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Case Report

Human Urogenital Myiasis Caused by *Psychoda Albipennis* Larvae (Diptera: Psychodidae) in Sanandaj, Iran: A Case Report

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Abstract

Urogenital myiasis is a rare parasitic infestation caused by dipteran larvae and is infrequently reported in non-endemic regions. This case report documented the first diagnosed case of *Psychoda albipennis*-induced urinary myiasis in a 41-year-old man from Sanandaj, Iran. The patient presented with dysuria and recurrent passage of mobile black-grayish particles in his urine over 2 months, following prolonged exposure to freshwater environments during fishing activities in Kermanshah Province. Morphological examination of the expelled larvae confirmed identification of *P. albipennis* using standard taxonomic keys, with emphasis on characteristic morphological structures. Laboratory analyses, including urinalysis and hematological profiling, ruled out bacterial infections, and imaging studies revealed no urinary tract abnormalities of the urinary tract. Treatment with oral ivermectin (200 µg/Kg) along with adequate hydration resulted in symptom resolution and cessation of larval excretion. Clinical symptoms subsided within 48 hours, and no larvae were observed in the urine after 1 week. This case underscored the facultative role of *P. albipennis* in urogenital myiasis, potentially associated with environmental exposure and compromised hygiene conditions. It highlighted the diagnostic challenges in differentiating myiasis from conventional urinary infections and emphasized the need for increased clinical awareness in regions with suboptimal sanitation. The findings supported the implementation of integrated public health strategies, including improved sanitation infrastructure and community education, to mitigate the risk of infestation. Further studies incorporating molecular diagnostic methods are recommended to enhance species-specific identification and epidemiological surveillance, particularly in resource-limited settings.

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Keywords ● Myiasis ● Calliphoridae ● Microscopy ● Urogenital

What's Known

- In Iran, urogenital myiasis accounts for only 0.7% of reported human myiasis cases. However, its occurrence highlights an important public health concern.

What's New

- Urogenital myiasis is a rare subset of myiasis involving infestation of the urinary tract or genitalia and accounts for less than 1% of reported cases. Prior to the report of urinary tract myiasis, two cases had been documented in Iran. The present report, from western Iran (Sanandaj), represents the third registered case in the country.

Introduction

The term "myiasis", derived from the Greek *myia* (fly), was first formally defined in 1840 by Reverend Frederick William Hope to describe the infestation of living vertebrate tissues by dipteran larvae.[1] Myiasis occurs when flies deposit eggs or larvae on mucous membranes, body cavities, or skin wounds, leading to parasitic

colonization of living or necrotic tissues. Over 150 dipteran species have been implicated in myiasis, with the family *Calliphoridae*—particularly the genera Calliphora, *Lucilia, Chrysomya,* and *Cochliomyia*—representing the most clinically significant obligate and facultative agents.[2] These larvae exhibit species-specific tropism and feed on host fluids or tissues for periods ranging from days to weeks before pupating and eventually exiting the host.[2] Although myiasis is globally distributed, it is disproportionately prevalent in tropical and subtropical regions due to climatic conditions favorable to fly proliferation.[3]

Clinically, myiasis is classified either anatomically (e.g., cutaneous, nasopharyngeal, or urogenital) or ecologically (obligate, facultative, or accidental). Urogenital myiasis is a rare clinical entity involving infestation of the urinary tract or genitalia and accounts for less than 1% of reported cases.[4]

While flies of the families Calliphoridae and Sarcophagidae are the predominant causative agents worldwide, members of the Psychodidae family, such as *P. albipennis*, have emerged as rare but notable causes of urogenital myiasis, particularly in regions with inadequate sanitation.[5] *P. albipennis* (Diptera: Psychodidae), commonly known as the non-biting "moth fly", thrives in moist organic matter, sewage systems, drains, and unsanitary toilet facilities. Females lay eggs near human orifices, and the larvae may opportunistically migrate into the urethra or bladder, particularly in individuals with poor personal hygiene, open-air defecation practices, or prolonged exposure to contaminated water sources.[6]

The pathogenic effects of urogenital myiasis result from a combination of larval enzymatic secretions, mechanical tissue damage, and secondary bacterial infection, leading to clinical manifestations such as dysuria, hematuria, and cystitis-like symptoms.[7] Despite the cosmopolitan distribution of *P. albipennis*, human urogenital myiasis caused by this species remains underreported, with only sporadic cases documented in countries such as Iran, India, Turkey, and Libya.[8-10]

Timely diagnosis and appropriate management of myiasis are essential to prevent complications and preserve patient health. The condition may be misdiagnosed as other dermatological or urogenital disorders if not accurately identified, particularly in regions where myiasis is infrequently encountered. In such settings, case reports play a critical role in increasing clinical awareness among healthcare providers and veterinarians. Furthermore, these reports contribute to the identification of emerging epidemiological patterns and provide a foundation for future research into risk factors, preventive strategies, and effective treatment approaches. The present study aimed to report and analyze a case of urogenital myiasis diagnosed in a patient who presented to the Central Laboratory of Sanandaj, in 2024.

Case Presentation

In this case report, we described a rare instance of urogenital myiasis caused by *P. albipennis* (Diptera: *Psychodidae*) in a 41-year-old male residing in Sanandaj, Iran. The patient presented to the Sanandaj Health Center Laboratory with complaints of dysuria and recurrent observation of black-grayish, mobile particles in his urine. His medical history revealed prolonged exposure to freshwater environments, including fishing and wading for several hours in a river near Kermanshah Province, Iran, approximately 2 weeks before the onset of symptoms. The treatment protocol consisted of oral administration of ivermectin (200 µg/Kg; Rooyandarou, Iran).

Live specimens expelled in the patient's urine were collected and transported to the laboratory in sterile glass containers. Due to their fragile structure and small size, the larvae were preserved in 70% ethyl alcohol (Merck, Germany). For microscopic observation, the larvae were treated with 10% potassium hydroxide (KOH; Sigma-Aldrich, USA) for 24 hours to render them transparent. Subsequently, the specimens were mounted in Puri's medium (prepared in the laboratory, according to standard protocols). The larvae were observed under a light microscope (Olympus CX31, Japan), and key morphological structures—including the head, anterior spiracle, posterior siphon, and body spines—were photographed (figure 1).

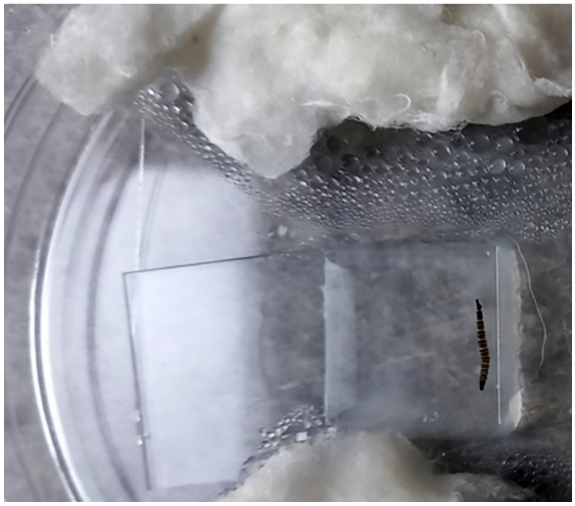

Figure 1: The figure shows the macroscopic appearance of *Psychoda albipennis* larvae, which was excreted by the patient.

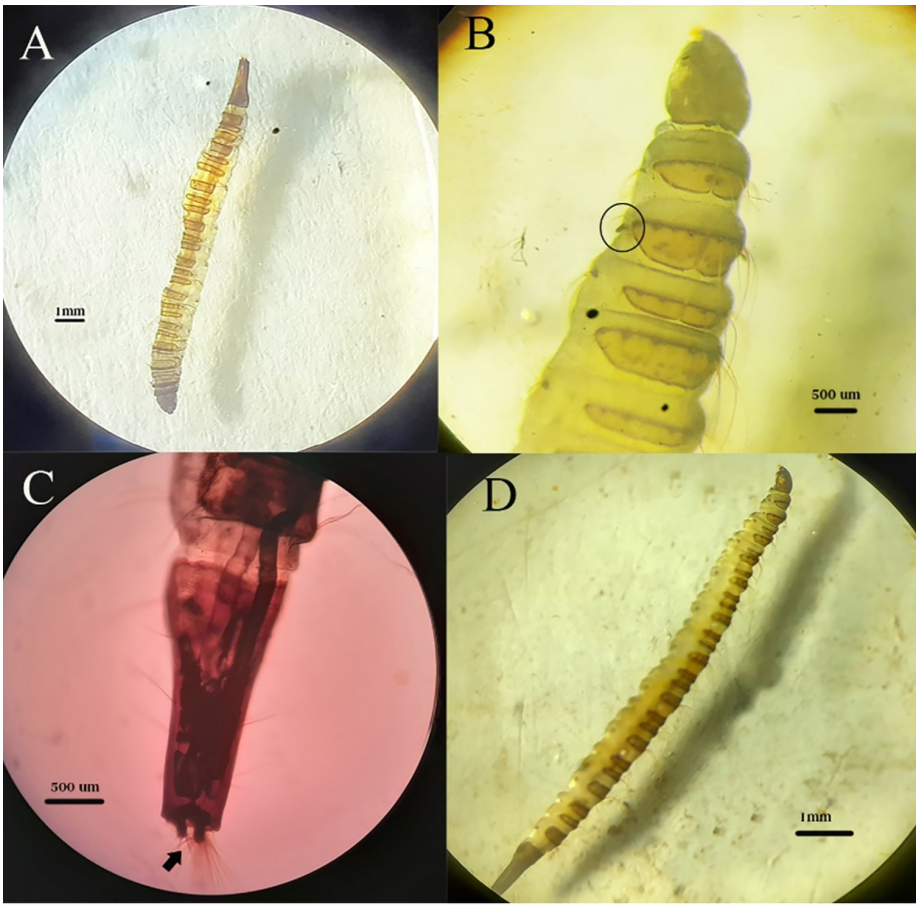

Figure 2: Microscopic views illustrate the morphological characteristics of *Psychoda albipennis* larvae collected from the patient. A: Dorsal view of the larvae collected from the patient; B: Cephalic skeleton and thoracic segments show the saddle-shaped chitinous sclerites; the circle indicates the anterior spiracles; C: Last abdominal segment and siphon with posterior spiracles (arrow); D: lateral view of the larva.

Morphological examination under light microscopy confirmed the presence of psychodid larvae, measuring approximately 9 mm in length (figures 1 and 2). Species-level identification as *P. albipennis* was achieved using standardized taxonomic keys.[11] As reliable identification was possible using morphological methods, and due to financial and time constraints, molecular confirmation was not performed. Urogenital myiasis caused by *Psychoda* species is exceptionally rare but has been sporadically reported in tropical and subtropical regions, often associated with larval contamination of freshwater sources.

The patient's prolonged aquatic activity likely facilitated larval entry into the urethral tract, as *Psychoda* females typically oviposit in moist organic matter or aquatic habitats. This case underscored the importance of considering myiasis in the differential diagnoses of patients presenting with genitourinary symptoms and a history of environmental exposure to potential larval breeding sites.

Comprehensive laboratory investigations were performed, including biochemical tests, urinanalysis, hematological evaluation, microscopy and culture, and serological assays, including total immunoglobulin E (IgE; Parspeyvand Co., Iran) and C-reactive protein (CRP; Parspeyvand Co., Iran). A pelvic computed tomography (CT) scan (Siemens SOMATOM Emotion, Germany) was also performed upon the recommendation of the urologist. The complete blood count (CBC; Sysmex, Japan) was within normal limits. However, the peripheral blood smear (PBS) revealed 15% atypical lymphocytes and neutrophils with toxic granulation graded as 2+. Urinalysis demonstrated the presence of live, motile larvae. According to the patient'shistory, he had been excreting larvae in his urine for approximately 2 months before presentation. All urine parameters were within normal limits except for glucose, which was attributed to the patient's 10-year history of type 2 diabetes mellitus. Treatment with oral ivermectin (200 µg/Kg) and adequate hydration resulted in marked symptom improvement and cessation of larval excretion. Clinical symptoms diminished within 48 hours, and no larvae were observed in the urine after 1 week.

This case report was prepared in accordance with the CARE (CAse REport) guidelines, which provided standardized criteria for reporting clinical case studies. All relevant clinical, laboratory, diagnostic, and follow-up data were presented transparently. Written informed consent was obtained from the patient before publication, and ethical approval for this report was granted by the Ethics Committee of Kurdistan University of Medical Sciences (IR.MUK.REC.1404.211).

Discussion

Urogenital myiasis remains a rare but clinically significant condition, particularly in regions affected by suboptimal sanitation and socioeconomic challenges. Cases of urinary myiasis, similar to the present report, have been described in India,[7] and reports from Iran[8] further underscore the facultative nature of this infestation. While obligatory myiasis-causing agents such as *Chrysomya bezziana* and *Wohlfahrtia magnifica* predominate in traumatic or wound-associated cases, facultative species, including *P. albipennis, Lucilia sericata,* and *Clogmia albipunctata,* thrive in unsanitary environments, exploiting mucosal secretions or urogenital discharges and resulting in accidental infestation.

In Iran, urogenital myiasis accounts for only 0.7% of reported human myiasis cases,[12, 13] yet its occurrence highlights critical gaps in public health infrastructure. Identified risk factors—such as poor personal hygiene, open sanitation systems, and warm climatic conditions—are consistent with global patterns observed in tropical and subtropical regions. For instance, the case reported from Ahvaz[8] involved a male laborer exposed to fly-infested latrines, whereas the Indian case[7] involved a female patient who habitually urinated in unsanitary facilities. These parallels emphasized the significant role of environmental and behavioral factors in facilitating larval entry into the urinary tract.

The morphological identification of larvae remains pivotal for accurate diagnosis, as clinical manifestations often mimic urinary tract infections, presenting with symptoms such as dysuria and hematuria. Consequently, misdiagnosis is common until larvae are microscopically confirmed. Similarly, a reported case of *C. albipunctata* from Beni Suef required repeated urinalysis to differentiate myiasis from bacterial cystitis.[14] Such diagnostic challenges necessitate heightened clinical suspicion, particularly in endemic areas.

Treatment strategies reported across cases included ivermectin administration, adequate hydration, and reinforcement of hygiene practices, with cystoscopy assisting in larval removal in persistent infections. Although ivermectin's efficacy has not been universally validated for urogenital myiasis, its use aligns with its broad antiparasitic activity and favorable safety profile. Conversely, spontaneous resolution through larval expulsion—as documented in Libyan case[9]—suggested that the human hosts might disrupt the fly's lifecycle without pharmacological intervention.

Globally, *P. albipennis* and *C. albipunctata* are increasingly implicated in urogenital myiasis, particularly in Asia and North Africa. Their preference for moist, organic-rich environments such as bathrooms and sewage systems underscores the importance of infrastructural improvements. In contrast, obligatory species such as *C. bezziana* remain primarily associated with wound myiasis, as demonstrated in Iranian cases involving nasal and scalp infestations.[12] It should be noted that the absence of polymerase chain reaction (PCR)–based species identification represents a limitation of the present case report.

Conclusion

Blowflies (Diptera, Calliphoridae) are commonly encountered in areas with poor hygienic conditions. Their eggs and larvae may infect humans under unsanitary conditions. Therefore, strict adherence to personal and environmental hygiene remains essential for prevention.

This case reinforces that urogenital myiasis, although rare, warrants multidisciplinary attention. Collaboration among clinicians, entomologists, and public health authorities is essential to mitigate risks through improved sanitation, effective fly control measures, and targeted community education. Future studies should prioritize molecular methods for larval identification and the development of standardized treatment protocols to optimize patient outcomes, particularly in resource-limited settings.

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Authors' Contribution

F.L: Scientific consultant for Microbiology, early detection of larvae in urine, supervisor, writing the first draft of the manuscript. HM: Scientific consultant for clinical biochemistry, investigation

resources, conceptualization, supervision. MB: Scientific consultant for Hematology, investigation resources, conceptualization, and data collection. MAR: Scientific consultant for clinical Immunology, participated in the final diagnosis, investigation resources, data gathering, and drafting. AV: Entomological studies and participating in final diagnosis, investigation resources, and interpretation. M.Sh: Scientific consultant as a physician, conceptualization, data gathering, drafting, interpretation. All authors involved in drafting the work or reviewing the manuscript, and final approval of the version to be published, agreed to be accountable for all aspects of the work in ensuring that questions related to accuracy or integrity of any part of the work are appropriately investigated and resolved.

Declaration of AI

To improve text clarity and style, the authors used the AI linguistic tool (Ludwig.guru) during manuscript preparation. This tool was used only for grammar and expression. The authors fully reviewed, edited, and verified the final content and accept full responsibility for its publication.

Conflict of Interest: None declared.

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