

Case Report

Nosocomial Myiasis with *Lucilia Sericata* (Diptera: Calliphoridae) in an ICU patient in Mashhad, Northeastern of Iran

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Abstract

Myiasis is the invasion of larvae to human or animal live tissues by flies belonging to the order Diptera and families like Calliphoridae, Sarcophagidae, Oesteridae, etc. Although rare, nosocomial myiasis must be noted carefully, especially in case of hospitalized patients. A 63-year old man admitted to an ICU ward in Mashhad is investigated and presented in this research. On the 35th day of hospitalization, about 100 larvae 6 – 7 mm in length, yellow to cream and fusiform were observed around the tracheotomy site. They were identified as second instar larvae of *Lucilia* genus of the family Calliphoridae based on morphological characters of the larvae. However, for exact identification of the species, the emerging adults must also be tested. According to the standard key of adult flies, they were identified as *Lucilia sericata*.

KeyWord: Calliphoridae, *Lucilia sericata*, myiasis, nosocomial myiasis

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Introduction

Arthropoda borne diseases that are caused by Insecta and Arachnida classes are important in Iran like *Paederus* beetles, House dust mites, *Pediculus* lice, etc.¹⁻³ Myiasis is one of them that caused by parasitic dipterous fly larvae feeding on the host's necrotic or living tissue.⁴ The various forms of myiasis can be classified on the base of entomological or clinical aspects. Entomologically, myiasis may be classified into three groups: obligatory, facultative, and accidental. Clinically, myiasis can be classified based on the part of body affected like dermal, sub dermal, aural, ocular, intestinal, and urogenital myiasis.⁵

Adult flies are attracted to putrefactive odors and open wounds or necrotic areas when seeking sites for laying eggs.⁶ It is important to draw attention to the hazard of myiasis under exceptional conditions. Myiasis in Iran is reported in association with flies belonging to the families Calliphoridae and Sarcophagidae.⁷⁻¹³ In these reports, *Lucilia sericata* is one of the human myiasis cases in Iran.^{9,11} Nosocomial myiasis may occur in hospitalized patients.¹⁴ Unfortunately, it happens particularly in patients with open wounds/sores and areas that are heavily infested with flies. Sadly, care taker neglect may be a factor in such places as nursing homes or hospices. Here, we report a very rare case of infection in a patient admitted to an ICU in Mashhad, Northeastern of Iran.

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Case Report

A 63-year old man was admitted to an ICU in Mashhad. The patient was diagnosed with progressive lung cancer through lung endoscopy. Due to respiratory apnea, he underwent emergent tracheotomy intubation. The patient suffered from respiratory distress and was therefore put on ventilator (Figure 1). He has been in adult ICU for more than 40 days while in deep coma. On the 35th day of hospitalization, about 100 larvae of 6 – 7 mm in length, yellow to cream and fusiform with no legs or wings and of similar shape were observed around the tracheotomy site and malodorous open wound; a nurse removed them manually followed by thorough irrigation of the wound. There was no evidence of deeper tissue penetration. Further investigation in the ICU showed that an adult insect was flying in the room which was identified to belong to the diptera order. As identification of flies is usually made based on examination of the adults, the second instar larvae were removed from the patient and transferred onto the blood agar medium for about 4 days supplemented with beef (Figure 2). The larvae were then transferred to a glass dish filled with about 5 cm of humid soil and incubated at 25°C. The larvae immediately migrated to deep soil and changed to the pupa stage 2 days later (Figure 3). After 14 days, two live green blow flies emerged in soil (Figure 4). Finally, the flies were identified using the standard keys in the Laboratory of the Department of Medical Entomology, School of Health and Nutrition, Shiraz University of Medical Sciences, Iran.

Discussion

The larvae removed from patient were identified as second instar larvae of *Lucilia* species of the family Calliphoridae on the basis of the morphology and size. *Lucilia* species are primarily scavengers of vertebrate carrion (e.g. exposed meat and fish), and several species are important agents of myiasis in livestock and humans.



Figure 1. The tracheotomy site of patient



Figure 2. The Second instar larvae on blood Agar



Figure 3. Puparium separated from soil



Figure 4. Adult *Lucilia sericata* (green)

Lucilia sericata is a facultative ectoparasite and is commonly known as the green bottle blow fly or sheep strike blow fly.¹⁵ Open wounds with necrotic areas are ideal sites for egg deposition and larval development. In this site, the rate of development after deposition to completion of the first larval stage is about 2.5 days.¹⁶

This patient was transferred to the ICU after undergoing surgery and the larvae were observed on the 35th day of hospitalization, indicating that the myiasis was nosocomial based on the development rates of the larvae in the second instar stage. Also, collecting a green fly in the ward while the patient was in the ICU is further evidence of the potential for nosocomial myiasis.

Nosocomial myiasis is rare; however, reports from other parts of the world^{4,6,14,17-21} suggest the predisposing risk factors to include initial presence of blood/mucus around the wounds or odors of decomposition, poor nursing care and summer time. In these patients, altered consciousness or hypoesthesia may prevent detection of the fly and paralysis may prevent the patient from fending it off. On the other hand, the hot/humid climate, and the ground floor location of the ICU provide optimal conditions for infestation. Comorbidities such as diabetes, vascular disease, and advanced cancer have been found in a high proportion of reported cases; in addition open wound and unseen bleeding around the tracheotomy site and halitosis from underlying bacterial lung infection may have especially contributed to the infestation in our case.

Although it is a rare occurrence, nosocomial myiasis must be especially addressed by hospital infection control. Simple measures, such as installing window screens (in areas with long periods of hot weather which may lead to windows left open for ventilation), using regular insecticide, covering food and using fans and bug-

zappers could help prevent nosocomial myiasis.

We introduce this infestation as a facultative myiasis; nevertheless, the antibacterial properties of secretions of the larvae of greenbottle fly *Lucilia sericata* are being used increasingly as a fast and effective means for treating necrotic wounds, particularly chronic wounds,²²⁻²³ which means that the therapeutic aspects of maggots can be also considered.

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Conflict of Interest

The authors have no potential conflict of interest.

Reference

1. Fakoorziba MR, Eghbal F, Azizi K, Moemenbellah-Fard MD. Treatment outcome of *Paederus dermatitis* due to rove beetles (Coleoptera: Staphylinidae) on guinea pigs. *Tropical Biomedicine*. 2011; **28** (2): 418 – 424.
2. Nazari M, Fakoorziba MR, Shobeiri F. *Pediculus capitis* infestation according to sex and social factors in Hamedan, Iran. *The South-east Asian Journal of Tropical Medicine and Public Health*. 2006; **37**(3): 95 – 98.
3. Fakoorziba MR, kadivar H, Alipour H. Identification of house dust mite species (Acarina : Astigmata). *J. Experimental Zoology*. 2009; **15**(2): 609 – 612
4. Hira PR, Assad RM, Okasha G, Al-Ali FM, Iqbal J, Mutawali KE, et

- al. Myiasis in Kuwait: nosocomial infections caused by *Lucilia sericata* and *Megaselia scalaris*. *Am J Trop Med Hyg.* 2004; **70**: 386 – 389.
5. Kettle DS. Medical and veterinary entomology. CAB International press. 1990: 658.
 6. Daniel M, Sramova H, Zalabska E. *Lucilia sericata* (Diptera: Calliphoridae) causing hospital-acquired myiasis of a traumatic wound. *J Hosp Infect.* 1994; **28**: 149 – 152.
 7. Faramarzi A, Rasekhi AR, Kalantari M, Hatam GR. *Chrysomya bezziana* as a causative agent of human myiasis in Fars province, southern Iran. *Iranian J Arthropod-Borne Dis.* 2009; **3**: 60 – 63.
 8. Mohammadzadeh T, Hadadzadeh R, Esfandiari F, Sadjjadi SM. A Case of gingival myiasis caused by *Wohlfahrtia magnifica*. *Iranian J Arthropod-Borne Dis.* 2008; **2**: 53 – 56.
 9. Salimi M, Goodarzi D, Karimfar MH, Edalat H. Human urogenital myiasis caused by *Lucilia sericata* (Diptera: Calliphoridae) and *Wohlfahrtia magnifica* (Diptera: Sarcophagidae) in Markazi province of Iran. *Iranian J Arthropod-Borne Dis.* 2010; **4**: 72 – 76.
 10. Soleimani Ahmadi M, Nasirian H, Nazemi Gheshmi AM, Yaghoobi Ershadi MR. Human extensive head skin myiasis. *Iranian J Publ Health.* 2009; **38**: 134 – 138.
 11. Talari SA, Sadr F, Doroodgar A, Talari MR, Gharabagh AS. Wound myiasis caused by *Lucilia sericata*. *Arch Iranian Med.* 2004; **7**: 128 – 129.
 12. Yaghoobi R, Tirgari S, Sina N. Human Auricular Myiasis caused by *Lucilia sericata*: clinical and parasitological considerations. *Acta Medica Iranica.* 2005; **43**: 155 – 157.
 13. Youssefi MR, Rahimi M, Marhaba Z. Occurrence of nasal nosocomial myiasis by *Lucilia sericata* (Diptera: Calliphoridae) In North of Iran. *Iranian J Parasitol.* 2012; **7**: 104 – 108.
 14. Minar J, Herold J, Eliskova J. Nosocomial myiasis in central europe. *Epidemiol Mikrobiol Immunol.* 1995; **44**: 81 – 83.
 15. Hall M, Wall R. Myiasis of humans and domestic animals. *Adv Parasitol.* 1995; **35**: 257 – 334.
 16. Wall R, French N, Morgan KL. Effects of temperature on the development and abundance of the sheep blowfly *Lucilia sericata* (Diptera: Calliphoridae). *Bull Entomol Res.* 1992; **82**: 125 – 131.
 17. Amitay M, Efrat M, McGarry JW, Shinwell ES. Nosocomial myiasis in an extremely premature infant caused by the sheep blowfly *Lucilia sericata*. *Pediatr Infect Dis J.* 1998; **17**: 1056 – 1057.
 18. de Kaminsky RG. Nosocomial myiasis by *Cochliomyia hominivorax* in Honduras. *Trans R Soc Trop Med Hyg.* 1993; **87**: 199 – 200.
 19. Joo CY, Kim JB. Nosocomial submandibular infections with dipterous fly larvae. *Korean J Parasitol.* 2001; **39**: 255 – 260.
 20. Szakacs TA, MacPherson P, Sinclair BJ, Gill BD, McCarthy AE. Nosocomial myiasis in a Canadian intensive care unit. *CMAJ.* 2007; **177**: 71 – 720.
 21. Yazar S, Dik B, Yalcin S, Demirtas F, Yaman O, Ozturk M, et al. Nosocomial oral myiasis by *Sarcophaga sp.* in Turkey. *Yonsei Med J.* 2005; **46**: 431 – 434.
 22. Kerridge A, Lappin-Scott H, Stevens JR. Antibacterial properties of larval secretions of the blowfly, *Lucilia sericata*. *Med Vet Entomol.* 2005; **19**: 333 – 337.
 23. Mumcuoglu KY, Miller J, Mumcuoglu M, Friger M, Tarshis M. Destruction of bacteria in the digestive tract of the maggot of *Lucilia sericata* (Diptera: Calliphoridae). *J Med Entomol.* 2001; **38**: 161 – 166.