

CLINICAL STUDY

First case of cutaneous human dirofilariosis in Slovak Republic

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Abstract: Dirofilariosis is a zoonotic disease caused by several species of the genus of *Dirofilaria*. The causative agent initiates a dangerous canine disease reported from many parts of the globe. The parasites are transmitted by arthropods, which act either as a vector or intermediate hosts. In humans the parasites do not usually reach the adult stage but microfilaraemia is absent because of mating impossibility. Human dirofilariosis is caused by *D. immitis* or *D. repens* and has been reported from many parts of the world including European countries, namely Italy, France, Spain and Greece. Sporadically, this parasitosis is detected in Central European countries such as Hungary and Switzerland. The presented paper reports the first case of human cutaneous dirofilariosis in Slovakia. The clinical manifestation was a typical subcutaneous granuloma with the adult worm in the center. The identification of *Dirofilaria repens* was made based on morphological appearance of the parasite. The patient 60 years old, lives in the area where in 2005 six cases of canine dirofilariosis caused by the same species were reported (Fig. 2, Ref. 16). Full Text (Free, PDF) www.bmj.sk.

Key words: dirofilariosis, zoonotic disease, *Dirofilaria*, cutaneous human dirofilariosis.

Dirofilariosis of dogs, the causative agent of which is transferred by mosquito, represents a serious problem for dogs and cats especially in Canada, Africa, Australia, Asia and Southern Europe. In connection to the global warming, this disease has penetrated into Central Europe, Slovakia included. The species that infect dogs and cats throughout the world are *Dirofilaria immitis*, *Dirofilaria repens*, *Acanthocheilonema (Dipetalonema) reconditum*, *A. (Dipetalonema) dracunculosis*, and *Cercopithifilaria (Dipetalonema) grassi*. In Europe the disease cause two species – *Dirofilaria immitis* and *D. repens* and the infections causing a serious disease in dogs have been reported mostly from southern Europe (2).

The parasites are transmitted by arthropods. The adult worm is 3–31 cm long and can be found in the heart or the pulmonary artery. They cause mechanical block of blood circulation that manifests by cough, dyspnoea and finally by heart and kidney failure. The adult female delivers living microfilariae into blood that is accessible for blood sucking mosquito, the potential carriers. In mosquitoes the microfilariae penetrate the epithelium

of mesenteron where they invade into Malpighian tubes (3). The microfilariae develop into the 3rd larval stage requiring the minimal temperature of the environment 14 °C for 1 month; in higher temperatures (≥26 °C) the development is shortened to 14 days. Maturation to an adult worm happens in the heart and the pulmonary arteries of the host and takes several months. After 6 months, the fertilized adult females start producing larvae.

Humans are considered accidental hosts without completion of the life cycle of the parasite and the disease in most cases has an asymptomatic course (2, 5). The most frequent form of human dirofilariosis are subcutaneous nodules caused by *D. repens*. Only rarely the parasite is found in pulmonary arteries, the heart, the eye or other organs (4). The human infection is frequently misdiagnosed as a malignant tumor. Therapy is only surgical. There are described multiple cases of human dirofilariosis (1) and their number is rapidly increasing. In humans microfilaraemia is not present because impossibility of copulation of the parasite, as had been shown in biopsies of subcutaneous nodules (6).

In Europe the disease is caused by two species *D. immitis* and *D. repens*, which were identified also in humans. *D. immitis* is found in Europe only sporadically, *D. repens* is frequently identified in connection to the human disease. Most of the European cases are reported from Italy (70 %), France, Spain and Greece (2). Sporadic cases are reported from central European countries, Hungary, Switzerland (10).

Case reports

Patient, 60-years-old, lives in the area (Malacky), where in the year 2005 were recorded 6 cases of dog dirofilariosis caused by the species *D. repens*. The patient worked on his weekend

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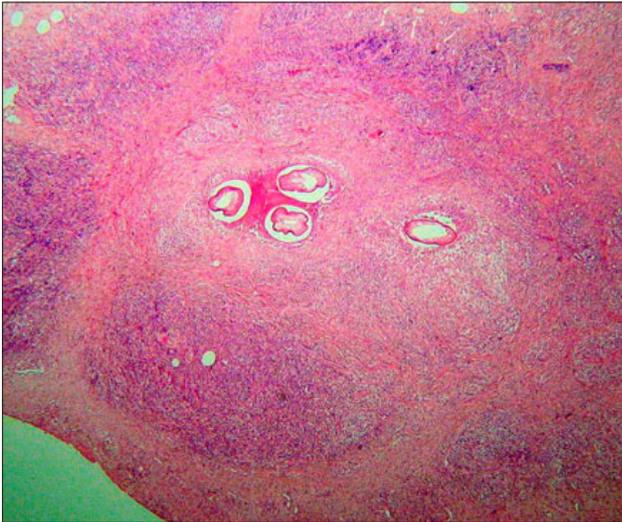


Fig. 1.

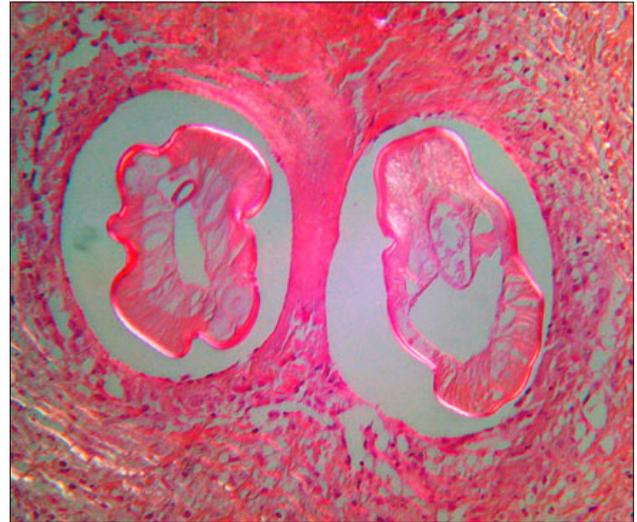


Fig. 2.

house in the woods and was several times exposed to mosquito attacks. After 3 weeks his left forearm has got swollen for 3 days; 2 months later, after another swelling of the forearm he visited a surgeon who identified two elastic subcutaneous nodules 6 and 7 mm large that were consecutively removed.

The surgical specimens were fixed in formalin and routinely processed in paraffin. Histological sections 5 µm thick were stained with hematoxylin and eosin. Light microscopy uncovered one granuloma with mixed population of inflammatory cells, peripheral fibrosis and necrosis in the center, without an identifiable parasite. The second granuloma contained a curved worm 100 µm thick, morphologically corresponding to the male of *Dirofilaria repens* (Fig. 1). Polarized light showed birefringence of the cuticle (Fig. 2). The patient is without problems two years after the surgery.

Discussion

Dog dirofilariosis has been recorded repeatedly in Slovakia after the year 2005 (7, 8, 9). Although one case of human dirofilariosis in the vitreous body has been reported from eastern Slovakia (10), so far no occurrence of subcutaneous dirofilariosis has been reported. Thus, we assume that this is the first case of this form of human dirofilariosis in the Slovak Republic.

In our patient the disease manifested clinically by the typical subcutaneous granuloma with the adult parasite in the center. Identification of *Dirofilaria repens* was based on the morphology and the typical clinical history. Clinical diagnosis almost always fails with the exception of a few cases localized beneath the conjunctiva, in which the ophthalmologist can observe the nematode as “helminthic parasitosis” often considered as onchocercosis. In cases of pulmonary infection the clinical picture may impose as cancer or sarcoidosis. In the cutaneous forms, most frequent clinical diagnoses are seborrhic cyst, dermal cyst, fibroadenoma, hematoma, collagen disease, angioedema, rheu-

matic disease, fibroma, neurofibroma, lymphadenitis, tumor of the parotid gland, filariosis caused by *Wuchereria bancrofti*, larva migrans, onchocercosis or loaosis (11).

Recent studies confirmed the shift of endemic dirofilariosis from subtropical to the zone of mild climate. As an example, Switzerland became to be considered a country with endemic appearance of this disease. The leading countries with over 100 described human dirofilariosis cases are Italy and Sri Lanka. Several Central European cases were proved to be imported infections. There was a curious case reported from Belgium, a country without previous report of the disease, where three members of one family were infected by mosquito imported in luggage from an endemic area or the international airport in the proximity of their housing (12). In the recent years 14 cases of human dirofilariosis were documented in Hungary, 8 of which were autochthon infections (13).

Based on the results of several European studies it is becoming evident that the territory of endemic dirofilariosis (the area of Mediterranean sea) expands in the direction to the north (14). In Slovakia there were confirmed findings of dirofilariae in dogs from the area of Komárno and Vysoká pri Morave in the year 2005 (7) and it can be anticipated that the infection will spread to other territories of the country regarding the fact that the transmitters are mosquito of the genus *Anopheles*, *Aedes Ochlerotatus*, and *Culex*, naturally spread in the Slovak Republic (15, 16).

References

1. Gratz NG. The mosquito infections of Europe. In: European Mosquito Bulletin 2004; 17: 1—7.
2. Genchi C. Epidemiology and distribution of Dirofilariosis in Europe: state of the art. In: Helminthologische Fachgespräche – Helminthological colloquium. Programme and lectures (Abstracts). Vienna 2003, 6—9.
3. Cancrini G, Gabrielli S. Vectors of Dirofilaria nematodes: biology, behaviour and host/parasite relationships. In: Genchi C, Rinaldi L, Crin-

goli G. Mapped parasitology 8 — *Dirofilaria immitis* and *Dirofilaria repens* in dog and cat and human infections. 2007; 48–56.

4. **Theis JH.** Public health aspects in the United States. In: *Veterinary Parasitology* 2005; 133 (2–3): 157–180.

5. **Pampiglione S, Canestri Trotti G, Rivasi F.** Human dirofilariasis due to *Dirofilaria (Nochtiella) repens*: a review of world literature. *Parassitologia* 1995; 37 (2–3): 149–93.

6. **Pampiglione S, Rivasi F.** Human dirofilariasis due to *Dirofilaria (Nochtiella) repens*: an update of world literature from 1995 to 2000. *Parassitologia* 2000; 42 (3–4): 231–254.

7. **Beladičová V, Valentová D.** Prvý záchyt dirofilárií na Slovensku. In: Holková R, Totková A, Klobušický M (Eds). XII. Aktuálne problémy humánnej parazitológie. Bratislava 2005: 11–12.

8. **Svobodová S, Svobodová, Beladičová V, Valentová D.** First case of canine dirofilariasis in Slovakia: a case report. *Veterinary Med* 2005; 50 (11): 510–512.

9. **Miterpáková M, Antolová D, Dubinský P.** Dirofilarioza – objavila sa na Slovensku ďalšia nebezpečná zoonóza? *Slov Veterin Cas* 2007; 2: 108–110.

10. **Vasilková D, Klinsbauer T, Juhás F, Uhlíková J, Uhlíková M, Hübner J, Koňáková G.** Izolácia *dirofilaria repens* pri vitreoretinálnom náleze. *Čs Oftalmol* 1994; 48 (4): 271–277.

11. **Jelinek T, Schulte-Hillen J, Lodcher T.** Human dirofilariasis. *Int J Dermatol* 1996; 35: 872–875.

12. **van den Ende J, Kumar V, van Gompel A, van den Enden E, Puttemans A, Geerts M, Levy J, Colebunders R, Eberhards M.** Subcutaneous dirofilariasis caused by *Dirofilaria (Nochtiella) repens* in a Belgian patient. *Int J Dermatol* 1995; 34: 274–277.

13. **Kucsera I, Szenasi Z, Danko J.** Review of human dirofilariasis diagnosed at the Department of Parasitology, National Center for Epidemiology, Budapest, Hungary. In: Genchi C, Rinaldi L, Cringoli G (Eds). *Mappe parassitologiche 8 — Dirofilaria immitis and Dirofilaria repens* in dog and cat and human infections 2007: 197.

14. **Trotz-Williams LA, Trees AJ.** Systematic review of the distribution of the major vector-borne parasitic infections in dogs and cats in Europe. In: *The Veterinary Record* 2003; 152 (4): 97–105.

15. **Jalili N, Orszagh I, Halgoš J, Labuda M.** Mosquitoes (Diptera, Culicidae) of Slovakia. In: *European Mosquito Bulletin* 2006; 6: 20–26. www.uel.ac.uk/mosquito.

16. **Orszagh I, Halgoš J, Jalili N, Labuda M.** Mosquitoes (Diptera, Culicidae) of Slovakia II. In: *European Mosquito Bulletin*. 2001; 11: 1–26. www.uel.ac.uk/mosquito.

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