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Nosocomial Myiasis: Rare but Preventable Infestation

Amandeep Singh
P.G. Department of Zoology, Khalsa College Amritsar, Punjab (India)-143001
*Correspondence for materials should be addressed to AS (email: kapooraman22@rediffmail.com)

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Abstract
Myiasis is the infestation of living tissue by fly larvae (order Diptera), which feed on either necrotic or living tissue. When it occurs in a hospital setting and is acquired after admission, it is referred to as nosocomial myiasis. This condition is most commonly seen in patients who are immobilized, sedated, intubated, or has chronic wounds that make them more susceptible to larval infestation. Nosocomial myiasis, infestation of hospitalized patients by fly larvae, is rare but signifies severe lapses in sanitation and patient care. This review examines epidemiology, causative vectors, clinical features, diagnostics, management, and prevention through a multi-faceted lens, drawing on case reports and outbreak data.

Keywords: Myiasis; Dipteran Larva; Parasitosis

Introduction

Nosocomial myiasis, or hospital-acquired myiasis, is a rare but preventable infestation of human tissue by dipteran larvae (maggots) contracted in healthcare environments. While common in community settings with open wounds and poor sanitation, its occurrence within hospitals underscores critical lapses in hygiene, infection control, and patient care protocols Severely ill, immobilized, and intubated patients are particularly at risk, making nosocomial myiasis both a clinical and ethical concern.

Epidemiology and risk factors

Though comprehensive incidence data are lacking, community-acquired cases totaled around 460 between 1970 and 2017 (Francesconi & Lupi 2012). A nosocomial outbreak occurred in Colima, Mexico, July 2021, affecting five inpatients, three ventilated by day 4 of admission (Espinoza-Gómez et al. 2023). Identified risk factors include impaired consciousness, sedation, mechanical ventilation, prolonged hospitalization, open wounds, and tropical climates favorable to fly development (Francesconi & Lupi 2012; Espinoza-Gómez et al. 2023; Minar et al. 2016). A 2007 Canadian ICU case involving *Lucilia illustris* infestation appeared three days post-admission in a sedated patient (Szakacs et al., 2007).

Causative agents

Common dipteran species implicated in the onset of nosocomial myiasis are
Calliphoridae (e.g., *Lucilia sericata*, *L. illustris*, *L. cuprina*): facultative parasites mainly targeting necrotic tissues, but capable of mucosal infestation (Francesconi & Lupi 2012; Minar et al. 2016).
Cochliomyia macellaria:It was the key species reported in the 2021 Colima outbreak, particularly in ventilated and wound-care patients (Espinoza-Gómez et al. 2023).
Sarcophagidae: Flies like *Sarcophaga ruficornis* have been witnessed in hospital-based nasal/oral infestations (Francesconi & Lupi 2012).
Chrysomya bezziana: It was reported in aggressive nasal myiasis; a 2016 Iranian case resulted in septal perforation (Mircheraghi et al. 2016).
Other species like *Megaselia scalaris* and *Parasarcophaga ruficornis* have been occasionally reported (Francesconi & Lupi 2012).

Pathogenesis

The dipteran life cycle egg to second/third larval instar, occurs within 8 hours to several days depending on species and environmental conditions. Discovery of advanced larvae after three or more days in hospital strongly indicates nosocomial origin (Francesconi & Lupi 2012). Larvae feed

on necrotic or, occasionally, living tissues, potentially causing cellulitis, sinusitis, and rare deep-tissue invasions like osteomyelitis or intracranial spread (Szakacs et al. 2007).

Clinical Presentation

Nasal/Nasopharyngeal Myiasis

Often seen in sedated or ventilated patients, presenting with nasal blockage, mucosal swelling, foul odour, or visible larvae. Iranian ICU cases of *L. sericata* and *C. bezziana* emphasize severity (Minar et al. 2016; Mircheraghi et al. 2016).

Oral/Oropharyngeal Myiasis

Described in intubated or comatose patients with open mouths, with ICU reports noting removal of 8–20 larvae following irrigation and debridement (Francesconi and Lupi 2012).

Cutaneous/Wound Infestations

Observed in patients with external fixators or surgical wounds, often involving *C. macellaria* or other calliphorids (Francesconi & Lupi 2012).

Other Sites

Rare reports include ocular, tracheal, gastrointestinal myiasis in debilitated or immunocompromised patients (Francesconi and Lupi 2012).

Diagnosis

Clinical observation*:* direct spotting of larvae in wounds or orifices.
Specimen processing*:* removal, preservation, rearing to adulthood, and microscopic or genetic identification (Minar et al. 2016).
Temporal correlation*:* comparing larval instar stage to length of hospital stay to confirm nosocomial status (Szakacs et al. 2007).
Imaging studies*:* utilized for deeper tissue involvement or complications.

Management

Physical removal

Thorough manual debridement under sterile conditions is first-line. Nasal/oral irrigation with saline or antiseptics assists in extracting larvae. Manual extraction with forceps, followed by saline or antiseptic wash is also a common procedure (Szakacs et al. 2007).

Topical and systemic therapy

Topical agents like turpentine or hydrogen peroxide may induce larval exit; systemic ivermectin is considered in extensive cases, especially cutaneous infestations (Francesconi & Lupi 2012). Broad-spectrum antibiotics can prevent secondary bacterial infections.

Supportive care

Careful wound care, device repositioning, hydration, and consultation with ENT or ophthalmology as needed.

Prevention and Control

Environmental Strategies

Install fine-mesh window and door screens (Francesconi & Lupi 2012; Minar et al. 2016).
Eliminate breeding sites such as stagnant water or decomposing matter near hospital premises.

Hygiene and sanitation

Emphasize regular cleaning of patient care areas, drains, and food-prep zones (Francesconi & Lupi 2012).
Strict adherence to hand hygiene protocols (WHO 2009).

Patient monitoring

Scheduled inspections for sedated, immobilized, or ventilated individuals.
Secure dressings and tubes, and maintain mucosal hygiene.

Vector surveillance

Use fly traps or environmental sampling to detect early presence of flies or larvae.

Staff awareness and training
Educate healthcare teams to recognize early signs of infestation and to implement reporting systems.

Institutional protocols
Implement emergency response policies including larval removal, species identification, treatment, and facility-wide inspections.

Case Summaries
Colima outbreak (2021)
Five hospitalized patients infested by *C. macellaria* from day 4 post-admission. Two fatalities, three recoveries following ivermectin and antibiotic therapy (Espinoza-Gómez et al. 2023).

Canadian ICU (2007)
A sedated 65-year-old intubated inpatients developed *L. illustris* infestation in nasal/ocular regions three days post-admission. Successfully treated with removal and prophylaxis (Szakacs et al., 2007).

Iranian ICU reports
Isolated cases of oral myiasis (multiple larvae removed) and nasal myiasis causing septal damage (Mircheraghi et al. 2016). All resolved after intervention and cleaning measures.

Discussion
Nosocomial myiasis is under recognized yet preventable. It represents a failure in infection control and patient care, especially when it involves highly vulnerable ICU populations. Patterns in case reports reveal consistent risk factors such as immobility, invasive equipment, and compromised sensory function coupled with vector access and poor environmental control. The economic and clinical toll can be severe: cases may necessitate extended hospital stays, intensive debridement, antagonist treatment, and can even result in death. The broader implications include loss of patient and family trust, legal consequences, and harm to institutional reputation. Effective prevention demands environmental controls, stringent hygiene, vigilant patient monitoring, and staff education. Institutional response protocols enable timely intervention and reduce morbidity, mortality, and reputational harm.

Conclusion
Nosocomial myiasis is a serious yet preventable healthcare-associated complication. Early detection, prompt mechanical and medical management, and robust environmental and institutional safeguards are essential. By addressing this condition through integrated infection control measures, hospitals can enhance patient safety, protect vulnerable populations, and maintain trust in healthcare quality. Prompt identification of larvae and their species is essential to confirm nosocomial origin. Prevention requires a multi-layered strategy: environmental modifications, rigorous hygiene, proactive patient examination, comprehensive staff training, and institutional vigilance. Addressing nosocomial myiasis enriches hospital infection control and elevates the standard of care for vulnerable inpatients.

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