



RESEARCH ARTICLE

Enteral myiasis causing acute dysentery: A case report

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ABSTRACT

Enteral myiasis or intestinal myiasis is acquired by ingesting food or water contaminated with dipteran fly eggs or larvae. Here, we describe a patient with intestinal myiasis presenting with acute dysentery caused by the larva of *Hermetia illucens*. The larva was identified morphologically, and its species confirmed through molecular analysis using polymerase chain reaction and sequencing based on mitochondrial cytochrome c oxidase subunit I gene (COI).

Keywords: Intestinal myiasis; Dysentery; *Hermetia illucens*; Black soldier fly.

INTRODUCTION

Myiasis is defined as the invasion of body tissues or cavities of living animals by maggots or larvae of dipterous flies. The incidence of human myiasis is widely distributed, with more cases being reported in regions of poor socio-economy (Francesconi & Lupi, 2012). Myiasis can be classified based on the affected anatomical location of the host, i.e., sanguinivorous, dermal/subdermal, nasopharyngeal, intestinal or enteral and urogenital (Zumpt, 1965). Myiasis can also be described by the degree of parasitism of the fly and further classified into obligatory, facultative or pseudomyiasis (Francesconi & Lupi, 2012). Pseudomyiasis, also known as accidental myiasis, happens when a host accidentally ingests a free-living larva which is later found in the host's gastrointestinal tract and is unable to complete its life cycle (Francesconi & Lupi, 2012).

Hermetia illucens or the black soldier fly, belongs to the family *Stratiomyidae* under the Diptera order. Originally indigenous to the Americas, it now has a worldwide distribution (Wang & Shelomi, 2017). Its larvae feed on a variety of organic materials including manure, and decomposing plants and animals (Wang & Shelomi, 2017). Although uncommon, this species has been reported to cause myiasis in humans, more specifically furuncular and intestinal myiasis (Adler & Brancato, 1995; Lee *et al.*, 1995; Calderón-Arguedas *et al.*, 2005; Fuentes & Risco, 2009). Here, we describe a patient with intestinal myiasis presenting with acute dysentery caused by the larva of *Hermetia illucens*.

CASE REPORT

A 26-year-old university student presented at a private hospital in Sarawak, Malaysia after he defecated a 'worm' along with bloody faeces. He had a 1-week history of

diarrhoea prior to this episode and was otherwise well. His vital signs were normal and physical examination did not reveal any abnormalities. He had salvaged the 'worm' and gave it to the attending physician. He was prescribed ciprofloxacin 500 mg twice daily and metronidazole 500 mg three times a day for one week. Stool culture and sensitivity was negative.

The 'worm' specimen was sent to the Parasitology Diagnostic Unit, University Malaya Medical Centre for identification. The specimen was dark brown in colour and measured approximately 25 mm long and 10 mm wide (Figure 1). It had a small non-retractile head with 11 body segments, each with transverse rows of bristles (Figure 2). The larva was alive and moved slowly but soon became inactive.



Figure 1. Gross appearance of the larva showing its dark brown colour, measuring approximately 25 mm long and 10 mm wide.



Figure 2. Stereomicroscope image of whole body of *H. illucens* larva illustrating a small non-retractile head with 11 body segments, each with transverse rows of bristles.

DNA was extracted from the larva and polymerase chain reaction (PCR) amplification based on the mitochondrial cytochrome c oxidase subunit I gene (*COX1*) was done as described previously (Karagodin et al., 2017). In brief, the larva was ground with a sterile pestle using mechanical vortex and the homogenate was then incubated at 56°C for 2 hours with 200 µL AL buffer and 20 µL proteinase K followed by genomic DNA extraction using DNeasy® Blood & Tissue kit (Qiagen, Hilden, Germany). DNA amplification was performed at 94°C for 2 min followed by 25 cycles of 94°C for 30 s, 55°C for 30 s and 72°C for 30 s. Final extension was 72°C for 5 min. The positive amplicon was sent to a local company (Apical Scientific Sdn Bhd, Malaysia) for DNA sequencing analysis. Sequences of this amplicon was analyzed using NCBI BLASTn database. The amplicon was found to be 100% identical to *Hermetia illucens COX1* (Accession number: MT908920.1).

At follow up, the patient was well.

DISCUSSION

Intestinal myiasis is a result of consuming food or water contaminated with dipteran fly eggs or larvae. The larvae of *Hermetia illucens* can be found in various environments such as over ripe fruits, decomposing plants, manure, exposed carcasses and abandoned honeycombs (Jirón & Solano, 1988). The life cycle of this fly is approximately 45 days long which consists of eggs (4 days), larvae (18 days), pupae (14 days) and adults (9 days) stages (Canella et al., 2016). Based on the characteristics of the larva received in this case, we concluded that it was a mature larva. It could have partially completed its development in the gastrointestinal tract before being expelled in the faeces. The larvae are resistant to acidic environment of the gastrointestinal tract, probably due to its tightly closed spiracular cavity and the tough coating of silicious material (Bohart & Gressitt, 1951).

Intestinal myiasis caused by *Hermetia illucens* is considered accidental (James, 1947) and may occur during summer when ripe unwashed fruits are consumed (Fuentes & Risco, 2009). Patients diagnosed with this condition have been reported to be asymptomatic or present with non-specific symptoms such as abdominal pain, diarrhoea,

vomiting and fainting spells (Meleney & Harword, 1935; Werner, 1956; Lee et al., 1995; Fuentes & Risco, 2009). In Malaysia, the first and only report of myiasis in human due to larvae of *Hermetia illucens* was published more than two decades ago (Lee et al., 1995). No other human cases have been reported in Asia. This demonstrates the rarity of human myiasis caused by this species. Other reports of intestinal myiasis in Malaysia have identified *Sarcophaga* spp. (Cheong et al., 1973) and *Clogmia albipunctatus* (Mokhtar et al., 2016) as the causative agents.

Dysentery or bloody diarrhoea is not a common symptom in intestinal myiasis. This manifestation has only been reported in a few cases of intestinal myiasis and the causative agents were identified as *Stomoxys calcitrans* (Macgregor, 1945), *Sarcophaga peregrina* (Hasegawa et al., 1992) and *Sarcophaga hemorrhoidalis* (Chen et al., 2020). Rectal bleeding which is the passage of fresh blood per rectum, has been reported in a child who had intestinal infestation of *Fannia canicularis* (Karabiber et al., 2010). To date, this is the first report of intestinal myiasis presenting with acute dysentery caused by the larva of *Hermetia illucens*. There is no known treatment for this larva infestation.

Fly larvae found in the faeces should alert physicians to the possibility of intestinal myiasis. Food hygiene including washing fruits or vegetables thoroughly before being consumed is an important preventive measure.

Conflict of interest

The authors declare that they have no conflict of interest.

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