CASE REPORT

Case Report: Furuncular Myiasis in Malawi [version 1; peer review: 1 approved, 1 approved with reservations]

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Abstract

Furuncular myiasis results when the larva penetrates healthy skin to cause a furuncle like nodule which may mimic common dermatoses like insect bites and pyoderma leading to misdiagnoses. Tumbu fly (Cordylobia anthropophaga) is the most common cause in Africa and is endemic in Malawi. We describe a case of C. anthropophaga furuncular myiasis from a 6-month-old baby who presented with an acute history of a rash and was initially misdiagnosed on two occasions. Treatment consisted of manual removal of the larva and subsequent local wound care with a good outcome. We believe that much as Malawi is in the endemic region of the Tumbu fly, the disease's clinical mimicking of common dermatoses and the patients' preference to treat themselves at home may result in clinicians gaining less experience in managing furuncular myiasis cases in their daily practice leading to misdiagnoses. This report therefore demonstrates the practical challenges which unwary clinicians and patients in Malawi might encounter when faced with this otherwise common condition. It further highlights the importance of dermatologists and other non-dermatologist clinicians to consider furuncular myiasis among differential diagnoses in like lesions which in turn will reduce the unnecessary use of antibiotics and delay correct patient treatment.

Keywords

Myiasis, Tumbu fly, Malawi

This article is included in the Malawi-Liverpool Wellcome Trust Clinical Research Programme gateway.
Introduction
Myiasis is a condition where a fly infests a living vertebrate host (humans/animals) for development of their larval stages. The fly larvae may develop on wounds, intestines, body cavities and on the skin among other places. Cutaneous and wound myiasis are the most common forms of the disease. Furuncular myiasis results when the larva penetrates healthy skin to cause a furuncle like nodule. Flies that may cause myiasis in humans include *Dermatobia hominis* and *Cordylobia anthropophaga* (furuncular myiasis) and *Cochliomyia hominivorax* and *Chrysomyia bezziana* (wound myiasis). Though endemic in many parts of Southern and Eastern Africa, including in Malawi, the disease receives little attention in the region. To our knowledge, there have been no published or reported cases of myiasis in Malawi in the past two decades and such data is also limited in the rest of Africa. Most literature on myiasis in the region, is reported among returning travelers with skin diseases after visiting the region. This usually lacks first-hand experience of challenges faced by clinicians in Africa, the source of the disease, in its management. As myiasis can mimic other common skin conditions in this setting which may confuse unsuspecting clinicians, this lack of experience in managing myiasis may result in mismanagement or delayed treatment of the disease.

This report describes such a case of furuncular myiasis in a child that presented to the dermatology unit at Queen Elizabeth Central Hospital in Blantyre, Malawi, with boils and was wrongly treated with antibiotics on first presentation. While emphasizing this knowledge gap among clinicians, this report further aims at sensitizing all clinicians about the endemicity of myiasis in Malawi and the need to think of myiasis in patients with a suggestive at-risk history and clinical lesions.

Case report
A 6-month-old baby girl presented with a few days’ history of a rash. The mother had noticed a red papule on the leg 10 days prior. She was not sure if the bites occurred at home, but the family had visited a game park outside the city a few days earlier. Apart from the baby, no one else at home had the rash. She consulted a pediatrician who initially treated her for insect bites. Days later, more new papules emerged, after which she was referred to our dermatology unit. There was no history of fever or irritability and she was feeding well. On examination, she had multiple discreet erythematous papules and pustules scattered on the thighs and trunk. On suspicion of pyoderma secondary to the insect bites, the child was sent home and prescribed oral cloxacillin 125 mg, 3 times a day for 5 days and advice about protective clothing was given. After 5 days, the rash persisted and the mother reported that some yellowish fluid was leaking from the areas that had rash. Unusually, she added, the baby, would wake up at night ‘with a startled as if something is pinching on her’. The papules had become larger and looked like boils and inside some of the boils there were clear and visible larvae. Manual removal of the live larvae with gentle lateral pressure aided with forceps was done and the larvae were sent to the laboratory. The evacuation of cavities was cleaned with betadine solution and dressed with clean gauze. No further medication was given; however, examination on day seven post-treatment showed healing of all the cavities.

Laboratory analysis
A total of 12 larvae were received at the laboratory: 11 live and one dead. Since they were transported live in a plastic bag they were immediately killed by immersion in hot water.
(80°C) for 15 seconds and thereafter preserved in buffered formalin waiting for identification. The larvae were all in the third instar stage, with well recognizable numerous short black spines with visible anterior and posterior spiracles (Figure 3). The morphology of the larvae were consistent with those reported for the Tumbu fly, Cordylobia anthropophaga.

Discussion

Furuncular myiasis caused by Cordylobia anthropophaga is mostly reported in Sub-Saharan Africa, where it is endemic in the tropics but is rare in other regions. There is no human-to-human transmission of the Tumbu fly, as humans are accidental hosts. Wild rodents are primary hosts; secondary hosts of C. anthropophaga include such domesticated animals as dogs, chickens, cats, rabbits and guinea pigs. Myiasis is more common in poor rural areas where people are in close contact with domestic animals. Larvae infestation is more common in children than in adults due to the soft skin of the children, and adults, in addition, develop immunity after repeated exposures. In endemic areas, however, infestation may occur regardless of urban or rural settings, or social economic status. Unlike the larva, the adult fly, measuring about 6–12 mm length, light brown in colour, with yellow face and legs and blue grey patches on thorax, is non-parasitic. A female adult Tumbu fly lays between 100 to 500 eggs on sand or soils contaminated by urine or fecal matter and not directly on the host skin. Commonly, the eggs are laid on bedding, on clothes impregnated with sweat or on improperly washed nappies and underwear contaminated with urine or fecal matter. This explains why the location of lesions on the baby in this case were on areas covered by clothing (trunk, thighs) but sometimes there might be presence of multiple lesions on patients depending on the contact area. The risk of oviposition is higher for clothing laid under a shade on grass or dry lines, even though they may visibly look clean. In contrast, oviposition will not occur on clothing dried in bright sunlight while even though they may visibly look clean. In contrast, oviposition will not occur on clothing dried in bright sunlight while heat from ironing clothes kills the eggs and the larva. Once laid, the eggs hatch into first instar larva, which can survive up to 15 days without feeding as they wait to enter the host. Contact with contaminated clothes or soil allows the hatched larvae to penetrate healthy skin of the host in order to continue development into second and third instar larvae, which will be complete 8–12 days later when the mature larva exits to pupate outside the host, completing the cycle. Penetration of the skin is usually asymptomatic. It is in the process of larval development under the skin that various cutaneous features become manifest: within 48 hours of infestation, occasional itch, irritation or pain caused by activity and biting of the larva or secondary to chemical irritation to the larva’s formites may be noted. Agitation and disturbance of sleep may occur in children as was reported by the mother in this case. Cutaneously, a small red papule appears early on and will evolve over the next few days to form a boil-like nodule when fully developed. A typical furunculoid lesion is a papule or nodule that exudes a serosanginous fluid consisting of feces of the larva. Inflammation developing gradually in the surrounding tissues may be so intense over the next 6 days as to mimic pyoderma. Clinical diagnosis is usually made when a typical furuncle is recognized which mostly contains the larvae in its third instar stage. When fully developed, the protruding breathing tube of the larva via a punctum and sensations of movement within the lesion can be observed. There is usually only one larva per ‘boil’, but patients may have several lesions. Other differential diagnoses include bacterial furunculosis, cysts, cutaneous leishmaniasis and dracunculiasis.

Treatment of furuncular myiasis involves removing the larvae. Cutting off air by placing an occlusive ointment such as petroleum jelly or mineral oils over punctum or breathing hole for one or two days will prevent the larva from breathing, forcing it to wriggle towards the surface where it is easy to extract with a forcep. Unlike the more fatally invasive D. hominis, larva of C. anthropophaga remains superficially in the skin without going into deeper tissues. If left untreated, the Tumbu fly larvae will eventually exit the lesion, pupate, and the mature adult fly will hatch after about 10–20 days. Complications of C. anthropophaga are therefore local superinfections like cellulitis and abscess formation. Remaining debris after accidentally rupturing the larva during extraction can lead to severe inflammatory reaction and increase the risk of developing a serious bacterial infection. Myiasis due to Tumbu fly can be prevented through drying laundry in the sun to prevent egg deposition and ironing clothes to kill any eggs or hatched larvae. Eliminating flies from homes and work areas with insecticides or mechanical traps can assist in preventing myiasis from occurring.

Despite being in the endemic region of Tumbu fly, where it is expected that clinicians are more aware of the disease than in non-endemic areas, in the present case the disease was initially missed by primary care clinicians and pediatricians. Even at a specialist unit, the child was only diagnosed at second review when the lesion became clinically clear following further development of the larva. According to Millikan, the clinical picture in furuncular myiasis is not well developed and hence not clearly diagnostic when patients present early leading to misdiagnosis, as was in this case. A number of cases of misdiagnosis in myiasis have been reported worldwide. In Nairobi, Kenya, 3 members of the same family were initially wrongly managed as furunculosis after developing multiple itchy painful boils on various body areas following a visit to a Tumbu fly endemic area two weeks before. Similarly, in Spain, a 29-year-old woman with abscesses on her buttock and leg which were thought to be from flea bites was given ciprofloxacin for 7 days. Later she was referred for dermatologic evaluation where larvae were extracted from the lesions. Early lesions of furuncular myiasis actually resemble insect bites until the larva grows and the typical aperture shows. We believe this may also explain why reported cases of myiasis in Malawi are rare in that patients with a rash may be treated as outpatients for such dermatoses as pyoderma and insect bites until the larva is ready to exit. Patients may then remove the larva themselves at home without returning to the clinic. Interestingly, most literature on clinical furuncular myiasis takes the form of case reports among travelers returning home from Africa, accounting for 7.3 to 11% of dermatological diseases among returning travelers but this is likely due to gross under reporting in African clinical setting where it is endemic.
misdiagnosis and mismanagement of a common condition in an endemic area. Clinicians however do not have experience managing the disease and hence do not think about it in their daily practice.

Conclusion
Myiasis might be a common condition in Malawi but poorly diagnosed and rarely reported. Awareness of the clinical condition and understanding of the disease process is essential to avoid unnecessary delay in diagnosis and incorrect treatment such as the inappropriate use of antibiotics. This will facilitate informed reassurance of the patient.

Data availability
All data underlying the results are available as part of the article and no additional source data are required.

References

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Krzysztof Szpila
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Evaluated manuscript is an interesting and important case report about furuncular myiasis caused by Cordylobia larvae. As I'm entomologist I was not able to assess clinical aspect of this contribution. In the context of entomology/taxonomy, the manuscript suffers from the lack of information about key(s) used for species identification of collected larvae (I recommend to use key in monograph of Zumpt 1965). In the Afrotropical Region are present four different species of Cordylobia: C. athropophaga, C. rodhaini, C. ruandae and C. ebadiana. At least two of them are known as human myiasis agents. Therefore, author should provide sufficient documentation of collected larvae (especially clear view on posterior spiracles) to prove that collected material belongs to C. athropophaga. Present documentation (Fig. 3) is not enough informative. Additionally authors should provide detailed information about place of storage of collected larvae (voucher specimen) in case of necessity of any further access to this material by other researchers. After completing the documentation of larval morphology and other mentioned information manuscript can be accepted.

Is the background of the case's history and progression described in sufficient detail?  
Yes

Are enough details provided of any physical examination and diagnostic tests, treatment given and outcomes?  
Partly

Is sufficient discussion included of the importance of the findings and their relevance to future understanding of disease processes, diagnosis or treatment?  
Yes

Is the case presented with sufficient detail to be useful for other practitioners?
Partly

**Competing Interests:** No competing interests were disclosed.

**Reviewer Expertise:** Entomology

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

**Reviewer Report 03 March 2020**

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**Jamie R. Stevens**

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A very well written report which neatly describes the continuing problem of misdiagnosis by clinicians of this condition in its early phase. The article does –in my opinion– a very good job of highlighting the problem of misdiagnosis in the case from Malawi which is the focus of the article, as well as other relevant examples from the literature. The photos are also clear and relevant, though Figure 3 might benefit from a scale bar.

I have only two criticisms of the article:

1. Many references, for example, reference 6 could (should) be replaced by reference to the classic monograph of Zumpt 1965, which documents in great detail the life-history of every Old World myiasis fly, including full check lists of known mammalian reservoir species. The authors really should take the time to read this text and cite as appropriate. Ref: Zumpt, F. (1965) *Myiasis in Man and Animals in the Old World*, Butterworth1.

2. I am not aware of any convincing reports of the development of immunity to infection with *C.anthropophaga* in adults, and reference 7 does not (as far as I can tell from my reading of it) support this hypothesis. I would suggest the authors attend to these two points prior to indexing.

**References**


**Is the background of the case's history and progression described in sufficient detail?**

Yes

**Are enough details provided of any physical examination and diagnostic tests, treatment given and outcomes?**
Yes

Is sufficient discussion included of the importance of the findings and their relevance to future understanding of disease processes, diagnosis or treatment?
Yes

Is the case presented with sufficient detail to be useful for other practitioners?
Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Insect phylogenetics, population genetics and evolution with special focus on myiasis-causing species, including the identification and genetic typing of adults and larvae of Cordylobia anthropophaga (the Tomb fly), the focal insect species of this article. My main publications on this topic come from my time as a Wellcome Trust Biodiversity Fellow.

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.