

The human aural myiasis caused by *Lucilia sericata*¹

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ABSTRACT. Myiasis is a rare, worldwide, human disease with seasonal variation, caused by developing larvae of a variety of fly species. It can be dangerous when infestations penetrate into the brain. In the available literature, we have found only a few papers concerning ear myiasis caused by *Lucilia sericata*. Here, we report 2 cases of aural myiasis. Early intervention (surgical removal, occlusion) in these cases should prevent complications. Larvae, for further examination, should be killed by immersion in very hot water, then preserved in an ethanol.

Key words: aural myiasis, *Lucilia sericata*

Introduction

Myiasis is a rare, worldwide, human disease with seasonal variation, caused by developing larvae of a variety of fly species; the most commonly reported include infections by *Dermatobia hominis* and *Cordylobia anthropophaga* [1]. Prevalence of myiasis is highest in the tropical and subtropical zones; in the United States and in Europe, the cases reported are mainly found in travelers returning from these destinations [1]. In moderate climates larvae of cosmopolitan dipteran flies are accidental parasites, i.e., human skin (*Hypoderma bovis* and *Gasterophilus intestinalis*), nose, paranasal sinuses, pharynx, and ears (*Calliphora* sp., *Lucilia sericata* and *Musca domestica*), alimentary tract and urogenital system (*Fannia canicularis*), and eyes, orbits, and periorbital tissue (*Calliphora vicina*, *H. bovis*).

Blowflies (Calliphoridae) are found worldwide. They can cause myiasis of relatively short duration, by both obligatory and/or facultative parasites, which mature within 4–7 days, usually in the host's

body orifices and in wounds. They must feed on host tissues, body fluids or ingested by people food for a certain period of time. While in flight, the fly may even drop its eggs in flight on the skin, wounds, or natural openings of an immobile person. The larvae pass through 3 stages before wandering from the lesion and dropping to the ground where they pupariate. The time required to complete the life cycle from egg to adult takes usually about 4–6 weeks. Myiasis can be classified as accidental (larvae ingested along with food may produce internal infection), semi-specific (larvae are laid on necrotic tissue associated with wounds), and obligatory (larvae affect undamaged skin) [2].

The symptoms and signs depend on affected organs. Patients mainly complain of boil-like, painful, pruritic and tender lesions, with the sense of something moving; sometimes, they induce fever, swollen glands, and headache.

Based the literature, the average age of hosts is approximately 60 years, with a male:female ratio of 5.5:1; homelessness, alcoholism, psychiatric diseases, mental disturbances and peripheral

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vascular disease are frequent cofactors [3,4]. However, cases of neonatal myiasis have also been reported [5]. In the available literature from 1960, we found only a few papers dealing with ear myiasis caused by *Lucilia sericata* [2,3,6–9], i.e., 4 in the United States [10] and one in Poland [11]. It should be emphasized that infestation of the ears can be dangerous, because of the possibility of larval penetration into the brain, which occurs in about 8% of such cases. Here, we report 2 cases of ear myiasis, caused by *Lucilia sericata* larvae.

Cases report

Case No. 1. A 57-yr-old man was admitted to ENT Department of Provincial Specialistic Hospital in Zgierz, Poland. He was a resident of the convalescence home of MONAR (Polish Organization Counteracting Addiction). However, 4 weeks before admission to the hospital he had left of



Patient No. 1:
Fig.1. auricula and external auditory meatus filled with fly larvae



Fig.2. after surgical removal of larvae

his own accord and became homeless; sleeping in the forest. At admission to the hospital the patient was dirty and untidy. He complained of otalgia, fetid otorrhea, itching, and bleeding. His left auricle was deformed, with perforation and ulceration of the congested skin; the upper part of the auricle cartilage was lost, and uncovered; the entire auricle and external auditory meatus were filled with fly larvae (Figs. 1–3). All larvae were carefully removed and placed into 3% formalin for further examination. Because of the lack of part of auricular cartilage, skin of auriculae was removed; healing of the wound followed without complications. The patient received a prophylactic antibiotic therapy to prevent secondary infections. After 6 weeks, a follow up examination revealed no larvae (Fig.4).



Fig.3. removed larva



Fig.4. follow up (6 weeks)

Case No. 2. A 44-yr-old woman was admitted to the Department of Head and Neck Neoplasms Surgery, Medical University of Lodz, Poland with carcinoma of the middle ear, which was treated by radio- and chemotherapy; during a follow up visit otorrhea was found, and the patient complained of aural fullness, otalgia, and the sensation of a foreign

body inside. During an examination, a number of larvae filling the destroyed pyramid of the temporal bone were detected. All larvae were carefully removed manually and surgical debridement of devitalized tissue was performed. After the removal, antiseptic dressing was applied. Larvae were placed into 3% formalin for further examination. The patient did not receive any local or systemic treatment. After 3 months, a follow up examination revealed no new larvae.

The maggots collected in both cases were identified using a key and description given in a monograph of Polish Calliphoridae [12], prepared for forensic entomology applications [13]. Due to fixation in 3% formalin, their external diagnostic features were difficult to examine, as their cuticles were swollen and detached from the body. Because of deformation of papillae surrounding spiracular field and the field itself, it was impossible to measure the papillae and spiracular distance factor. For this reason, several specimens were prepared for microscopic examination after dissolving in 10% KOH. The specimens revealed a cephaloskeleton, anterior and posterior spiracles, and spines of thoracic segments.

In all cases, the oral sclerite was not sclerotized and there were no sclerotized area below the posterior tip of ventral cornua was not observed. The anterior spiracles were divided into 7–10 lobes. The slits of posterior spiracles were linear, surrounded by a thin, but complete, peritreme. The shape of spines of thoracic segment II was consistent with the description and illustrations given in keys. On the basis of features observed, all maggots were identified as 3rd stage larvae of *Lucilia sericata* Meigen (Diptera: Calliphoridae), the most common species causing otomyiasis in central Europe.

Discussion

Myiasis usually occurs in neglected chronic lesions, especially among patients with poor hygiene, as in case No.1. Case No. 2 is unique because it occurred in a patient with no hygienic or socioeconomic risk factors conducive to egg deposit or larval growth [1]. Myiasis in humans may be either asymptomatic, or severe and life threatening since larval infestations of the eye, nose, and ears may penetrate into the brain [15]. Aural myiasis may present a number of different signs and symptoms, i.e., larvae in the ear can variously

induce otalgia, fetid otorrhea, aural fullness, perforation of the tympanic membrane, bleeding, itching, a roaring sound, tinnitus, vertigo, and furuncle of external auditory canal. Damage to the auditory meatus can lead to deafness and meningitis [2,14,16].

Maggots are able separate necrotic tissue from the living tissue and for this reason, they are sometimes employed in „biosurgery”. This procedure involves continuous flushing or irrigation of the wound with copious exudates formed by the host in response to maggots, which kill, ingest and digest bacteria. Maggots also cause granulation of host tissue due to continuous larval movement in the wound, which results in liquefaction of necrotic tissue as well as increasing the presence of total human fibroblasts.

In the case of aural myiasis, early intervention will avoid complications. Surgical removal of larvae with local anesthesia (lidocaine) is the most important procedure that should be undertaken. Intervention should be undertaken to avoid lacerating the larvae since retained larval parts may lead to foreign body reaction. After the removal, antiseptic dressings are advised; antibiotics should be administered only if secondary infection is noted. If such procedure is insufficient, occlusion using petroleum jelly, liquid paraffin, beeswax, hair gel or heavy oil should be employed; lard or bacon strips placed over the central punctum have been used to coax the larva to emerge spontaneously head-first over the course of several hours. Occlusion may occasionally result in asphyxiation of the larvae without inducing them to exit and the dead larvae may elicit an inflammatory response with the formation of foreign body granuloma and calcification.

Treatment may also include oral administration of ivermectin (200 µg/kg/24h *per os*) or topical use (1% solution) [1].

After removal, larvae should be killed by immersion for 30 seconds in very hot (>80 °C), but not boiling water, which prevents decay and maintains the natural color; then they should be preserved in 70% to 95% ethanol. Formalin should not be used as fixative, since it causes excessive hardening of the larval tissues, making the larvae difficult to identify.

Conclusions

1. Larvae of cosmopolitan flies can induce

human parasitosis.

2. Clinicians must have a clinical suspicion of aural myiasis not only to patients traveling to warm, humid climates or living in poor hygienic conditions, but also in a moderate climate with no hygienic or socioeconomic risk factors.

3. Treatment should include manual removal of larvae, as well as local and systemic drugs.

4. For the exact identification, larvae should be killed by immersion in very hot water and fixed in 70% to 95% ethanol.

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Muszyca u ludzi wywołana przez *Lucilia sericata*

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Muszyca jest chorobą pasożytniczą zwierząt, niekiedy także człowieka, wywołaną obecnością i wędrówką larw much, głównie *Dermatobia hominis* i *Cordylobia anthropophaga*. W dostępnym piśmiennictwie udało się znaleźć tylko 8 prac dotyczących muszycy ucha.

Celem pracy jest przedstawienie 2 przypadków muszycy ucha zewnętrznego wywołanych przez larwy *Lucilia sericata*. Przypadek 1. dotyczy 57-letniego pacjenta, podopiecznego Ośrodka MONAR w Sokolnikach (woj. łódzkie), przyjętego na Oddział Otolaryngologii Wojewódzkiego Specjalistycznego Szpitala w Zgierzu; ok. 4 tygodnie wcześniej samowolnie opuścił Ośrodek i będąc bezdomnym, nocował w lesie. Przy przyjęciu stwierdzono liczne, żywe larwy w obrębie rozległych zmian małżowiny usznej, obejmujących jej skórę i chrząstkę. Przypadek 2. dotyczy 44-letniej pacjentki leczonej w Klinicznym Oddziale Chirurgii Nowotworów Głowy i Szyi Katedry Chirurgii Głowy i Szyi Uniwersytetu Medycznego w Łodzi z powodu raka ucha środkowego. Po radio- i chemioterapii wystąpiło ropienie, a w czasie wizyty kontrolnej stwierdzono liczne, żywe larwy w obrębie zniszczonej piramidy kości skroniowej. U obydwu chorych zastosowano bardzo dokładne oczyszczenie zmienionych miejsc i usunięcie wszystkich larw. Usunięte larwy zostały zidentyfikowane jako larwy *Lucilia sericata*.

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