Ophthalmomyiasis in Hawaii

Eric H.N. Kajioka MS, Cherie F.K. Nagao CT (ASCP), Stefan Karas MD, John M. Hardman MD, and James J. Navin MD

Abstract

Ophthalmomyiasis is the infestation of the eye by fly larvae. Commonly caused by Oestrus ovis, a female sheep botfly will accidentally deposit her larvae into a human eye, resulting in disease. Prompt recognition and treatment of this condition will improve patient care and reduce potential complications. We report a case of ophthalmomyiasis in a young man from Molokai who was infested while unloading a Christmas tree.

Introduction

Ophthalmomyiasis, or infestation of the eye by the larvae of dipterous flies, is commonly caused by *Oestrus ovis*, a sheep botfly found in major sheep-raising regions.[1] Normally, female botflies deposit their larvae directly into the nostrils of sheep for development in the upper respiratory tract.[2,3] When the larvae are instead deposited into the eye, ophthalmomyiasis results. While this condition is commonly found in veterinary medicine, human pathogenesis has been well recognized for over 150 years by shepherds in Italy, where the fly is commonly known as *"a musca chi caca"* or "shitting fly".[4]

Illustrative Case Report

A 16 year old boy on the island of Molokai was unloading Christmas trees and thought he had brushed his eye with a branch. He experienced persistent eye irritation associated with a sensation that something was moving under his eyelid. The patient's mother examined his eye and extracted out some larvae before taking her son to the Emergency Department. While in the ED, an ophthalmologist was able to visualize three larvae under slit lamp exam. He removed them and sent them to the laboratory, which identified the organism as *Oestrus ovis* (Figure 1). The patient was later examined by an ENT physician who found no other larvae in his upper respiratory tract.

Discussion

Although the first reported case of ophthalmomyiasis in Hawaii has been mentioned as early as 1925,[5] this case report serves to reinforce ophthalmomyiasis as an established disease entity in the Hawaiian islands. While classically reported to occur in sheep farming areas in the Mediterranean, Middle East, Africa, and Central America,[4,6-8] ophthalmomyiasis has been reported in non-rural areas as well as North America, Asia, and Hawaii.[5,8-11]

Commonly caused by *Oestrus ovis*, or sheep botfly, this fly is normally active during warm weather and bright sunlight, lives up to 4 weeks, and continues its lifecycle as an obligate parasite in sheep and goats. A pregnant female botfly will fly into the nostril of a sheep or goat and flick her abdomen, leaving her larvae on the nasal mucous membranes. The larvae then implant themselves for 2 weeks to 9 months, developing and feeding on the mucous membranes until they finally mature, crawl out of the nasal passages, and pupate in the soil.[12]

Ophthalmomyiasis results when the female botfly accidentally deposits its larvae in the eyes of humans and can be further classified into externa, interna, and orbital depending on the location of infection. Externa involves infection of the conjunctiva and lid, interna involves penetration of the globe or sclerae, and orbital involves invasion through the sclerae into the vitreous cavity.[6] Ophthalmomyiasis externa is the most common form, and signs and symptoms of infection are similar to conjunctivitis, which include an acute foreign body sensation with pain, redness, irritation, lacrimation, blurred vision, and photophobia.[1,8] The infection is usually self-limiting and will resolve after 10 days if untreated, as the larvae fail to develop in human conjunctivae. Failure to seek early treatment, however, can also result in corneal ulcerations, conjunctival hemorrhages, punctate keratitis, or progression of infection causing ophthalmomyiasis interna or orbital ophthalmomyiasis.[5]

Treatment of ophthalmomyiasis externa involves physical removal of larvae from the conjunctiva. Lidocaine may be used to anesthetize the eye as well as immobilize the larvae, enhancing their removal.[6] A slit lamp may also be used to assist removal, but the larvae tend to avoid bright light so the anesthetic should be administered prior to use.[1,8] Careful follow-up examination will ensure complete removal of larvae. Symptoms should resolve within one to two days post-larvae removal. The management of internal and orbital ophthalmomyiasis depends on the clinical presentation and an ophthalmologist should be consulted for proper treatment.

Authors:
- Department of Pathology
The John A. Burns School of Medicine
University of Hawaii
Honolulu, HI 96822 (E.H.N.K., J.M.H., J.J.N.)
- Clinical Laboratories of Hawaii
Honolulu, HI 96817 (C.F.K.N., J.J.N.)
- Department of Ophthalmology
Straub Clinic and Hospital
Honolulu, HI 96813 (S.K.)
- Department of Pathology
Straub Clinic and Hospital
Honolulu, HI 96813 (J.J.N.)

Correspondence to:
James J. Navin MD
Department of Pathology
Straub Clinic and Hospital
888 South King Street
Honolulu, HI 96813
fax: (808) 522-4339
email: jnavindr@aol.com

Conclusion

Although uncommon, ophthalmomyiasis is an established disease entity in Hawaii and should be considered in the differential for ophthalmologic complaints of foreign body impaction, eye pain, or conjunctivitis. Clinicians should be aware of this disease to ensure prompt diagnosis and treatment.

Acknowledgments

We are indebted to Clinical Laboratories of Hawaii and Moon Soo Park, MD, who made this work possible. We also thank the Straub Foundation and the University of Hawaii for their support.

References

1. Mathieu ME, and Wilson, Barbara B. Myiasis. In: Mandell GL, Bennett, John E., and Dolin, Raphael, ed. Mandell, Douglas, and Bennett's Principles & Practice of Infectious Diseases. 5th ed. Charlottesville: Churchill Livingstone; 2000:2976-9.
2. Cepeda-Palacios R, Scholl PJ. Intra-puparial development in Oestrus ovis (Diptera: Oestridae). Journal of Medical Entomology 2000;37(2):239-45.
3. Colwell DD, Scholl PJ. Cuticular sensilla on newly hatched larvae of Gasterophilus intestinalis and Oestrus ovis. Medical & Veterinary Entomology 1995;9(1):85-93.
4. Pampiglione S, Giannetto S, Virga A. Persistence of human myiasis by Oestrus ovis L. (Diptera: Oestridae) among shepherds of the Etnean area (Sicily) for over 150 years. Parassitologia 1997;39(4):415-8.
5. Yoshimoto CM, Goff ML. External ophthalmomyiasis, a disease established in Hawaii. [Review] [21 refs]. Hawaii Medical Journal 1997;56(1):10-2.
6. Cameron JA, Shoukrey NM, al-Garni AA. Conjunctival ophthalmomyiasis caused by the sheep nasal botfly (Oestrus ovis). Am J Ophthalmol 1991;112(3):331-4.
7. Risco JM, al-Dosari F, Millar L. Sheep nasal botfly (Oestrus ovis) larvae infestation of the conjunctiva. Arch Ophthalmol 1995;113(4):529-30.
8. Hira PR, Hajj B, al-Ali F, Hall MJ. Ophthalmomyiasis in Kuwait: first report of infections due to the larvae of Oestrus ovis before and after the Gulf conflict. Journal of Tropical Medicine & Hygiene 1993;96(4):241-4.
9. Nacapunchai D, Lamon C, Sukprasert N. A first record from Thailand of human external ophthalmomyiasis due to Oestrus ovis. Southeast Asian Journal of Tropical Medicine & Public Health 1998;29(1):133-6.
10. Sigauke E, Beebe WE, Gander RM, Cavuoti D, Southern PM. Case report: ophthalmomyiasis externa in Dallas County, Texas. Am J Trop Med Hyg 2003;68(1):46-7.
11. Yoshimoto CM. Observations on ophthalmomyiasis.[comment]. Wilderness & Environmental Medicine 1998;9(4):263.
12. Michigan State University College of Veterinary Medicine Parasitology Identification Tutorial. 2004. (Accessed at http://cvm.msu.edu/courses/mic569/docs/parasite/cyclo.htm.)

Figure 1.— *Oestrus ovis* in the first instar stage

The larvae were removed from the patient and fixed in 10% formaldehyde. the larvae were embedded in paraffin, and sections were stained in hematoxylin and eosin. Light microscopy demonstrates the cross-section of *Oestrus ovis* in the first instar stage. This figure is a representation of one of three larvae obtained from the patient's eye (400x).