

Ophthalmomyiasis Due to *Oestrus Ovis* – A Study from South India.

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Abstract

Myiasis is the intrusion of dipterian fly hatchlings in humans or other vertebrates. The association of any anatomical site of the eye is called Ophthalmomyiasis. Since information on outside ophthalmomyiasis is rare in South India, the present study is carried out to explore the epidemiology, risk factors and clinical highlights. Patients with ophthalmomyiasis were prospectively identified over four years. Slit-lamp microscopy was used to examine the conjunctiva. Larvae collected from conjunctiva were subjected to the lactophenol cotton blue staining technique. Two conjunctival swabs were collected from the patients who were diagnosed with ophthalmomyiasis. Standard microbiological methods were followed. Majority of the patients presented with the symptoms of conjunctivitis and foreign body sensation. Using smooth forceps helps in preserving morphology instead of using toothed forceps.

1. Introduction:

Myiasis is the intrusion of dipterian fly hatchlings in humans or other vertebrates.[1] A well-known zoonotic condition that affects a range of animals is myiasis caused by *Oestrus ovis* (bot fly larva). Various parts of the host may get an impact because of larval invasion. Typically, skin and bodily cavities (mouth, nose, ear, and eye) are involved. Ophthalmomyiasis is the term used to describe any anatomical region of the eye's involvement. [2] Larvae often attack the outside of the eyes or areas that are afflicted with ocular adnexia, such as the eyelids, conjunctiva, or lacrimal ducts (external ophthalmomyiasis). On rare circumstances, they may also involve the orbit (orbital myiasis) or even the eyeball itself (internal ophthalmomyiasis).[3]

In external ophthalmomyiasis, the patient's peculiar history includes insect hit in the eye followed immediately by pain, burning sensation, lacrimation, foreign body movement in the eye, redness and the development of subsequent edema. Misdiagnosis is normal, with attribution of intense conjunctivitis to different causes. The clinical signs might be confused

for acute conjunctivitis or periorbital cellulitis.[4] In tropical regions like North Africa and South Asia, *oestrus ovis* myiasis is endemic in sheep and goats.[5] The mechanical removal of the larva is followed by topical antibiotics, steroids, and painkillers as needed for management. [6]

Since the information on outside ophthalmomyiasis is rare in South India, the current study was conducted to investigate the disease transmission, risk factors and clinical highlights among the patients who were diagnosed as external ophthalmomyiasis.

2. Materials and Methods:

This was a prospective observational study conducted at Vinayaka missions medical college and hospital, a tertiary health care center. The duration of the study period was four years. Written informed consent was collected from all the patients. Institutional ethical committee clearance was obtained. All the patients who presented to ophthalmology department with the symptoms similar to conjunctivitis and foreign body sensation were evaluated for the presence of larvae. Pertinent data about demographics, clinical features, treatment, and risk factors were recorded.

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Slit-lamp microscopy was used to examine the conjunctiva. Two conjunctival swabs were collected from the patients diagnosed as ophthalmomyiasis. Standard microbiological methods were followed to identify the isolates [7,8]

A sum of twenty three patients were diagnosed as ophthalmomyiasis because of *Oestrus ovis*. Preponderance of males (n=15) was observed than females (n=4). Age was extended between 25-57 years. (Table.1)

3. Results:

Table1 Characteristic features of patients with ophthalmomyiasis

Variables	No. of Patients
Age	25-57 (Range in years)
Sex :	
Male	19
Female	4
Eye involvement :	
Unilateral	22
Bilateral	1
No. of larvae :	
1-5	11
>5-10	9
>10	3
Type of trauma :	
Insect hit	21
Non specific	2

All patients had creepy crawly hit while riding a motorcycle or while strolling along the ocean coast which is near the cattle grazing territory. All patients had symptoms, such as, redness, foreign body sensation, lacrimation and tingling. Indeed, even pain was complained by a few patients.

Ophthalmological findings: A slit-lamp inspection revealed small, transparent worms crawling over the ocular conjunctiva. Anterior chamber seemed to be healthy. Using sterile forceps and 4% xylocaine drops

as topical anaesthetic, worms were manually removed. With the aid of spines on their bodies, the worms were strongly sticking to the bulbar conjunctiva and had to be manually removed. Larvae were removed from the conjunctiva using plain forceps.

All the collected larvae from the conjunctiva were placed on a glass slide containing one drop of sterile saline and covered with a coverslip. Two conjunctival swabs were collected from the affected eye.

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Microbiological findings: On microscopic examination, a spindle-fashioned skeleton with many segments and intersectional spine bands were seen. The larvae had a couple of sharp thick oral hooks and a lot of brown hooks on the anterior margin of each body segment and they were identified as *Oestrus*

ovis. [Figure.1]. Few larvae were examined after staining with cotton blue technique. In the present study, it was observed that the usage of toothed forceps might damage the morphology of larvae. [Figure.2]

Figure.1 *Oestrus ovis* removed from the surface of conjunctiva with plain forceps.



Figure.2 *Oestrus ovis* removed from the surface of conjunctiva with toothed forceps.



All conjunctival swabs collected from patients were processed based on standard operating procedures in microbiology. No swab specimen yielded significant pathogenic microbial growth.

In all patients, treatment includes mechanical removal of larvae with the aid of plain forceps and application of topical antimicrobials with steroids. All patients responded to the treatment and no complications were noticed during follow up.

4. Discussion:

In our study, over four years 23 patients were diagnosed with ophthalmomyiasis due to *Oestrus ovis*.

In our study insect hit was found to be the common risk factor especially while riding a motorcycle along the sea coast of the study region. All patients had similar symptoms, redness of eye, itching and foreign body sensation.

In 1840, Hope was the first individual to portray myiasis. [9] All around, human myiasis is circulated with different species and abundant in poor financial regions of tropical and semitropical nations. [3] Ocular involvement occurs in under 5 percent of all instances of human myiasis. [10]The most widely recognized reason for external ophthalmomyiasis is the larvae of sheep botfly, *Oestrus ovis*. [3]

Bot fly is similar to the honey bee in appearance, which is dim dark colored, 10–12 mm in length. Bot fly ejects larvae in the form of milky white fluid in its environment or it deposits the larvae (first instar larvae) in the anterior nares of the cattle. Deposited larvae will move towards the septum where further growth will occur to reach the stage of second instar larvae. Again the larvae proceed to frontal sinuses and develop third stage larvae. During sneezing larvae will get expelled into the soil for pupation.[11,12]

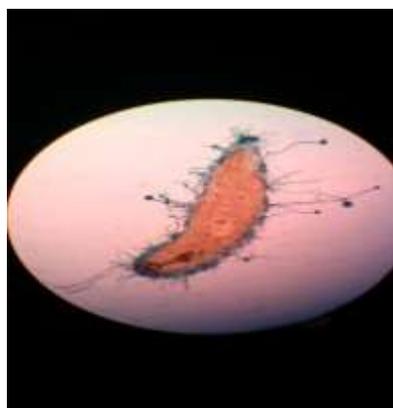
Accidentally ocular conjunctiva of human exposes to the larvae especially first instar larvae and causes external ophthalmomyiasis. With the aid of spines present all over the body larvae tightly adheres to the conjunctiva and resists normal saline irrigation. It consists of two major anterior hooks similar to bull horns. These hooks help the larval anterior region to stabilize on the conjunctiva and drags the posterior body towards the anterior region. This action is further enhanced by the presence of intersegmental spines which may lead to minor abrasions on the conjunctiva. [12] Despite the being low likelihood of orbital penetration and probable consequences, it is advisable to quickly remove the larvae from the conjunctival mucosa. The typical symptoms of external ophthalmomyiasis include itching, a feeling of a foreign body, and a watery discharge that is adhered to the conjunctiva. [13]. The potential consequences of a false positive for viral or allergic conjunctivitis are not noteworthy. The occurrence of external ophthalmomyiasis, which differs from another microbial conjunctivitis that may occur often, is widespread in the late spring and during harvest season.

The Mediterranean region, including Italy, and even Russia, Serbia, Africa, America, and Oman accounted for increasingly scattered events. [14,15] *O. ovis* accounted for 2 of the 65 detected parasite infections of the eye in a retrospective analysis of a 4-year period in Tunisia. [16] A case report also included an American soldier living in northern Iraq. [17] The larvae of *Oestrus ovis* are unable to penetrate cornea or sclera because they cannot secrete proteolytic enzymes. However, keratitis [13] and keratouveitis[18] have been reported as present in *Oestrus ovis* larvae.

Usually the larvae of *O.ovis* will be actively motile and difficult to view under the microscope. In our study, an attempt was made to immobilize the larvae after placing it on the glass slide containing a drop of paraffin oil. Due to the high viscosity of paraffin oil, movements of larvae were restricted and its morphology was viewed clearly. Another technique used to immobilize the larvae was, gently exposing the slide containing larvae with normal saline and coverslip to the flame.

In this study, the cotton blue staining technique was used to view the larvae of *O.ovis*. During the study, larvae were preserved in vials containing normal saline. Few days after preservation, larvae from vials were taken for morphological examination of *O.ovis*. Interestingly, an accidental finding was noted in the cotton blue mount technique, larvae of *O.ovis* which was simultaneously infected with *Aspergillus species*.Fig.3 Such finding of fungal infected *O.ovis* larvae was not reported in the world literature to our knowledge.

Figure 3 Aspergillus infected *Oestrus ovis*



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The advantage of lactophenol cotton blue mount was quite obvious from the above findings. This helps to diagnose immediately and to institute the appropriate antimicrobial therapy for infection. The second advantage of the cotton blue technique, kills the parasite and able to view easily along with the fungus. By this method larvae could be preserved for more than two years without any disintegration.

In conclusion, our study highlights two things, the entire morphology and movements of *O. ovis* were visible when we used smooth forceps whereas morphology and movement of larvae got distorted when we used toothed forceps and conjunctival swabs should be taken for the diagnosis of superadded microbial infections and treatment modality changes according to microbiological diagnosis.

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