

## Case Report

# Cutaneous myiasis due to *Cochliomyia hominivorax* in a drug user

Luis Trombetta<sup>1</sup>, Adriana Oliva<sup>2</sup>, Viviana Galache<sup>1</sup>, Javier Bava<sup>1,3</sup>, Alcides Troncoso<sup>4</sup>

<sup>1</sup>Infectious Diseases "Francisco J Muñiz" Hospital

<sup>2</sup>CONICET-Laboratory of Forensic Entomology

<sup>3</sup>Department of Micology La Plata University

<sup>4</sup>Department of Microbiology, Parasitology and Infectious Diseases, School of Medicine, Buenos Aires University

### Abstract

Myiasis is the condition resulting from the invasion of tissues or organs of man or animals by dipterous larvae. The blowflies (Calliphoridae) of Argentina comprise several species that may cause myiasis by colonizing wounds or infected body orifices, and one specific parasite: *Cochliomyia hominivorax*. This species often causes traumatic myiasis in cattle, dogs and cats, and it is not rare in humans. The larvae consume living tissues, so they are dangerous unless speedily removed. Immediate operative exploration along with the removal of larvae and primary defect closure is recommended in every case. Here we report a case of myiasis in a scalp wound caused by blunt force trauma to the area, in a male patient with a case history of alcohol and drug abuse. Seventy-one living larvae were extracted from the wound and determined as *C. hominivorax* in the Forensic Entomology Laboratory. Given the aggressiveness of these larvae, specific and quick diagnosis as well as the application of appropriate treatment is crucial.

**Key words:** head, maggots, myiasis, human myiasis, *Cochliomyia hominivorax*

*J Infect Dev Ctries* 2009; 3(11):873-876.

(Received 15 June 2009 – Accepted 28 October 2009)

Copyright © 2009 Trombetta *et al.* This is an open-access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

### Introduction

Myiasis is a condition in which fly maggots feed off and develop in the tissues of living organisms. True myiasis results from flies laying eggs in or on the tissues deliberately. There are two forms of myiasis: obligate, in which it is necessary for the maggots to feed on living tissues; and facultative, where flies take advantage of wounds or degenerative necrotic conditions as a site to incubate their larvae [1]. In general obligate human myiasis occurs in tropical areas, whereas facultative myiasis can occur anywhere in the world. Myiases are human infestations by fly larvae (maggots). They can occur in three settings: larvae in necrotic tissues; accidental infestations when flies that usually put their eggs in decaying matter put them in urinary or gastrointestinal passages; and larvae in living tissues [2].

Nowadays, myiasis is found in indigents amply exposed to flies [3] or small babies abandoned in dustbins [4]. Oral myiasis is also known to occur in persons with very poor dental hygiene or in those who suck their thumbs [5]. In some rare cases, myiasis can also be picked up by visitors to underdeveloped countries and naturally natives are also affected, but these cases remain unreported [6].

That said, however, the infestation is more common in persons having close contact with animals that are the usual targets of flies [7].

An article published in 2000, on wound myiasis in the United States, found 137 reported cases of acquired myiasis in the continental United States between 1960 and 1995 [8]. Most maggots only eat necrotic tissues and because of this preference are used for larval therapy of infected skin ulcers as well as for deeper lacerations [9,10]. *Cochliomyia hominivorax*, however, eats normal tissues and its maggots can migrate to the brain, lungs and other organs where infestation by this species can cause death.

### Case report

A 32-year-old man was seen in a consultation because of a wound he had on his head for two days. The day prior to admission to the hospital the wound was primarily treated, rinsed and sutured in layers. The patient appeared in the emergency unit of our hospital seeking treatment for a penetrating head injury after a street fight. A physical examination revealed symptoms indicating former drug and alcohol abuse. He said he was a jewel handicraft man and that he had been using cocaine and marijuana

since he was a teenager and still used them. The patient was oriented regarding his person and the place but not the time (*i.e.*, he knew his name and where he was, but not the month or the year or that Christmas had just passed). In the emergency room his temperature was 100°F. Remarkable findings, in addition to his mental status, included a lacerated wound on the head. Local examination revealed an erythematous skin suture with a painful edema. The patient was hospitalized and emergency laboratory testing was performed (L =  $11.0 \times 10^9/L$ , neutrophils = 80% with a left curve, C-reactive protein = 15.4 mg/l).

In this case, due to a severe bacterial infection, an antibiotic and an intravenous antibiotic treatment was introduced (cefalothin). The patient was taken for an emergency surgery during which the sutures were removed and the surgeon took about 71 live maggots from his head tissues (Figures 1 and 2). Before and after surgery he received a dose of ivermectin. Blood cultures drawn at the time of admission to the hospital were sterile. The patient recovered well following surgery and was discharged from our hospital after four days, with no sequelae. The maggots were identified as *C. hominivorax*, which was confirmed by the Laboratory of Forensic Entomology.

**Figure 1.** Head myiasis



**Figure 2.** Larva of *Cochliomyia hominivorax*.



## Discussion

The epidemiological characteristics of myiasis are well defined. It has been described as persons having close contact with animals that usually attract flies. Low socioeconomic level, poor health, alcoholism, poor hygiene, poor housing conditions, or diabetes also seem to also be predisposing factors for myiasis. In South America myiasis has also been described with similar epidemiological characteristics. Different classifications of myiasis can be adopted depending on the description of myiasis in the infected area of the host, or according to the biology of the species of fly causing the myiasis [11].

There are in Argentina two species of obligate parasites which develop on man: the screw-worm *C. hominivorax* and the berne maggot *Dermatobia hominis*. The latter is restricted to subtropical areas and causes benign furunculoid myiasis in humans. Dogs and cattle are more often attacked. *C. hominivorax* often attacks dogs, cats and cattle, and in humans it causes painful myiasis that may cause death. It has been recorded from all the provinces of Argentina; however, in the southern half of the country it is not active in winter and early spring [12].

Usually the lesions are located in exposed areas of the skin, such as on the arms and legs, costal region and even eyelids. Deep injuries of the head are very common in drug users, also in very poor patients. These injuries vary in severity from trivial to life-threatening, but the usual complications are infection. Diagnosis is based on the characteristics of the injury and the epidemiological background, and it

is confirmed with the removal of the larva and later with a morphological analysis. Treatment consists of the mechanical removal of maggots, which can be provided by the application of ether [11].

Myiasis by this species may have a fatal outcome in rhynomiiasis and inadequately treated scalp myiasis. It is extremely important to consider this diagnosis in patients who are being consulted for skin lesions, as *C. hominivorax* is particularly dangerous because it burrows deeply into the tissues. Statistics show that most patients treated for *C. hominivorax* were male rural workers aged 20 to 40 years in Salta province and aged 30 to 46 years in Mendoza province. Habitual use of alcohol was considered a risk factor. Cases involving *D. hominis* were always traced to visits to northern Argentina, usually to the Iguazú falls. Cases of *C. hominivorax* came from Buenos Aires city, and ranged from a 20-year-old university student (vulvar myiasis) to an alcohol and cocaine user (ophthalmomyiasis). The first patient had excellent personal hygiene but was in the habit of sunbathing for long periods. The second had an irregular lifestyle and was in the habit of sleeping in the sun surrounded by his dogs [13].

Myiasis by *C. hominivorax* is very painful. Cavernous lesions are formed, so that it is difficult to extract the larvae in a single session, and this delay makes the situation more dangerous. As long as larvae are present, a foul-smelling, bloody discharge is observed [8].

In this case, using the modalities already described, the mechanical removal was successful. The maggots isolated from this case were identified as *C. hominivorax*. The screw-worm fly or *C. hominivorax*, which is common in tropical South America, is also found in Argentina. Several cases of head myiasis have been documented from Argentina. However, there is no information in the Argentine literature about skin lesions caused by *C. hominivorax*. We found a report of a case of head myiasis in Buenos Aires city with very few details in a non-indexed Argentine Journal from 1973 [14, 15].

*C. hominivorax* is widely distributed in the warm parts of the American continent, from Mexico to northern Argentina. It is extremely important to consider this diagnosis in patients who consult for skin lesions. As stated above, the complete destruction of the skin in few days' time can be explained by the known capacity of *C. hominivorax* to deeply bury into tissues. Radiological investigations are only mandatory if there is any

suspicion of a head injury [16]. Treatment consists of the aforementioned mechanical removal of maggots, as well as the application of ether [17].

In Argentina, cattle and dogs are reservoirs of *C. hominivorax*. Insistence upon responsible ownership of pets might be the way to eradicate myiasis from large cities such as Buenos Aires. Personal cleanliness and proper tending of wounds drastically diminishes the probability of suffering from specific myiasis, although there are records of *C. hominivorax* laying eggs on unbroken skin and in ears of healthy, well-groomed persons. Measures for public hygiene, such as proper disposal of garbage, diminish the probability of facultative myiasis. The fight against myiasis should include programs of sanitary education for the community.

To summarize, the present case adds further proof to a phenomenon which has been observed at least since 1939, that myiasis is most likely to affect substance abusers [13, 15]. Poor living conditions are an added risk factor inasmuch they contribute to poor personal hygiene. However, people who do not fall into one of the aforementioned categories are also at risk, depending on their lifestyle and life choices. In particular, the public should be warned against sleeping in the sun. Therefore, it is important that not only doctors, but the general public as well, should be aware of these additional risk factors [10].

Argentina has many public health problems but since solutions to prevent myiasis are known and viable, they should be pursued as this infestation can lead to death. Depending on the aggressiveness of the etiological agent and/or the time that it takes to diagnose the infestation and implement proper treatment, myiasis either can be easily resolved or become clinically very serious [8]. Therefore, rapid diagnosis is extremely important to avoid serious consequences. The flies fail to infest humans when they feed and develop in the excrement, sweepings, decomposition matter and corpses of diverse types of animal. It is considered that the flies that put eggs in the excrement or in the necrotic or rotten corpses of animals are potential agents of myiasis [10]. The fight against the myiasis should include strategic planning that recommends basic cleaning and sanitary education programs for the community. Individual actions that tend to diminish risk factors are also extremely important in the prevention of this parasite. Personal cleanliness, avoidance of environmental exposure, and proper treatment of wounds can many infestations [1].

## Acknowledgements

We thank Madeleine Hahn from Aston University, Birmingham, UK, for the valuable suggestions.

## References

- Zumt, F. Myiasis in man and animals in the Old World. London, 1965: 267.
- Hirshman JV, Richardson P, Kraemer RS, Mackowiak PA (2004) Death of an Arabian Jew. *Arch Intern Med* 164: 833-839.
- Hyun D, Cain M, Blue-Hnidý DE, Conway JH (2004) Urinary myiasis associated with ureteral stent placements. *Pediatr Infect Dis J* 23: 179-181.
- Bapat S (2000) Neonatal myiasis. *Pediatrics* 106: 6.
- Lata J, Kapila BK, Aggarwal P (1996) Oral myiasis: a case report. *Int J Oral Maxillofac Surg* 25: 455-456.
- Sweis IE, Griffith HB, Pensker J (1997) Souvenirs from Belize: the botfly and the screwworm fly. *Plast Reconstr Surg* 99: 868-870.
- Uriarte FJ, Ell SR (1997) Doctors, there are maggots in my nose. *J R Soc Med* 90: 634-635.
- Sherman RA (2004) Wound myiasis in urban and suburban United States. *Arch Intern Med* 160: 2004-2014.
- Woff H and Hansson C (2003) Larval therapy – an effective method of wound debridement. *Clin Exp Dermatol* 28: 134-137.
- Claxton M, Armstrong D, Short B, Jefferey R, Boulton JM (2003) 5 questions and answers about maggot debridement therapy. *Adv Skin Wound Care* 16: 99-102.
- Osorio J, Mancada L, Molano A, Valderrama S, Gualtero S, Franco-Paredes C (2006) Role of ivermectin in the treatment of severe orbital myiasis due to *Cochliomyia hominivorax*. *Clin Infect Dis* 43: 57-59.
- Mariluis J, Mulieri P, Patitucci L, Oliva A (2007) Cystomyiasis by larvae of a *Psychoda* sp. (Diptera: Psychodidae): first case for Argentina. *Can Soc Forensic Sci* 40: 187-188.
- Oliva A, López Ramos N, Bosio LA (2007) Fatal scalp myiasis: autopsy finding of *Cochliomyia hominivorax* (Diptera: Calliphoridae) in the brain cavity. *Can Soc Forensic Sci* 40: 183-186.
- Jörg ME (1973) Conjuntivitis aguda por larvas de *Oestrus ovis* L. Dos observaciones en la Argentina. *La Prensa médica Argentina* 60: 1155-1159.
- Jörg ME (1976) Miasis anal y consideraciones generales del parasitismo por larvas de mosca. *La Prensa médica Argentina* 63: 47-51.
- Amaral ADF (1940) Observações em torno de dois casos de miiase humana pela *C. hominivorax*. *An Paul Med Cir* 39: 404-405.
- Dourmishev AL, Dourmishev LA, Schwartz RA (2005) Ivermectin: pharmacology and application in dermatology. *Int J Dermatol* 44: 981-988.

## Corresponding Author

Dr. Luis Trombetta, MD  
Uspallata 2272, CP: C1182  
Buenos Aires, Argentina  
Email: lusumar@fibertel.com.ar

**Conflict of Interest:** No conflict of interest is declared.