

DIROFILARIOZA DONJEG OČNOG KAPKA: REDAK SLUČAJ OČNE PARAZITSKE INFEKCIJE SA MOGUĆOM ENDEMSKOM EKSPOZICIJOM

PRIKAZ SLUČAJA

CASE REPORT

LOWER EYELID DIROFILARIOSIS: A RARE CASE OF OCULAR PARASITIC INFECTION WITH POSSIBLE ENDEMIC EXPOSURE

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SAŽETAK

Uvod: Dirofilarioza, uzrokovana parazitskom nematodom *Dirofilaria repens*, predstavlja zoonozu sa retkim očnim manifestacijama koje se sve češće prijavljuju u regionima sa povećanom rasprostranjenosti parazita. Infekcija se kod ljudi manifestuje lokalizovanom inflamatornom reakcijom a zahvaćenost oka može dovesti do značajne nelagodnosti i dijagnostičkih izazova. Iako se često povezuje sa putovanjem u endemska područja, kao što je Mediteran, dirofilarioza je takođe endemska u Srbiji, što ukazuje na mogućnost lokalne transmisije.

Prikaz slučaja: Pacijentkinja, stara 38 godina, javila se sa senzacijom pokreta u donjem kapku desnog oka, nakon povratka sa odmora u Grčkoj. Pregledom je ustanovljeno postojanje lokalizovanog otoka i opipljive pokretne mase u donjem kapku desnog oka. Hirurškim putem izvršena je ekstirpacija nematode, a dalja parazitološka analiza je potvrdila prisustvo *Dirofilaria spp.* S obzirom na to da je Srbija endemsko područje za dirofilariozu, ne može se isključiti mogućnost da je infekcija nastala pre putovanja. Prethodno prisutni simptomi su se potpuno povukli nakon zahvata, bez daljih komplikacija tokom praćenja. Ovaj slučaj ističe važnost razmatranja parazitskih infekcija u diferencijalnoj dijagnozi novonastalih lokalizovanih masa na kapku, naročito kod pacijenata sa podatkom o skorijem putovanju u endemske oblasti, odnosno onima koji u njima žive.

Zaključak: Opisom ovog slučaja predstavljena je klinička prezentacija i uspešno lečenje dirofilarioze kapka, retke okularne manifestacije infekcije nematodom *Dirofilaria spp.* Podatak o putovanju u endemske regione može pobuditi sumnju na parazitske uzročnike inflamacije oka, ali treba uzeti u obzir i mogućnost lokalne transmisije u područjima poput Srbije. Pravovremena dijagnoza i hirurška intervencija često dovode do potpunog izlečenja. Potrebna su dodatna istraživanja kako bi se bolje razumela geografska rasprostranjenost dirofilarioze u endemskim područjima, njene okularne manifestacije, kao i komplikacije koje mogu nastati zbog neadekvatne dijagnostike i lečenja.

Ključne reči: dirofilarioza, okularna manifestacija, masa na kapku, parazitska infekcija

ABSTRACT

Introduction: Dirofilariosis, caused by the parasitic nematode *Dirofilaria repens*, is a zoonotic disease with rare ocular manifestations that are being increasingly reported in regions experiencing expanded parasite distribution. Infection in humans manifests as a localized inflammatory reaction and ocular involvement can lead to significant discomfort and diagnostic challenges. While often associated with travel to endemic areas, such as the Mediterranean region, dirofilariosis is also endemic in Serbia, which highlights the possibility of local transmission.

Case report: A 38-year-old female patient presented with unusual sensations of movement in her lower eyelid following a vacation in Greece. Clinical examination revealed localized swelling and a palpable moving mass in the lower eyelid. Surgical excision of the lesion was performed, and parasitological analysis confirmed the presence of *Dirofilaria spp.* Given that dirofilariosis is also endemic in Serbia, the possibility of pre-existing local infection before the patient's trip cannot be excluded. The patient's symptoms resolved completely after surgery, with no recurrence or complications noted during follow-up. This case underscores the need for considering parasitic infections in the differential diagnosis of eyelid masses, especially in patients who have recently traveled to or live in endemic areas.

Conclusion: This case highlights the clinical presentation and successful management of lower eyelid dirofilariosis, a rare ocular manifestation of *Dirofilaria spp.* infection. While a travel history to endemic regions can raise suspicion, endemicity in regions like Serbia necessitates factoring in the possibility of local transmission. Early detection and prompt surgical intervention are often curative. Further research is needed to understand local transmission dynamics and the ocular involvement of dirofilariosis in endemic areas, as well as complications that may arise due to inadequate diagnosis and treatment.

Keywords: dirofilariosis, ocular manifestation, eyelid mass, parasitic infection

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UVOD

Dirofilarioza je zoonotska parazitska infekcija uzrokovana nematodama iz roda *Dirofilaria*, koje prvenstveno inficiraju pse i druge mesoždere. Infekcije kod ljudi nastaju slučajno kada zaraženi komarci prenesu larve na ljude putem ujeda. Dve vrste koje su najčešće uključene u dirofilariozu kod ljudi su *Dirofilaria immitis* i *Dirofilaria repens* [1]. *Dirofilaria immitis* obično izaziva plućnu dirofilariozu, koja pogađa pluća i plućne arterije, dok je *Dirofilaria repens* češće povezana sa potkožnim i okularnim infekcijama [2].

U regionima kao što je mediteranski basen, posebno u zemljama kao što je Grčka, infekcije nematodom *Dirofilaria repens* pospešuje velika prevalencija komaraca, te prisustvo zaraženih životinja, odnosno rezervoara [3]. Srbija je takođe prepoznata kao endemsko područje za nematodu *Dirofilaria repens* a brojne studije govore o značajnom stepenu prisustva infekcije i kod pasa i kod ljudi. Sistematska istraživanja od 2008. godine na ovamo su potvrdila da klima u Srbiji, populacije komaraca, kao i pasa kao rezervoara infekcije, stvaraju povoljne uslove za endemsko prenošenje. Tasić i saradnici su dokumentovali dirofilariozu pasa na severu Srbije [4], dok su Tasić-Otašević i saradnici, kao i Momčilović i saradnici prijavili više slučajeva autohtonih ljudskih infekcija, uključujući potkožne i subkonjunktivne oblike [5,6].

Iako je očna dirofilarioza neuobičajena, ona predstavlja jedinstveni dijagnostički izazov zbog svojih varijabilnih kliničkih manifestacija, koje mogu uključivati otok, crvenilo, osećaj nelagodnosti ili senzacije slične stranom telu u zahvaćenom području [7]. U nekim slučajevima, pacijenti prijavljuju karakterističan osećaj „da se nešto pomera“ ispod kože ili oko oka, što se pripisuje pokretljivosti nematode unutar potkožnog tkiva [8].

Ovom prilikom, opisujemo slučaj 38-godišnje žene koja je imala senzacije pokretanja u donjem kapku nakon odmora provedenog na jednom grčkom ostrvu. Iako je njena istorija putovanja u početku izazvala sumnju na uvezenu slučaj, infekcija je mogla da dobije i u Srbiji, gde je *Dirofilaria repens* endemična. S obzirom na životni ciklus i brzinu rasta nematode *Dirofilaria repens*, ne može se isključiti mogućnost autohtone infekcije u Srbiji, što naglašava dijagnostičku složenost ovakvih slučajeva.

Uprkos tome što su simptomi po svojoj prirodi zabrinjavajući, očna dirofilarioza generalno ima povoljnu prognozu nakon hirurškog uklanjanja parazita. Retko dolazi do recidiva, a pacijenti se obično u potpunosti oporave. Međutim, usled faktora kao što su povećani broj putovanja na globalnom nivou, klimatske promene i širenje populacije komaraca, učestalost dirofilarioze kod ljudi raste [8]. Rano prepoznavanje kliničkih

INTRODUCTION

Dirofilariosis is a zoonotic parasitic infection caused by nematodes belonging to the *Dirofilaria* genus, which primarily infect dogs and other carnivores. Human infections occur incidentally when infected mosquitoes transfer larvae to humans through bites. The two species most frequently implicated in human dirofilariosis are *Dirofilaria immitis* and *Dirofilaria repens* [1]. *Dirofilaria immitis* commonly causes pulmonary dirofilariosis, affecting the lungs and pulmonary arteries, whereas *Dirofilaria repens* is more frequently associated with subcutaneous and ocular infections [2].

In regions such as the Mediterranean basin, particularly in countries like Greece, *Dirofilaria repens* infections are facilitated by high mosquito prevalence and the presence of infected animals, i.e., reservoirs [3]. Serbia is also recognized as an endemic area for *Dirofilaria repens*, with numerous studies highlighting significant infections in both dogs and humans. Since 2008, systematic research has confirmed that the climate in Serbia, mosquito populations, and canine reservoirs create favorable conditions for endemic transmission. Tasić et al. documented canine dirofilariosis in northern Serbia [4], while Tasić-Otašević et al. and Momčilović et al. reported multiple cases of autochthonous human infections, including subcutaneous and subconjunctival forms [5,6].

Though ocular dirofilariosis is uncommon, it presents a unique diagnostic challenge due to its variable clinical manifestations, which can include swelling, redness, discomfort, or sensations akin to a foreign body in the affected area [7]. In some instances, patients report a distinctive sensation of “something moving” beneath the skin or around the eye, attributed to the nematode’s motility within subcutaneous tissue [8].

In this instance, we report the case of a 38-year-old woman who presented with sensations of movement in her lower eyelid following her vacation on a Greek island. While her travel history initially raised suspicion of an imported case, the infection could also have been acquired in Serbia, where *Dirofilaria repens* is endemic. Considering the life cycle and growth rate of *Dirofilaria repens*, the possibility of autochthonous infection in Serbia cannot be excluded, which underscores the diagnostic complexity of such cases.

Despite the concerning nature of the symptoms, ocular dirofilariosis generally has a favorable prognosis following surgical removal of the parasite. Recurrence is rare, and patients typically achieve full recovery. However, with factors such as increased global travel, climate change, and expanding mosquito populations, the incidence of human dirofilariosis has been on the rise [8]. Early recognition of the clinical signs is crucial

znakova je ključno jer se tako izbegava uspostavljanje pogrešne dijagnoze i sprovođenje nepotrebnih procedura a omogućava brzo uklanjanje parazita i prestanak simptoma.

Ovaj slučaj stavlja u prvi plan važnost razmatranja parazitskih infekcija u diferencijalnoj dijagnozi masa nepoznatog porekla ili senzacija pokreta u očnim kapcima. Kliničari moraju da budu na oprezu, ne samo kod pacijenata sa nedavnom istorijom putovanja u endemska područja, već i kod pacijenata koji borave u oblastima u kojima je ustanovljena lokalna vektorska populacija, kao što je Srbija, gde se sve češće prijavljuju slučajevi infekcije kod ljudi. Sama činjenica da nije izvesno da li je infekcija ove pacijentkinje uvezena ili autohtona dodatno naglašava potrebu za povećanom svešću prilikom uspostavljanja dijagnoze, i u endemskim i u neendemskim područjima.

PRIKAZ SLUČAJA

Tridesetosmogodišnja pacijentkinja se javila našoj oftalmološkoj klinici žaleći se na neobičnu senzaciju u spoljašnjem delu donjeg kapka. Prijavila je da je senzacija počela sedam dana nakon povratka sa odmora na grčkom ostrvu. Boravila je na ostrvu Tasos od prvog do 18. jula, a prvi put je registrovala senzaciju u kapku 31. jula. Opisala je da joj se ova senzacija naizmenično javlja i nestaje a ogleda se u osećanju kao da joj se „nešto pomera“ unutar kapka. Pacijentkinja je negirala bol, svrab ili crvenilo i nije bilo povezanih sistemskih simptoma kao što su povišena temperatura, umor ili limfadenopatija. Nije bilo značajnih pojava zabeleženih u njenoj prethodnoj medicinskoj dokumentaciji – odsustvo prethodne istorije alergija, sistemskih bolesti ili operacija na očima. Nije uzimala nikakve lekove, a nije se sećala ni ujeda komaraca tokom odmora. U periodu od osam meseci pre odmora u Grčkoj, pacijentkinja nije putovala van Beograda i nije prethodno boravila na selu, bila blizu reka ili u kontaktu sa životinjama. Takođe se nije sećala ujeda komaraca pre ovog događaja.

Oftalmološki pregled je pokazao da pacijentkinja ima normalnu oštrinu vida (20/20) na oba oka. Prednji i zadnji segmenti očiju bili su potpuno normalni. Nije bilo znakova hiperemije konjunktive, pojave iscedka ili abnormalnosti rožnjače. Prvi spoljni pregled kapaka nije otkrio nikakav vidljiv otok, eritem ili abnormalnu masu. Međutim, kako je pacijentkinja nastavila da opisuje senzaciju pokretanja u kapku, malo, lokalizovano uzvišenje postalo je primetno u medijalnom delu donjeg kapka. Pri bližem posmatranju, uočena je struktura nalik crvu koja se kreće ispod kože. Nakon palpacije, struktura je nestala, ali se ponovo pojavila nekoliko minuta kasnije u temporalnom delu donjeg kapka (Slika 1).

to avoid misdiagnosis and unnecessary procedures, enabling prompt removal of the parasite and resolution of symptoms.

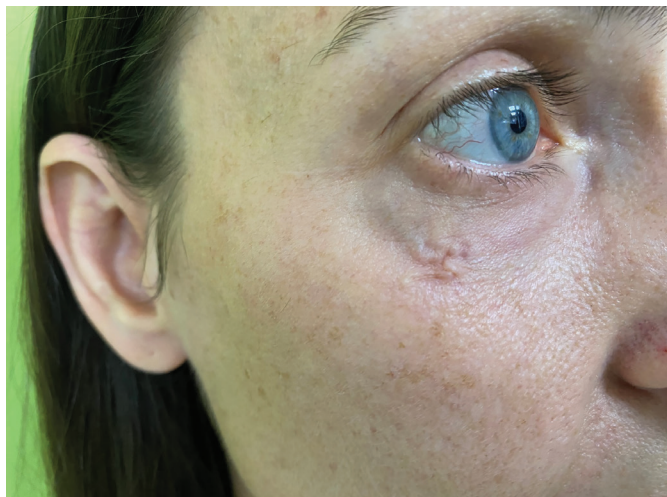
This case emphasizes the importance of considering parasitic infections in the differential diagnosis of unexplained eyelid masses or movement sensations. Clinicians must remain vigilant not only in patients with a recent history of traveling to endemic regions but also in patients residing in or traveling to areas with established local vector populations, such as Serbia, where incidental human infections are being increasingly reported. The uncertainty as to whether this patient's infection was imported or autochthonous further emphasizes the need for enhanced diagnostic awareness in both endemic and non-endemic settings.

CASE REPORT

A 38-year-old woman presented at our ophthalmology clinic complaining of an unusual sensation in the outer part of her lower eyelid. She reported that the sensation had started seven days after returning from a vacation spent on a Greek island. She had been on the island of Thasos from July 1 to July 18, and she first noticed the sensation in her eyelid on July 31. She described it as intermittent and stated that she felt as though "something was moving" inside the eyelid. The patient denied any pain, itching, or redness, and there were no associated systemic symptoms such as fever, fatigue, or lymphadenopathy. Her medical history was unremarkable, with no previous history of allergies, systemic diseases, or ocular surgeries. She had not been taking any medications, and she did not remember any mosquito bites during her holiday. The patient had not traveled outside Belgrade in the eight months before her holiday and reported no prior trips to the countryside, being near rivers, or being exposed to animals. She also did not recall any mosquito bites before this event.

On examination, the patient's visual acuity was 20/20 in both eyes. The anterior and posterior segments of the eyes were completely normal. There was no evidence of conjunctival hyperemia, discharge, or corneal abnormalities. Initial external inspection of the eyelid did not reveal any visible swelling, erythema, or abnormal masses. However, as the patient continued to describe the sensation of movement, a small, localized elevation became noticeable in the medial part of the lower eyelid. On closer observation, a worm-like structure was seen moving beneath the skin. Upon palpation, the structure disappeared but reappeared several minutes later in the temporal part of the lower eyelid (Figure 1).

Given the clinical presentation, we suspected a parasitic infection. An infectious diseases specialist

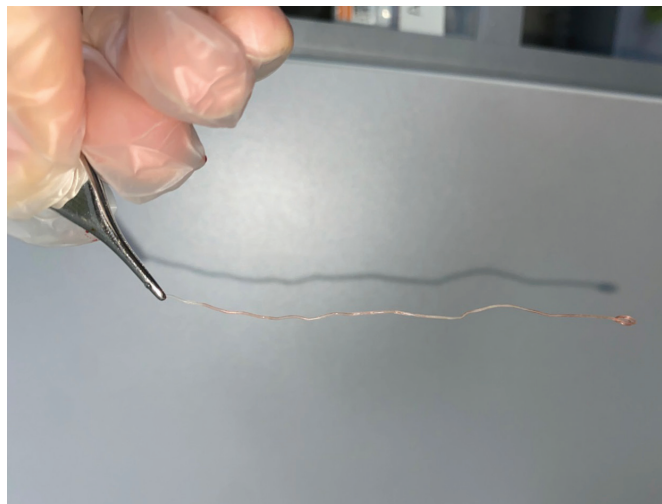


Slika 1. Preoperativna fotografija tridesetosmogodišnje pacijentkinje koja prikazuje desni donji kapak sa vidljivim blagim otokom koji ukazuje na potkožnog parazita (*Dirofilaria* spp.). Pacijentkinja je pre hirurškog uklanjanja imala senzaciju nelagodnosti i kretanja unutar kapka, što je u skladu sa prisustvom parazita

Picture 1. Preoperative image of a 38-year-old female patient showing the right lower eyelid with visible slight swelling indicative of a subcutaneous parasite (*Dirofilaria* spp.). The patient experienced discomfort and the sensation of movement within the eyelid, correlating with parasitic presence, before surgical removal

S obzirom na kliničku sliku, posumnjali smo na parazitsku infekciju. Infektolog je sproveo inicijalne analize krvi, koje nisu pokazale abnormalnosti, a test na eozinofiliju je bio negativan. Obavestili smo pacijentkinju o verovatnoj dijagnozi i preporučili hitno uklanjanje parazita. Pacijentkinja je pristala na proceduru. Nije bilo potrebe za lokalnom anestezijom. Čekali smo da se parazit ponovo pojavi ispod kože. Kada je pokret ponovo bio vidljiv, napravljen je mali rez na temporalnom delu donjeg kapka i finim pincetom je izvađen parazit sličan crvu. Izmerena je nematoda dužine preko 12 centimetara. Procedura je protekla bez komplikacija, a pacijentkinja nije osetila ni bol ni nelagodnost tokom ili nakon uklanjanja nematode (**Slika 2**). Ekstrahovani parazit je poslat na odeljenje parazitologije na identifikaciju. Dobijeni rezultat potvrdio je da je u pitanju *Dirofilaria* spp.

Nakon ekstrakcije, infektolog je izvršio dodatna ispitivanja, uključujući i rentgen srca i pluća, koja su pokazala normalne rezultate. Metoda koncentracije po Notu je takođe korišćena za testiranje mikrofilarije u krvi, a rezultati su bili negativni. Nivoi imunoglobulina E (IgE) su bili u normalnom opsegu (ispod 4,7 IU/ml; referentni opseg 0–100 IU/ml). Testovi krvi su ponovljeni sedam dana nakon inicijalnog testa, bez uočenih značajnih promena. S obzirom na odsustvo mikrofilarija i normalne laboratorijske nalaze, dodatna antiparazitska terapija nije bila indikovana i infekcija je klasifikovana



Slika 2. Prikazan je tanak, izduženi parazitski organizam (*Dirofilaria* spp.) uhvaćen pincetom nakon hirurške ekstrakcije. Crvolika struktura je duga 12 centimetara

Picture 2. A thin, elongated parasitic organism (*Dirofilaria* spp.) is shown being held with tweezers after surgical extraction. The worm-like structure is 12 centimeters long

conducted initial blood tests, which showed no abnormalities, and the patient's results were negative for eosinophilia. We informed the patient about the likely diagnosis and recommended immediate removal of the parasite. The patient consented to the procedure. Without the need for local anesthesia, we waited for the parasite to reappear under the skin. Once the movement was visible again, a small incision was made in the temporal part of the lower eyelid, and using fine forceps, the worm-like parasite was extracted. The nematode measured over 12 centimeters in length. The procedure was uncomplicated, and the patient did not experience any pain or discomfort during or after the removal (**Figure 2**). The extracted parasite was sent to the parasitology department for identification and the result confirmed *Dirofilaria* spp.

Following the extraction, the infectious diseases specialist conducted additional tests, including radiography of the heart and lungs, which showed normal results. Knott's concentration method was also used to test for microfilariae in the blood, and the results were negative. IgE levels were within the normal range (below 4.7 IU/ml; reference range 0–100 IU/ml). The blood tests were repeated seven days after the initial test, with no significant changes observed. Given the absence of microfilariae and normal lab findings, additional antiparasitic treatment was not indicated and the infection was classified as an amicrofilaremic case of *Dirofilaria* spp. infection successfully treated surgically.

Postoperatively, the patient did not require any additional treatment, and the small incision healed well,

kao amikrofilaremični slučaj infekcije nematodom *Dirofilaria spp.* koja je uspešno izlečena hirurškim putem.

Postoperativno, pacijentkinji nije bilo potrebno dodatno lečenje, a mali rez je dobro zarastao, ostavljajući jedva vidljiv ožiljak. Mesec dana kasnije, nalaz kliničkog pregleda pacijentkinje je i dalje bio normalan, bez znakova recidiva ili dodatnih simptoma.

DISKUSIJA

Inficiranje ljudi nematodom *Dirofilaria* nastaje kada komarac koji ujede domaćina unese infektivnu larvu trećeg stadijuma (L3) u njegov krvotok. Mada su ljudi slučajni domaćini pa se larva retko razvije u odraslog crva, u nekim slučajevima je ovo napredovanje moguće. Kod pacijentkinje čiji smo slučaj opisali, larva je sazrela u svoj odrasli oblik, ilustrujući jedan od neuobičajenih razvoja događaja koji može dovesti do ovakvog ishoda.

Okularna dirofilarioza, iako retka, mora se uzeti u obzir kao diferencijalna dijagnoza kod pacijenata koji imaju nerazjašnjeno oticanje očnih kapaka ili osećaj pokretanja u kopcima, posebno kod onih koji su putovali u područja gde je *Dirofilaria* endemična. U slučaju naše pacijentkinje, ona je prethodno boravila na grčkom ostrvu, koje je deo mediteranske regije poznate po endemskim infekcijama koje prenose komarci. Međutim, s obzirom na životni ciklus i brzinu rasta nematode *Dirofilaria repens*, ovu infekciju je pacijentkinja mogla dobiti i u Srbiji, gde je autohtona dirofilarioza dobro dokumentovana [9]. Pun životni ciklus nematode *Dirofilaria repens*, uključujući faze larve i prepatentni period pre izlučivanja mikrofilarija, obično traje 6-9 meseci. Kod ljudi, *Dirofilaria repens* često ne dostiže punu zrelost, ali dužina parazita od dvanaest centimetara ukazuje na to da se infekcija možda dogodila nekoliko meseci ranije, što nam govori da je malo verovatno da je ona nastala prilikom prethodnog putovanja pacijentkinje.

U Srbiji su dokumentovani slučajevi dirofilarioze i kod ljudi i kod životinja, posebno u oblastima duž rečnih tokova gde preovlađuju komarci prenosioci. Džamić i saradnici su prijavili slučajeve potkožne infekcije nematodom *Dirofilaria repens* u Srbiji i Crnoj Gori, uključujući periokularnu lokalizaciju, i istakli ulogu regionalnih vektora u prenošenju [10]. Naša pacijentkinja, koja nije prethodno boravila na selu i koja živi u urbanom okruženju, pokazuje da su gradski slučajevi mogući i da urbano okruženje ne bi trebalo da isključi dirofilariozu kao diferencijalnu dijagnozu. Tasić i saradnici su takođe uočili značajno inficiranje pasa u Srbiji, naglašavajući značaj zoonotskih rezervoara u izloženosti ljudi nematodi *Dirofilaria repens* [11]. Imajući u vidu ove nalaze i ograničenu istoriju putovanja pacijentkinje van Beograda, endemsko poreklo infekcije u Srbiji se može smatrati verovatnim.

leaving a barely visible scar. One month later, the patient's clinical examination findings remained normal, with no signs of recurrence or additional symptoms.

DISCUSSION

Human infection with *Dirofilaria* occurs when a mosquito introduces an infective third-stage larva (L3) into the bloodstream when biting the host. While humans are accidental hosts and the larva rarely develops into an adult worm, in some cases, this progression is possible. In the patient we have described, the larva matured into its adult form, illustrating one of the uncommon scenarios in which this can happen.

Ocular dirofilariosis, though rare, must be taken into consideration as a differential diagnosis in patients presenting with unexplained eyelid swelling or sensations of movement, particularly in those who have traveled to regions endemic to *Dirofilaria*. In our case, the patient had recently visited a Greek island, which is part of the Mediterranean region known for endemic mosquito-borne infections. However, given the life cycle and growth rate of *Dirofilaria repens*, this infection could have been also acquired in Serbia, where autochthonous dirofilariosis is well documented [9]. The full life cycle of *Dirofilaria repens*, including larval stages and the prepatent period before microfilariae excretion, typically spans 6–9 months. In humans, *Dirofilaria repens* often fails to reach full maturity, yet the parasite's twelve-centimeter length suggests that infection may have occurred several months earlier, making recent travel an unlikely origin.

In Serbia, dirofilariosis cases have been documented in both humans and animals, particularly in areas along river courses where mosquito vectors are prevalent. Džamić et al. reported cases of subcutaneous *Dirofilaria repens* infection in Serbia and Montenegro, including periocular sites, and highlighted the role of regional vectors in transmission [10]. The case of our patient, who had no recent exposure to the countryside and lived in an urban setting, demonstrates that urban cases are possible and that the urban setting should not exclude dirofilariosis as a differential diagnosis. Tasić et al. also noted significant canine infections in Serbia, underscoring the importance of zoonotic reservoirs in human exposure to *Dirofilaria repens* [11]. Given these findings and the patient's limited travel history outside of Belgrade, endemic origin in Serbia remains plausible.

The pathogenesis of human dirofilariosis involves mosquito-borne transmission of infective larvae, which migrate through subcutaneous tissues and mature into adult worms, reaching 10 to 15 centimeters in length. Simon et al. reported that *Dirofilaria repens*

Patogeneza ljudske dirofilarioze uključuje prenos infektivnih larvi od strane komaraca. Larve migriraju kroz potkožno tkivo i sazrevaju u odrasle crve, dostižući dužinu od 10 do 15 centimetara. Simon i saradnici su naveli da *Dirofilaria repens* može da se nastani u različitim periokularnim strukturama, kao što su očni kapak, orbita i subkonjunktivalna tkiva, izazivajući simptome kretanja [12]. Džamić i saradnici su dokumentovali nekoliko slučajeva u kojima su pacijenti iskusili osećaj kretanja ispod kože, što sugerše da je ovo karakteristično za infekcije nematodom *Dirofilaria repens* [9].

Epidemiološki gledano, nedavne studije su dokumentovale porast u broju slučajeva očne dirofilarioze u području Mediterana, što je posledica klimatskih promena i mobilnosti ljudi. Na ovaj način se proširuju staništa komaraca vektora. Pupiće-Bakrač i saradnici su razmatrali slučajeve mikrofilaremije kod ljudi naglašavajući važnost kontrole vektora u prevenciji infekcija [13]. Značaj kontrole širenja infekcije je očigledan jer se svest o riziku od nematode *Dirofilaria* sada odnosi i na urbana, neendemska područja, što je u skladu sa našim slučajem u kojem se sumnjalo na autohtonu dirofilariozu.

Hirurško uklanjanje je osnova lečenja očne dirofilarioze i nudi siguran i delotvoran pristup uz minimalne komplikacije. Kalogeropoulos i saradnici su naglasili da ekscizija obično rešava simptome bez potrebe za dodatnom terapijom. U slučaju naše pacijentkinje, odsustvo mikrofilarije i normalan nivo IgE u krvi potvrdili su amikrofilaremičnu infekciju, što govori u prilog tome da je hirurško lečenje dovoljno [3]. I Tasić-Otašević i saradnici su dokumentovali slučajeve gde je samo ekscizija bila adekvatna metoda lečenja, bez potrebe za sistemskom terapijom, što se poklapa sa ishodom naše pacijentkinje, kod koje nakon uklanjanja nematode nije primećen recidiv [14]. Važno je napomenuti da se, na osnovu opšteg konsenzusa, antihelmintička terapija obično ne preporučuje za slučajeve površinske dirofilarioze.

Dijagnostikovanje očne dirofilarioze može predstavljati izazov zbog njene varijabilne i nespecifične prezentacije. Engelsberg i Blekberg su istakli potrebu da se parazitske infekcije uključe u diferencijalnu dijagnozu periokularnih masa, posebno kod pacijenata iz endemskih područja ili onih koji su nedavno putovali [7]. Pogrešne dijagnoze mogu dovesti do neodgovarajućeg lečenja, kao što su antibiotici ili steroidi, koji su neefikasni kod parazitskih infekcija. Nadalje, Radovanović Spurnić i saradnici su naglasili važnost blagovremenog otkrivanja i hirurškog uklanjanja, kako bi se sprečilo nepotrebno i potencijalno štetno lečenje [15]. Naš slučaj naglašava potrebu da se *Dirofilaria* uzme u obzir kao diferencijalna dijagnoza, ne samo u endemskim regionima, već i kod pacijenata sa periokularnim simptomima koji nisu prethodno putovali.

can lodge in various periocular structures, such as the eyelid, orbit, and subconjunctival tissues, causing symptoms of movement [12]. Džamić et al. documented several cases wherein patients experienced sensations of movement in subcutaneous sites, suggesting that this mobility is characteristic of *Dirofilaria repens* infections [9].

Epidemiologically, recent studies have documented a rise in the number of ocular dirofilariosis cases in Mediterranean regions, driven by climate change and the mobility of humans, both of which expand mosquito vector habitats. Pupiće-Bakrač et al. discussed human microfilaremia cases, underlining the importance of vector control in preventing infections [13]. The infection control implication is clear as awareness of *Dirofilaria* infection risk extends even to urban, non-endemic areas, which is in keeping with our case of suspected autochthonous dirofilariosis.

Surgical excision remains the cornerstone of ocular dirofilariosis treatment, offering a safe and effective approach with minimal complications. Kalogeropoulos et al. emphasized that excision typically resolves symptoms without the need for additional therapy. In our case, the absence of microfilariae in blood tests and a normal IgE level confirmed an amicrofilaremic infection, supporting the sufficiency of surgical management [3]. Similarly, Tasić-Otašević et al. documented cases where excision alone was appropriate, with no need for systemic therapy, which coincides with our patient's outcome, where no recurrence was observed post-removal [14]. It is important to note that, based on general consensus, antihelmintic therapy is not typically recommended for cases of superficial dirofilariosis.

Diagnosing ocular dirofilariosis can be challenging due to its variable and nonspecific presentation. Engelsberg and Bläckberg highlighted the need to include parasitic infections in the differential diagnosis of periocular masses, particularly in patients from endemic areas or those with recent travel history [7]. Misdiagnoses can lead to inappropriate treatments, such as antibiotics or steroids, which are ineffective for parasitic infections. Additionally, Radovanović Spurnić et al. emphasized the importance of timely detection and surgical removal, to prevent unnecessary and potentially harmful management [15]. Our case emphasizes the need to consider *Dirofilaria* as a differential diagnosis not only in endemic regions but also in non-traveling patients with periocular symptoms.

Finally, the case of our patient highlights the importance of public and professional awareness of dirofilariosis risks in both endemic and emerging regions. Diagnosing this condition requires more than clinical

Najzad, slučaj naše pacijentkinje ističe važnost javne i profesionalne svesti o rizicima dirofilarioze, kako u endemskim tako i u područjima u kojima se od nedavno beleži ova infekcija. Dijagnostikovanje ovog stanja zahteva više od kliničke sumnje; neophodna je stručna procena mikrobiologa specijalizovanog za parazitologiju kao i upotreba naprednih dijagnostičkih instrumenata, uključujući radiološko snimanje, imunodijagnostiku i molekularne tehnike. Savić i saradnici su sprovedi seroepidemiološku studiju u severnom delu Srbije, dokumentujući značajnu seroprevalenciju kod ljudi i pasa. Oni su istakli ulogu ekoloških i faktora životne sredine u prenošenju infekcije [16]. Edukacija putnika i stanovnika o preventivnim merama, kao što je izbegavanje izloženosti komarcima, i dalje je ključno. Kliničari u Srbiji i drugim područjima u kojima je zabeleženo širenje dirofilarioze moraju da održavaju visok nivo svesti i uzmu u obzir ovu parazitsku infekciju u slučajevima kod kojih postoje periokularni simptomi.

ZAKLJUČAK

Prikazani slučaj očne dirofilarioze ističe potrebu da kliničari održavaju visok stepen sumnje na parazitske infekcije kod pacijenata koji imaju atipične periokularne simptome, posebno onih koji su prethodno putovali u endemske regione ili su boravili u oblastima sa lokalnom populacijom vektora. U ovom slučaju, uspešno uklanjanje nematode *Dirofilaria spp.* dovelo je do potpunog razrešenja simptoma i minimalnog ožiljka. Sa povećanjem broja putovanja na globalnom nivou, klimatskim promenama i širenjem staništa komaraca, ključno je prepoznati potencijal dirofilarioze u endemskim i neendemskim područjima. Rana dijagnoza i pravovremena hirurška intervencija su od suštinskog značaja kako bi se izbegli nepotrebni tretmani i osigurali optimalni ishodi za pacijenta.

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suspicion; it necessitates the expertise of microbiologists specializing in parasitology and the use of advanced diagnostic tools, including radiological imaging, immunodiagnostics, and molecular techniques. Savić et al. conducted a seroepidemiological study in the northern part of Serbia, documenting significant seroprevalence in humans and canines and emphasizing the role of environmental and ecological factors in transmission [16]. Educating travelers and residents about preventive measures, such as avoiding mosquito exposure, remains critical. Clinicians in Serbia and other regions experiencing the spread of dirofilariasis must maintain a high level of awareness and consider this parasitic infection in cases presenting with periocular symptoms.

CONCLUSION

The presented case of ocular dirofilariasis highlights the need for clinicians to maintain a high index of suspicion for parasitic infections in patients presenting with atypical periocular symptoms, especially those with recent travel history to endemic regions or residing in areas with local vector populations. In the case of our patient, successful removal of the *Dirofilaria spp.* led to complete symptom resolution and minimal scarring. With the increase in global travel, climate change, and expanding mosquito habitats, it is crucial to recognize the potential for dirofilariasis in both endemic and non-endemic regions. Early diagnosis and timely surgical intervention are essential to avoid unnecessary treatments and to ensure optimal patient outcomes.

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