

Persistent Pediatric Gastro-Intestinal Myiasis: A Case Report of Fly Larval Infestation with *Musca Domestica* with Review of Literature

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ABSTRACT

The occurrence of dipterous fly larvae in human is termed as human myiasis. Human myiasis can be classified based on clinical condition it causes like cutaneous myiasis, ocular myiasis, urogenital myiasis and intestinal myiasis. Based on the need for a particular host, myiasis can be divided as specific myiasis, semi-specific myiasis. Accidental myiasis results when the fly larvae are deposited/ingested by human resulting in infestation, which is also called as pseudomyiasis. Fly larvae may be present on the dead and decaying organic matter and domestic animals like dog and cats which are naturally infested with fly larvae and can be source for infection in children. Very few cases have been retrieved from literature on the occurrence of intestinal myiasis in children throughout the world. We report a case of two siblings in the same family infested with dipterous fly larvae.

Key words: Human myiasis, Fly larvae, Pediatric gastrointestinal myiasis

INTRODUCTION

The occurrence of dipterous fly larvae in human is termed as human myiasis. Though myiasis is a natural infection of live-stock, human may suffer from fly larval infestation.^[1] Fredrick William Hope, in 1,840 reported cases of dipterous fly larval infestation in human and coined the term myiasis as against scholechiasis (myiasis caused by fly larvae other than dipteran group) that was used previously.^[2] Fly larvae were found to be infested in open wounds as they thrive on dead tissue for their survival. Human myiasis can be classified based on clinical condition it causes like cutaneous myiasis, ocular myiasis, urogenital myiasis and intestinal myiasis. Based on the need for a particular host myiasis can be divided as specific myiasis, semi-specific myiasis. Accidental myiasis results when the fly larvae are deposited/ingested by human resulting in infestation, which is also called as pseudomyiasis since the adult flies are not parasitic by nature. As described by Zumpt in 1965, true human myiasis is established only when the fly larvae remain in the host for a long period feeding on

the hosts dead or living tissue, body fluids, ingested food and producing clinical illness.^[3] Children are among those most predisposed to myiasis due to their playing habits. Fly larvae may be present on the dead and decaying organic matter and domestic animals like dog and cats which are naturally infested with fly larvae and can be source for infection in children.^[4] Very few cases have been retrieved from literature on the occurrence of intestinal myiasis in children throughout the world.^[5-8] We report a case of two siblings in the same family infested with fly larvae.

CASE REPORT

A Parent brought stool samples of his two pre-school children and complained about the presence of numerous live, larval forms in the stools. Children were found to be suffering from gastrointestinal symptoms including, persistent diarrhea, abdominal pain and occasional nausea and vomiting. The symptoms were lasting for more than four weeks. Children had loss of appetite, showed signs of fatigue and there was significant reduction in weight over one month and have shown signs of malaise and weakness. The children were also developing itching of skin near the perianal and perineal region and on the abdomen. The father of children was having a vermicompost preparation and supply business. The house environment includes lot

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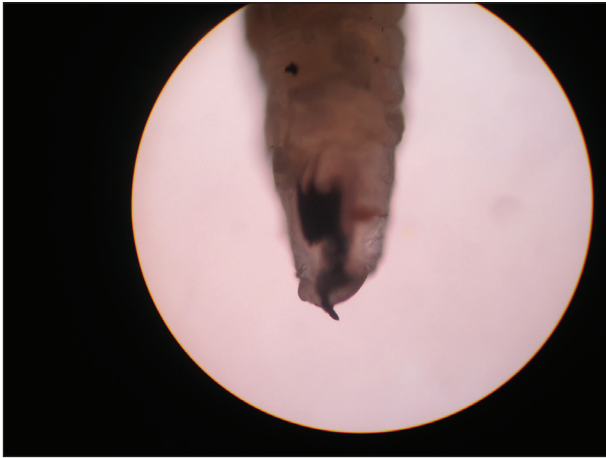


Figure 1: Cephalo-pharyngeal skeleton with characteristic black color hook

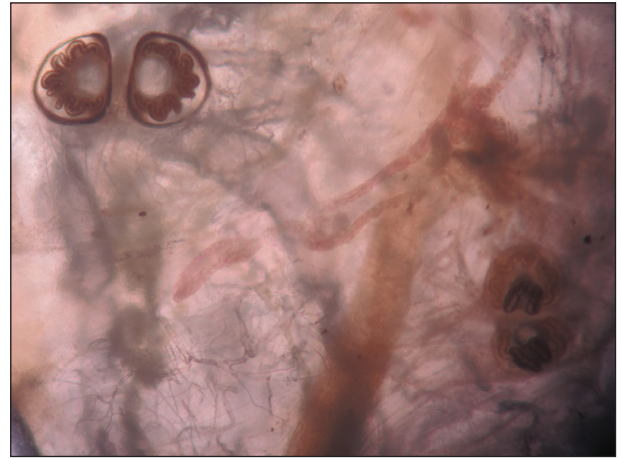


Figure 2: Anterior respiratory spiracles and posterior "D" shaped spiracles

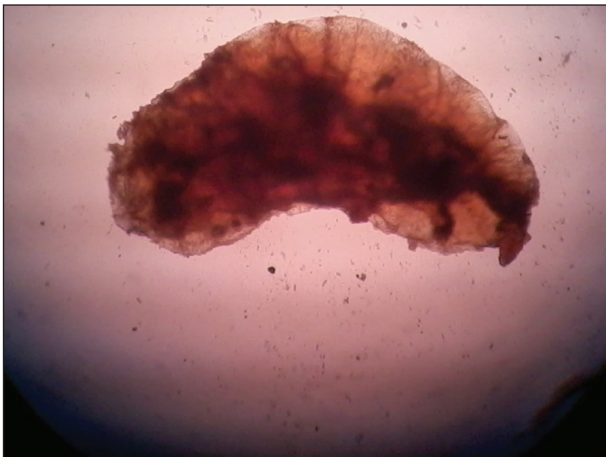


Figure 3: Dark color pupae



Figure 4: Adult fly

of decaying matter as a part of his business. After receiving the fecal sample, it was found that plenty of live larval forms were present in scanty stool. Stool examination for other common parasitic forms was negative. Microscopic analysis of stool revealed no digestive disorders and other pathological condition. Endoscopy was not performed. Larvae were collected from feces and their mouthparts, spiracles and other material were first cleared by macerating the specimen in a 10% aqueous solution of potassium hydroxide (KOH) at room temperature for at least 15 min. As the tissues soften larvae were teased away with fine forceps or sharp needles. Microscopic observation revealed cephalo-pharyngeal skeleton with characteristic black color hook as shown in Figure 1. Anterior respiratory spiracles and posterior "D" shaped spiracles as shown in Figure 2. Dark color pupae have been demonstrated in the laboratory as shown in Figure 3. The larvae were preserved in laboratory for development of adult fly. After development in to adult fly it was confirmed as belonging to

the house fly as shown in Figure 4. As there is no approved medication for treatment, parent was advised to take necessary precautions and prevent possible re-exposure. Allergic manifestations were treated by corticosteroids and children were prescribed nutritional and vitamin supplements. A telephonic review by the parent, regarding patient's conditions showed that after about one week the larvae have ceased appearing in stool.

DISCUSSION

Myiasis caused by fly larvae has been classified in to three types including obligatory myiasis, facultative myiasis and accidental myiasis. Fly larvae that require living mammalian tissue to survive are responsible for obligatory myiasis, those that infest on wounded or necrosing tissue cause facultative myiasis and those fly larvae that are accidentally ingested or deposited on tissues of human or animals may be responsible for accidental myiasis.^[9] Fly larvae belonging

to the families *Calliphoridae* (blowflies), *Rhinoestrus spp.* (botflies), *Gasterophilus spp.*, *Hypoderma spp.*, *Chrysoma spp.* and *Sarcophagidae* (flesh flies) are frequently responsible for myiasis. Other fly larvae belonging to Anisopodidae, Piophilidae, Stratiomyidae and Syrphidae occasionally cause myiasis. Depending on the relationship between the host and the infesting fly larvae species, myiasis can be of specific, semi specific or accidental. Flies that need a host for larval development cause specific myiasis *Dermatobia hominis* (human botfly), *Cordylobia anthropophagi* (tumbu fly), *Oestrus ovis* (sheep botfly), *Hypoderma bovis* (cattle botflies or ox warbles), *Gasterophilus spp.* (horse botfly), *Cochliomyia hominivorax* (new world screwworm fly), *Chrysomya bezziana* (old world screwworm fly), *Auchmeromyia senegalensis* (Congo floor maggot) and *Cuterebra spp.* (rodent and rabbit botfly). Non-specific myiasis is caused by flies that lay eggs in decaying animal or vegetable matter which also develop larvae in open wounds or sores include *Lucilia spp.* (green botfly), *Cochliomyia spp.* (blue botfly), *Phormia spp.* (black botfly), *Calliphora spp.* (blowfly) and *Sarcophaga spp.* (flesh fly or sarcophagids). Flies that do not need any host to develop, deposit eggs accidentally leading to pseudomyiasis which is caused by *Musca domestica* (housefly), *Fannia spp.* (latrine flies), *Eriatalis tenax* (rat-tailed maggots) and *Muscina spp.*^[10] More than fifty flies have been reportedly responsible for different types of myiasis in humans. Previous studies have showed that *M. Stabulans*, the common housefly is responsible for majority of cases of myiasis as the female fly oviposits around 150 eggs on the food or other decaying matter which later undergo developmental changes involving three larval stages (the first instar, 2nd instar and 3rd instar) before transforming in to pupa and to adult.^[9] Intestinal myiasis in most cases is difficult to diagnose as the clinical symptoms resemble in any other gastrointestinal infection either by parasites or other microorganisms. Many species of fly larvae that might be accidentally ingested with food cannot survive in the gastrointestinal environment. Larval survival through the passage from the acidic environment of stomach and later alkaline nature of intestine is least understood. It is believed that presence of chitinous coat on the larvae may help in survival throughout the gastrointestinal tract until they hatch out in bowel. Insects have the habit of laying eggs on uncovered food stuff including fruits in belief that they may be used by the developing larvae. Children by nature unless in the guardian of parents have the habit of consuming the fly larvae infested food without proper cleaning or inspection. Self diagnosis either by patients themselves or parents in case of pediatric age group patients observing the presence of whitish, moving worms in stool is reported in literature. Another

drawback in clinical diagnosis of human intestinal myiasis is that in most cases the larval forms do not survive, and they are eliminated after initial infestation. In the present case though the infesting larval forms were belonging to facultative fly larvae, repeated exposure to the eggs and larvae present in the domestic environment may have been responsible for the persistent infestation and clinical pathology. Myiasis, though not considered as a parasitic infection, and may not be life threatening leads to significant morbidity, especially in children and pregnant woman. Microbiologists should appropriately identify the condition and report so as to assist in proper patient management. Application of insecticides in the environments may reduce fly infestation. Improvement of sanitation, personal hygiene may prevent recurrent larval infestation. A recent study revealed the efficacy of oral Ivermectin (200 µg/Kg) for complete removal of fly larval infestation.^[8] Myiasis cases involving various other organs, with different underlying conditions are reported in children.^[9,11-15] It is now clear that gastrointestinal infestation of children with fly larvae is not uncommon. Reports have highlighted the increased prevalence of human myiasis in rural population as compared to the urban counterparts, which may be attributed to different domestic activities including agriculture. Seasonal predilection for human myiasis may be because the larvae thrive in damp soil of rainy season.^[16] Reports of new fly larval species causing myiasis in human are a cause of concern.^[17]

CONCLUSION

Myiasis, though is not recognized as a parasitic infection and has no approved medication for treatment, it has been demonstrated from the published literature that the fly larvae of the dipterous group have the ability to feed on living or dead tissues, ingested food material and can survive both in animals (mammals) and human and may be responsible for varied clinical manifestations. Probably due to under reporting many clinicians and pediatricians still have inadequate knowledge about clinical implications of human myiasis. We re-emphasize the role of human myiasis and the associated morbidity it causes, as evidenced by increasing reports worldwide. More than adults, children are predisposed to infestation with fly larvae due to their playing habitats and lack of knowledge of hygiene, especially in rural areas. Pediatricians should be aware of myiasis causing larvae and take microbiologists advice in laboratory identification and initiate appropriate supportive treatment wherever necessary to minimize the morbidity.

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