapıldığı kurum, etik kurul ya da özel izin adres bilgileri gibi tanıtıcı bilgiler içermemelidir. Ön değerlendirmeden (bilimsel nitelik, dil, yazım kuralları kontrolü, İntihal kontrolü iThenticate ve Turnitin programı,) geçen bilimsel çalışmaların hakem ataması yapılır. Sorumlu yazar makalenin hangi aşamada olduğunu sistem panelindeki Süreçteki Makaleler kısmından takip edebilir. Atanan hakemlere, kör hakemlik kuralları çerçevesinde çalışmanın tam metni, şekil, tablo, grafik ve resimleri sistem üzerinden yüklenerek e-posta aracılığıyla makale değerlendirme talebi gönderilir. Hakemler e-posta aracılığıyla gönderilen linke tıklayarak talebi kabul ya da reddederler. Kabul eden hakemler, kararlarını sistem üzerinden en fazla 1 ay içinde sebeplerle birlikte yüklemelidirler. Hakemin önerdiği düzeltme var ise tekrar yazara gönderilir. İstenilen düzeltmeler 1 ay içinde tamamlanıp gönderilmediği takdirde makale otomatik olarak iptal edilecektir. Editör, makalelerin yayın değerliliği ve hakemlerin görüşlerine dayanarak yayına kabul veya red kararını verir. İstenilen düzeltmeler yapıldıktan sonra makale yazar tarafından sisteme tekrar yüklenir. Derginin gizlilik bildiriminde belirtildiği gibi, yazarların kimlik bilgileri ve e-posta adresleri hiçbir şekilde başka amaçlar için kullanılmayacaktır.

Bu dergi; bilimsel araştırmaları halka ücretsiz sunmanın bilginin küresel paylaşımını artıracağı ilkesini benimseyerek, içeriğine anında açık erişim sağlamaktadır.

Mehmet Akif Ersoy University Journal of Health Sciences Institute
INSTRUCTIONS TO AUTHORS

I- Mehmet Akif Ersoy University Journal of Health Sciences Institute General Information

Mehmet Akif Ersoy University Journal of Health Sciences Intitute (MAKU J. Health Sci. Inst.) is the publication of Mehmet Akif Ersoy University Health Sciences Institute. It is published two times annualy. The journal is a peer-reviewed scientific journal in which basic and clinical scientific articles in the field of medical sciences (veterinary, medicine, dentistry, nursing and sports sciences) are published. The language of the journal is English. Papers submitted to the journal should not have been previously published, accepted for publication or be in the process of evaluation for publication in any other journal. This rule does not apply to articles presented as bulletins in scientific meetings and whose summaries are published. In such cases, however, the name, date and place of the meeting in which the paper was presented should be notified. The format of the article should be in accordance with the rules of "Uniform Requirements for Manuscripts Submitted to Biomedical Journals: Writing and Editing for Biomedical Publication (http:/www.icmje.org/)".

On receipt of the paper by the Editorial Board, the paper is evaluated for compliance with the format rules and the authors are informed about the result in four weeks. In the event that the paper is not found to comply with the general publication principles of the journal from the standpoint of either technical characteristics or general scope, the paper is rejected. Alternatively, the author(s) may be asked to re-submit the paper in accordance with the writing requirements. Papers resubmitted are passed through a similar technical examination and, if found to comply with the rules, are passed on for peer review. The paper is sent, without the title, to two reviewers selected by the board, who then assess the paper for scientific content and format compliance. When necessary the Editorial Advisory Board can send the paper to third reviewers. The selection of reviewers is ultimately at the discretion of the editor, associate Editors and/or the editorial board. The appropriate reviewers can be selected from journal's international database of reviewers listing or, if needed; independent reviewers can be determined from inland or abroad. Thereafter the Editorial Advisory Board carries out the final editing, taking the reports of the reviewers into consideration, and, when necessary, communicating with the author(s).

The Editor gives the final decision about the acceptance of the manuscript. The Editorial Board is authorized to publish the paper, return it for correction, or reject it. The assessment process involves research articles, case reports and original articles submitted to the journal. Other types of articles are evaluated directly by the Board. Papers submitted to the journal will not be returned whether they are published or not. The Editor and the Editorial Board have the right to reject, to require additional revision or to revise the format of manuscripts which do not follow the rules. The authors should inform the editorial board if they decide to withdraw the manuscript. The editor may consult editorial executive board about a manuscript if (s) he deems necessary. All the authors should submit a collectively signed statement that there is no conflict of interest regarding scientific contribution or responsibility. The association, establishment, and medication-material supply firms which have given financial, even partial, or material support to the research should be mentioned in a footnote. No fee or compensation will be paid for articles published in the journal.

The Editorial Board assumes that the author(s) are obliged not to submit the paper to another journal before completion of the assessment process. In the "method" section of articles concerned with experimental research on humans or animals, a sentence showing that the informed consent of patients and volunteers has been obtained following a detailed explanation of the interventions carried out on them. In such studies, authors should clearly state the compliance with internationally accepted guidelines (1975 Helsinki declaration revised in 2002 http://www.wma.net/e/policy/b3.htm, Guide for the care and use of laboratory animals-www.nap.edu/catalog/5140.html) issued by the Republic of Turkey Ministry of Health and published in the Official Journal dated 29 January 1993 number 21480 "Regulations Concerning Drug Research", and other more recently published rules laid out in governing statutes. They should forward a copy of the Ethic Committee Approval received from the relevant institution. Standard abbreviations used in the text are written in full when first mentioned. In the use of drugs, the generic names should be written in their Turkish pronunciation spelling

form. Measurement units are given according to the metric system; e.g. written as “mg”, no punctuation is used, in the case of extensions (,,) is used as a separator. Laboratory measurements are reported in International System Units (US; Systeme Internationale; SI).

Scientific responsibility

All scientific responsibility of the articles belongs to the authors. The authors of the submitted article must have a specific contribution to the work. Authors' name ordering should be a joint decision. Corresponding author is considered to accept the author sorting by filling in "Author Responsibility and Publication Transfer Form" on behalf of all authors. All of the authors should be listed under the title of article.

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The authors are responsible for their compliance with the ethical rules. In experimental studies on animals, it should be noted that the study protocol has been approved by the animal experiment ethics committee at the institution where the study was conducted. Authors should submit the ethics committee's approval with the article. If there are previously published text, tables, pictures, etc. in the article, the authors have to get written permission from the copyright holder and the authors should specify and indicate the used material in the manuscript. In the course of the manuscript evaluation, the authors may be requested to submit the research data and / or the ethics committee approval document if deemed necessary.

Plagiarism policy

Manuscripts submitted to Mehmet Akif Ersoy University Journal of Health Sciences Institute is evaluated in terms of plagiarism. Every submitted article is checked for plagiarism through iThenticate and Turnitin software. When Smilarity Index of the article is above %20, it is sent back to the corresponding author to revise it. If plagiarism is proved after publication of the article, that article will be immediately removed from the website and the concerned authors will be considered ineligible for publication of their articles in Mehmet Akif Ersoy University Journal of Health Sciences Institute.

II- Types and Characteristics of Papers to be Submitted to the Journal

a) Research Articles: These articles are prepared in full accordance with the writing style definitions given below, in which previously unpublished original research data are evaluated. The main text section of the research articles should include (Title, Introduction Materials and Methods, Results, Discussion and Conclusion) sections and (excluding title page, bibliography, tables/figures/pictures) should not exceed 20 pages. If some parts of the research data given in these articles have previously been discussed in another paper, this must be notified without fail when sending the paper and, in addition, reference should be made to the relevant paper within the bibliography.

b) Review Articles: Review Articles should cover subjects falling within the scope of the journal which are of active current interest. They may be submitted or invited. Invited reviews will normally be solicited by the Review's Editor, but suggestions for appropriate review topics may be sent to editor.

c) Case Reports: These are articles which present and discuss the characteristics of one or more cases which have special features and scientific importance from the clinical evaluation, observation or other standpoint. Case presentations include the title page, summary, main text (includes introduction, case and discussion), bibliography,

table/figure/picture sections; subtitles in the main text are organised according to the text content. Abstracts of the case presentations should have 150 words. The main text (excluding title page, bibliography, table/figure/picture) should not exceed 10 pages.

d) Brief Reports: These are articles in which original ideas dealing with important theoretical or practical problems related to a specific subject are presented and discussed. Original articles include a title page, summary,

main text, bibliography, table/figure/picture sections; subtitles in the main text are organised according to the text content. The main text of original articles (excluding title page, bibliography, table/figure/picture) should not exceed 10 pages.

e) Special Sections:

1. Letters to the Editor: These articles include evaluation and criticisms of articles published in the journal. These are published together with the responses of the author(s) of the paper concerned where possible. Letters to the Editor may not exceed 5 pages.

2. Meeting news/notes: These articles introduce scientific meetings held or to be held on subjects within the scope of the journal. The paper may not exceed 1 page.

3. Journal news: These articles introduce scientific journals being published within the scope of the journal. The paper may not exceed 1 page.

4. Introduction of websites: These articles introduce websites relevant to the scope of the journal. These articles may not exceed 1 page.

5. Book/Thesis Section: These articles introduce books/theses published on subjects related to the scope of the journal and may not exceed 3 pages.

III- Preparation of Manuscripts

Papers to be submitted to the journal include the sections of title page, abstract, main text, references and tables/figures/pictures. Articles submitted for publication in the journal should follow the following formal principles: The text should be prepared in Microsoft Word program in Times New Roman font style with a font size of 12 font, black and 1.5 line. All side of the paper, page margins should be as 2.5 cm. Line numbers should be added to the beginning of the page.

Anatomical terms should be used as written in Latin. Running title (not exceed 40 characters) of the manuscript should add to title page. The name of the clinic, department / science, institute and institution should be stated.

a) Title Page: should contain the category, the title (only first letter capital), the names of the authors (only the first letters capital), the institution (s) where they work (indicated with numbered footnotes), corresponding author (address, phone, fax numbers and e-mail address). Corresponding author is indicated by an asterisk (*). If the article was previously presented at a scientific meeting, the name, date and place of the meeting must be stated.

b) Main Text: The main text of the paper is organised under the subtitles of Abstract and Keywords, Introduction, Materials and Methods, Results and Discussion.

Abstract and Keywords: This is written in two languages, Turkish and English, and also includes the title of the paper. The abstract is consists of 200 words. The abstract should bring out the main points of the manuscript and should include the following information: objective, the animals or sample population involved, design, the materials and methods used, the main results, a brief conclusion and clinical relevance, where applicable. They should be comprehensible to readers before they have read the paper, and abbreviations and reference citations should be avoided. At the end of the abstract, at least 3, at most 5 keywords in both languages are included.

In the introduction, following a brief statement of basic information and justifications which constitute the basis of the paper, the objective is clearly given in the last paragraph. If necessary, the "method" section may be organised according to sub-titles such as research/patient/ test group, instruments, application and statistical analysis. This section should be written with clarity so that a person not involved in the study may easily understand. Results summarize the findings of the study and, when necessary, basic findings are supported with tables and figures. In the discussion section, the findings of the study are discussed in the light of relevant national and international studies; this section includes discussion of original findings, not a general review.

c) Acknowledgements: When considered necessary, author(s) may add brief acknowledgements in a few sentences to those whose contributions to the paper are not at author level but deserve to be mentioned. Here, the contributions of those acknowledged (e.g. financial or equipment aid, technical support etc) are clearly stated (e.g. "scientific counseling", "editing of the draft", "data collection", "participation in clinical research" etc).

d) Bibliographic References:

All citations in the text should refer to: the year of publication of the reference should be indicated in parentheses after the surname of the author or authors.

Examples: Bell (2005), Nielsen and Engberg (2006), Doyle et al. (2007) were indicated that.....

The name of the author and the year of publication should be stated in parentheses at the end of the sentence.

Examples: ...were detected as 23% of the samples (Bell, 2005); ....were detected as 23% of the samples (Nielsen and Engberg, 2006); ...were detected as 23% of the samples (Doyle et al., 2007).

In case of more than one reference, references should be arranged chronologically.

Examples: ....were reported that... (Bell, 2005; Nielsen and Engberg, 2006; Doyle et al., 2007).

More than one reference from the same author(s) in the same year must be identified by the letters 'a', 'b', 'c', etc., placed after the year of publication.

Examples: (Bell, 2005a; Bell, 2005b; Bell, 2005c …)

The authors can use below formatted style link in mendeley:

http://csl.mendeley.com/styles/529990351/sagbilensderg

References should be written in alphabetical order. Reference style, the authors' names and year of publication should be written in bold. Source list should be prepared as follows:

i) Examples of journal articles:

Cohen, N.D., Vontur, C.A., Rakestraw, P.C., 2000. Risk factors for enterolithiasis among horses in Texas. Journal of the American Veterinary Medical Association 216, 1787-1794.

Rajmohan, S., Dodd, C.E., Waites, W.M., 2002. Enzymes from isolates of *Pseudomonas fluorescens* involved in food spoilage. Journal of Applied Microbiology 93, 205-213.

Ono, K., Yamamoto, K., 1999. Contamination of meat with *Campylobacter jejuni* in Saitama, Japan. International Journal of Food Microbiology 47, 211-219.

For articles that are accepted for publication and have a DOI number but not yet published; DOI number must be specified at the end of the article.

McGregor, B.A., Butler, K.L., 2014. The value of visual fleece assessment in addition to objective measurements in identifying Angora goats of greater clean mohair production. Small Ruminant Research, in press (DOI: 10.1016/j.smallrumres.2014.04.001).

ii) Books:

Combs, G.F., 1992. The Vitamins: Fundamental Aspects in Nutrition and Health. Academic Press, San Diego.

Concannon, P.W., 1986. Physiology and Endocrinology of Cannine Pregnancy. In: Marrow, D.A. (Ed.), Current Therapy in Theriogenology. Philadelphia, W.B. Saunders Company, pp. 491-497.

Perkins J.B., Pero, J., 2002. Vitamin biosynthesis. In: Sonenshein, A., Hoch, J., Losick, R. (Eds.), Bacillus subtilis and Its Closest Relatives: from Genes to Cells. ASM Press, Washington D.C., pp. 271-286.

Kramer, J.M., Gilbert, R.J., 1989. Bacillus cereus. In: Doyle, M.P. (Ed.), Foodborne Bacterial Pathogens. Marcel Dekker, New York, pp. 22-70.

iii) Thesis:

Bacınoğlu, S., 2002. Boğa spermasında farklı eritme süreleri ve eritme sonrasında oluşturulan soğuk şoklarının spermatolojik özelliklere etkisi. Doktora Tezi, İstanbul Üniversitesi Sağlık Bilimleri Enstitüsü, İstanbul.

iv) Web site or author is an institution:

FDA, 2001. Effect of the use of antimicrobials in food-producing animals on pathogen load. Systematic review of the published literature. http://www.fda.gov/cvm/antimicrobial/PathRpt.pdf (Accessed: 14.12.2001)

Cleveland, C.W., Peterson, D.S., Latimer, K.S., 2005. An Overview of Canine Babesiosis. Clinical Pathology. College of Veterinary Medicine, The University of Georgia: http://www.vet.uga.edu/vpp/clerk/Cleveland (Accessed: 17.12.2005).

Thierry, F., 2006. Contagious equine metritis: a review. Equine Reproductive Infections: http://www.equinereproinfections.com (Accessed: 07.07.2006).

FSAI, 2008. Report of the Implementation Group on Folic Acid Food Fortification to the Department of Health and Children. Food Safety Authority of Ireland:http://www.fsai.ie/assets/0/86/204/cc3c2261-7dc8-4225-bf79-9a47fbc2287b.pdf (Accessed: 20.06.2008).

v) Paper presented at a scientific meeting

Cardinali, R., Rebollar, P.G., Mugnai, C., Dal Bosco, A., Cuadrado, M., Castellini, C., 2008. Pasture availability and genotype effects in rabbits: 2. development of gastro-intestinal tract and immune function of the vermiphorm appendix. In: Proc. 9th World Rabbit Congress, Verona, Italy, 1159-1164.

Mauget, R., Legendre, X., Comizzoli, P., 1998. Assisted reproductive technology in sika deer: a program to preserve endangered deer subspecies. In: Proc. 4th Int. Deer Biology Congress, Kaspovar, 185-186.

e) Tables: Each table is printed on a separate page and numbered according to the sequence of referral within the text (Table 1). Each table has a title and, when necessary, explanations are given under the table (e.g. abbreviations given in the table). Each table should be understandable without need for referral to the text. Each table should be referred to in the text..

f) Figures and Pictures: Figures should be numbered according to the order of use and should be expressed with short titles.Figures should be numbered in the text (Figure 1). Letters, numbers and symbols within the figure should be clear and readable when downsized for printing.Each figure should be referred to in the text..

IV- Submission of Articles (Blind Peer-Review)

The article submission is only accepted online via 'http://dergipark.gov.tr/maeusabed' The Corresponding authors, all the files can be added to the system by clicking the submit new article icon at the above address. Authors must register on Dergipark system before submitting a manuscript. After signing up, clicking Mehmet Akif Ersoy University Journal of Health Sciences icons on the main page, the manuscript written according to the guide for authors is submitted in 4 steps (start, submission, reference, preview & submit). The submitted manuscript must not contain any identifying information, such as author information, institution, ethics committee or special permit address, during the preliminary evaluation phase. The manuscript that pass the preliminary evaluation (paper scientific qualification, language, conformity to Guide for author and checking plagiarism via

iThenticate and Turnitin program,) are assigned to the Reviewers. The corresponding author can follow the article evaluation process from the section on the Articles in the Process. According to the blind peer-review rules, the main text, tables, graphics and pictures of the manuscript are uploaded via the system and sent to the appointed reviewers for an article evaluation request via e-mail. The reviewers accept or reject the request by clicking on the link sent via e-mail. The reviewers who accept it have to upload their decisions together with the reasons within a maximum of 1 month via the system. If the correction requested by the Reviewer is sent back to the author. If the requested corrections are not completed within 1 month, the article will be automatically canceled. After the desired corrections are made, the article is uploaded back to the system by the author. The editor makes decisions to accept or reject papers based on their opinion of the papers' publication worthiness and reviewers' comments. As stated in the privacy statement, authors' identity information and e-mail addresses will not be used for any other purpose.

MEHMET AKİF ERSOY ÜNİVERSİTESİ SAĞLIK BİLİMLERİ ENSTİTÜSÜ DERGİSİ

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Araştırma Makaleleri / Research Articles

Olgu Sunumları / Case Reports

MAKU J. Health Sci. Inst. 2024, 12(2): 46-52.
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Research Article / Araştırma Makalesi

Virological and Serological Investigation of Feline Coronavirus Infection in Cats

Kedilerde Feline Coronavirus Enfeksiyonunun Virolojik ve Serolojik Araştırılması

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Abstract: Feline coronavirus infection is an important viral disease affecting feline health. In this study, feline coronavirus infection (FCoV) in cats was investigated using virological and serological methods. For this purpose, blood and swap samples were taken from 60 cats aged six months or older with or without clinical signs in different races, sexes, ages and social environments, which were not vaccinated against the aforementioned infection and kept as pets at home. Collected blood samples were checked for FCoV antibodies by applying FCoV rapid test-antibody (Ab) and indirect Enzyme-Linked Immunosorbent Assay (ELISA) methods. Similarly, swap samples taken from the same cats were checked for the presence of FCoV antigen using the FCoV rapid test-antigen (Ag) method. Of the 60 cat blood serum samples analysed, 21 (35%) were determined to be seropositive by rapid test-Ab method and 41 (68.3%) by indirect ELISA method. The difference between the antibody positivity rates determined as a result of the indirect ELISA method and the rapid test-Ab method was found to be statistically significant (P<0.001). The presence of FCoV in 60 swap samples collected was investigated by rapid test-Ag method and 1 sample (1.7%) was found to be antigen positive. As a result of this research, the presence/prevalence of FCoV infection in owned cats was revealed both virologically and serologically. In addition, the indirect ELISA method was found to be more sensitive and reliable than the rapid test-Ab method in the serological diagnosis of FCoV infection.

Keywords: Antigen, Antibody, ELISA, Cat, Feline Coronavirus, Rapid test.

Öz: Feline coronavirus enfeksiyonu kedi sağlığını etkileyen önemli viral bir hastalıktır. Bu çalışmada, kedilerde feline coronavirus enfeksiyonunun varlığı (FCoV) virolojik ve serolojik yöntemler kullanılarak araştırıldı. Bu amaçla söz konusu enfeksiyona karşı aşılanmamış farklı ırk, cinsiyet, yaş ve sosyal çevrede bulunan klinik bulgu gösteren veya göstermeyen altı aylıktan büyük sahipli 60 kediden hem kan hem de dışkı örneklemesi yapıldı. Toplanan kan numunelerine FCoV antikor (Ab) hızlı test ve indirekt Enzyme Linked Immunosorbent Assay (ELISA) yöntemleri uygulanarak FCoV antikorları yönünden kontrol edildi. Benzer şekilde aynı kedilerden alınan dışkı numuneleri de FCoV antijen (Ag) hızlı test yöntemi kullanılarak FCoV antijen varlığı yönünden kontrol edildi. Örneklenen 60 kedi kan serumundan 21 adedinin (%35) rapid test-Ab yöntemi, 41 adedinin (%68,3) ise indirekt ELISA yöntemi ile seropozitif olduğu saptandı. İndirekt ELISA yöntemi ile rapid test-Ab yöntemi sonucunda belirlenen antikor pozitiflik oranları arasındaki farklılığın istatistiksel olarak önemli (P<0.001) olduğu tespit edildi. Toplanan 60 adet dışkı örneğinde de FCoV varlığı rapid test-Ag yöntemi ile araştırıldı ve bir numunede (%1,7) antijen pozitiflik belirlendi. Bu araştırmanın sonuçları, sahipli kedilerde FCoV enfeksiyonu prevalansının yüksek olduğunu ve enfeksiyonun serolojik tanısında indirekt ELISA yönteminin rapid test-Ab yöntemine göre çok daha duyarlı ve güvenilir bir yöntem olduğunu göstermektedir.

Anahtar Kelimeler: Antijen, Antikor, ELİSA, Kedi, Feline Coronavirus, Hızlı test.

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Introduction

Feline Coronavirus (FCoV), a common pathogen in cats, is classified in the *Coronaviridae* family. The pathogen has an enveloped, pleomorphic, ss (+) RNA genome. Most coronaviruses indicate tropism to mucosal epithelial cells of the intestinal and respiratory tract. Additionally, some coronavirus infections may lead to serositis,

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encephalitis, and hepatitis. Previous studies have identified two biotypes of FCOV: Feline Enteric Coronavirus (FECV) and Feline Infectious Peritonitis Virus (FIPV) (Pedersen, 1987; Vijaykrishna et al., 2007). The FECV, the apathogenic form of FCoV, is commonly isolated in the digestive tract of domestic and wild cats and may predispose these animals to some other pathogens. In infected animals, it has been reported that mutations in the nucleic acid of FECV lead to macrophage tropism, resulting in the formation of the FIPV biotype, which in transform causes feline infectious peritonitis (FIP), a systemic infection with a high mortality rate. FIP, which develops in cats with the effect of many unfavorable factors, can be seen in effusive (wet) and non-effusive (dry) clinical forms (Vennema et al., 1998; Lin et al., 2009).

Enteric coronavirus is transmitted to susceptible individuals by fecal-oral transmission. Infection in young animals is characterized by diarrhea lasting 3-4 days, while older animals are mostly asymptomatic. The causative agent has affinity for the epithelium of the large intestine, ileum, and rectum and can persist in these regions for up to 18 months. In cats persistently infected with FECV, mutations in the S protein of the virus have been suggested to enable the virus to evade the immune system (Herrewegh et al., 1997; Lappin, 2014). Although enteric coronaviruses are found in the bloodstream and lymph nodes, the pathogenesis of infection is limited to gastrointestinal symptoms (Vogel et al., 2010). The diagnosis of infection should be based on a combination of laboratory test results (serologic, virologic, biochemistry) and clinical symptoms.

In this study, it was aimed to determine the virological and serological presence of FCoV infection in nonvaccinated cats (owned/unowned) of different gender, age and social environment, with or without clinical signs, older than six months and to gather data about the prevalence of the disease. It was also aimed to compare the sensitivity of indirect ELISA and rapid test (Ab) methods used in this study in the serologic diagnosis of FCoV infection.

Materials and Methods

Ethical Approval

This research was conducted after the approval of Burdur Mehmet Akif Ersoy University Animal Testing Local Ethics Council (Approval Number: 26.08.2020-80/662)

Sampled Animals

In this study, Feline Coronavirus (FCoV) infection was studied virologically and serologically in owned cats of different genders, ages, and social environments, with or without clinical symptoms, who came to the clinics in Antalya and Burdur provinces. For this purpose, fecal and blood samples were collected from 60 cats (25 males + 35 females) with or without clinical symptoms and not vaccinated against the infection. The sampled cats were aged between 6 months and 15.5 years. Anamnesis information and clinical symptoms, if any, were recorded during collection.

Collection of Samples

Blood samples were collected from the *vena cephalica antebrachii* into sterile coagulated tubes and fecal samples were collected from the rectum into fecal sample containers and brought to the laboratory under cold storage conditions. Fecal samples were stored at -80°C until testing. After the blood samples were centrifuged at 5000 rpm for 15-20 minutes, the separated serum part was transferred to sterile stock tubes and stored at -80°C until the test phase.

Indirect Enzyme-Linked Immunosorbent Assay (ELISA)

Serum samples obtained from blood samples collected from cats were analyzed for the presence of FCoV-specific antibodies (Ig) using a commercial indirect ELISA kit (FCoVCHECK Ab ELISA, Biopronix-Agrolabo, code 27224496,

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Torino-Italy) as described by manufacturer's protocol. The results were obtained quantitatively by measuring the optical density (OD) of each well of the plates spectrophotometrically at 450 nm in ELISA reader (Mindray MR-96A, Hamburg-Germany), and calculations were performed as described in the kit protocol.

FCoV Antibody (Ab) Rapid Test

A commercial Rapid FCoV Ab test kit (Asan Easy Test FCoV Ab, code no: 023351, Seoul, Republic of Korea) was used for the detection of FCoV-specific antibodies (Ig) in blood serum according to the manufacturer's procedure. This test is an immunochromatographic method for the rapid and quantitative detection of FCoV specific antibody in serum, plasma or whole blood of cats.

FCoV Antigen (Ag) Rapid Test

A commercial Rapid FCoV Ag test kit (Asan Easy Test FCoV Ag, code no: 23121, Seoul, Republic of Korea) was used for the detection of FCoV antigen in collected cat fecal samples. The test was performed according to the manufacturer's procedure and the results were evaluated.

Statistical Analysis

The statistical analysis of the data obtained in the study was performed using the SPSS 21 package program (IBM SPSS Software, USA). Chi-square (chi-square -$\chi 2$) test was used to determine the statistical significance of the differences in the positivity rates determined in different age groups in males and females as a result of the analysis of blood serum and fecal samples using ELISA and Rapid Test Ab/Ag. Furthermore, the statistical significance of differences in positive rates determined by rapid test-antibody and ELISA was examined by Chi-Square test. Data with a value of $P<0.05$ were considered significant.

Results

In the study, the seroprevalence rate of FCoV infection was 68.3% (41/60) in 60 cat blood sera analyzed by indirect ELISA diagnostic method and 35% (21/60) by FCoV Ab rapid test method. In the study, among the 60 fecal samples analyzed by FCoV antigen rapid test technique, antigen positivity (1.7%) was detected only in the sample of a 7-month-old female Tabby (sarman) cat. This cat had symptoms like effusive (wet) FIP and diarrhea. Blood serum sampled from this cat was also positive by both indirect ELISA and FCoV Ab rapid test.

When we observed the distribution of FCoV antibody positivity detected by ELISA method according to gender in the study, it was found that 64% (16/25) of male cats and 71.4% (25/35) of female cats were positive (Table 1).

In the study, antibody positivity determined by FCoV antibody rapid test method in cats was 40% (10/25) in male cats and 31.4% (11/35) in female cats (Table 2).

Table 1. Distribution of FCoV seropositivity detected by ELISA method according to gender.

Gender	Sample No.(n)	FCoV Ab			
		n (+)	%	n (-)	%
Male	25	16	%64	9	%36
Female	35	25	%71.4	10	%28.6
Total	**60**	**41**	**%68.3**	**19**	**%31.7**

Ab: Antibody

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Table 2. Distribution of FCoV seropositivity detected by FCoV antibody rapid test method according to gender.

Gender	Sample No. (n)	FCoV Ab			
		n (+)	%	n (-)	%
Male	25	10	%40	15	%60
Female	35	11	%31.4	24	%68.6
Total	**60**	**21**	**%35**	**39**	**%65**

Ab: Antibody

In the study, FCoV seropositivity detected in cats using indirect ELISA was 73.9% (17/23) in cats aged 6 months-1 year, 82.4% (14/17) in 2-year-old cats, 60% (6/10) in 3-year-old cats, 50% (1/2) in 4-year-old cats, 50% (2/4) in 5-year-old cats, and 25% (1/4) in cats aged 6 and older. (Table 3).

A total of 43.5% (10/23) in cats aged 6 months-1 year, 17.7% (3/17) in 2-year-old cats, 60% (6/10) in 3-year-old cats, 0% (0/2) in 4-year-old cats, 50% (2/4) in 5-year-old cats and none of cats aged 6 and over were detected FCoV seropositive according to age by rapid test method (Table 4).

Table 3. Distribution of FCoV seropositivity detected by ELISA according to age groups.

Age	Sample No. (n)	FCoV Ab			
		n (+)	%	n (-)	%
6 months-1 year	23	17	73.9	6	26.1
2	17	14	82.4	3	17.7
3	10	6	60	4	40
4	2	1	50	1	50
5	4	2	50	2	50
≥ 6	4	1	25	3	75
Total	**60**	**41**	**68.3**	**19**	**31.7**

Ab: Antibody

Table 4. Distribution of FCoV seropositivity detected by rapid test (Ab) according to age groups.

Age	Sample No. (n)	FCoV Ab			
		n (+)	%	n (-)	%
6 months-1 year	23	10	43.5	13	56.5
1-2	17	3	17.7	14	82.4
3	10	6	60	4	40
4	2	0	0	2	100
5	4	2	50	2	50
≥ 6	4	0	0	4	50
Total	**60**	**21**	**35**	**39**	**65**

Ab: Antibody

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Statistical Results

In the study, no statistically significant difference was found between males and females in seropositive-seronegative changes because of indirect ELISA analysis of blood serum samples taken from the animals ($\chi2$= 0.372; P=0.542). Similarly, there was no significant difference between the seropositive values determined in males and females in the Rapid antibody test in blood samples ($\chi2$= 0.471; P>0.05) and Rapid antigen test in feces ($\chi2$= 0.726; P>0.05). Again, the distribution of both antibody and antigen-positive rates in general age groups was statistically insignificant (P>0.05). However, it was determined that there was a significant (P<0.05) difference in the statistical evaluation of seropositivity detected by ELISA between 2 years and younger and 3 years and older ($\chi2$= 4.660; P=0.031). In the statistical analysis of the seropositive values in the Rapid antibody test and ELISA results, which form the basis of our study, a statistically significant P<0.001 difference was found between the groups ($\chi2$= 13.348).

Discussion

Coronaviruses are pathogens that cause different levels of infection in humans and animals. Many viruses in this family have high mutation ability and the capability to transmit between species. For this reason, it is very difficult to apply protection and control methods against CoV types. FCoV infections are a highly contagious disease common in wild and domestic cats worldwide. Fighting the infection becomes very difficult because the disease is very common, especially in places where domestic cats are kept together (cats on breeding farms, cat shelters, etc.) and can be detected in cat of all age groups.

Due to the high mortality rate observed in the FIP form of the disease, it is important not to waste time in diagnosis and treatment. For this purpose, researchers are working hard to develop new diagnostic methods and to improve their reliability. In addition to clinical symptoms, virological, serological and molecular techniques and histopathological examination are performed to accurately diagnose the infection (Tasker, 2018; Zhao et al., 2019). In addition to these methods, rapid immunoassay kits have been developed to detect FCoV antibodies and antigens. However, with the current research results on the reliability of the tests, the question marks in mind have started to increase.

In FCoV seroprevalence studies conducted worldwide, proportional changes have been detected between countries. In studies using the ELISA method (Bell et al., 2006; Pratelli, 2008; Tharaguchi et al., 2012; Suba et al., 2016; Mūrniece et al., 2021) the seroprevalence of the disease has been reported between 34% and 89.5%. Studies on the seroprevalence of FCoV in Turkey (Pratelli et al., 2009; İleri, 2013; Oğuzoğlu et al., 2010) reported rates between 26% and 69.8%. In our study, the seroprevalence of FCoV infection was 68.3% by indirect ELISA method and 35% by rapid test (Ab) method. These results are in parallel with the results of previous studies.

In this study, it was determined that the distribution of antibody positivity according to gender was not statistically significant. This result is consistent with other studies in the literature (Bell et al., 2006; Oğuzoğlu et al., 2010; Tharaguchi et al., 2012; Mūrniece et al., 2021). As a result of the rapid test (Ag) conducted on fecal samples in our study, the FCoV antigen rate in our sample group was determined as 1.7% (1/60). This result is lower than the prevalence values determined in previous antigenic studies on FCoV (Can-Şahna et al., 2007; Loock et al., 2021; Vojtkovska et al., 2022). This was thought to be since the study was conducted with a limited number of samples and the sensitivity of the test method used was low. However, the limited number of studies in this field makes our findings important. When the seropositivity rates of ELISA and rapid test (Ab), which is another perspective of our study are compared there is a significant difference detected that supports previous research.

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In a study by Addie et al. on the effectiveness of IFA, ELISA and rapid test kits in the diagnosis of FCoV, they found positivity rates of 100%, 100% and 64.1-84.6%, respectively. In this study, samples that had not been previously tested for FCoV and included in the study by random sampling method were evaluated and sensitivity rates were found to be 35% in Rapid Ab and 68.3% in indirect ELISA method. In light of these data, it was revealed that the difference between positive result rates was statistically significant. Accordingly, it has been concluded that the ELISA method provides more effective and highly reliable results in laboratory diagnosis than rapid antibody tests.

Although the cats were sampled for the study were in different age groups, it was found that there was a statistically significant difference in antibody positivity rates between cats between 6 months and 2 years of age and cats in other age groups (3≥). This result is in line with other studies (Cave et al., 2004; Hartmann, 2005; İleri, 2013).

This may be explained by the fact that the immune system in young cats is not fully developed or is susceptible to diseases. Therefore, regular FCoV screening in young cats will be useful for the early diagnosis of the disease. Although the animals used in our study were owned, considering that they are in constant contact with the environment and other cats and that cat owners can adopt new cats from unknown sources, our seroprevalence value is parallel to the results of research conducted on environments where more than one cat lives together and on stray cats (Bell et al., 2006; Pratelli et al., 2009)

As a result, our study revealed that the ELISA method is more sensitive than rapid test kits (Ab) for detecting FCoV seropositive cats. Preferring high-sensitivity methods such as the ELISA method in the diagnosis of suspicious cases will allow the veterinarian to initiate the correct treatment protocol in a timely manner and will prevent the patient from going through too much stress by saving him from many different procedures whose results are not clear. As FCoV infection is widespread in domestic cats and poses a risk to feline health, it is concluded that it would be beneficial to give importance to protection and control measures against infection. In this context, vaccination against the infection in question will be beneficial.

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Research Article / Araştırma Makalesi

The Effect of Educetion on the Knowledge Level, Awereness and Attitudes of Physiotherapy Students' Towards Organ Donation and Transplantation

Fizyoterapi Öğrencilerinin Organ Bağışına ve Nakline Yönelik Bilgi Düzeyi, Farkındalık ve Tutumlarına Eğitimin Etkisi

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Abstract: The current educational curriculum does not provide physiotherapists with adequate knowledge and skills regarding tissue and organ donation and transplantation. This study aims to investigate whether educational interventions on organ donation and transplantation lead to significant changes in physiotherapy students' knowledge, awareness, and attitudes. The study involved 96 students from the Department of Physiotherapy and Rehabilitation at a state university, with a mean age of 19.61±1.43 years. Data were gathered through face-to-face interviews and evaluated using a socio-demographic information form, the Organ-Tissue Donation and Transplantation Knowledge Scale, and the Organ Donation Attitude Scale. After administering a pre-test, a 60-minute educational session was conducted, followed by a post-test. Statistical analysis revealed significant differences in the Organ Donation Knowledge Scale before and after the educational intervention (p=0.0001). Significant differences were also observed in the Organ Donation Attitudes Scale, the Humanity and Moral Conviction sub-dimension, the Fears of Medical Neglect sub-dimension, the Fears of Bodily Mutilation sub-dimension, and the Total Negative Attitudes sub-dimension (p=0.0001). Healthcare professionals play a critical role in informing and guiding people about organ donation for increasing awareness and encouraging positive attitudes. Therefore, providing comprehensive and effective education on organ donation and transplantation to physiotherapists can significantly enhance their ability to improve public knowledge and attitudes towards organ donation.

Keywords: Organ donation, Knowledge level, Attitide, Physiotherapy students, Education.

Öz: Fizyoterapistler, mevcut eğitim programları aracılığıyla doku ve organ bağışı ile nakli konusunda yeterli bilgi ve beceri kazanmamaktadır. Bu çalışmada fizyoterapi öğrencilerine organ bağışı ve nakline yönelik verilen eğitim ile öğrencilerin bilgi düzeyi, farkındalık ve tutumlarında anlamlı farklılık oluşup oluşmadığının incelenmesi amaçlanmıştır. Çalışmaya bir devlet üniversitesinin Fizyoterapi ve Rehabilitasyon Bölümü'nde öğrenim gören, yaş ortalaması 19.61±1.43 yıl olan toplam 96 öğrenci katılmıştır. Veriler yüz-yüze görüşme yöntemiyle toplanmış ve sosyo-demografik bilgi formu, Organ Doku Bağışı ve Nakli Bilgi Düzey Ölçeği ve Organ Bağışı Tutum Ölçeği kullanılarak değerlendirilmiştir. Öğrencilere ön test yapıldıktan sonra, 60 dakika süren bir eğitim gerçekleştirilmiş ve ardından son test uygulanmıştır. Organ Bağışı Bilgi Düzeyi Ölçeğinde eğitim öncesi ve sonrası istatistiksel olarak anlamlı fark (p=0.0001) bulunmuştur. Organ Bağışı Tutumları Ölçeğinin Yardımseverlik ve Ahlaki Değer alt boyutu, Tıbbi Olarak İhmal Edilme Korkusu alt boyutu, Bedensel Yaralanma Korkusu alt boyutu ve Toplam Negatif Tutumlar alt boyutunda eğitim öncesi ve sonrası istatistiksel olarak anlamlı fark (p=0.0001) bulunmuştur. Sağlık çalışanlarının hasta ve yakınlarını organ bağışı konusunda bilgilendirme ve yönlendirme rolleri, organ bağışı ile ilgili farkındalığı artırmada ve olumlu tutumları teşvik etmede büyük önem taşır. Bu nedenle, fizyoterapistlere organ bağışı ve nakli hakkında kapsamlı ve etkili eğitimler verilmesi, fizyoterapistlerin halkın organ bağışı konusundaki bilgi ve tutumlarını geliştirmelerine önemli katkı sağlayabilir.

Anahtar Kelimeler: Organ bağışı, Bilgi düzeyi, Tutum, Fizyoterapi öğrencileri, Eğitim.

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Introduction

Organ donation and transplantation are considered to be one of the fundamental building blocks of modern health services. These procedures are crucial for treating severe illnesses and enhancing quality of life. Healthcare professionals are key players in the successful implementation of organ donation and transplantation processes, as they are both intermediaries between donors and recipients and professional practitioners (Jawoniyi et al., 2018).

Attitudes towards organ donation and transplantation vary due to religious, cultural, social and societal values. Studies have reported that the primary cause for negative attitudes towards organ donation is incomplete and/or misinformation on the subject. Therefore, it is emphasized that training is needed to increase organ donation (Şantaş & Şantaş, 2018). In particular, the knowledge, attitudes, and awareness of healthcare professionals on this subject are important factors that directly affect the effectiveness of organ donation and transplantation processes.

It has been reported that undergraduate education of students studying in medical and health sciences and related departments is insufficient to change and improve students' attitudes about organ donation and transpantation both in our country and in other countries (Akkas et al., 2018; Kiberd, 1998; Özmen et al., 2008,; Sağiroğlu et al., 2015; Sakallı & Sucu Dağ, 2020; Soylar & Ulaş Kadioğlu, 2018). While medical school and health sciences students tend to have more positive attitudes compared to students from other departments, research highlights gaps in their knowledge, conflicting attitudes, and educational needs concerning organ donation and transplantation. These studies suggest that incorporating education on organ donation and transplantation into the curriculum is essential (Fontana et al., 2017; Goz et al., 2006; Kim et al., 2006; Sağiroğlu et al., 2015; Symvoulakis et al., 2014; Yalçın Balçık et al., 2019). However, it has also been reported that the reason why some students are not registered donors despite their high awareness and positive attitudes regarding organ donation is due to lack of knowledge and education (Kolagari et al. 2022; Sengul & Sahin, 2022).

There are few studies in the current literature assessing the knowledge, attitudes, and beliefs of physiotherapy students regarding organ-tissue donation and transplantation. A study conducted in India evaluated the knowledge, attitudes, and beliefs of physiotherapy students concerning organ donation (Sharma et al., 2018). There are also few studies in our country evaluating the views, knowledge level, and attitudes of Turkish physiotherapy students regarding organ-tissue donation (Güler et al., 2017; Sakallı & Sucu Dağ, 2020; Tuncer & Gurses, 2024). Although these studies highlight the educational needs of physiotherapy students regarding organ donation and transplantation, there is a lack of research evaluating the effectiveness of such educational efforts.

In light of the existing gaps and limitations in the literature, this study aims to assess the attitudes, awareness, and knowledge levels of physiotherapy students regarding organ donation and transplantation, as well as to evaluate the impact of the education provided on these processes.

Materials and Methods

Study Design

The study adhered to the principles outlined in the Declaration of Helsinki and received approval from the university's ethics committee (approval number: GO 2023/66). All participants provided written informed consent.

Participants

The study included 96 physiotherapy students who volunteered to participate in the research and were studying at the faculty of health sciences at a state university in the 2022-2023 academic year. The study was conducted between February 2023 and March 2023 at the Department of Physiotherapy and Rehabilitation, Faculty of Health Sciences, Burdur Mehmet Akif Ersoy University. The

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inclusion criteria were: (i) being an undergraduate student in the department of Physiotherapy and Rehabilitation (ii) age between 18 and 25 years, (iii) agreeing to participate in the study voluntarily. The exclusion criteria was: (i) failing to complete any of the assessments.

Procedure

Data collection tools were self-report scales adapted for Turkish validity and reliability. Data were collected through a face-to-face interview method utilizing a questionnaire. The questionnaire consisted of a total of 81 questions, including 24 questions that questioned the participants' socio-demographic characteristics, medical conditions and various opinions about organ donation, a 17-item "Organ-Tissue Donation and Transplantation Knowledge Scale" that included information about organ donation, and a 40-item "Organ Donation Attitude Scale".

Following the administration of the pre-test, a 60-minute education on "Organ Donation and Transplantation" was given by an expert team consisting of experienced doctors, nurses and physiotherapists.

Content of the educational program were (i) What is Organ Donation? (ii) Importance of Organ Donation, (iii) Status of Organ Donation in Turkey, (iv) Legal and Religious Dimensions of Donation, (v) Organ Donation Process, (vi) Who Can Donate Their Organs?

Questions and feedback from students were received after the education. Following the education, students were given an educational brochure and a post-test was administered 7 days after the education.

Data Collection Instrument

Sociodemographic Data Form: Socio-demographic characteristics, medical conditions and various opinions about organ donation were questioned in 24 questions.

Organ-Tissue Donation and Transplantation Knowledge Scale (ODTKS): It is a 17- item scale developed by Emiral et al. (2017) to evaluate individuals' knowledge about organ donation and transplantation. For questions 1, 3, 4, 4, 5, 7, 11, 12, 14, 16, the correct answer is assigned 1 point, while all other answers receive 0 points. For the remaining questions on the scale, a wrong answer is given 1 point, while the other responses receive 0 points. The total score on the scale is calculated by summing the scores from each individual question. The scale ranges from a minimum score of 0 to a maximum score of 17, with higher scores indicating a greater level of knowledge about organ donation and transplantation.

Organ Donation Attitude Scale (ODAS): The scale designed to evaluate individuals' attitudes toward organ donation was initially developed by Parisi & Katz in 1986, revised by Kent & Owens in 1995, and later validated for use in Turkey by Yazici Sayin in 2016. The scale comprises of 40 questions in 6-point Likert type and is analysed in 3 dimensions, each of which is evaluated within itself. The first dimension shows " Humanity and Moral Conviction" (HMC) about organ donation and consists of 20 positive statements. The scale ranges from a minimum score of 20 to a maximum score of 120. The second dimension, "Fears of Medical Neglect" (FMN), includes 10 negative statements, with scores ranging from a minimum of 10 to a maximum of 60. The third dimension, "Fears of Bodily Mutilation" (FBM), also comprises 10 negative statements, with the same scoring range. Higher scores in all three dimensions reflect an increased attitude towards each respective dimension (Yazici Sayin, 2016).

Statistical Analysis

The data were analyzed using IBM SPSS software (version 26.0). Descriptive statistics of demographic data and dependent variables were interpreted as frequency, mean±standard deviation ($\bar{x}$±SD), and percentile. Continuous variables were presented as mean±standard deviation ($\bar{x}$±SD), while categorical variables were reported as counts (n) and percentages (%). The Shapiro-Wilk test was performed to assess normality of the data. To analyze differences

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between initial and final measurements, the paired t-test was used for parametric data, and the Wilcoxon signed-rank test was applied for non-parametric data. The significance level was accepted as $p<0.05$ for all analyses.

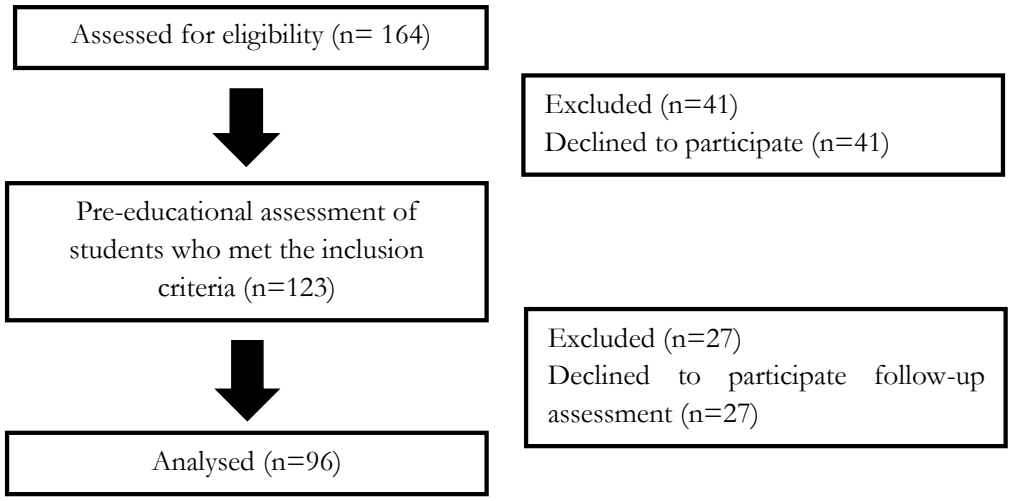

Figure 1. Flow diagram of the study.

Table 1. Socio-Demographic Characteristics of Students

Variables				x±**SD**	
Age (years)				19.61±1.43	
Education satisfaction (0-10)				8.73±1.07	
Variables				**n**	**%**
Gender	**Male**			18	18.8
	Female			78	81.3
Organ failure in the relatives	**Yes**			8	8.3
	No			88	91.7
		Pre-Education		**Post-Education**	
		n	**%**	**n**	**%**
Knowing that there is an "Organ Donor Registration System" in Turkey	**Yes**	45	46.9	91	94.8
	No	51	53.1	5	5.2
Knowing how the "Organ Donor Registration System" works	**Yes**	9	9.4	78	81.3
	No	87	90.6	18	18.7
Accepting transplant an organ into your body from an another person	**Yes**	79	82.3	83	86.5
	No	1	1	0	0
	Perhaps	16	16.7	13	13

Results

Out of 164 Physical Therapy and Rehabilitation students invited to the study, 123 agreed to

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participate, and the initial assessment was conducted. The study concluded with 96 participants completing the follow-up assessment conducted one week later (Fig. 1). Participants reported their satisfaction with the education using a numerical rating scale, with an average score of 8.73±1.07. The average age of the participants was 19.61±1.43, and other demographic information is summarized in Table 1.

The pre- and post-education scores of the students on the ODTKS, along with the significance levels of the observed changes, are presented in Table 2. Additionally, Table 3 displays the scores and significance levels for the students on the ODAS before and after the education. Significant changes were observed in all measurements compared to the pre-education period.

Table 3 summarizes the students' levels of willingness to donate organs and their organ donation status both prior to and following the education. Prior to the education, there were 2 individuals who had donated organs. However, the evaluation conducted one week after the training revealed that 15 individuals had donated organs, representing a 13.5% increase in organ donation rates.

Table 2. Differences in the Pre and Post Education Scores on the Knowledge and Attitudes Scales.

Variables	Pre-Education x±SD	Post- Education x±SD	Difference x±SD	p	Effect Size
ODTKS	12.67±1.91	15.03±1.45	2.35±2.05	**p<0.001***	**1.366**
ODTKS-DC	3.23±0.72	3.93±0.73	0.69±0.99	**p<0.001***	**0.965**
ODTKS-LEMP	9.43±1.68	11.09±1.15	1.65±1.64	**p<0.001***	**1.115**
ODAS- HMC	96.94±16.32	105.44±13.29	8.50±11.38	**p<0.001***	**0.565**
ODAS-FMN	20.62±7.67	16.53±5.86	4.09±5.59	**p<0.001***	**0.588**
ODAS-FBM	25.81±10.46	22.27±9.24	3.54±5.32	**p<0.001***	**0.357**
ODAS-TNA	46.43±16.04	38.82±13.31	7.61±8.18	**p<0.001***	**0.511**
WDO	2.87±0.93	3.28±1.05	0.40±0.90	**p<0.001***	**0.407**

ODTKS: Organ-Tissue Donation and Transplantation Knowledge Scale, ODTKS-DC: Donor Characteristics Sub-dimension, ODTKS-LEMP: Legal, Ethics, Medical Process Sub-dimension, ODAS: Organ Donation Attitude Scale, HMC: Humanity and Moral Conviction, FMN: Fears of Medical Neglect, FBM: Fears of Bodily Mutilation, TNA: Total Negative Attitute, WDO: Willingness to Donate Organs.

Table 3. Willingness towards organ donation.

Willingness to Donate Organs	Pre- Education		Post- Education	
	n	%	n	%
I don't want to donate any part of my body and I don't want to sign an organ donor card either.	8	8.3	6	6.3
I am undecided about signing an organ donor card; I don't think I want to donate my organs.	22	22.9	10	10.4
I am undecided about signing an organ donor card, but I think I would like to donate my organs.	42	43.8	46	47.9
I want to donate my organs and would like to sign an organ donor card.	22	2.9	19	19.8
I have already signed an organ donor card.	2	2.1	15	15.6

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Discussion

The aim of this study was to evaluate the effects of education given to physiotherapy students regarding organ donation and transplantation on the students' knowledge level, awareness and attitudes. The findings show that receiving education on organ donation increases the knowledge level and positively affects attitudes. In addition, an increase in organ donation rates was observed after the education.

Organ Donor Registration System and its Operation

In studies conducted on students studying health sciences, the percentage of students who know the functioning of the Organ Donor Registration System in our country is not sufficient. In a study involving 352 nursing students, 30.1% were unaware of the steps to take if they wished to donate organs (Özbek Yazıcı et al., 2015). In a study involving nursing students, 83.7% stated that they did not know the working structure of the organ donation registration system in Turkey (Yazıcı Sayın & Dağcı, 2022).

In a study conducted in a state hospital in our country, it was determined that the rate of healthcare professionals who knew the Organ Donor Registration System was 78.6%, while the rate of those who knew how this system worked was 40.9% (Karataş, 2021). In a study by Türkben Polat et al. (2020) involving nursing students, 68.4% of the students reported that they did not know where to apply to donate organs. In our study, 46.9% (n=45) of physiotherapy students were aware of the "Organ Donor Registration System" in Turkey prior to receiving education, whereas this awareness increased to 94.8% (n=91) following the education. While the percentage of students who knew how the organ donor registration system worked before the education was 9.4% (n=9), this rate became 81.3% (n=78) after the education. The study's findings indicate that awareness of the "Organ Donor Registration System" in Turkey is insufficient, and knowledge about how this system operates is quite low. After the training, the rate of knowing the Organ Donor Registration System and its operation has increased significantly. To the best of our knowledge, organ donation is not included in the curriculum in physiotherapy departments. For this reason, we think that the number of students who know how the organ donor registration system works before the training is quite low.

Organ-Tissue Donation and Transplantation Knowledge Level

In the study assessing Turkish physiotherapy students' knowledge and attitudes towards tissue/organ transplantation and donation, the average score for ODTKS-DC was 3.48 ± 0.79, for ODTKS-LEMP was 9.56 ± 2.15, and the overall score was 13.04 ± 2.51 (Tuncer & Gurses, 2024). In a study by Tekin and Abdullayev (2023) on nursing students, the mean score for ODTKS was 12.9±2.4. The mean score for ODTKS-DC was 3.5 ± 0.9, while the mean score for ODTKS-LEMP was 9.4±1.9.

In a study conducted with 252 participants at a public hospital in Konya Province, which assessed healthcare professionals' knowledge and attitudes about organ donation, the mean score on the ODTKS-DC subscale was 3.53 ± 0.98, while the mean score on the ODTKS-LEMP subscale was 8.42 ± 3.27 (Karataş, 2021).

In our study, the mean knowledge level score on the ODTKS before the education was found to be consistent with the findings reported in literature. In our study, the mean score of the knowledge level of ODTKS before the education was found to be 12.67 ± 1.91, and the mean score after the education was found to be 15.03 ± 1.45. The mean score for the ODTKS-DC subscale was 3.23 ± 0.72 before the education and 3.93 ± 0.73 after the education. The mean score for the ODTKS-LEMP was 9.43 ± 1.68 before the education and 11.09 ± 1.15 after the education. A statistically significant increase in the knowledge level scores of physiotherapy students regarding Organ-Tissue Donation and Transplantation was observed following the education.

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Organ Donation Attitude

When the mean scores obtained from the ODAS in the study by Güler et al. on nursing students, the mean total score for the ODAS-HMC was 95.13±18.81. For the ODAS-FMN sub-dimension, the mean score was 29.30±10.74, while for the ODAS-FBM sub-dimension, it was 30.00±10.68. The mean total score for the sub-dimension of overall negative attitude was 59.31±19.44 (Güler et al., 2020).

In another study conducted on nursing students, the mean score of ODAS-HMC, which is a positive attitude indicator of the ODAS, was 104.00+15.05. The mean score of the ODAS-FMN, which are indicators of negative attitudes, was determined to be 45.88+11.64 and the mean score of the ODAS-FBM was determined to be 42.74+12.65, and the total scale score was determined to be 192.63+29.63 (Sarı et al., 2023). In a study involving healthcare professionals at a state hospital, it was determined that they received 96.8±22.2 from the HMC sub-dimension, 24.2±13.0 from the FMN sub-dimension, and 26.4±12.0 from the FBM sub-dimension (Karataş, 2021).

In a study conducted with physiotherapy students, the mean scores of attitudes toward organ donation measured by the ODAS were 99.26±13.44 for the HMC, 22.29±7.98 for the FMN, and 29.34±9.65 for the FBM subdimensions, corresponding to a high level of attitude (Tuncer & Gurses, 2024).

Our research findings are similar to the literature knowledge before the education. A statistically significant increase in the positive attitudes of the physiotherapy students towards organ donation was observed after the education, while a statistically significant decrease in their negative attitudes was observed. The average scores obtained by the physiotherapy students on the sub-dimensions of the ODAS before the education were as follows: 96.94±16.32 for the HMC sub-dimension, 20.62±7.67 for the FMN sub-dimension, and 25.81±10.46 for the FBM sub-dimension. After the education, the average scores were found to be 105.44±13.29 for the HMC sub-dimension, 16.53±5.86 for the FMN sub-dimension, and 22.27±9.24 for FBM sub-dimension.

Having an Organ Donation Card

Studies have shown that although students have positive attitudes towards organ donation, only a small number of them have organ donation cards (Fontana et al., 2017; Güler et al., 2020; Poreddi et al., 2016). In a study involving nursing students, it was found that while most students recognized the significance of organ donation for saving lives and promoting recovery, only 0.7% possessed an organ donation card (Güler et al., 2020). In a study exploring physician candidates' views on organ transplantation, it was reported that 72.3% of the students considered donating their organs, but only 14.1% had an organ donation card (Naçar et al., 2001).

In a study conducted on health management students, it was determined that 6 out of 118 students (5.1%) donated their organs (Soysal & Kaya, 2019). A study involving 352 nursing students, it was determined that 50.3% of the students considered donating their organs, while only 9.9% had an organ donation card (Özbek Yazıcı et al., 2015). As a result of a study carried out on university students studying in different faculties; it was found that 47.8% of the students considered organ donation, whereas only 4.2% of the students had declared organ donation by the date of the study (Kavurmacı et al., 2014).

In a study involving 504 university students, it was found that 30.1% of the students had considered donating an organ, while only 3.6% had actually donated. (Güler et al., 2017). In a study of nursing students, only 2.5% of them had a donor card (Yazıcı Sayın & Dağcı, 2022).

In a study of medical school students in Iran, the majority of students (73.8%) indicated their willingness to donate organs, but most of them (67.5%) yet a significant number (67.5%) were

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unsure of how to acquire an organ donation card, and only 9.6% had obtained one as voluntary donors (Kolagari et al., 2022). Kose et al. reported that only 3.8% (n=4) of university students who held favorable views on organ transplantation actually had a certificate indicating they had donated their organs (Kose et al., 2015).

A study conducted on students studying in health sciences indicated that 6% of the students carried a legal donor card (Goz et al., 2006). In a study of undergraduate health sciences students in Turkey, it was found that 11.4% of them possessed an organ donor card (Sarı et al., 2023).

In a study conducted among medical students, it was reported that only three out of 171 students (1.8%) donated their organs. In addition, it was observed that although the number of students who wanted to donate their organs was high, few students donated their organs (Koçak et al., 2010).

In a study conducted among health college students, when organ donation status of the students was examined, it was determined that this rate increased to 12.1% after the education, while it was 2.7% before the education (Arslan et al., 2016).

In our study, having an organ donation card before the education is similar to the literature. In our study there were 2 individuals (2.1%) who had donated organs pre-education. However, the evaluation conducted one week after the education revealed that 15 individuals (15.6%) had donated organs, representing a 13.5% increase in organ donation rates. According to this result, it can be inferred that although students have a positive approach towards organ donation, they do not exhibit actual behavior towards donation. In line with the studies conducted, physiotherapy students should be informed about this issue by adding a course on organ donation and transplantation into the curriculum, and awareness should be created on this issue with pre- and post-graduation training. It is thought that all roles on this issue should be adopted starting from the student process and this situation will positively affect the outcomes of organ donation and transplantation.

The major strength of this study is that, to our knowledge, it is the first study to assess the effectiveness of education given to physiotherapy students regarding organ donation and transplantation processes.

Collecting data from a single center is a limitation of our study. The findings of this study may not be generalizable to all physiotherapy students nationwide or globally.

Conclusion

The findings of this study indicate that educational interventions significantly enhance physiotherapy students' knowledge, awareness, and attitudes towards organ donation and transplantation. The results demonstrate that targeted education can effectively address knowledge gaps, correct misconceptions, and positively alter attitudes regarding organ donation. Educational programs are essential for raising awareness, and enhancing public understanding of organ donation. Moreover, providing students with information about organ donation centers and transplant processes and increasing their awareness can potentially improve organ donation rates. Therefore, integrating organ donation education into university curricula, ensuring access to accurate and up-to-date information, and fostering a supportive environment for organ donation through public and health sector collaboration are essential. Educational and awareness-raising efforts should be considered fundamental strategies to encourage organ donation and address organ shortages.

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Case Report / Olgu Sunumu

Case Report of a Dog Heavily Infected with Hepatozoonosis

Bir Köpek Hastada Şiddetli Hepatozoonosis Enfeksiyonu Olgu Sunumu

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Abstract: Canine hepatozoonosis is a widespread tick-borne protozoan disease and generally affects domestic dogs. Diagnosis can be made via PCR, serology, and direct observation of the gamonts of the parasite on stained blood smears. In the present case, a four-year-old female crossbred hunting dog presented to Balikesir University Veterinary Faculty clinics of internal medicine with a history of exercise intolerance, and weight loss for ten days. The dog was highly infected and showed anemia, thrombocytopenia, and neutrophilia. In radiographic analysis, unilateral pulmonary pathology was determined. This case report can be important for clinicians who live in Turkey to recognize the parasite.

Keywords: Dog, Protozoon, Hepatozoon, Pulmonary radiography, Anemia.

Öz: Köpeklerde yaygın gözlenebilen ve kene kaynaklı protozoer hastalıklardan biri olan hepatozoonozis genellikle evcil köpekleri etkiler. Hastalığın teşhisi PCR, seroloji ve periferal kan yaymalarında parazitin gamontlarının doğrudan gözlemlenmesi yoluyla yapılabilir. Bu olguda, Balıkesir Üniversitesi Veteriner Fakültesi iç hastalıkları kliniğine 10 gündür devam eden egzersiz intoleransı ve kilo kaybı şikayetiyle başvuran 4 yaşında dişi, melez av köpeği sunuldu. Yoğun bir şekilde hepatozoonozis ile enfekte olduğu belirlenen köpekte anemi, trombositopeni ve nötrofili olduğu belirlendi. Radyografik incelemede tek taraflı akciğer patolojisi belirlendi. Bu olgu sunumu Türkiye'de çalışan klinisyenlerin paraziti tanıması açısından önemli olabilir.

Anahtar Kelimeler: Köpek, Protozoon, Hepatozoon, Akciğer radyolojisi, Anemi.

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Introduction

Canine hepatozoonosis is a protozoal disease caused by *H. canis* that generally affects domestic dogs (O'Dwyer et al., 2001). This genus has more than 340 species. Of those, two, *H. canis* and *H. americanum*, have been found to infect dogs, while three, *H. felis*, *H. silvestris*, and *H. canis*, have been found to infect domestic cats (Baneth 2011; Giannelli et al 2017). The first description of *H. canis* dates back to 1905, and it is likely the most common vector-borne parasite affecting dogs in Africa, Eurasia, and Latin America. Epidemiologic surveys have revealed different results ranging between 20-59% (Dordio et al., 2021; Heylen et al., 2021; Baneth and Allen, 2022). On the other hand, in Turkey, hepatozoonosis was first described in 1933, and then several epidemiological surveys in the different regions of Turkey were performed (Voyvoda et al., 2004; Karagenc et al., 2006; Paşa et al., 2009; Aktas et al., 2013; Aktas et al., 2015, Aydin et al., 2015). In these studies, the prevalence of canine hepatozoonosis caused by *H. canis* changes between 3.61 %to 36.8%. However, it is important to note that these seroprevalence studies used different diagnosing methods.

H. canis is mainly spread by *Rhipicephalus sanguineus* but by other dog tick species (O'Dwyer et al., 2001; Gavazza et al., 2003). The dog is infected via ingestion of the tick-containing sporulated oocysts. After the sporulated oocysts are ingested, the sporozoites are released into the dog's intestinal tract and they are carried by blood to

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other various tissues where merogony occurs. Some merozoites enter neutrophils or monocytes to develop gametogony (Ezeokoli et al., 1983; Baneth et al., 2007). In addition, vertical transmission of the disease was reported (Schafer et al., 2022).

Hepatozoonosis generally causes asymptomatic disease but may cause fever, severe anemia, weight loss, and lymphadenomegaly in varying combinations depending on the level of parasitemia. In the case of high parasitemia, severe clinical signs, and marked leucocytosis can be observed. In contrast, low parasitemia is associated with general symptoms observed in other tick-borne diseases like babesiosis and ehrlichiosis (Baneth and Weigler, 1997). On the other hand, coinfection of other tick-borne diseases can be important for evaluating prognosis and treatment (Tuna et al., 2020).

Diagnosis of *Hepatozonoosis spp.* can be performed by the detection of gamonts within neutrophils and monocytes determined via peripheral blood smears (Elias and Homans, 1988). Additionally, indirect fluorescent antibody test and polymerase chain reaction (PCR) can also be used (Inokuma et al., 2002;Karagenc et al., 2006). Furthermore, previous studies have shown PCR is 22 times more sensitive than blood smear microscopy (Aktas et al., 2015). Antiprotozoal treatment of *H. canis* and *H. americanum* results in clinical improvement with a gradual decrease in parasitemia but complete elimination of the parasite generally does not occur (Macintire et al., 2001). İmidocarb (5-6 mg/kg 14 days) and doxycycline (10 mg/kg, 21 days) are commonly used in the treatment of disease (Baneth, 2011).

The present study, it was aimed to evaluate a dog referred to Balikesir University Veterinary Faculty internal medicine clinics that positive for *Hepatozoonosis spp.* on its blood smear investigation.

Materials and methods

A four-year-old female crossbred hunting dog presented to Balikesir University Veterinary Faculty clinics of internal medicine with a history of exercise intolerance, and weight loss for ten days.

Clinical examination revealed decreased body temperature (37.0 C°), weight loss, subicteric and pale mucosal membranes, and weakness (Figure 1).

Figure 1: The dog and pale mucous membranes.

Defecation, urination, and food consumption were reported as normal. No tick was found on the patient. No abdominal defense was determined. During thoracal oscultation process, coarse pulmonary sounds were recognized. In hematological analysis, slightly increased leucocyte and neutrophil count, and monocyte proportion were determined. On the other hand, prominently decreased erythrocyte and platelet count, hemoglobin level, and pocket cell volume were determined (Table 1). In blood smear examination gamont of the parasite is commonly determined in neutrophils in every microscopic scene (Figure 2).

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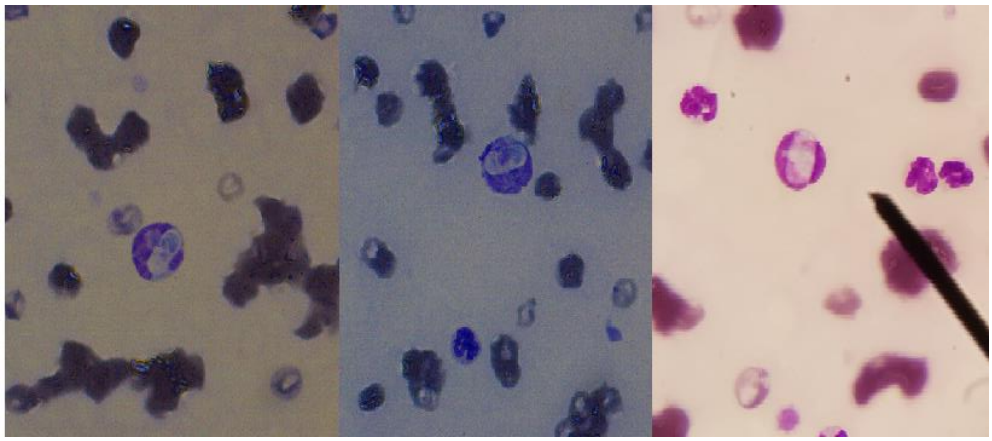

Figure 2: The leucocytes infected with gamont of the parasite.

Table 1: Haematologic examination findings.

Parameters	Result	Rerefence Range
WBC	16.47 10^{*9}/L	6-14.2
LYM	1.75 10^{*9}/L	1.48
MON	0.81 10^{*9}/L	0.2-1.5
NEU	13.75 10^{*9}/L	3-12
EOS	0.15 10^{*9}/L	0.1-1
BAS	0.01 10^{*9}/L	0-0.5
LY%	10.6%	12-30
MO%	4.9%	2-4
NE%	83.5%	62-87
EO%	0.9%	1-8
BA%	0%	0-3
RBC	1.48 10^{*12}/L	5.5-8.5
HGB	3.1 g/dl	12-18
HCT	10%	37-55
MCV	67 fl	60-77
MCH	20.9 pg	19.5-24.5
MCHC	30.9 g/dl	31-34
PLT	48 10^{*9}/L	200-500
MPV	16.0 fl	3.9-11.1

White blood cell (WBC), lymphocyte (LYM), neutrophile (NEU), monocyte (MON), eosinophil (EOS), red blood cell (RBC), hemoglobin (HGB), haematocrit (HCT), mean corpuscular volume (MCV), mean corpuscular hemoglobin concentration (MCHC), mean platelet volume (MPV), platelet count (PLT).

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In radiographic analysis, an alveolar pattern was determined in the right cranial pulmonary lobe was determined (Figure 3). Furthermore, the lam agglutination test was also positive (Figure 4). The owner of the dog did not accept the serum biochemical analysis of the dog due to financial issues. Based on these clinical and laboratory findings, the diagnosis of the case was suggested as hepatozoonosis. The dog was treated with 10 mg/kg of doxycycline (Monodoks 100 mg capsule, Deva, Turkey) orally for twenty-one days. Another supportive treatment is 0.5 mg/kg of methylprednisolone (Prednol 16 mg tablet, Mustafa Nevzat, Turkey) orally for three days because of its antiiflammatory properties. At the end of the treatment process, no reliable data related to the result of the treatment was obtained from the owner of the dog.

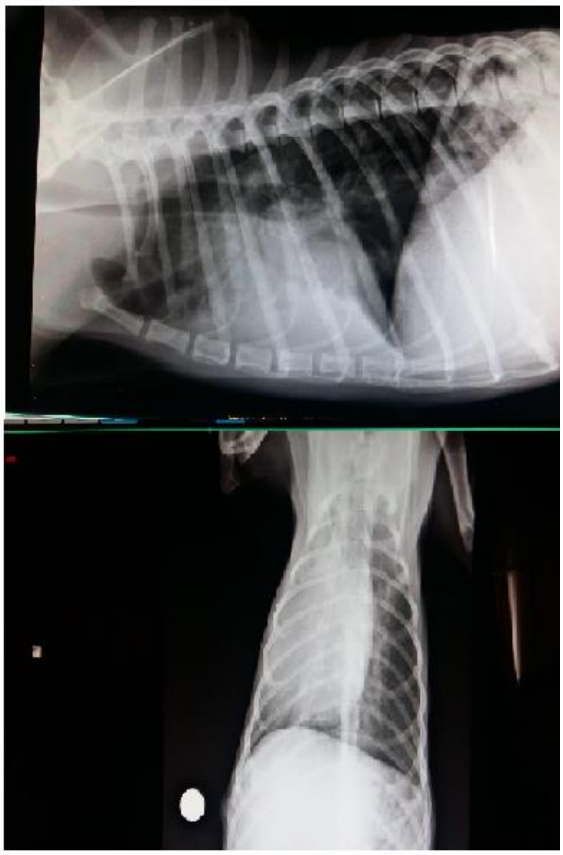

Figure 3: Laterolateral and ventrodorsal radiographies. Alveolar pattern (arrow) and silhouette sign (arrow head).

Figure 4: Positive result of lam agglutination test

Discussion

H. canis is common in Europe, Asia, Africa, and Latin America. However, *H. americanum* is named "The North American parasite" due to its specific distribution. Furthermore, gamonts of *H. canis* can be observed commonly in stained blood smears of infected dogs. In contrast, the gamonts of *H. americanum* are rarely found in stained blood smears (Banet and Allen, 2022). Due to there being no travel history of the patient and determining the *Hepatozoon spp.* gamonts commonly in stained blood smear, it can be suggested that *H. canis* can be responsible for the disease.

The present study determined anemia, slightly increased neutrophile and leukocyte count, thrombocytopenia, and decreased hemoglobin levels in hematological analysis. In parallel to these findings, the lam agglutination test was also positive due to inflammatory response. In the clinical examination weight loss, weakness, poor hair coat, and pale mucous membranes were determined. Clinical and hematological findings are congruent with previous studies (Paşa et al., 2009). In a previous study, gamonts of the *H. canis* were not detected very commonly in blood smear analysis as in our study (Carvajal et., 2012). However, in the present study, at least one gamont was observed nearly every microscopic scene. It can be suggested that the patient exhibitied a pronounced parasitic burden.

Furthermore, a silhouette sign and an alveolar sign were observed in unilateral lungs in radiographical analysis. However, no prominent dyspnea was observed during clinical examination. The exact etiology of the pathologies in the lung could not be determined. On the other hand, according to our literature search, this is the first case report in

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dogs with hepatozoonosis and concurrently pulmonary pathology.

Babesiosis, anaplasmosis, and ehrlichiosis are also commonly determined in dogs with hepatozoonosis(Tuna et al.,2020,). Unfortunately, the existence of these diseases was not eliminated in this case. So, it can be suggested that this is the main deficiency of this case report. On the other hand, none of the diseases stated before was not diagnosed with blood smear analysis. PCR analysis was not performed to determine the species of the parasite due to highly common gamonts of the parasite were observed. *H. canis* is not always commonly observed in stained blood smears. Furthermore, concurrent pulmonary radiographic signs have not been reported before in dogs with hepatozoonosis.

The high number of gamonts in each microscopic scene of the stained blood smears constitutes a significant aspect of the case report. It can be suggested, that this case report can be important for clinicians to recognize the gamonts of the parasite in stained blood smears.

Conflict of Interest

There is no conflict of interest.

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Case Report / Olgu Sunumu

Surgical Management of Symphisis Mandibulae Fracture in a Hedgehoh (Erinaceus europaeus) Following a Traffic Accident (Case Report)

Bir Kirpide (Erinaceus europaeus) Trafik Kazası Sonucu Symphisis Mandibulae Kırığının Cerrahi Sağaltımı (Olgu Sunumu)

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Abstract: The material of this case report was a 3-year-old male Western European hedgehog (Erinaceus europaeus) brought to Burdur Mehmet Akif Ersoy University Animal Hospital. The patient was brought as a result of a traffic accident. Radiographic images were taken for diagnosis, and it was determined that there was a fracture in the symphysis mandible. As a result of the examinations, an operation was decided to provide the coaptation of the symphysis mandible. After monitoring the patient's general condition and fasting for 12 hours, the patient was taken to the operating room. 3 µg/kg medetomidine was administered intramuscularly to the patient for sedation. For anesthesia, 4 mg/kg ketamine was administered intramuscularly. Ventral surface of the symphysis line was shaved, and asepsis and antisepsis were provided. A stab incision was made in the ventral surface of the symphysis line with a number 11 scalpel, and an 18 g hypodermic needle was inserted. The needle was removed into the oral cavity following the caudal aspect of the lower incisor. 0.3 mm cerclage wire was passed through the needle, and the needle was removed. The cerclage wire curved from the needle passed across the mandible was removed from the first incision site, and reduction was achieved. The cerclage wire was bent and cut. In the postoperative period, the reduction status was determined by X-ray.

Keywords: Western European hedgehog (Erinaceus europaeus), Traffic accident, Cerclage wire, Symphysis mandible fracture.

Öz: Bu olgu sunumunun materyalini Burdur Mehmet Akif Ersoy Üniversitesi Hayvan hastanesine getirilen 3 yaşında, erkek Batı Avrupa Kirpisi (Erinaceus europaeus) oluşturdu. Trafik kazası sonucu getirilen hastanın tanı amacıyla radyografik görüntüleri alınıp simfizis mandibulada kırık olduğu belirlendi. Yapılan muayeneler sonucunda simfizis mandibula kırığının redüksiyonu için operasyon kararı alındı. Hastaya sedasyon amacıyla 3 µg/kg medetomidin kas içi olarak uygulandı. Anestezi için ise 4 mg/kg ketamin kas içi olarak uygulandı. Simfizis çizgisinin ventral yüzeyi tıraş edilip asepsi ve antisepsi sağlandı. Simfizis çizgisinin ventral yüzeyine 11 numara bisturi ile küçük bir ensizyon uygulanarak 18 g hipodermik bir iğne sokuldu. İğne, alt insisiv dişin kaudalini takip ederek ağız boşluğuna çıkarılarak 0,3 mm' lik serklaj teli iğneden geçirilip iğne çıkarıldı. Mandibulanın karşısından geçirilen iğneden kavis verilen serklaj teli ilk ensizyon yerinden çıkartılarak redüksiyon sağlandı. Serklaj teli sıkıştırılarak kesildi. Postoperatif dönemde ilk olarak röntgenle redüksiyonun durumu tespit edildi.

Anahtar Kelimeler: Batı Avrupa Kirpisi (Erinaceus europaeus), Trafik kazası, Serklaj teli, Simfizis mandibula kırığı.

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Introduction

Erinaceus europaeus is an insectivore weighing less than 1.5 kg. Active life from April to September, and hibernation starts in October and continues until March (Claire ve ark., 2010). Hedgehogs use a variety of foods as food sources, including eggs and young birds, mice, and frogs, in addition to invertebrates such as insects, caterpillars, and worms (Rautio ve ark., 2015).

Hedgehog-caused road accidents have decreased in many regions, which indicates that hedgehog populations are declining in these regions. This population decline includes badger predation, increased road traffic, increased use of insecticides, molluscs, anticoagulants, rodenticides, and agricultural chemicals. The nocturnal activity of hedgehogs in urban areas is shaped by badgers, human activity, weather conditions, and the availability of prey (Claire ve ark., 2010).

The effects of roads and traffic on animal populations are not limited to traffic accidents. Damage to or loss of habitat, traffic, and road-related factors that can affect the movement of animals can lead to significant reductions in the life span and population. Factors such as light visual stimuli, traffic noise, road construction activities, human access to natural habitats resulting in pollution, erosion and sedimentation cause a noticeable decrease in habitat quality. The affected areas are not limited to the specified road; depending on the relevant factors, they can spread over extensive areas (Huijser ve Bergers, 2000).

Hedgehogs are omnivorous, with highly developed jaws and primitive and relatively coarse dentition (Chaprazov ve ark., 2014). It has a small skull with a zygomatic arch. The third upper premolar tooth is absent or small. The tooth formula is I 3/2, C 1/1, P 3/2, M 3/3, totalling 36 teeth (Santana ve ark., 2010).

Incisor teeth are sharp teeth used for grasping and lifting small prey. Canine teeth are quite small and similar to incisors or premolars. Molar and premolar teeth are flat and wide (Chaprazov ve ark., 2014). In the ninth week, the hedgehogs form all the temporary teeth, and the milk teeth grow between days 18 and 23. Permanent teeth develop between the 7th and 9th week. Erinaceus europeus M1, M2, P2, I3 have permanent teeth in the second month. After the 2nd and 3rd canine teeth, M3 is formed. In the 4th and 5th months, P3 and P4 appear. Erinaceus europeus has permanent dentition, M1, M2, P2, I3, C, M3, P4, P3, I2, I1, respectively (Asher ve Olbricht, 2009).

This case report aims to present the diagnosis, treatment, and postoperative results of a fracture of the symphysis mandible in a hedgehog due to a traffic accident.

Case Report

In the examination of a 3 years old male Western European hedgehog (Erinaceus europaeus) weighing 700 grams, which was brought to Burdur Mehmet Akif Ersoy University Faculty of Veterinary Medicine Animal Hospital as a result of a traffic accident, symphysis mandibulae fracture was diagnosed by radiological examination (Figure 1).

Figure 1. A case of symphysis mandibulae fracture in Western European Hedgehog (Erinaceus europaeus).

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After monitoring the patient's general condition, it was fasted for 12 hours. Medetomidine 3 µg /kg and ketamine 4 mg/kg were applied to the right musculus quadriceps femoris. Atipamezole was applied to the same area again to wake the patient.

A stab incision was made in the skin ventral to the symphysis mandible. An 18G hypodermic needle was inserted along the lateral surface of the mandible and removed into the oral cavity following the caudal aspect of the lower incisor. A 0.3 mm cerclage wire was passed through an 18G hypodermic needle. The needle was inserted from the opposite side of the mandible in the same way, and the cerclage wire was curved and removed from the point where it first entered after passing through the needle. After the fracture reduction was completed, the wire was stretched and cut outside the skin incision, and then the wire was bent (Figure 2), (Figure 3). A postoperative radiological image was taken (Figure 4).

Figure 2. Use of cerclage wire in symphysis mandibulae.

Figure 3. Completion of fracture reduction using cerclage wire.

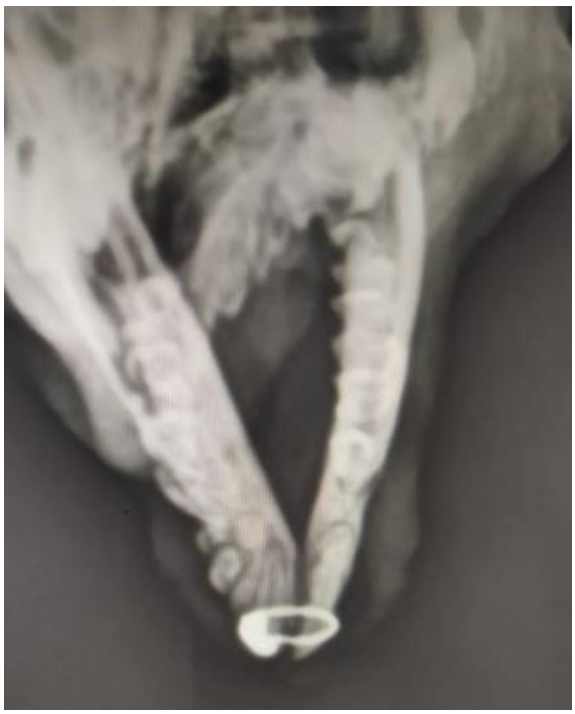

Figure 4. Postoperative radiology image.

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Since the patient was homeless, it was kept in the intensive care cage at Burdur Mehmet Akif Ersoy University for 6 weeks. Wet food was given for six weeks in order to prevent the patient from chewing the food and disturbing the reduction. Postoperatively, the patient was followed up once a week by radiology. At the end of the sixth week, stabilization was achieved, and the patient returned to daily routines.

Discussion

Radiological imaging can be used to diagnose and determine the fracture's location. During the radiological examination, overlapping structures in the mandibular condyle and ramus evaluation may cause artifacts and fracture fragments not to be identified. (Woodbridge ve Owen, 2013). Therefore, multidirectional radiographs were taken in the preoperative period.

Cerclage wire application is the most effective surgical treatment method for uncomplicated and simple mandibular symphysis fractures (Woodbridge ve Owen, 2013). Accordingly, we have applied cerclage wire to the symphysis mandible fracture. It has been observed that a single cerclage wire can be effectively used as a treatment method for symphysial fracture.

The cerclage wire is advanced from the ventral surface of the symphysis line along the lateral mandibular surface and surrounds the incisor teeth caudally (Hayashi ve ark., 2019). The fracture was traversed using an 18G hypodermic needle ventral to the symphysis, followed by reduction caudal to the incisor teeth, and subsequently, the cerclage was tightened and cut.

The wire used can be removed postoperatively after three weeks. Approximately six weeks are required for the fracture to heal (Jacobson, 2019). In this case, the patient was fed wet food for six weeks after the operation to prevent deterioration of the fracture line. Healing was observed at the end of the sixth week with radiological examinations.

Conclusion

In conclusion, it is revealed that traffic accidents can result in symphysis mandible fractures. Utilization of oblique radiographs facilitates the diagnosis of symphysis separations in hedgehogs. Furthermore, the coaptation achieved through the fixation of mandibular symphysis separation utilizing cerclage wires, combined with a diet of wet food, facilitates healing within six weeks.

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