Research Article

External ophthalmomyiasis by larvae of Oestrus ovis (sheep nasal botfly): Second case report from Sri Lanka

JAMTN Gunathilake[1], G Rajapaksha[2], MH Gunatilake[2], SASC Senanayake[2], KR Dayawansa[1], S Gunawardena[2]

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Abstract

External ophthalmomyiasis is the invasion of superficial tissues of the eye by fly larvae of the order Diptera. We describe a case of acute conjunctivitis caused by the first instar larvae of *Oestrus ovis*. This is the second such case reported in Sri Lanka.

A 28-year-old male was admitted to the National Eye Hospital of Sri Lanka, complaining of itching, redness, the sensation of a foreign body and swelling of his right eye. On examination, visual acuity in both eyes was normal; conjunctival injection was noted in the right eye, and the presence of a few motile larvae was observed on the conjunctival surface. The patient recovered completely following the removal of six larvae and treatment with topical antibiotics. The morphological features of the extracted larvae were compatible with the first instar larva of *Oestrus ovis*. We assert that early detection and removal of botfly larvae will help minimize ocular damage.

Keywords: *External ophthalmomyiasis, conjunctivitis, Oestrus ovis, sheep nasal botfly, Sri Lanka.*

Introduction

Ophthalmomyiasis is the invasion of ocular tissues by fly larvae of the order Diptera, and larvae of *Oestrus ovis* (sheep botfly) are the main causative agents in humans.[1] External ophthalmomyiasis refers to larvae that infest superficial tissues of the eye such as the eyelid, conjunctiva, and lacrimal duct; while internal ophthalmomyiasis involves penetration of inner structures such as the anterior or posterior chambers.[2] The natural hosts of *Oestrus ovis* are sheep and goats. We describe a case of acute conjunctivitis caused by the first instar larvae of *Oestrus ovis*. This is the second such case reported from Sri Lanka.

Case report

A 28-year-old sailor serving in the Sri Lanka Navy was admitted to the National Eye Hospital, Sri Lanka, at around 6pm on 10th February 2022 with the following symptoms: itching, redness,

[1] *National Eye Hospital of Sri Lanka, Colombo, Sri Lanka*
[2] *Department of Parasitology, Faculty of Medicine, University of Colombo, Colombo, Sri Lanka*

Address for correspondence: Prof Sharmini Gunawardena, Department of Parasitology, Faculty of Medicine, University of Colombo, 25, Kynsey Road, Colombo 08, Sri Lanka. Telephone: +94 779 833 599

email: sharmini@parasit.cmb.ac.lk *https://orcid.org/0000-0003-4143-4895*

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Figure 1. First instar larva of *Oestrus ovis* (x 100)

the sensation of a foreign body and the swelling of his right eye since morning. He had developed itching of his right eye that morning and sought treatment from the medical center at the navy camp. Washing his eye with normal saline had helped improve the condition for several hours. However, by evening, the symptoms had gradually worsened, and upon inspection of his eye in the mirror, he had noticed some moving worms, which led him to seek treatment from the hospital.

On examination, both eyes had 6/6 visual acuity as per the Snellen chart. Under slit-lamp examination, conjunctival injection was noted in the right eye. Few motile larvae were seen on the conjunctival surface. There was no evidence of orbital cellulitis or endophthalmitis. After instillation of a topical anesthetic solution (proparacaine hydrochloride 0.5% ophthalmic solution) to the eye, five larvae were removed using fine forceps under visualization (for magnification of the field) of the operating microscope. The patient was treated with topical antibiotics (a single drop of moxifloxacin 0.5% ophthalmic solution, instilled 6 hourly). A routine examination carried out the following morning revealed the presence of another motile larva, which was also removed. This larval specimen was stored in formal-saline and sent for identification to the Department of Parasitology, Faculty of Medicine, University of Colombo. The patient responded well to the measures mentioned above and was completely cured when inspected during a subsequent follow-up session.

Microscopic examination revealed the extracted larva to be translucent, segmented, white in color and measuring approximately 1.07 mm (length) x 0.36 mm (width) in size (Figure 1). The tapering anterior end had two dark horn-shaped oral hooks connected to a cephalopharyngeal skeleton (Figure 2). The larva consisted of eleven body segments with four rows of spines running along them. Two rounded projections, each equipped with curved spines, were located on the posterior segment of the larva (Figure 3). These morphological features were compatible with the first instar larva of *Oestrus* ovis.[3]

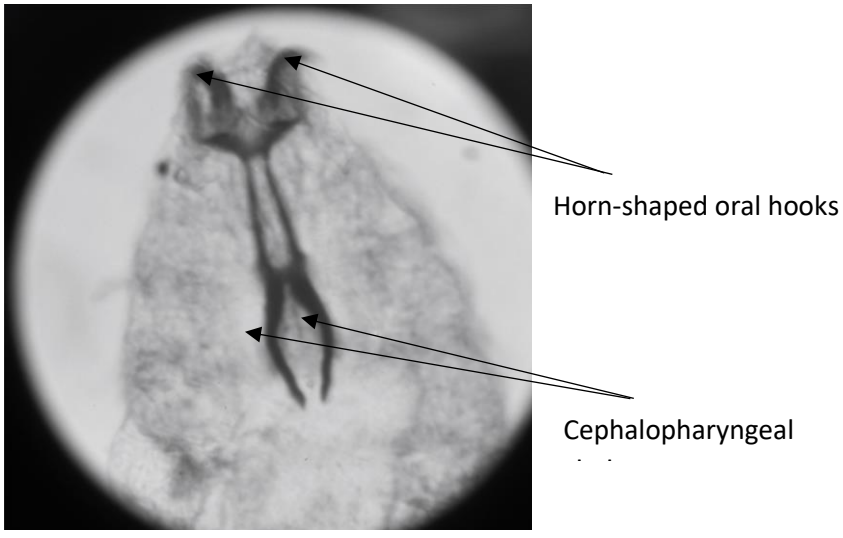

Figure 2: Enlarged view of anterior end of *Oestrus ovis* first instar larva (x 400) showing horn-shaped hooks and cephalopharyngeal skeleton

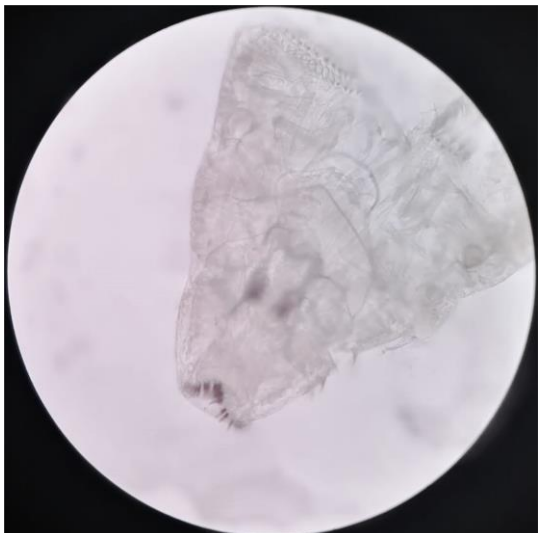

Figure 3: Enlarged view of the posterior end of *Oestrus ovis* first instar larva (x 400) showing two rounded projections containing curved spines

Our patient is a resident of Galewela, which is situated in the Matale district (Central province). He is currently stationed at the naval camp in Welisara, which is situated in the Gampaha district (Western province).

Two weeks prior to the incident, he had been aboard a ship off the coast of Galle, which later docked at the Colombo port on 8th February, 2022. On the following day (9th February, 2022) he had travelled to and from the naval camp in Trincomalee (Eastern province), which is situated approximately 266km away from his duty station, by official transport. He gave no history of contact with either sheep or goats, nor did he remember any trauma being caused to his eye by insects, particularly flies.

The timeline of this patient's illness is shown in Figure 4.

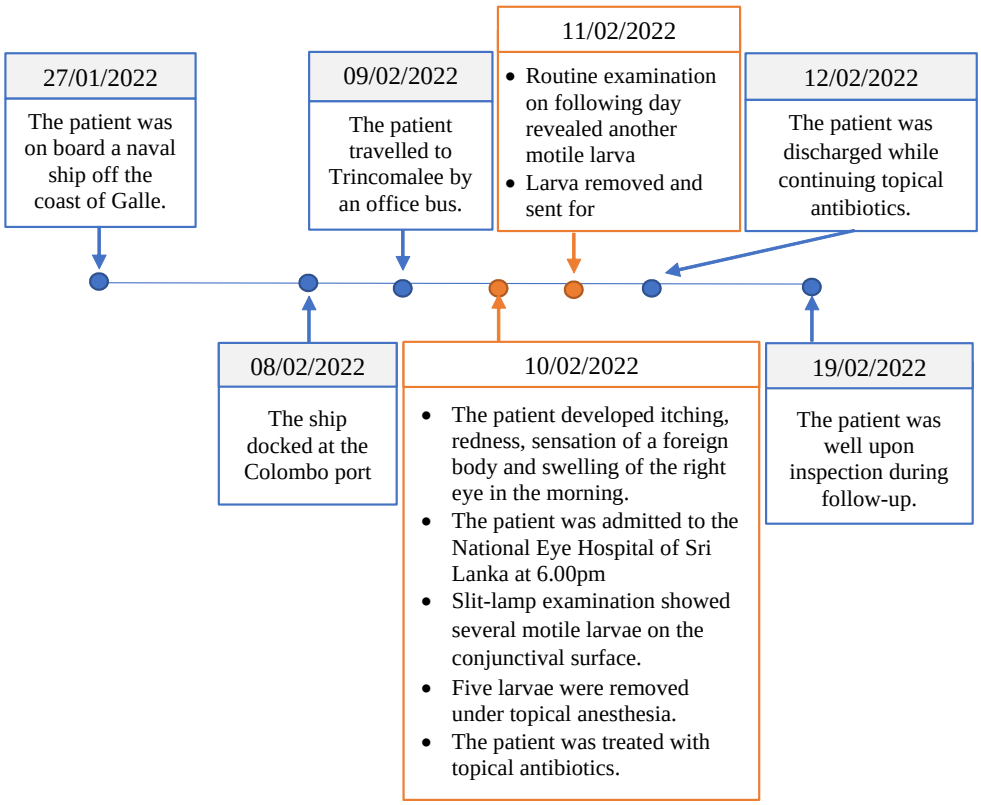

Figure 4: Timeline of the patient's illness

Discussion and Conclusion

Human ophthalmomyiasis due to *Oestrus ovis* has been reported worldwide, typically among farmers and shepherds from countries in the Mediterranean basin.[4] A recent review estimated around 261 cases in these Mediterranean countries, with the external form of myiasis occurring in 99.62% (n=260) of them.[4] However, this is rare in Sri Lanka, and this report describes the second case to be reported in the country. The first case was reported in 2007, and documented by Samarasinghe and Weerakoon. The patient was a 20-year-old farmer, and a resident of Puttalam (Northwestern province), who had presented with a red eye.[5]

When analysing the movements of our patient, there is no clear indication as to where he may have acquired this infection. Deposition of the first instar larvae on the conjunctiva of this patient would most likely have occurred during his bus ride from Trincomalee. Furthermore, the movement of the bus would have helped mask the sensation of larval deposition.

Sheep are the natural hosts of these botflies, and hence, they are commonly referred to as 'sheep botflies'. However, goats, deer and (on rare occasions) humans, can become secondary hosts.[6] A recent meta-analysis, based on 66 studies, comprising of 59,086 sheep and goats from 26 countries in 5 continents, estimated the global prevalence of oestrosis to be 51.15% among sheep and 42.19% among goats. A high prevalence was noted within northern Africa and southern Europe, while the estimated prevalence in the Asian region was 48.28% and 37.01% for sheep and goats respectively.[7] According to data from the Department of Census and Statistics in 2021, there are nearly 362,000 goats and just over 12,000 sheep in Sri Lanka.[8] However, the prevalence of oestrosis among these farm animals is not recorded in Sri Lanka.

The adult female fly deposits larvae on or near the mucous membranes of the host - usually the nostrils of the sheep, or conjunctiva, as in this case. These larvae are obligate parasites that undergo three stages of maturation within their natural hosts (i.e. first, second and third instar - L1, L2 and L3 larval stages), and then get expelled to pupate in the soil. Transition into the adult fly occurs around a month later, and they can live for up to about three weeks. However, the first stage larvae do not mature further in the 'unnatural' human host. They wander in the tissues, causing irritation, pain and inflammation.[6]

Clinically, most cases of human ophthalmomyiasis have been limited to external ocular structures. They usually present with the sensation of a foreign body, irritation, tearing, photophobia, pain, redness or mucopurulent discharge.[4,9,10] Equipped with their oral hooks and spines, the larvae can (although rarely) burrow into the inner structures of the eye, causing much inflammation (internal ophthalmomyiasis), and lead to orbital cellulitis, endophthalmitis or even loss of vision.[11,12] Debilitated elderly people and poorly nourished children are particularly susceptible to internal invasion. The removal of larvae, combined with local antibiotics to prevent secondary bacterial infection, were sufficient to relieve the patient of symptoms.

Epidemiological surveillance of farm animals is recommended to estimate the prevalence of oestrosis in Sri Lanka. In addition, screening and treatment of farm animals will help improve animal productivity, as well as minimize the potential zoonotic risk of infection spreading to humans.

Declarations

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Ethics statement: Written informed consent was obtained from the patient for publication of this case report and any accompanying images.
Authors' contributions: Patient management was done by TG and RD. Processing of the specimen and imaging was done by GR and HG. Entomological expertise was provided by SS. Writing of the draft report and overall coordination was by SG. All authors critically reviewed and approved the final report.

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