Nasal Nosocomial Myiasis Infection Caused by *Lucilia Sericata* Following Epistaxis and Nasal Packing: A Case Presentation

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Abstract

The aim of this case report was to present our clinical approach for a case wherein nasal packing was applied for epistaxis and nosocomial nasal myasis caused by *Lucilia sericata* was developed during the follow-up in the intensive care unit because of subarachnoid hemorrhage. Nasal packing was used for epistaxis during the anticoagulant treatment of a 79-year-old man who was hospitalized, followed up, and treated at the coronary intensive care unit for the diagnosis of congestive heart failure. The larvae of *L. sericata* were observed in the nasal cavity after the nasal packings were removed on the third day. Hospital-acquired myiasis is rarely seen in clinical settings. The most critical point in the prevention of myiasis is undoubtedly hygiene as well as the use of an air conditioning system in the ventilation of the entire hospital, especially in the intensive care units. The present case report is the first for nosocomial myiasis caused by *Lucilia* in Turkey.

Keywords: Nosocomial, nasal, myiasis, *Lucilia sericata*

INTRODUCTION

Myiasis is characterized by infestation of living human and animal tissues and the body cavities by fly larvae. Myiasis flies can leave their eggs or live larvae in the natural cavities of humans such as those in the mouth, nose, ear, anus, or urogenital regions as well as in open wounds.

Myiasis flies are present in the suborder of Cyclorrhapha. The common myiasis agents in humans are *Sarcophaga*, *Wohlfahrtia*, *Calliphora*, and *Lucilia* flies under the Sarcophagidae and Calliphoridae families. *Lucilia sericata* flies belonging to the Calliphoridae family are endemic flies in the temperate regions of the Northern Hemisphere and may cause myiasis in human (1). Dik et al. (2) determined the species causing myiasis in human beings and animals in Turkey; they showed that the most frequent species was *Wohlfahrtia magnifica* and the second one was *L. sericata* in the cases.

The presence of larvae in the nasal cavity is a rare condition and also an embarrassing situation for the patient, family, and responsible team. This condition can be observed at a higher rate in elderly people, especially women, who have difficulty in removing the flies on they own. This is commonly seen in communities with low socioeconomic status or poor nasal hygienic and in communities in tropical countries. It is endemic in India because of the warm and humid conditions (3, 4).

This case reports presents our clinical approach for a case wherein nasal packing was applied for epistaxis and nosocomial nasal myasis caused by *L. sericata* was developed during the follow-up in the intensive care unit because of subarachnoid hemorrhage. We believe that this is the first case report of nosocomial myiasis caused by *Lucilia* in Turkey.

CASE PRESENTATION

A 79-year-old man, who was hospitalized, followed-up, and treated in the coronary intensive care unit of Cumhuriyet University for the diagnosis of congestive heart failure, had developed epistaxis following anticoagulant therapy. Consultation of the case from department of Otolaryngology was requested, and anterior packing was applied after

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the evaluation. Computerized brain tomography (CBT) was conducted for the change in consciousness during the follow-up of the case, an epidural and subdural hematoma compressing the adjacent parenchyma in the left intracranial section at an extra-axial distance was determined, and subdural hematoma was drained by craniotomy. In the CBT and postoperative CBT reports that were taken for the detection of subdural hematoma of the case, no radiological finding was observed showing a larva in the intracranial area.

Endoscopic evaluation was done in the intensive care unit when myiasis was observed in the nasal cavity after the anterior packing was removed 3 days later. A large number of larvae of approximately 1-cm length were observed in the erythematous, edematous, necrotic, and nasal cavity of the mucosa in both the nasal passages (Figure 1). All the larvae were cleaned both in the morning and in the evening for 2 days with endoscopy. Also, nasal irrigation was performed with hydrogen peroxide solution for five times a day for mechanical cleaning. Larvae from the nasal cavity were sent to the medical parasitology laboratory to determine the species. Nasal myiasis had completely disappeared on the third day of treatment (Figure 2). However, the patient died on the 5th day of clinical follow-up at the neurosurgery intensive care unit because of cardiopulmonary arrest.

The larvae, some of which were living and some were dead, were examined macroscopically. Some larvae were examined under the microscope to determine their general structures, stages, and species. In these analyses, the shape of mouth-pharynx skeleton (Figure 3a) located on anterior end of the larvae and structures (Figure 3b) of their anterior and posterior stigmas and number of holes (Figure 3c, d) were examined.

The live larvae sent were taken in a beaker that was covered with a gauze bandage and contained pieces of meat milled in a humid nook in order to have the larvae stages completed and to obtain a mature fly. Growth of

Figure 1. Anterior rhinoscopic view of *Lucilia sericata* larvae in nasal cavity

Figure 2. Anterior rhinoscopic view of nasal cavity on the 3rd day of treatment

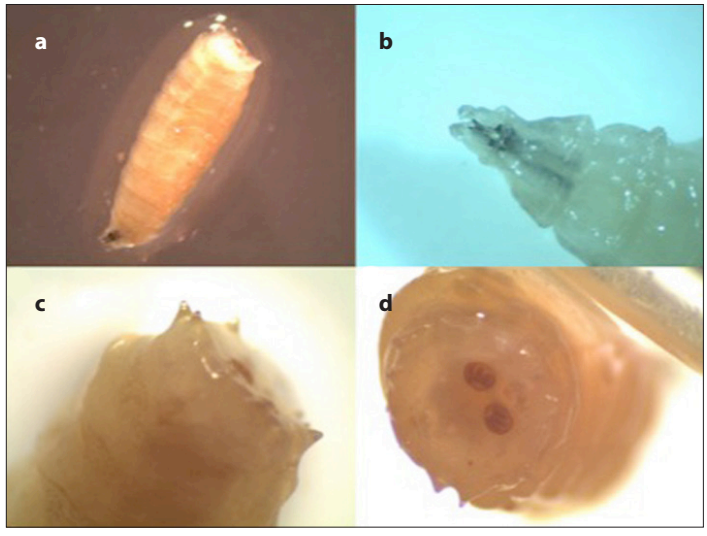

Figure 3. a-d. General appearance of the larvae (×4 objective) (a). Anterior appearance of the larvae (×36 objective) (b). Posterior appearance of the larvae (×36 objective) (c, d)

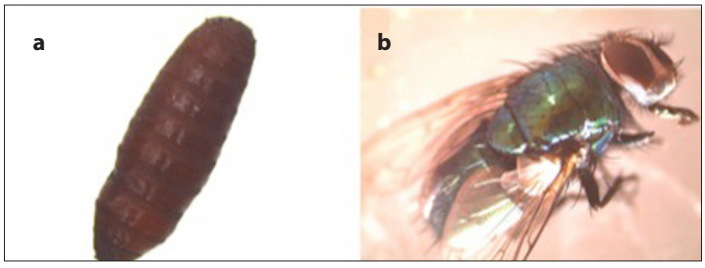

Figure 4. a, b. General appearance of the pupa period (×36 objective) (a). Appearance of the mature fly (×36 objective) (b)

the larvae was observed and they were allowed to pass to the pupa period by placing humid napkin pieces in the beaker (Figure 4a). Some of the pupae became mature flies during the observations (Figure 4b). The mature flies obtained were examined, and their properties were compared with that of the larval stage. It was determined from the investigation that dead and living larvae and mature flies were *L. sericata* (5).

Informed consent was obtained from the patient.

DISCUSSION

The predisposing factors of myiasis include poor hygiene; mental retardation; open wounds; intensive care and immobilized patients; underlying diseases such as atrophic rhinitis and chronic rhinosinusitis; conditions such as tuberculosis, leprosy, syphilis, and malignancies; systemic diseases such as diabetes mellitus; and other conditions causing immunosuppression (6). In particular, if sufficient precautions are not taken in the intensive care units, nosocomial myiasis is an important risk factor because the patient cannot react or be unaware. Epistaxis, nasal obstruction, malodorous nasal flow, facial pain, and headache are frequently observed symptoms of nasal myiasis (7).

The type of the larvae causing nasal myiasis may affect the clinical course of patients. The larvae are associated with the risk of invading the brain tissues by destructing the surrounding tissues, and the intracranial spread may be fatal by 8%. For example, the larvae of *Cochliomyia hominivorax* invade the living tissues, destroy the nasal pyramid, and can reach the brain tissue by penetrating the paranasal sinuses and the cribriform plate (8). A CT scan can assess the presence of inflammation as well as other changes in the paranasal sinuses and the extent of osteonecrosis and tissue invasion (e.g., critical regions such as the brain). In addition, the physician responsible for the follow-up and treatment of nasal myiasis should pay attention to intracranial complications and should try not only mechanical cleaning and lavage but also systemic therapies, considering the risk of intracranial spread of the larvae.

Although treatments for cavitary myiasis, ranging from mechanical extraction to the use of topical, oral, and intravenous agents have been proposed, there is still no consensus on the best treatment for oral or nasal myiasis cases (9). Various medical treatments can be applied for nasal myiasis. Tay et al. (10) tried to remove the fly larvae by applying the lavage primarily with mechanical extraction and physiological saline solution in the nasal myiasis cases who were diagnosed as mucocutaneous leishmaniasis, which was not specified in the literature before. However, when this method failed, they observed that approximately 50 larvae came out by themselves within 15 minutes in the patients in whom nasal irrigation was applied with ivermectin solution and they gave a single dose of oral ivermectin treatment to the cases. No larva was observed after the treatment. They pointed out in their case reports that ivermectin irrigation may be a simple and effective treatment method for nasal myiasis. It should be noted that the larvae can reach the areas of the nose and paranasal sinuses that cannot be accessed by deep and anterior rhinoscopic examination. Thus, nasal endoscopic evaluation should be applied in such cases (4, 11).

There are a limited number of cases of nosocomial myiasis caused by *L. sericata* and other myiasis found in the literature. All of these cases were followed up in the intensive care unit (12).

Magen, who extracted the maggots from eyes, mouth, and paranasal sinuses of a hospital patient, published the first report of myiasis caused by *L. sericata* in 1826 (13). Jacobson et al. (14) reported the first nosocomial nasal myiasis case who underwent a long thoracic surgical procedure and the active myiasis species was found to be Phaenicia sericata. Smith and Clevenger (15) accepted that since nasal myelitis caused by Cochliomyia macellaria larvae in diabetic hyperosmolar coma cases developed when the patient was unconscious during follow-up in the intensive care unit, it was a hospital-acquired infection. Based on this point of view, they pointed out that immobile and dependent patients are a risk group in terms of nosocomial nasal myelitis.

Josephson and Krajden (16) shared a similar case with nosocomial nasal myelitis who was followed up in the intensive care unit in the literature, and they drew attraction to the risk of myiasis in debilitated bench patients. The case who had severe maxillofacial wounds after a traffic accident and for whom *L. sericata* larvae were observed in the mouth cavity, nose, paranasal sinuses, and orbit with inclusion was reported by Daniel et al. (13). It was pointed out in this case that the mental and physical disorder of the patient, addiction, and deep necrotic wounds in the face area as well as the open windows for ventilation in the hospital may be a facilitating factor for the development of myiasis. The first nosocomial nasal myiasis case in France is shared with the literature in 2005 by Couppié et al. (8). *Cochliomyia hominivorax* was the found to be the active pathogen in this case, and it showed a very aggressive course and caused destruction in the patient's nasal pyramid. *Cochliomyia hominivorax* infections can be aggressive enough to lead the patient to death. Couppié et al. (8) also pointed out in their case report that the patient was debilitated bench for this nosocomial infection as well as the hospital rooms were not air conditioned, and the windows were left open for continuous ventilation. Kim et al. (17) shared the first case of nosocomial nasal myiasis caused by *L. sericata*, who was 76 years old in coma in Korea, in the literature. In this case, because of the settlement of *L. sericata* in the deep regions of the nasal cavity during the treatment, they highlighted the importance of mechanical cleaning along with endoscopy. Lee et al. (18) pointed out that CT assessment may be beneficial for the detection of bone destruction and larvae spread in the cases at whom Sarcophaga peregrina larvae were determined in both nasal cavities of a patient with nasotracheal intubation on the 8th follow-up day at the hospital. In 2011, Nazni et al. (12) shared the cases of nosocomial nasal myiasis caused by Lucilia cuprina (Wiedemann), who were followed up as semiconscious in the intensive care unit, with the literature. Another case in the literature was reported by Youssefi et al. (19) and was the first nosocomial nasal myiasis case caused by *L. sericata* in Iran. Maleki et al. (20) shared a nasal nosocomial myiasis case, caused by Wohlfahrtia nuba (Diptera: Sarcophagidae) in a 5.5-year-old female patient living in Iran, with the literature. The last case specified in the studies that we could access belonged to Mircheraghi et al. (3). This case, as in the other cases, was diagnosed with nosocomial nasal myiasis during the follow-ups in the intensive care unit, and the active pathogen was *Chrysomya bezziana*.

Growth of *L. sericata* was very rapid, and pupa formation was observed within 4 days. Therefore, in one case, nosocomial nasal myiasis may be diagnosed only if it occurs after the fourth day of hospitalization. In the present case, nosocomial nasal myiasis was diagnosed because of the development of epistaxis during the clinical course and the application of nasal packing and a period of 5-6 days between the hospitalization and the discovery of larvae besides the predisposing factors such as being immobile and being followed up in the intensive care unit as intubated.

CONCLUSION

Hospital-acquired nasal myiasis is rarely seen. Besides, some cases are not reported because they will negatively affect the reputation of the institutions. The most critical point in the prevention of myiasis is undoubtedly hygiene and the use of the air conditioning system in the ventilation of the entire hospital, especially in the intensive care units. It may be beneficial to keep the windows closed or to cover the windows with fine wires in order to control the fly population. However, more radical approaches may be required in endemic and tropical areas.

Consequently, the case had been shared with the literature because it was the first nosocomial nasal myiasis case caused by *L. sericata* in Turkey among the databases that we could access.

Informed Consent: Informed consent was obtained from the patient.

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