OPHTHALMOMYIASIS EXTERNA IN JORDAN

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ABSTRACT

Objective: To describe the epidemiology of external ophthalmomyiasis at the Royal Medical Services military hospitals in Jordan.

Methods: A retrospective chart review of patients with ophthalmomyiasis externa was done at Royal Medical Services military hospitals in Jordan.

Results: A total of 49 cases of ophthalmomyiasis externa were studied over a period of 3 years from 2001 to 2004; of those 65.2 % were males and 34.8 % were females. The median age was 31.6 ± 13.45 standard deviation (SD). The right eye was involved in 57% of the cases. About two thirds of cases occurred during April to June and one third during September to November. Number of extirpated worms ranged from one to 23 with an average of 8.37 ± 5.52 SD. The clinical presentations ranged from mild to severe conjunctivitis, lacrimation and mild foreign body sensation to severe preseptal cellulitis.

Conclusion: Ophthalmomyiasis externa condition affects the eyelids and conjunctiva in Jordan. Most of the cases are documented as case reports and are localized to certain parts of Jordan. This report includes cases from different parts of Jordan.

Key words: Ophthalmomyiasis externa, Ophthalmomyiasis interna, Orbital myiasis, Oestrus ovis

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Introduction

Infestation with larvae (maggots) is known as myiasis. Ophthalmomyiasis externa refers specifically to infestation that involves the lids and conjunctiva in man. The sheep nasal botfly (*Oestrus ovis* sp.) is responsible for most cases of external ophthalmomyiasis and was described for the first time in 1947 by Patel [(1)] while the human bot fly (*Dermatobia hominis*) is the most common cause of cutaneous myiasis. Ophthalmic myiasis has been reported from different parts of the world and it is common in Jordan as the vector of the *Oestrus ovis* larvae is most prevalent in the warm climate of Mediterranean countries.

We present the clinical manifestation of 49 patients with external ophthalmomyiasis that had been seen in different royal medical services military hospitals.

Methods

We retrospectively reviewed the charts of 49 patients who were seen at 5 Royal Medical Services military hospitals and diagnosed as cases of ophthalmomyiasis externa over a period of 3 years from 2001 to 2004.

Charts were reviewed for patient demographic data

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and the following items were recorded: Gender, age, affected eye, and the time during which the eye was affected, number of maggots extirpated from the eye and the clinical features.

Results

Thirty-two (65.2 %) patients were males and 17 (34.8 %) were females. The ages ranged between 11 and 73 years with a median age of 31.6 ± 13.45 SD. The median age of males and females was almost the same with 31 for the former and 32 for the later. The right eye was involved in 57% of cases. The right eye was involved in about 60% of male patients, and both eyes were almost equally affected in female patients (Table I).

Table I. Patients' demographic data

	Male	Female	Total
Gender	32 (65%)	17 (35%)	49 (100%)
Age	31	33	32
Eye affected			
Right	19 (60%)	9 (53%)	28 (57%)
Left	13 (40 %)	8 (47%)	21 (43%)

Thirty-two (65.3%) cases occurred during April to June and 17 (34.7%) cases during September to November (Fig. 1).

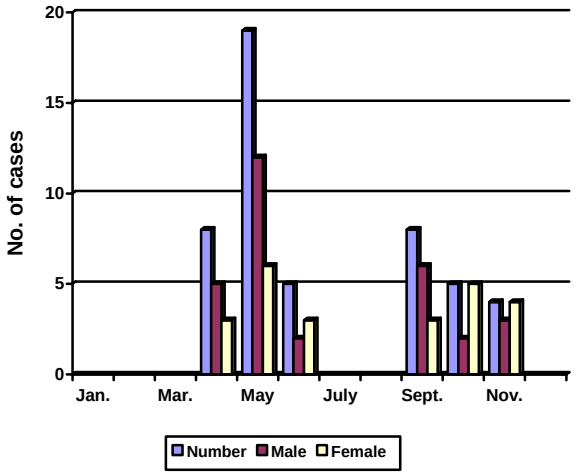

Fig. 1. The incidence of ophthalmoyiasis externa over months and the incidence among males and females

Number of extirpated worms ranged from one to 23 with an average of 8.37 ± 5.52 SD (Fig. 2).

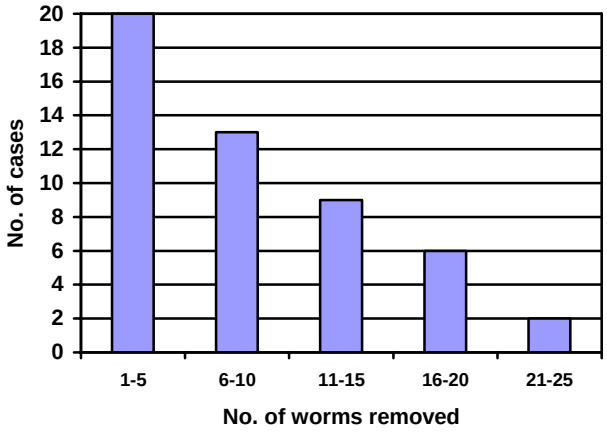

Fig. 2. Number of extirpated worms

The clinical presentations ranged from mild to severe conjunctivitis, lacrimation, conjunctival hyperaemia, and mild foreign body sensation up to severe preseptal cellulitis with itching, foreign body sensation, lacrimation, conjunctival chemosis and congestion being the commonest clinical features (Table II).

Table II. The frequency of the clinical features

Clinical Feature	Percentage
Foreign body sensation	49
Swelling	100
Chemosis	100
Pain	71.5
Itching	63
Rhinorrhea	24.5
Lacrimation	100
Punctate corneal erosion	37
Redness	63

All of our patients were outdoors in rural areas at the time of infestation, and were in close contact with sheep and goats during work, shepherding or farming. This explains the infection among males. Most of the cases among females occurred during milking sheep or goats. Most of the animals that were in contact with humans were sheep. None of the patients had history of allergic reactions in the past. The eye involvement was unilateral in all patients. The presenting complaint was (something hit their eye), after that they developed foreign body

Fig. 3. Left preseptal cellulitis secondary to ophthalmomyiasis externa

Fig. 4. Oestrus *ovis* maggot on the conjunctiva with conjunctival chemosis

Fig. 5. Oestrus *ovis* maggot reaping over the cornea

sensation, lacrimation, photophobia, redness, swelling, itching, watery discharge and pain that had always appeared abruptly. The diagnosis was made by direct visualization of the larvae in the bulbar and palpebral conjunctiva or corneal surface by slit lamp bio-microscope.

Findings on slit lamp examination were: Normal visual acuity, swollen erythematous lids (Fig. 3), conjunctival injection (bulbar and palpebral), chemosis, follicular conjunctival reaction and punctate corneal epithelial erosions in some cases (Fig. 4), presence of small organisms about one millimeter (mm), whitish translucent with small black spots on their body, actively moving on the conjunctiva or cornea (Fig. 5).

Double eyelid eversion was done to detect organisms in the conjunctival fornix. Management included: Instillation of topical anesthesia of benoxinate 0.4% eye drops, instillation of topical antibiotic eye/ointment or paraffin oil to stop the oxygen supply and suffocate the larvae, instillation of anticholinesterase ointment to kill or paralyze the larvae, or instillation of 10% hypertonic saline eye drops and then removal of the larvae by swab stick or forceps. Topical corticosteroids and antibiotics were given with a 24 hours follow up for all patients. Most of the symptoms resolved immediately after removal of the larvae, and complete recovery was noticed in all cases within a few days.

Number of cases diagnosed in each Royal Medical Services military hospital is summarized in Table III.

Table III. Number of cases diagnosed in the Royal Medical Services military hospitals

Hospital Name	No. of Cases
King Hussein Medical Center	12
Prince Rashid Al- Hasan Hospital	14
Prince Hashim Hospital	6
Prince Ali Hospital	8
Prince Zeid Hospital	9
Total	49

Discussion

Myiasis is the invasion of living animal tissue by fly larvae (maggots) and can be classified as accidental, facultative (opportunistic), or obligate. Human cases are considered accidental and most

often result in subcutaneous infestations (furuncular myiasis) caused by the tropical species *Dermatobia hominis*, the human botfly. African furuncular myiasis caused by tumbu fly (*Cordylobia arthroponaga*) was documented as case reports in the Jordanian peace- keeping forces during the last few years.[2] One of the causes of human myiasis is *Oestrus ovis* (sheep nasal bot fly) that usually attacks the eyes,[3,4] nose, ears,[5] pharynx,[6] tracheo-pulmonary,[7] and oral mucosa.[8] The condition is referred to as ophthalmomyiasis when the larvae are found in the ocular tissues. The larvae most commonly attack the lids, conjunctiva, lacrimal sac, or the nasolacrimal ducts[1] and is referred to as ophthalmomyiasis externa.

In the majority of cases, external ophthalmomyiasis is caused by larvae of the sheep nasal botfly (*Oestrus ovis*).[1,3-6,8-21] External ophthalmomyiasis can occur in most regions of the world, particularly in underdeveloped or rural areas where livestock prevail.[9] It is most common in the Middle East, Africa,[10] and Central America.[11]

In the Middle East most of the reported cases were from Jordan[3] and surrounding countries,[11-14] Oman,[15] Kuwait,[16] and southern Iran.[17] Most of the cases occurred during spring (the first part of the wet season) and autumn (during the cold dry season).[11] Several cases have recently been reported among military personnel of the coalition forces serving in Iraq.[11,12] Amr *et al*[3] reported 17 cases of ophthalmomyiasis externa due to the sheep nasal botfly, Oestrus ovis, from the Ajloun area in northern Jordan during the years 1990-1991. All cases were among males, and they occurred either from April to July or from September to November.

In our study we reported 49 cases of external ophthalmomyiasis from different parts of Jordan and about two thirds of the affected patients were males. All of the cases were outdoors in rural areas at time of infestation, in close contact with sheep and goats, shepherding or farming while most of the cases among females occurred during milking sheep or goats.

The right eye was involved in about 60% of males patients, and both eyes were almost equally affected in females patients and this may be related to how they got inoculated. About two thirds of cases occurred between the period of April and June where temperature and humidity are most suitable for the life cycle of the botfly to be continued.[17] The majority of cases occurred in low socio-economic classes because they usually depend on livestock, especially sheep, and they do not use the proper methods of prevention such as skin and cloth repellents to prevent the flies from getting close to their eyes or use drugs that protect animals from re-infection by the parasite. Another reason could be related to poor hygiene and their close contact with the uncovered, stagnant water resources.

In the normal life cycle of the *Oestrus ovis*, the adult female fly deposits larvae around the nostrils of sheep and goats and the larvae migrate into the sinuses. There they mature by going through three progressively larger larval stages (instars). After a few months, the fully mature larvae (third instar) pass out of the nostrils and pupate on the ground.

Adult flies emerge from the pupae approximately 3-6 weeks later and live for about a month.[18] Occasionally, the sheep nose botfly deposits larvae near the eyes of humans living or working in close proximity to livestock.

In humans, Oestrus *ovis* larvae generally do not develop past the first instars stage, although other species may grow much larger. An interesting feature of Oestrus *ovis* is that it can deposit larvae while still in flight. The fly darts close to the eyes or nostrils and ejects a stream of larvae into the target area.

Clinically conjunctivitis is most commonly found and is marked by foreign body sensation with watery or mucopurulent discharge. Superficial follicular conjunctivitis and punctate keratitis may be seen on examination. A crawling or wriggling sensation accompanied by swelling and cellulitis (Fig. 3) may be seen in palpebral myiasis in the affected eye. Many patients report having an insect buzzing around their face or striking them in the eye immediately prior to the onset of symptoms. Few patients noticed the presence of larvae in their eyes and in some others the larvae were noticed by their relatives.

Another documented way of inoculation was while driving,[19] although we did not face this in our patients. A trial to remove the larvae was attempted by some patients. Upon questioning, this group of patients admitted to have similar condition in the past. Other group of patients were seen by physicians and diagnosed to have preseptal cellulitis and were given systemic and topical antibiotic. With worsening of symptoms the patients were referred to the ophthalmic casualty unit for further assessment and treatment.

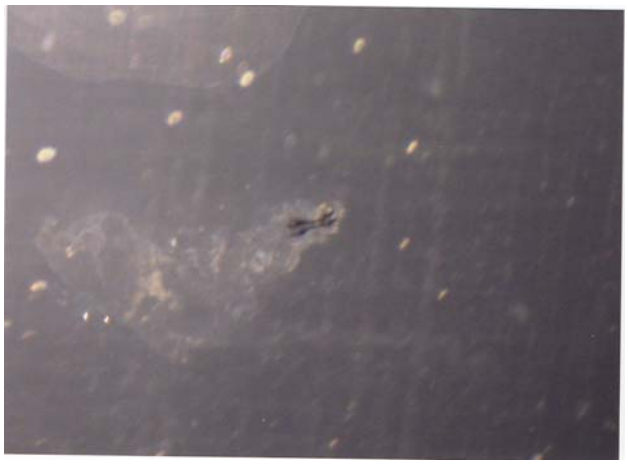

Fig. 6. Oestrus *ovis* maggot and hooks the maggots was spread on the sleds

Diagnosis of ophthalmomyiasis externa is made by demonstration of larvae (Fig. 4, 5), which are readily visible to physicians examining the eye and in some cases they can be seen traveling through the cornea (Fig. 4). They are grey-white in color and measure about one mm long. They have eleven body segments, each with spines or hooks,[20] which allow them to maintain their hold on the host tissue while moving about by means of peristaltic contractions. A pair of enlarged oral hooks on the anterior end (mouth) anchors the larva firmly while it feeds on eye secretions and bits of broken tissue (Fig. 6). As a small number of larvae may be present, a high index of suspicion is necessary to make the diagnosis.

The best treatment is the manual removal of larvae; however because of the big number of the larvae in some cases and their ability to move quickly and hide in the conjunctival fornices when they are exposed to the slit-lamp light, further topical agent is usually used to stop or slow down their movement either by the instillation of topical anaesthesia (benoxinate 0.4% eye drops), topical antibiotic eye/ointment or paraffin oil to stop the oxygen supply and suffocate the larvae. Instillation of anticholinesterase ointment or hypertonic saline drops to kill or paralyze the larvae can be used then the larvae are removed by swab stick or forceps. Steroids and antibiotics may be necessary to control inflammation and secondary bacterial infection. Follow-up is required to rule out complications or the existence of additional larvae.

If the larvae penetrate the conjunctiva and the sclera then this will lead to uveitis and the condition will be referred to as ophthalmomyiasis interna,[4] which is most commonly caused by a single larva of the *Hypoderma* spp. More serious complications may include lens dislocation and retinal detachmen,[21] optic atrophy,[22] or involvement of both eyes.[23] Diagnosis is usually confirmed by the observation of migratory tracks across the subretina.[24] In general, the larva dies and vision is not affected. The larvae can be destroyed by argon laser photocoagulation.[25] However, if significant inflammation exists, steroid therapy may be necessary, with surgical extraction being reserved for the most severe cases.[21]

Orbital myiasis[26] may be due to a number of fly species and is generally seen in patients who are unable to care for themselves. Foul odor is the most likely attracting factor to the flies, and disease is due to the local destruction of tissue by the maggots. Orbital myiasis is easy to diagnose with significant numbers of larvae present. An entomologist is usually needed to determine the exact species. Therapy is directed at removal of all maggots and control of secondary infection.[21]

Finally ophthalmomyiasis can be prevented by avoiding the places where livestock are housed or where they congregate during spring and summer seasons or by the use of skin and cloth repellents to prevent the flies from getting close to the eyes. Another measure that can be employed is to protect animals from re-infection by the parasite by drugs such as Closantel during the fly season, thus limiting the extension of the endemic zone of the parasite.[18]

Conclusion

Ophthalmic myiasis should be considered as occupational disease among farmers and shepherds. Awareness of larval conjunctivitis in rural areas especially in spring, summer and early fall will lead to prompt diagnosis and immediate management to prevent complications.

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