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DIROFILARIA REPENS INFECTION IN A TEN-YEAR-OLD BOY FROM THE ISTRIA PENINSULA: CASE REPORT

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SUMMARY – Dirofilariasis is a zoonotic infection caused by worms belonging to the genus *Dirofilaria*. The disease is transmitted by mosquitoes and the hosts are usually dogs. Infections in humans are rare and they usually manifest as a subcutaneous nodule or a conjunctival form. We present a 10-year-old boy with a subcutaneous nodule on his left forearm, who was admitted to the hospital. On examination, the only significant findings were high levels of eosinophils. The pediatrician suspected dirofilariasis and the boy was referred to pediatric surgery. The whole lesion was surgically removed and histopathologic examination confirmed parasitic infection by *Dirofilaria repens*. Although human dirofilariasis is a rare disease, the number of reported cases has recently increased worldwide. The disease mainly occurs in southern European countries, but has also been described in eastern Europe, Central Asia and Sri Lanka. Croatia is one of the endemic areas for dirofilariasis, especially in the region of the Istria Peninsula. The case presented highlights the requirement for further monitoring of endemic areas in order to establish effective preventive measures.

Key words: *Dirofilariasis;* Dirofilaria repens*; Zoonoses; Croatia; Case report*

Introduction

Human dirofilariasis is a zoonotic infection caused by several species of worms belonging to the genus *Dirofilaria*, natural parasites of dogs, cats, foxes and wild mammals[1]. This infection is seen worldwide, mostly caused by *Dirofilaria (D.) repens*, *D. immitis*, *D. tenuis*, *D. ursi,* etc.[2]. Humans are accidental hosts and infections are caused by two species, *D. repens* and *D. immitis*[1,3]. *D. immitis* infection manifests as round, so-called coin lesions or infiltrates in the lungs often mimicking primary or metastatic neoplasm, while *D. repens* causes subcutaneous or subconjunctival infiltrates[3]. The intermediate hosts and vectors are mosquitoes (the family Culicidae, species *Culex pipiens* and *Aedes albopictus*)[4]. Mosquitoes take up microfilaria while feeding on an infected host[1,2]. After transmission by mosquitoes, microfilaria develops in the malpighian tubules to the infective third stage larva and then migrates to the proboscis through the body cavity. The transmission takes place when a potential vector bites dogs or other hosts, including humans, during a subsequent blood meal[2,5]. Man is a dead-end host for *Dirofilaria*. Worms are detained in subcutaneous nodules as a single migratory nodule, which may or may not be painful, found on the face, neck, hands, chest and eye, and on the scrotum[6-10]. The present case describes *D. repens* infection in a 10-year-old boy with the aim of stressing the importance of dirofilariasis in differential diagnosis of subcutaneous lumps, especially in the countries with endemic infection as in the Istria Peninsula.

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Case Report

A 10-year-old boy from the Istrian region presented to our department with a swelling in the left forearm. A month before the first pediatric examination, the mother had noticed a swelling sized 7x4 cm in his left upper arm. The swelling was painful on palpation, with visible reddening of the skin. After a while, the swelling reduced to the size of 1.5 cm in diameter and moved to the middle part of the forearm. Pain on palpation disappeared and the skin over the swelling became normal. Shortly afterwards, the child developed angina lacunaris, so therapy with benzathine phenoxymethyl penicillin (Silapen®) was introduced. Given that after a month of treatment the cough still persisted, the family physician referred the patient to a pediatrician. The child was hospitalized for several days. During hospital stay, a small painless mass on the middle part of the left forearm and eosinophilia were found. Based on the history of infectious disease and epidemiology, the diagnosis of *D. repens* was included and the patient was referred to pediatric surgery for excision. The nodule was surgically removed (Fig. 1A,B) and histopathologic examination showed a foreign body granuloma around the parasite with its characteristic cuticle, suggestive of *D. repens* (Fig. 1C,D). A week later, the boy felt well, the sutures were removed, the eosinophil count decreased from 13.8 rel.% to 7 rel.%, and then further to 2 rel.% in the next few days.

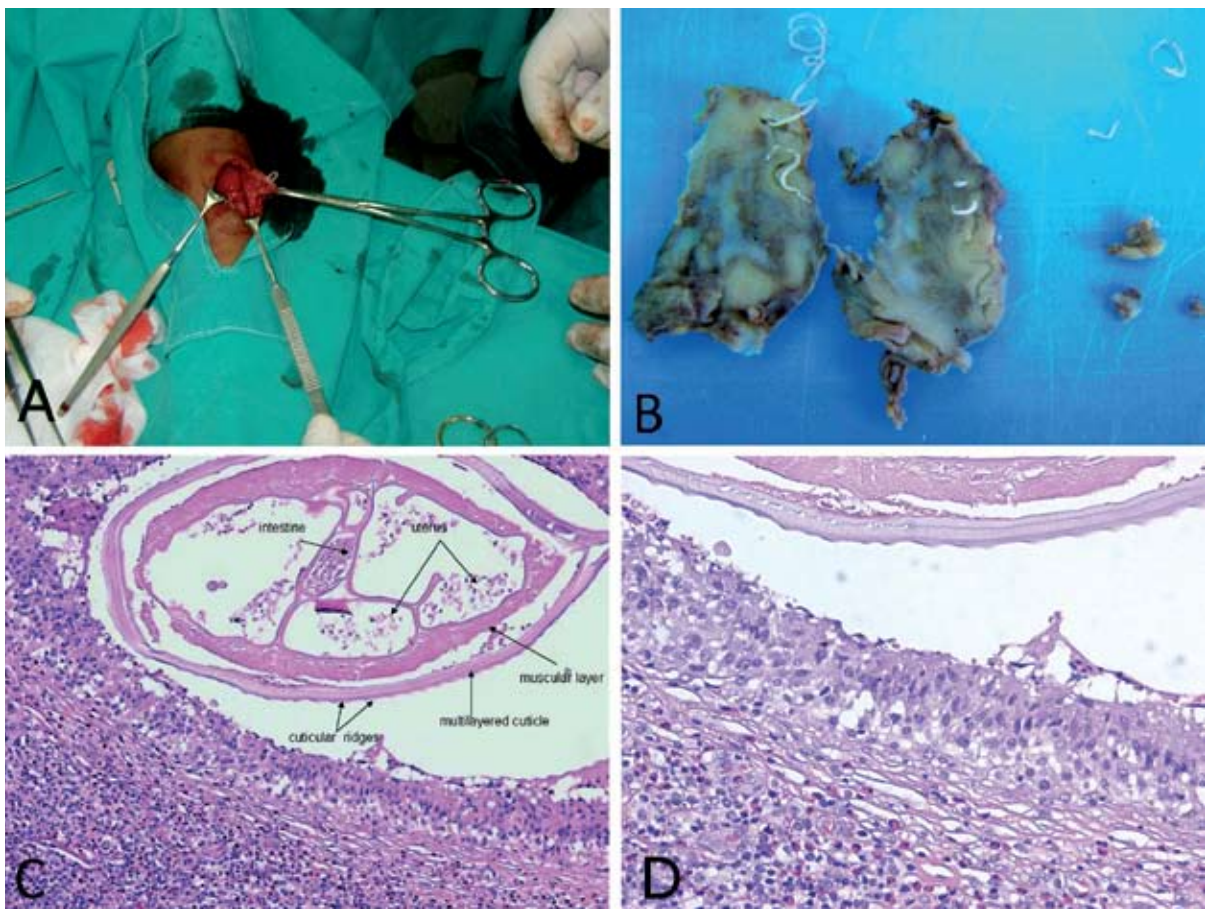

Fig. 1. Part of filaria (arrow) presented during surgical excision (A) and on longitudinal section through subcutaneous nodule which is fibrotic (B). Microscopic section discloses Dirofilaria repens. *The parasite morphology is characterized by multilayered cuticle, external longitudinal cuticular ridges and well-developed muscular layer. The worm is surrounded by granulomatous inflammation (C). Besides histiocytic proliferation and foreign-body giant cell reaction around the parasite, there is an accompanying pronounced leukocyte infiltration with numerous eosinophils (D).*

Discussion

Although dirofilariasis in humans occurs rather rarely, the number of documented cases of subcutaneous dirofilariasis due to *D. repens* has been increasing worldwide over the last decade[1,9]. It is considered as an arthropod-borne infection with the fastest spread rate[9]. Canine and feline dirofilariasis occurs mainly in southern European countries, such as Italy, Spain, Portugal, the south of France, and Greece[3,4]. The disease has also been described in eastern Europe, Central Asia and Sri Lanka[1-3]. Transmission of dirofilariasis depends on the presence of infected dogs (microfilaremia in cats is rare and their role as reservoirs for mosquitoes is not epidemiologically relevant). In recent years, dirofilariasis has spread from the 'classical' Mediterranean countries to northern and eastern ones, which can be explained by climate changes, global movement and insecticide resistance. At present, *Dirofilaria* epidemiology shows the following characteristics: 1) increased spread in endemic areas; 2) areas that used to be free from infection are now endemic; 3) higher incidence of *Dirofilaria* in dogs untreated with preventive drugs; and 4) the *Aebes albopictus* mosquito, which is an important vector of *Dirofilaria* infections, could spread from southern to northern European countries in the near future, thus changing the epidemiological patterns of dirofilariasis in humans and animals[4].

The first reported case of human dirofilariasis in Croatia occurred in 1996. The prevalence of the disease in humans in Croatia is unknown since it is not one of the infectious diseases that have to be reported to the epidemiological service. According to the literature, at least 10 human cases have been reported in Croatia so far[11]. Epizootiological studies of dirofilariasis among dogs were performed and the results confirmed 15.5% of dogs in Croatia to be infected with *D. repens*. The Istria Peninsula and Dubrovnik-Neretva County are two regions where the presence of dirofilariasis in dogs has been positively confirmed. Like other countries in the Mediterranean, Croatia is also an endemic area[12]. As mentioned previously, the patient presented in this case report comes from the Istria Peninsula and this fact was also considered on differential diagnosis. The present case highlights the need of medical awareness for the right diagnosis of dirofilariasis. Further monitoring in the endemic areas is necessary to establish effective preventive measures[1].

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Sažetak

INFEKCIJA PARAZITOM *DIROFILARIA REPENS* U DESETOGODIŠNJEG DJEČAKA U ISTRI: PRIKAZ SLUČAJA

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Dirofilarijaza je zoonoza uzrokovana crvima koji pripadaju rodu *Dirofilaria*. Bolest prenose komarci, a uobičajeni domaćini su psi. Infekcije ljudi su rijetke i najčešće se očituju kao potkožni čvor ili kao konjunktivan oblik. Prikazuje se slučaj 10-godišnjeg dječaka koji je zaprimljen u bolnicu sa subkutanim čvorom na lijevoj podlaktici. Jedini značajniji nalaz su bile povišene vrijednosti eozinofila u krvi. Pedijatar je posumnjao na dirofilarijazu i dječak je upućen na dječju kirurgiju. Lezija je kirurški u cijelosti odstranjena i patohistološki je potvrđena parazitna infekcija, *Dirofilaria repens*. Unatoč tome što je ljudska dirofilarijaza rijetka bolest, broj zabilježenih slučajeva je u porastu u cijelom svijetu. Bolest se uglavnom javlja u zemljama južne Europe, ali je opisana i u istočnoj Europi, Centralnoj Aziji i Šri Lanki. Hrvatska je također jedno od endemskih područja za dirofilarijazu, osobito dijelovi Istarskog poluotoka. Prikazanim slučajem želi se istaknuti važnost praćenja endemskih područja kako bi se eventualno potaknulo uvođenje preventivnih mjera.

Ključne riječi: *Dirofilarijaza;* Dirofilaria repens*; Zoonoze; Hrvatska; Prikaz slučaja*