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Clinical Pearls

Migratory myiasis in a European traveller due to *Hypoderma* larvae

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A 28-year old otherwise healthy Dutch male presented at the emergency department with fatigue, joint complaints and migratory subcutaneous swellings on back, and legs. Moreover, he reported a parasite coming out of the epidermis of his back. Three months previously, he returned from travelling across South America, South and Southeastern Asia and the Caucasus.

At presentation, routine haematological and biochemical investigations were normal, except for high levels of eosinophils ($>10 \times 10^9/l$) and an increased erythrocyte sedimentation rate (highest 76 mm/h). Microscopic examination of faeces, routine PCRs and serological tests for ascariasis, fascioliasis, filariasis, paragonimiasis, schistosomiasis, strongyloidiasis, toxocariasis and trichinellosis were negative.

Due to migratory swellings, a *Gnathostoma spinigerum* infestation was suspected and he was treated with albendazole. However, after 2 weeks of treatment, two thick nodules on the patient's right flank appeared. A white, oval-shaped, 7 mm parasite was surgically removed from one of the nodules (Figure 1A). In addition, serological tests for gnathostomiasis returned negative. Therefore, this diagnosis was rejected and albendazole treatment was ceased.

Finally, molecular examination revealed the diagnosis: *H. sinense* (S1). Further sequencing of mitochondrial targets,

however, revealed a large number of mismatches between the specimen and the closest matching *Hypoderma* sp, *H. sinense* and *H. lineatum* (S2). Therefore, the specimen could not be assigned to a particular species. Also, the patients' extensive travel history (across 24 countries) did not help to distinguish between *H. sinense* and *H. lineatum*, since *H. lineatum* is endemic in large parts of Asia and northern Mexico, and *H. sinense* is endemic to Western Himalaya. The patient was treated with ivermectin (12 mg orally once time daily) in three courses of 3 days with several weeks in between. The patients' condition improved and his blood screen returned to normal.

Hypoderma sp. (warble flies), belonging to the Oestridae family, usually cause subcutaneous myiasis in cattle and are generally found in the Northern Hemisphere. *Hypoderma sinense* was first discovered by Pleske in 1926, but soon synonymized with *H. lineatum*. The adult flies look very similar and their life cycle is identical (Figure 1B), although they differ in the host they parasitize.^{1,2}

The diagnostic process was challenging due to the large number of possible parasitic infestations characterized by migratory (sub)cutaneous swelling(s). These infestations include fascioliasis, gnathostomiasis, loaiaiasis, dirofilariasis, mansolelliasis, paragonimiasis and toxocariasis. However, fascioliasis, paragonimiasis

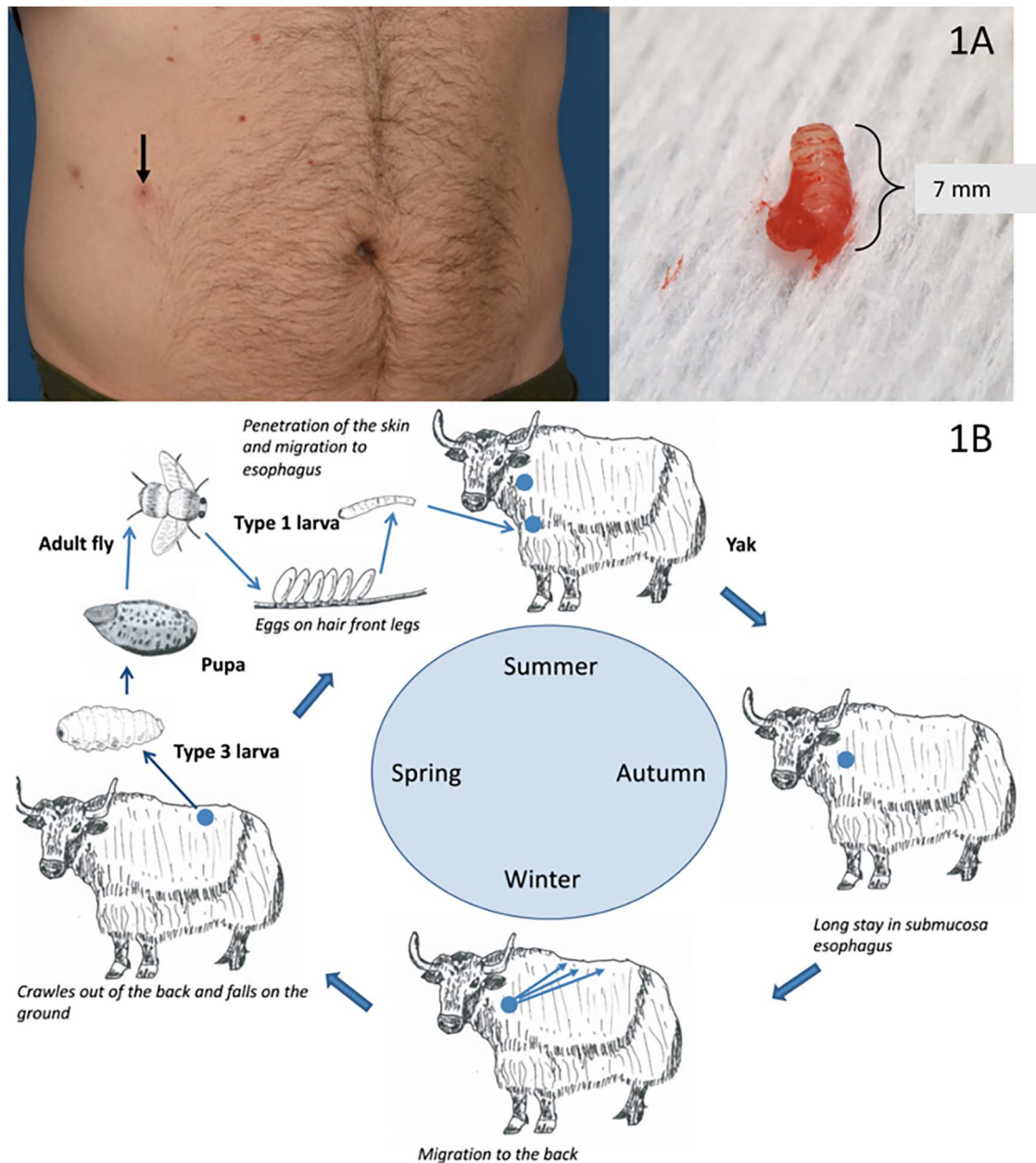


Figure 1. (a) Surgically removed larva removed from a subcutaneous swelling in the patient's abdomen. (b) Life cycle of the *Hypoderma sinense*/*Hypoderma lineatum* parasite. The adult flies look very similar and their life cycle is identical, but they differ in the host they parasitize: yaks (*H. sinense*) or (domesticated) cattle (*H. lineatum*)

and mansolelliasis are characterized by nodular subcutaneous swelling; loaiasis is only seen at the African continent and *G. spinigerum* larvae cannot mature in humans larger than 3 mm. Sparganosis and dirofilariasis could also be added as possible differential diagnosis typically presenting with subcutaneous migratory swelling(s). However, these infestations were not included in our initial possible differential diagnosis.

Case reports of human infestations with *Hypoderma sp.*, such as *H. lineatum* and *H. sinense* are rare, especially in Europe. In 2014, a case report was published, describing a farmer, who had never travelled outside Italy with an infestation by *H. lineatum*, confirmed by molecular analysis.³ Puente et al. (2010) reported on a European with an *H. sinense* infestation, presenting with abdominal pain and, inflammation of the right groin and

testicular region after traveling to northern India.⁴ Furthermore, a comment was published (2012) about an *H. sinense* infestation of a German tourist who had developed swellings and pain after traveling to Tibet.⁵

Supplementary data

Supplementary data is available at *JTMEDI* online.

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Conflict of interest

The authors declare that they have no conflict of interest.

Patient consent

Written informed consent was obtained from the patient for the publication of the case report.

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