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Cutaneous Furuncular Myiasis in a Rural Kenyan Hospital: A Case Report

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ABSTRACT

Myiasis is a neglected tropical disease caused by infestation by the larval stages (maggots) of many species of flies, which occur worldwide but are more prevalent in the tropical and subtropical regions. The two main types of flies causing human myiasis are *Dermatobia hominis* (bot fly) and *Cordylobia anthropophaga* (tumbu fly). Cases of human myiasis in Kenya are not well documented, but some epidemiological studies show the tumbu fly to be the most prevalent. Transmission and infestation occur in cases of poor personal and environmental hygiene, especially in spaces shared with wild and domestic animals. Cutaneous myiasis, presenting as a furuncular, wound, and migratory disease, is the most common clinical phenotype that may be associated with secondary pyogenic infection and cellulitis, especially when not treated promptly. In this study, we present a case of cutaneous furuncular myiasis in a patient from rural Kenya. We share our experience managing the patient and also provide a literature review on the clinical case management of myiasis, with a call for more epidemiological and clinical work to be done to better understand this neglected disease.

INTRODUCTION

Myiasis is the term applied to the disease produced by infestation by the larvae (maggots) of the species of flies of the arthropod order *Diptera*, that invade and live parasitically in human tissues ('myia' is a Greek word for fly). Myiasis is a neglected disease. It is sporadically distributed worldwide, and the flies infest many animals and humans. The most common flies causing human infestation are *Dermatobia hominis* (bot fly), which is endemic in Central and South America and the Caribbean; and *Cordylobia anthropophaga* (tumbu fly), which is

endemic to sub-Saharan Africa and is responsible for the furuncular form of cutaneous myiasis (Kuria & Oyediji, 2020; Robbins & Khachemoune, 2010). In Kenya, there is no robust data that captures the prevalence of myiasis in humans, though some surveillance epidemiological studies report that myiasis is endemic in the south-eastern counties, e.g., Kitui. Most human cases are anticipated to closely follow the prevalence in domestic animals, e.g., in dogs, sheep, and goats. A cross-sectional study done on canine cutaneous myiasis in Kitui County, Kenya, revealed an overall prevalence of 45%, with all the larvae isolated

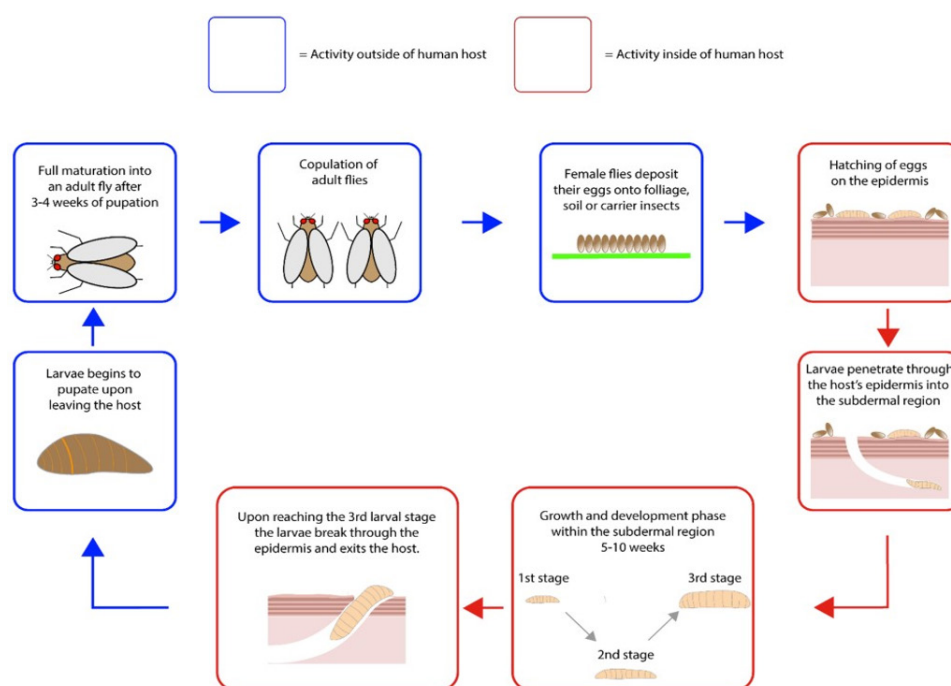


Figure 1: The life cycle of myiasis larvae (Man *et al.*, 2022)

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being *C. anthropophaga* (tumbu flies) (Mutinda *et al.*, 2022). The flies prefer warm and humid environments and are thus restricted to the summer months in temperate zones, but are prevalent year-round in the tropics and subtropical countries. The mechanism of transmission varies depending on the species of fly. The adult fly may deposit its eggs on a wound, which hatches to produce the larva that burrow into the skin, or it may deposit the eggs directly into the nostrils, the conjunctiva, on the lips, or on an intact skin with subsequent larva invasion into the tissues. The *D. hominis* species is usually found in humans, cattle, swine, cats, dogs, horses, sheep, other mammals, and bird species. It is especially interesting because it deposits eggs on a mosquito, tick, or other fly. When the mosquito or tick bites a human, the warmth of the skin induces the eggs to hatch, and the larvae enter the skin at the site of the bite. *C. anthropophaga* is hosted by wild rats (the main hosts), mice, monkeys, squirrels, dogs, cats, rabbits, guinea pigs, goats, chickens, and humans. The flies lay their eggs on the ground or dump clothes and bed linens hung out to dry. People get infected when they contact the hatched larvae (Francesconi & Lupi, 2012). Figure 1 panel from Pharmaceutical Research (2022) shows the life cycle of myiasis larvae (Man *et al.*, 2022). Infestation may be classified based on parasite-host interaction as obligatory, facultative, or accidental myiasis. More commonly, it is classified based on the body parts affected, e.g., cutaneous, nasopharyngeal, intestinal, and urogenital myiasis, etc. (Dires *et al.*, 2022). Cutaneous myiasis is the most common type and may have three different clinical forms: furuncular, migratory, or wound myiasis. The furuncular subtype is the most commonly encountered, often presenting with nodular and cystic cutaneous lesions (Dires *et al.*, 2022).

The diagnosis of myiasis is clinical with direct observation of the larvae, and laboratory testing is not routinely required. Manual removal of the larva is the most common mode of treatment, while surgery may rarely be used, especially where there are associated pyogenic infections or the occurrence of myiasis in body cavities or unusual sites.

Case Summary

History and Physical Examination

A 76-year-old man, a father of four adults from Sagana, Kirinyaga County, Kenya, was admitted with a 2-week history of acute-on-chronic left lower limb septic venous ulcers and generalized painful boil-like swellings predominantly distributed on both his arms and back. He was a widower who lived alone and worked as a subsistence farmer, cultivating food crops and rearing a few sheep and goats. He had a significant history of smoking (about 40 pack years) and ethanol use, especially of the traditional local brews. He had no other comorbidities.

The boil-like swellings on his body had been recurrent over several months (>10 months), affecting his legs, arms, groin, torso, and neck. They were painful and itchy, with an associated feeling of creeping movements

within the lesions. He reported that occasionally “whitish worms” would come out of the lesions spontaneously or whenever he squeezed some of the lesions. He lived in a one-bedroomed semi-permanent house, which he shared with the lambs and kids of his sheep and goats, respectively. He denied coming into direct physical contact with someone with similar lesions. The systemic inquiry was unremarkable.

On physical examination, he was an elderly male in chronic poor health with features of general neglect and poor overall sanitary condition. He was sick-looking, poorly groomed, and dull in appearance and disposition. His vital signs were unremarkable. He was mildly pale and dehydrated but had no scleral jaundice, finger clubbing, pedal edema, or peripheral lymphadenopathy.



Figure 2: Upper and lower panels showing multiple furuncles appearing as nodular and nodulo-cystic lesions on the back of the patient. On the lower panel, some furuncles are noted to have healed spontaneously (see the associated hyperpigmented scars).



Figure 3: Upper panel showing a furuncle with a maggot being manually removed by gentle squeezing. The lower panel shows a live maggot extracted from a furuncle on the patient

The patient had multiple tender skin lesions, worse on the bilateral forearms and the back. They were mixed lesions, i.e., nodular, cystic, and nodulo-cystic, with surrounding skin induration and scratch marks. Both new and old lesions in different stages of healing were noted. Serosanguinous and purulent discharge was noted in some of the lesions. Dramatically, live maggots could be squeezed from some of them, i.e., one live whitish maggot per lesion. See Figures 2 and 3 panels.

His left lower limb was swollen up to the knee level, was hyperpigmented, and had an approximately 8cm by 10cm ulcer on the dorsum of the foot with foul-smelling sero-purulent discharge and concomitant severe cellulitis. The neurovascular exam was normal. The right lower limb was grossly normal. The rest of the systemic exam was grossly normal.

Basic Work-Up

His complete blood count showed neutrophilic leukocytosis with a total leucocyte count of 28.2×10^3 cells/l (4-11) with 83.5% neutrophils; hemoglobin was 10.7g/dl (12-16) with a mean corpuscular volume of 81fl (mild anemia); a normal renal function test with creatinine of 73.6 mmol/l, a normal random blood sugar of 5.6mmol/l, and a negative rapid test for the human immunodeficiency virus. A compression doppler ultrasound scan of both lower limbs showed features of bilateral venous insufficiency with no deep venous thrombosis and marked soft tissue swelling of the left leg up to the mid-thigh level (consistent with the cellulitis).

Patient Management and Follow-Up

A clinical diagnosis of cutaneous furuncular myiasis in a patient with a septic chronic venous left leg ulcer with associated cellulitis was made. The maggots were physically removed by squeezing and plucking them out using non-toothed tissue forceps and surgical gauzes at the bedside. The wounds and furuncles were cleaned and dressed daily with topical antiseptics. A seven-day course of intravenous flucloxacillin and acetaminophen analgesics was also administered. The outcome was the complete resolution of all the lesions in about two weeks. The septic venous ulcer was debrided serially, cleaned, and dressed daily, and is currently scheduled for split-thickness skin grafting later on. The patient and his family members were educated on the importance of personal and environmental hygiene to prevent the recurrence of the myiasis infestation.

DISCUSSION

The typical clinical encounter with human myiasis in temperate countries is the returning traveler from endemic areas presenting with predominantly cutaneous myiasis (Chang & Donaghy, 2021; Dalton & Chambers, 2009; Oliva *et al.*, 2020; Song *et al.*, 2017; Suárez *et al.*, 2018; Uslu *et al.*, 2018). In tropical countries, e.g., Kenya, the disease is observed in endemic regions. The most common etiological species are *C. anthropophaga* and *D. hominis*. Patients typically present with cutaneous myiasis in the clinical forms of furuncular, i.e., boil-like lesions (the most

common), wound type, or migratory phenotypes (Dires *et al.*, 2022). Furuncular myiasis is typically diagnosed clinically during patient encounters, sometimes aided by pictorial taxonomical keys (Dires *et al.*, 2022). Whereas routine dermoscopy and ultrasound may aid in accurate diagnosis and speciation (Bakos & Bakos, 2007), they often offer no additional therapeutic value in the eventual definitive management of the infestation. Our patient had myiasis caused by *C. anthropophaga* (tumbu fly) based on its predominant endemicity, multiple furuncles, and typical appearance when matched to pictorial taxonomical keys. We believe our patient acquired the infestation during direct contact with the tumbu fly larvae in the unsanitary living environment at home shared with domestic animals. The larvae penetrate the skin, causing intense pruritus, pain, skin erythema, and a dramatic sense of crawling underneath the skin. This results in single or multiple furuncles, which may be nodular, cystic, or nodulo-cystic, and of varying sizes, and are associated with surrounding cellulitis in some cases. They are distributed in the arms, legs, buttocks, torso, neck, and sometimes in the body orifices or unusual sites like the eyes, nose, ears, or around surgical devices (Dalton & Chambers, 2009; Das *et al.*, 2021; de Souza Barbosa *et al.*, 2008; Dires *et al.*, 2022; Huang *et al.*, 2020). The lesions have a central opening (punctum) that allows the larvae to breathe. The latter can be seen as bubbles when the body part is immersed in water (Francesconi & Lupi, 2012). Secondary bacterial infection of the furuncles may cause purulent discharge from some of them (as was the case with our patient) and significant cellulitis and/or abscesses. Typically, symptoms develop within 2 days of the fly bite as itchy lesions, with the furuncles developing over 6 days. After 8-12 days, the mature larvae leave the skin and fall to the ground, where they pupate and soon become adult flies. Treatment is aimed at the complete eradication of the maggots from the skin and the prevention or management of secondary infections. If the larvae or maggots are visible, manual extraction can be performed using clippers, artery forceps, etc., taking care to extract the maggots whole. If the larva is not visible, the central pore can be covered with petroleum jelly, liquid paraffin, or turpentine oil, which suffocates the larva and causes it to migrate to the surface, where it can be manually extracted (Francesconi & Lupi, 2012). Topical (1% solution) or systemic ivermectin is toxic to all forms of myiasis and may rarely be used. Surgical removal of the larva may be needed for eradication of the maggots, especially in unusual locations (e.g., in body orifices and cavities), and for drainage of associated abscesses or debridement of devitalized tissues (Bani Hani *et al.*, 2019; Dires *et al.*, 2022). This is followed by thorough daily wound care. In our patient, the maggots were all manually removed, with subsequent wound management (including antibiotics) leading to complete healing of the furuncles over a period of two weeks, albeit with scars that are already fading.

CONCLUSION

Human myiasis can be a debilitating disease with significant personal and psychological trauma associated with the

ensuing complications of cutaneous disease, especially in the more common furuncular myiasis, e.g., pain, cosmetic aberrations, secondary pyogenic infections, intense foreign body reactions during inadequate extractions, secondary tetanus (consider tetanus booster vaccination in all cases), etc. (Francesconi & Lupi, 2012). The focus of management should be the prevention of infestation by limiting exposure to flies, especially in tropical areas, such as by wearing clothing that covers the extremities, using mosquito nets, and using insect repellants. Other general measures include covering wounds with clean dressing to prevent flies from reaching the skin, avoiding spreading clothes on the ground, ironing clothes dried on the line (the heat destroys the eggs and the larvae), and improving general personal hygiene and environmental sanitation (Diaz, 2006).

RECOMMENDATIONS

Myiasis is a neglected disease, yet it has associated significant personal and psychological burdens related to the larval infestation. Although not well documented, human myiasis does occur in Kenya. Cases of myiasis are likely to be misdiagnosed due to a lack of prior clinical experience with similar cases. The authors recommend more epidemiological studies be done in Kenya to properly map the prevalence of this neglected disease, as well as deliberate training of health workers on the case management of myiasis.

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REFERENCES

Bakos, R. M., & Bakos, L. (2007). Dermoscopic diagnosis of furuncular myiasis. *Arch Dermatol*, 143(1), 123-124. <https://doi.org/10.1001/archderm.143.1.123>

Bani Hani, M. N., Al Manasra, A. R., Daradkah, H., Bani Hani, F., & Bani Hani, Z. (2019). Cutaneous Myiasis Around Gastrostomy (PEG) Tube Insertion Site: The Second Case Report. *Clin Med Insights Case Rep*, 12, 1179547619869009. <https://doi.org/10.1177/1179547619869009>

Chang, K. M., & Donaghy, H. J. (2021). Myiasis in a returning traveller. *Travel Med Infect Dis*, 43, 102141. <https://doi.org/10.1016/j.tmaid.2021.102141>

Dalton, S. C., & Chambers, S. T. (2009). Cutaneous myiasis due to *Dermatobia hominis* (the human botfly) in a New Zealand traveller returned from South America. *N Z Med J*, 122(1302), 95-99.

Das, S., Gaur, N. K., Shaikh, O. H., & Kumbhar, U. S. (2021). Feeding gastrostomy stoma site cutaneous myiasis: a rare entity. *BMJ Case Rep*, 14(7). <https://doi.org/10.1136/bcr-2021-244352>

de Souza Barbosa, T., Salvitti Sá Rocha, R. A., Guirado, C. G., Rocha, F. J., & Duarte Gavião, M. B. (2008). Oral infection by *Diptera* larvae in children: a case report. *Int J Dermatol*, 47(7), 696-699. <https://doi.org/10.1111/j.1365-4632.2008.03725.x>

Diaz, J. H. (2006). The epidemiology, diagnosis, management, and prevention of ectoparasitic diseases in travelers. *J Travel Med*, 13(2), 100-111. <https://doi.org/10.1111/j.1708-8305.2006.00021.x>

Dires, A., Kebede, A., Gedamu, S., & Dires, T. (2022). Case of multiple furuncular myiasis in Northeast Ethiopia. *Clin Case Rep*, 10(7), e6015. <https://doi.org/10.1002/ccr3.6015>

Francesconi, F., & Lupi, O. (2012). Myiasis. *Clin Microbiol Rev*, 25(1), 79-105. <https://doi.org/10.1128/cmr.00010-11>

Huang, Y. L., Liu, L., Liang, H., He, J., Chen, J., Liang, Q. W., Jiang, Z. Y., He, J. F., Huang, M. L., & Du, Y. (2020). Orbital myiasis: A case report and literature review. *Medicine (Baltimore)*, 99(4), e18879. <https://doi.org/10.1097/md.00000000000018879>

Kuria, S. K., & Oyedeji, A. O. (2020). Human myiasis cases originating and reported in africa for the last two decades (1998-2018): A review. *Acta Trop*, 210, 105590. <https://doi.org/10.1016/j.actatropica.2020.105590>

Man, E., Price, H., & Hoskins, C. (2022). Current and future strategies against cutaneous parasites. *Pharmaceutical Research*, 39, 1-21. <https://doi.org/10.1007/s11095-022-03232-y>

Mutinda, K. N., Gichohi, M. P., Maina, W. R., Maina, G. S., & Agosa, K. E. (2022). Prevalence, Etiology, and Risk Factors Associated with Occurrence of Canine Cutaneous Myiasis in Kitui County, Kenya. *Vet Med Int*, 2022, 5699060. <https://doi.org/10.1155/2022/5699060>

Oliva, E., Bargiggia, G., Quinzan, G., Lanza, P., & Farina, C. (2020). Furuncular myiasis in Italian traveler returning from Kenya. *J Infect Dev Ctries*, 14(1), 114-116. <https://doi.org/10.3855/jidc.11560>

Robbins, K., & Khachemoune, A. (2010). Cutaneous myiasis: a review of the common types of myiasis. *Int J Dermatol*, 49(10), 1092-1098. <https://doi.org/10.1111/j.1365-4632.2010.04577.x>

Song, S. M., Kim, S. W., Goo, Y. K., Hong, Y., Ock, M., Cha, H. J., & Chung, D. I. (2017). A Case of Furuncular Myiasis Due to *Cordylobia anthropophaga* in a Korean Traveler Returning from Uganda. *Korean J Parasitol*, 55(3), 327-331. <https://doi.org/10.3347/kjp.2017.55.3.327>

Suárez, J. A., Ying, A., Orillac, L. A., Cedeño, I., & Sosa, N. (2018). First case of Furuncular Myiasis due to *Cordylobia anthropophaga* in a Latin American resident returning from Central African Republic. *Braz J Infect Dis*, 22(1), 70-73. <https://doi.org/10.1016/j.bjid.2017.12.003>

Uslu, U., Erdmann, M., Schliep, S., & Sticherling, M. (2018). Crusted Nodules on the Lower Left Arm in a Traveller Returning from South America: A Quiz. Furuncular myiasis. *Acta Derm Venereol*, 98(1), 159-160. <https://doi.org/10.2340/00015555-2804>