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Subcutaneous parasitic infection in Slovenia: a case report

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Abstract

Filariasis is a parasitic disease caused by infection with roundworms of the Filarioidea superfamily. Depending on the species of roundworm, the disease can present itself in one of three forms. It can affect the lymphatic system, the subcutaneous tissue, or serous cavities. We present the case of a male patient from central Europe with a subcutaneous manifestation similar to filariasis. Laboratory findings showed eosinophilia and elevated levels of IgE antibodies, and histological examination of skin biopsy material showed granulation tissue with lymphoid and plasma cell infiltration. When the lesion was examined under a microscope following an excision, live wormlike parasites about 3.5 cm long were detected. Such parasitic infections are usually encountered in tropical regions and sometimes reported in travelers returning from endemic countries. Our patient, however, had never left Europe, which is what makes this case so interesting.

Keywords: dermatology, filariasis, *Dirofilaria*

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Introduction

The skin and subcutaneous tissues can be infected by a variety of arthropods, protozoa, and helminths. The specific organisms found vary greatly with the patient's exposure history, especially travel to or residence in endemic areas. Because cutaneous parasitic infections are rarely reported in Europe, they present a diagnostic challenge to dermatologists. The aim of this article is to encourage European practitioners to enhance their differential diagnosis by also including vector-borne parasitic diseases. We present the case of a Slovenian patient with a subcutaneous nodule on the lower left forearm.

Case report

Patient history

A 64-year-old male, living in the port town of Koper, Slovenia, where he works in a harbor warehouse, developed a painless swelling of the subcutis on his left forearm. The swelling developed over the span of several weeks. He described the skin of the affected area as slightly reddish, with mild pruritus being the only discomfort. The patient visited a dermatologist and was prescribed systemic corticosteroids due to a suspected erythema nodosum diagnosis. However, 2 weeks of therapy brought no significant remission. The patient was otherwise healthy with no systemic therapy. Furthermore, he denied recent changes in lifestyle or ever having traveled outside of the European Union.

Clinical presentation

At the time of admission to our clinic, a nodular lesion 4 × 5 cm in diameter could be seen on the dorsal part of the left forearm. The overlying skin showed no pathological changes except for mild erythema. A prompt biopsy was performed and revealed a cystic formation containing a translucent whitish liquid. The fluid contained five 3.5 cm long white wormlike live parasites (Figs. 1–2).

Figure 1 | Living parasites immediately after removal.

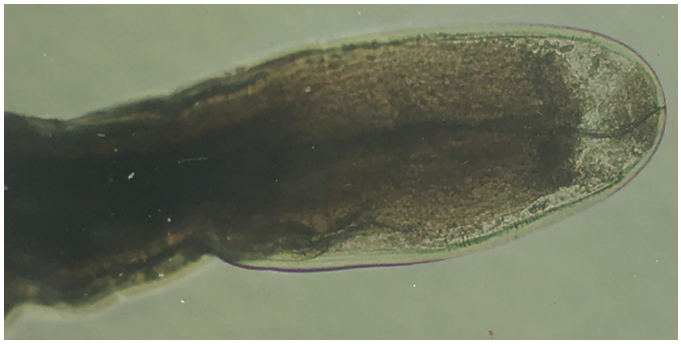

Figure 2 | Parasite head, microscopy.

Laboratory findings

A blood sample was taken and tested for routine laboratory parameters (blood cell count, electrolytes, creatinine clearance, urea, liver enzymes, bilirubin, protein concentration, total amount of IgE antibodies, and sedimentation rate). The only clinically significant results were eosinophilia in peripheral blood of 7.1% and elevated IgE antibodies (177 IU/ml). The histopathological findings revealed granulation, lymphoid and plasma cell infiltration, and a high number of eosinophils. To determine the species of the parasites, testing using the ELISA technique was performed for *Toxocara canis*, *Toxocara cati*, *Taenia solium*, and *Trichinella spiralis*. All

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serology results were negative. No serologic tests for *Loa loa* were performed. The examination of feces for parasites proved negative on five attempts.

Treatment and results

After finding the parasites, the cystic lesion was fully excised, including the epithelial lining. Over a period of 36 months following the treatment, the site of excision healed, and the patient showed no further symptoms. Blood levels of eosinophils returned to normal within 2 weeks.

Discussion

According to Francesconi and Lupi, several species of flies that may provoke myasis in humans exist in central Europe; these include *Hypoderma* spp., *Gasterophilus* spp., *Sarcophaga* spp., and others. Children and older individuals are most often affected. On rare occasions, the larvae that usually infest wounds can penetrate uninjured skin and develop in the dermis or subcutis. The cutaneous variety of the disease can be observed in one of two forms: furuncle-like myasis and creeping myasis (1). In our case, however, the patient was a healthy adult. Moreover, the parasites detected at the incision site did not display the microscopic characteristics of larvae but of mature parasites.

Cutaneous larva migrans is caused by the larvae of various nematode parasites of the hookworm family (Ancylostomatidae). These parasites live in the intestines of dogs, cats, and wild animals. Inside animal feces they mature into filariform larvae (over a period of 1 to 2 weeks) that can penetrate the human epidermis on contact (2). The clinical presentation however, includes an erythematous, intensely pruritic eruption, and this may present as twirling lesions (3), very much unlike the signs and symptoms of our patient.

Toxocara canis or *Toxocara cati* may present as lesions similar to panniculitis (4). However, serology, which is more than 90% sensitive, proved negative in our case. Furthermore, parasite morphology was different during microscopy.

Another parasite that could provoke a similar lesion was observed in a patient with *Dracunculus medinensis* (5). The male worms usually measure around 3 cm but are usually not found in surface tissues. On the other hand, the female worms, which migrate through the subcutis, are far longer, measuring up to 100 cm. Furthermore, the negative exposure history of drinking infested water made this parasite an unlikely candidate in our case (5).

Human loiasis is a disease caused by the filarial worm *Loa loa* and is transmitted by adult female *Chrysops* flies. The disease is limited to forested areas of western and central Africa, and it is especially common in Cameroon, eastern Nigeria, and Congo (6). More than 10 million people are estimated to be infected worldwide (7). There are two major clinical presentations, the first being adult worm migration under the bulbar conjunctiva (eyeworm) and the second a characteristic transient and migratory edema known as Calabar swelling, which is caused by its wanderings and is usually seen on the extremities (8, 9). The swelling, which usually ranges from 5 to 10 cm in diameter and consists of localized subcutaneous edema, is an immediate hypersensitivity reaction to the antigenic material released by the worm. The skin over the swellings may be untouched or erythematous and hot (8, 9). During their migration, female worms also release microfilariae, which permeate into the bloodstream. Microscopic examination of a blood smear for microfilariae is a practical procedure for diagnosing *Loa loa* (10). Our patient proved negative for microfilariae on three separate attempts. This, however, does not fully exclude an infection with *Loa loa* because one-third of loiasis patients are amicrofilaremic. Absence of microfilariae is also possible in an infection by only male parasites, which are of a similar size to the parasites we encountered, the male measuring 3 to 3.5 cm and the female 5 to 7 cm (10, 11). In contrast, eosinophilia is almost guaranteed in cases of loiasis (10,12).

Dirofilaria repens is a filarial nematode that normally affects the Canidae family (13). In rare cases, the larvae can spread to humans via a mosquito bite; however, the parasites normally fail to reach adulthood in human hosts. *Dirofilaria* infections in humans usually manifest as a single subcutaneous nodule, which is caused by larvae trapped by the inflammatory cells (14). Since 1977, more than 3,500 cases of human *Dirofilaria repens* infection in Europe have been reported (15). *Dirofilaria* infections occur more commonly in adults 40 to 49 years old. There are no serologic tests available for *Dirofilaria repens*, and so microscopic examination of the worm remains the most frequently used diagnostic method, despite a large number of zoonotic *Dirofilaria* species having morphology similar to *Dirofilaria repens*, thereby making definitive diagnosis difficult (14, 16).

A parasite similar in both clinical picture and microscopic appearance to *Dirofilaria repens* is *Dirofilaria immitis*, also known as the heartworm (16). However, this parasite shows a much smaller zoonotic potential, with only 25 cases of human infections having been reported in Europe in the last 40 years (17).

Based on the patient history, clinical presentation, localization, histology, laboratory findings, microscopy, expert opinion, and exclusion of toxocariasis by serology as well as the patient's exposure history, combined with the success of operative treatment, we suspect the infection was caused by *Dirofilaria repens*, or possibly *Dirofilaria immitis*. Despite all this, it is still difficult to exclude *Loa loa*.

The clinical picture best correlates with subcutaneous lesions caused by *Dirofilaria repens*. Histological examination of the lesion border showed granulation and eosinophil infiltration, which can be present in both loiasis and dirofilariasis. However, histology is nonspecific. The laboratory results showing relative eosinophilia and absence of microfilariae are possible with *Loa loa* diagnosis and very likely in a *Dirofilaria repens* infection. The morphology of the parasites found in the tissue sample shows similarities with both *Loa loa* and *Dirofilaria* species. However, thorough morphologic examination with molecular characterization of the organism should be performed in order to confirm the diagnosis. Because cases of *Dirofilaria repens* and to a much lesser extent *Dirofilaria immitis* have previously been reported in Europe, we suspect that the infection was most likely caused by one of these two species. Surgical removal of subcutaneous nodes being the definitive treatment for dirofilariasis also supports this diagnosis. However, the patient's work with cargo from ships arriving from Africa also makes it difficult to fully rule out an infection with *Loa loa*.

Conclusions

Filariasis-like infections are rarely seen in Europe and therefore present a challenge to dermatologists. In current times, when migration is common, we stress the importance of keeping a broad spectrum of differential diagnoses in mind and stress the significance of a detailed epidemiological patient history.

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