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CASE REPORT **Open Access**

Myiasis in A Chronic Untreated External Ear Lesion: A Case Report

Muhammad Yatsrib Semme[1,*], Mohammad Reza Zainal Abidin[2]

[1]General Practitioner, Wisata UIT General Hospital, Makassar, Indonesia
[2]Otorhinolaryngology specialist, Wisata UIT General Hospital, Makassar, Indonesia

*Corresponding Author. Email: yatsribsemme@gmail.com, Telp: +6285341251212

ABSTRACT

Myiasis is a prevalent parasitic infection which predominantly observed in rural regions among humans. In the practice of otolaryngology, this medical condition has the potential to impact the auditory organs, nasal passages, paranasal sinuses, nasopharynx, oral cavity, and the integumentary system of the craniofacial region. We reported a case in a 77-year-old woman who came to the emergency department due to chronic ear pain followed by the emergence of maggots. The chronic wound in the ear is the culprit in this condition. Dipterous larvae undergo their life cycle within the body of vertebrates which are attracted to open wounds. The primary objective in the treatment of myiasis is the eradication of maggots. In this case, we present successful treatment of aural myiasis following the complete removal of the maggot and treating the underlying condition. This case taught the lesson that myiasis could affect the human auditory system, especially in chronic untreated ear lesions with poor sanitation. Removing the larva and treating the underlying disease is the key treatment.

Keywords: Earache, myiasis, larva

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Introduction

Humans are susceptible to attacks not just from mature insects but also from their larval stages. Myiasis, also referred to as "fly strike," is the invasion of human and animal tissue by dipteran larvae, commonly known as maggots.[1] Myiasis is a condition when maggots infest the tissues and organs of living vertebrates, including humans, and feed on the host's live or decaying tissue.[1,2] The condition is widely recognized as a prevalent parasite infestation in livestock across tropical climates worldwide. In addition to animals, this illness has also been documented to manifest in humans residing in underdeveloped countries. While instances of myiasis in humans are infrequent, outbreaks are exceedingly uncommon. Human infestation is contingent upon the proximity of pets and livestock due to the zoonotic nature of the disease.[3] The prevalence is neglected worldwide, but it depends on seasonal variation, which is related to the latitude and life cycle of the various species of flies. Its incidence is higher in the tropics and subtropics of Africa and the Americas. A review of epidemiological and clinical data on human myiasis from Ecuador reported that the highest annual incidence was reported in the Amazon (23 cases/100,000 population), followed by Coast (5.1/100,000) and Andes (4.7/100,000).[4]

Instances of aural myiasis (AM) typically occur as facultative or accidental occurrences, meaning that the presence of larvae in the ear is coincidental. Aural myiasis predominantly occurs in regions with tropical and subtropical climates characterized by elevated humidity and warm temperatures. It is particularly prevalent in rural areas where humans frequently interact with animals.[5] Aural myiasis refers to the invasion of the outer and/or middle ear by parasitic larvae. Flies can lay eggs while in flight and are drawn to the scent emanating from the ear. The presence of chronic lesions, particularly chronic suppurative otitis media, plays a role in attracting flies to the ear. The extent of infestation is contingent upon the specific fly species, host organism, and surrounding environment, in addition to the immune response of the host.[6] Surgery is not necessary for the majority of AM cases. An analysis of 45 cases of AM documented in 34 studies revealed that 88.9% of patients did not have surgical intervention.[1] Therefore, this article intends to share clinical manifestation along with its treatment of this rare condition, aural myasis, particularly in chronic untreated ear lesions with poor sanitation.

Case

A 77-year-old woman was brought to the hospital's emergency room (ER) by her family due to her primary complaint of chronic left earache lasting for 5 years. Complaints followed with the emergence of maggots from the ear. The family confirmed that over the past month, over 30 larvae were emerging from the left ear. Complaints are present together with a

reduction in hearing, a sense of fullness, and a perception of movement in the ear. Previously, the patient had sustained long-standing wound in his left ear. However, due to uncertainty and a tendency to use unsanitary materials to clean his ears, he refrained from seeking medical attention. Thus yet, the wound had not underwent any cleaning or treatment. The patient and his family stated that there were no signs of maggots in other body organs, such as the nose, mouth, or eyes. There is a history of untreated hypertension. There were no constitutional symptoms present, such as fever, nausea, vomiting, or diminished consciousness. The individual resided in a highly populated residential region and was employed as a housewife. The patient and her family did not have any domesticated animals.

Upon careful inspection, a laceration was observed on the left auricle, along with a superficial ulcer that exhibited signs of pus and bleeding on its surface. During otoscopic examination, signs of inflammation such as swelling, redness, ulcers, pus, bleeding, and the presence of granulation were observed. Additionally, there were active fly larvae (maggots) inside the external ear canal (Figure 1a). The right ear did not exhibit any visible abnormality. There were no abnormalities detected in the nervous system. Routine blood testing showed leukocytosis which is 13.470/µL, with predominant granulocytes (differential count: lymphocytes 3.640/µL; granulocytes 8.810/µL; and mid 1.010/µL). The preliminary diagnosis is left AM, along with an auricular laceration. The first course for treatment in the emergency room was the administration of analgesics. Furthermore, the process of treating and disinfecting ear lesions was performed. The patient received local anesthetic using a 1% Lidocaine solution, followed by the removal of several maggots using forceps (refer to Figure 1b). Ear tampons were used to minimize the discharge and control bleeding.

The patient underwent consultation with an otolaryngology specialist, who then planned for the removal of necrotic wound tissue through debridement. Additionally, maggot extraction was intended to take place in the operating room, with the patient under general anesthesia. A thorough removal of the maggots and complete removal of fluids and granulation tissue was performed. Subsequently, the caustic substance is removed, completing the procedure by using a tampon soaked in Burow's solution. Suturing was conducted on the auricular laceration. Additional treatments included analgesics and broad-spectrum systemic antibiotics. Ear assessment was conducted every 24 hours, along with the application of caustics, Burow's tampons, and changes to the bandage. During the sixth day of treatment evaluation, significant reductions in ear discharge, pain reduction, and absence of maggots were observed. Laceration wounds absence of active inflammation. Patients are recommended to adhere to medication management and receive outpatient care at the polyclinic.

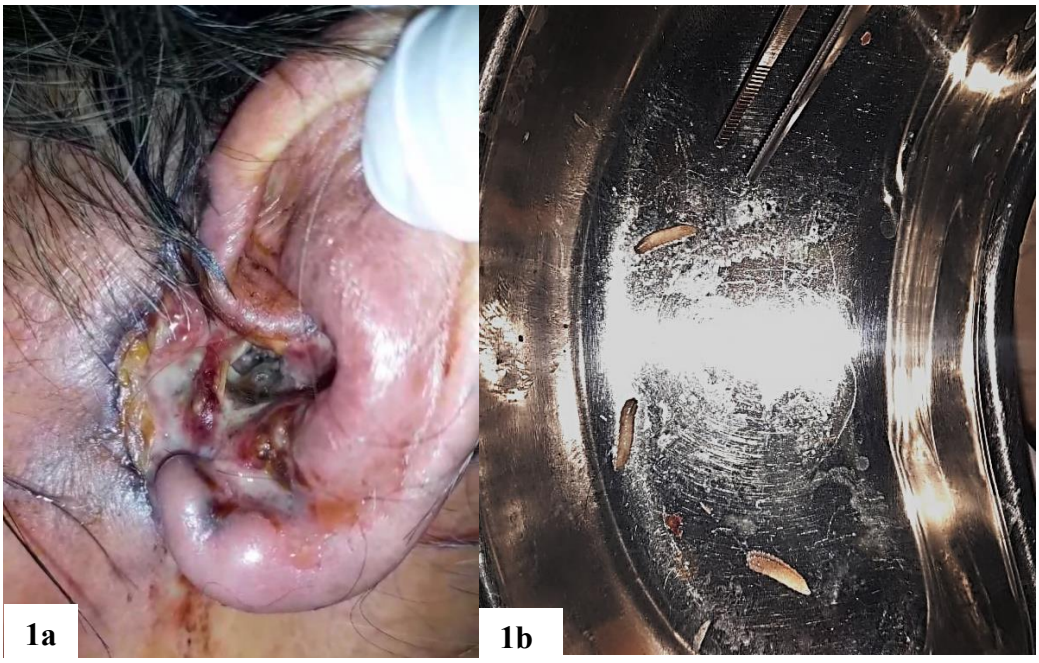

Figure 1a. Physical examination of the left auricle. The auricles exhibit edema, erythema, superficial ulcers, and lacerations, along with the presence of maggots in the external auditory canal. **1b.** The extracted fly larvae (maggots) can be observed, having been successfully removed in the emergency room.

Discussion

Myiasis is a prevalent parasitic infection in mammals. The condition is predominantly observed in rural regions among humans who have more proximity to animals. This condition arises when female flies deposit eggs, which then lead to clinical symptoms associated with the affected organs. In the practice of otolaryngology, this medical condition has the potential to impact the auditory organs, nasal passages, paranasal sinuses, nasopharynx, oral cavity, and the integumentary system of the craniofacial region.[5] As we discovered, the patient's ear was infested with mature maggots.

Dipterous larvae, commonly referred to as maggots, undergo their life cycle within the body of vertebrates, either completely or in phases. Gravid flies are attracted to visible wounds or other body organs such as the eyes, ears, nose, vagina, anus, and others to deposit eggs. Upon hatching, the larvae actively target compromised skin and nourish themselves by consuming the tissue. The fully developed third instar larvae descends to the soil to undergo metamorphosis into pupae. Following a specific duration, the fully developed fly emerges

from the pupa. Various types of flies infest human or animal tissue in their larval stage. Certain species necessitate a mammalian host for the growth of their larvae, whereas others may lay their eggs in exposed wounds as a replacement for decomposing animal or plant material. Blowflies (*Calliphoridae*), flesh flies (*Sarcophagidae*), and botflies (*Oestridae*, *Gasterophilidae*, *Hypodermatidae*, *Cuterbridae*) are the three main categories of flies that typically cause myiasis. However, flies from other families like *Muscidae* and *Phoridae* can also cause myiasis resulting in this issue.[7] In this particular case, the identification of the species or family of maggots that infested the patient was not conducted due to the obvious difficulty of visually differentiating the fly larvae. There have been 71 fly species identified in Indonesia, mostly in Sulawesi. All species are classified under the genus Simulium and categorized into five subgenera, namely *Gomphostilbia*, *Nevermannia*, *Wallacellum*, *Morops*, and *Simulium.*[8]

Myiasis is broadly classified into two categories: obligate and facultative myiasis.[7] Obligate myiasis-causing species require a living host for their growth while facultative-causing species sporadically deposit eggs or larvae on a living host and typically develop in decomposing matter. Facultative myiasis can be categorized into primary, secondary, and tertiary forms, depending on the species' capacity to initiate myiasis (primary) or to infest pre-existing myiasis (secondary and tertiary). Myiasis can also be categorized according to the specific location of the larvae in the host's body, which can be either external or internal. These locations include the ear, skin, gastrointestinal tract, eyes, mouth, and urogenital tract.[9] This case can be categorized as primary obligate auricular myiasis.

The larvae responsible for myiasis can enter the human ear cavity by producing mucopurulent secretions. Aural myiasis is infrequent in adults but prevalent in children, particularly in adults with underlying mental disabilities.[7] It was detected in a geriatric patient in this particular case. The patient had no prior medical record of psychological issues or psychiatric disorders. Potential risk factors include impairments in performing activities and patient mobility, leading to inadequate levels of hygiene and self-care. There have been similar instances in 2020 where elderly people with minimal socioeconomic risk factors and residing in remote locations with tropical temperatures have reported such incidences.[10] Extrinsic factors, such as inadequate sanitation and lack of permanent housing, contribute to the development of favorable circumstances. While livestock is commonly found in rural locations, the presence of flies in metropolitan areas with high rates of poverty can be attributed to rubbish and waste.[11]

Aural myiasis can manifest with symptoms including pruritus, hemorrhage, dyspnea,

and agitation. Additionally, one may experience sensations of gradual movement and auditory buzzing. Severe infestations might result in malodorous discharge emanating from the ear. Ear pain or otalgia are the most prevalent clinical signs of aural myiasis. Otorrhea, which refers to the discharge of fluid from the ear, can be an important sign to consider. The variety of symptoms may encompass eardrum perforation, tinnitus, and furuncles or blisters in the middle ear. Severe infestations might lead to the development of deafness and meningitis. Larval infestation can cause damage to the tissue surrounding the ear canal, including the bones, however, fatalities are uncommon. Tissue injury may arise from either mechanical disruption of the tissue or the secretion of the collagenase enzyme by the larvae.[7] Interestingly, a simultaneous anomaly was discovered in the form of auricula laceration. Based on the patient's medical history, it is unclear whether this aberration happened before or after the infestation of fly larvae. The laceration could either be the site of the egg's initial deposit or a result of myiasis-related complications.

This case exhibits similar clinical signs to other documented cases of AM, including otalgia, foreign body sensation and movement in the ear, impaired hearing, and the presence of purulent discharge and blood in the ear. In 2020, Wang et al. documented a case involving a 29-year-old lady who exhibited risk factors for congenital mental problems.[6] In the same year, Rummens et al. documented a case involving a 65-year-old lady who had multiple risk factors for a previous occurrence of cancer on the same side of her parotid gland. The patient had undergone surgical intervention, chemotherapy, and radiotherapy as part of her treatment.[10] In 2015, Al Jabr et al. documented a case of auditory myiasis in a 12-year-old kid with no prior medical conditions. One identifiable risk factor is the patient's residence in a desert area. There is an infection of obligate parasites belonging to the *Sarcophagidae* family, namely the species *Wohlfahrtia magnifica.*[5]

No additional study was conducted to ascertain the specific species of maggots that were infesting the patient in this particular case. The clinical value of species identification is uncertain and necessitates specialist biological and entomological laboratory equipment. The treatment principles for AM, particularly when it affects the ear canal, middle ear, and mastoid, remain the same irrespective of the specific species involved. The treatment protocol continues to involve eradicating flies and larvae, thoroughly cleansing the area affected by any residual larvae, and delivering antibiotics in the presence of a secondary infection.[11]

The primary objective in the treatment of myiasis is the eradication of maggots. It is crucial to refrain from directly squashing flies while removing them, as they may deposit their eggs. It is advised against killing maggots found in the ear, as they can be challenging to

locate, and leaving dead maggots in the ear can lead to a foreign body reaction. The ear canal can be irrigated using various substances such as 70% ethanol, physiological saline, urea, oil drops, dextrose, creatinine, iodine salts, and topical ivermectin. Among these, ivermectin is the most frequently employed and efficacious medication for eliminating any residual larvae. Local anesthetics can be employed to restrict larval mobility and prevent local irritation. Following manual cleansing, it is advised to undergo both local and systemic therapy. In cases of ear infections, such as ours, it is crucial to apply topical medicines.[6]

Various topical therapies have effectively treated myiasis affecting the external ear, middle ear, and/or mastoid. These encompass traditional therapeutic substances like alcohol and ether, as well as modern substances like combination antibiotic/steroid treatments. Before and following ear toilet and maggot removal, topical therapy is typically used to eradicate larvae and aid in their removal. Additionally, topical therapy is employed to promote healing of the outer and/or middle ear.[2] In this scenario, topical medication has been implemented, yielding satisfactory outcomes in alleviating inflammation and diminishing secretions. To halt the necrosis process in the ear tissue, a thorough larval extraction is performed. Administering antibiotics is conducted to mitigate and preempt subsequent infections.

An interesting point is that a systematic review conducted in 2020 highlighted the use of fly larvae (maggots) as a therapeutic intervention to facilitate the recovery of chronic wounds. The evaluated outcomes encompass the removal of dead tissue, eradication of bacterial proliferation, formation of new tissue, decrease in wound size, complete healing, adverse effects, and duration of the healing period. Several studies indicate markedly superior outcomes, whereas others indicate the contrary. Thus, this therapy remains a subject of controversy for various categories of wounds.[12]

The limitation of this presented case is that the identification of the causative fly species was not done. It is due to the lack of resources in our facility and the scarce of the case of human myiasis. Identifying the causative species would help clinician in treating this condition, such as the need for larvicidal to eradicate the maggot from wound infestation.

Conclusion

Myasis can be infested in humans, especially in the auditory system. From this case we can learn that myasis can occur in chronic untreated external ear lesions in patients with low-quality sanitation. This condition rarely becomes fatal. Complete removal of larva and treating the underlying condition can significantly treat this condition.

Conflict of Interest

All authors declare that they have no conflicts of interest.

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