

Case Report

Recurrence of human wound myiasis due to *Chrysomya bezziana* Villeneuve (Diptera: Calliphoridae) from India: A case report

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Abstract. Myiasis, the tissue invasion of living vertebrate animals by the fly larvae is commonly observed throughout tropical regions of the world. The phenomenon is also witnessed among humans where unhygienic conditions are prevalent and domestic animals are in their close vicinity. Tissue infestation by fly larvae is well recognized complication of neglected wounds. A rare case of recurrence of human myiasis is reported in the chronic wound of an 18-years-old male patient suffering from 'equinovarus'- a congenital feet deformity. The causative maggots were identified as third instar larvae of the Old World Screwworm fly- *Chrysomya bezziana*. The recurrence of human wound myiasis due to *C. bezziana* is reported for the first time from India. It is concluded that neglected open wounds and poor hygienic conditions are the critical predisposing risk factors for the recurrence of myiasis.

INTRODUCTION

Myiasis is a parasitic infestation of live vertebrates with the dipteran larvae that grow within the host while feeding on its living or dead tissue (Zumpt, 1965). The condition is very much prevalent in tropical and subtropical countries because the climate favors abundant growth of the myiasis causing flies in terms of faster life cycle and higher number of generations per year (Francesconi & Lupi, 2012). India is amongst one of the tropical countries where the incidence of myiasis is very common among man and domestic animals (McGraw & Turiansky, 2008). Myiasis can be classified into two categories according to host parasite relationship. Obligatory myiasis is caused by those fly maggots which develop exclusively on live host whereas facultative myiasis is the result of infestation by fly maggots which usually develop on decaying organic matter

but occasionally invade living host (Hall & Smith, 1993). According to affected location, myiasis can be classified as cutaneous, ocular, oral, nasopharyngeal, aural and enteric (James, 1947). The range of anatomical sites infested can be very broad but infestations are limited either to skin surface or deeper body cavities. Cutaneous myiasis has been recorded to be the most frequent clinical form and can be further categorized into three subtype's i.e. furuncular, creeping and wound myiasis depending on the type of invading maggots (McGraw & Turiansky, 2008).

Wound myiasis involves the infestation of soft tissue of neglected wounds by parasitic larvae of fly among domestic animals as well as humans. Homeless people, mentally retarded patients, drug addicts and infants are more vulnerable to attack and are probably overlooked by the scientific literature (Kokem & Saki, 2005). Foul smelling

purulent discharge from the neglected open wounds encourages oviposition by facultative or obligatory parasitic flies followed by development of larvae. With their oral hooks, the larvae invade the dermal layer and start feeding on the tissue resulting in the enlargement of pre-existing wounds. The condition may be asymptomatic but also results in more or less severe problems and can prove to be fatal when the larvae invade the body cavities or sinuses that cannot be visualized directly (Singh & Singh, 2015).

A large number of fly species are responsible for causing wound myiasis. Screw-worm flies are one of the major groups in this category. *Chrysomya bezziana* Villeneuve - the Old World Screw-worm fly is an obligatory myiasis causing species (Francesconi & Lupi, 2012). It is widely distributed over the tropical and subtropical parts of Ethiopian and the Oriental regions (Zumpt, 1965). Although adults are not disease causing agents, they are known to have an important role in development of myiasis because the larvae reach their potential host through them. The gravid female fly generally deposits the eggs even in the most trivial sore and unless the case is attended to at once, considerable destruction of the tissues can occur. The most serious results however follow the invasion of nasal and accessory sinuses by the larvae. If the fly is successful in laying the large number of eggs, hundreds of larvae will soon penetrate the sinuses and are extremely difficult to dislodge. Internal ear can be invaded and damaged in the similar manner. Cases of human wound myiasis by *C. bezziana* are prevalent in Indian sub-continent, South East Asia and Africa (McGraw & Turiansky, 2008). 59 cases had been reported from India in which infestation with the maggots of *C. bezziana* were found in pre existing wound of all parts of the body (Patton, 1922). Cases of wound myiasis due to *C. bezziana* had been reported from Africa in which 163 larvae were removed from facial wound (Bouffard & Legac, 1929) and from Kenya, where larvae were found in ulcerative lesion on the foot and had tunneled for some distance up the leg (Symes & Roberts, 1932). Recurrence of human wound myiasis has been scantily

reported in literature. Hokelek *et al.* (2002) reported the recurrence of wound myiasis in a 32-years-old female from Turkey due to *Sarcophaga* species. The debilitated women having previously been treated for decubitus ulcer on her left heel had a recurrence on the same site in which there was a myiasis infestation. Similarly recurrence of myiasis had been reported in a patient of cutaneous malignancy from New York (Villwock & Harris, 2014). The present study reports a rare case of recurrence of human wound myiasis in the chronic wound of a patient suffering from congenital disorder of feet known as 'equinovarus'. The causative larvae were identified as third instar larvae of *C. bezziana* belonging to family Calliphoridae. Although limited reports of recurrence of human wound myiasis are documented in literature, the present study is assumed to be the only one of its kind since no report was available from India regarding the same.

CASE REPORT

In July 2015, an 18-years-old male patient was admitted to surgical ward of Guru Nanak Dev Hospital, Amritsar, Punjab (India) with a chronic wound on left foot. On physical examination a cavity of 4 x 4.5cm was observed on the sole of left foot including pus and necrotic tissue. The patient was suffering from congenital deformity known as 'talipes equinovarus' in which the feet are rotated internally at the ankle, toes point downwards and the soles face each other. The infection on his left foot had started one month ago due to a household injury. On questioning, the patient disclosed that his left foot got injured by a piece of glass since he was barefooted due to his inability to wear shoes. Due to low socio economic status, he could not get medical advice and hence neglected the wound. Hematological examinations revealed leukocytosis and a mild eosinophilia. During debridement process, seventeen creamish white larvae were recovered from necrotic tissue. Followed by the removal of larvae, the wound was irrigated with ivermectin solution and further medical and surgical treatment of

the wound was carried out. After antiseptic dressing, the patient was prescribed with broad spectrum antibiotics and was advised to visit again after one week. But the patient did not visit the hospital as advised. A month later, the patient approached the hospital complaining of severe pain, and inflammation in the same wound on left foot. The wound did not heal for one month and was full of foul smelling purulent discharge. Eleven maggots were noticed underneath the necrotic tissue during the debridement process. The recovered larvae were preserved in glass vials containing 70% ethanol from both the visits and were brought to Department of Zoology, Khalsa College Amritsar (Punjab), India. The larvae were processed to prepare permanent mounts of taxonomically important body parts like anterior spiracles, posterior spiracles and cephalopharyngeal skeleton.

Larval examination

The larvae were creamish white, 12–18 mm long, worm like gradually tapering at the anterior end (Fig. 1). The anterior spiracles were plamate in shape each being composed of 4-6 lobes arranged in a single row located at dorso-posterior margin on each side of prothorax (Fig. 2a). The posterior spiracles consisted of three oblique slits encircled by dark thick peritreme that is incomplete ventro-medially around the compressed button (Fig. 2b). The cephalopharyngeal skeleton comprised of a pair of long, curved and stout mouth hooks with prominent dorsal arch and dorsal cornu. The ventral cornu is narrow, deprived of an aperture called



Figure 1. Third Instar larva of *C. bezziana* extracted from wound.

‘window’, and is partially bifurcated posteriorly (Fig. 2c). The maggots were identified to be third instar larvae of *C. bezziana* on the basis of anterior, posterior spiracles and cephalopharyngeal apparatus with the help of available keys in literature (Erzinclioglu, 1984; Sukontason *et al.*, 2006).

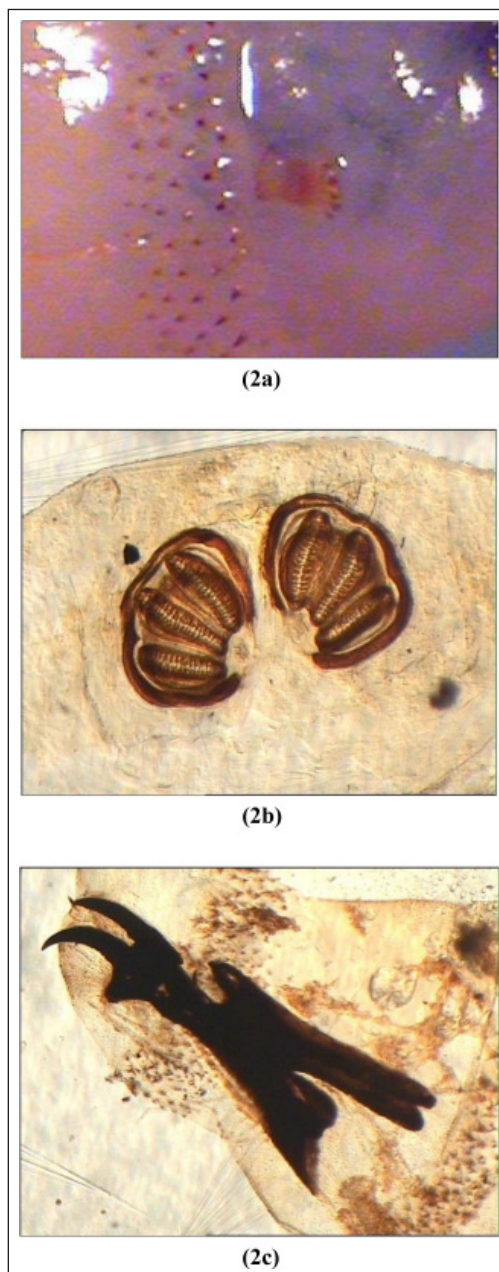


Figure 2. Larval mounts (a) Anterior Spiracle (b) Posterior Spiracular plate (c) Cephalopharyngeal apparatus of third instar larvae of *Chrysomya bezziana*.

DISCUSSION

Myiasis, a parasitic infestation of tissues and organs of man and domestic animals by fly larvae occurs more frequently in warmer climate than in the colder ones. The incidence of this disease can be correlated with existing level of sanitation, the density of prevailing fly populations and economic status of the individual (Singh and Singh, 2015). Wound myiasis and cutaneous myiasis are the most commonly observed clinical forms of myiasis (Diaz, 2009). Open neglected suppurative wounds are the favorable sites that attract and stimulate the gravid female flies for oviposition. However the poor personal hygiene, ignorance and the mental illness further add to it (Hall & Wall, 1995). The studies indicate that the invasion by the fly larvae usually occur when the patient's mental or physical functions are completely or partially impaired and hence they cannot brush the flies away (Chigusa *et al.*, 1998). Furthermore necrotic lesions as those due to adenocarcinoma (Kani *et al.*, 1981), squamous cell carcinoma (Shitara, 1989; Singh and Singh, 2011), diabetic foot (Singh & Singh, 2006) and immunocompromised infections (Verettas *et al.*, 2008) are also vulnerable to myiasis infestations among humans. We present here an unusual case of recurrence of human wound myiasis due to *C. bezziana* (Diptera: Calliphoridae). Previous studies have reported numerous cases of human wound myiasis caused by various genera of flies like *Sarcophaga haemorrhoidalis* (Abdel-Hafeez *et al.*, 2015), *Oestrus ovis* (Zammarchi *et al.*, 2014), *Phormia regina* (Miller *et al.*, 1990), *Cochliomyia hominivorax* (Thyssen *et al.*, 2012), *Lucilia sericata* (Babamahmoudi *et al.*, 2012), *Chrysomya bezziana* (Singh & Singh, 2011) etc. The causative fly in the present study was identified as *C. bezziana* which is an obligatory myiasis causing species that develops exclusively in the wounds of living vertebrates. The fly is generally attracted to neglected malodorous wounds to lay eggs and the condition is augmented especially if the affected organ of the patient is hypoesthetic i.e. having reduced sensations. This is in agreement

with our case where the patient's feet often experienced numbness due to the congenital feet deformity. Due to this condition the patient did not feel any nibbling sensation due to feeding activity of larvae and hence was unaware of the presence of same in his wound. The neglected chronic wound in case of present study has acted as a favorable predisposing site for the recurrence of myiasis. The reason the wound becomes chronic is that body's ability to deal with damage is overwhelmed by the factors such as repeated trauma, continued pressure, ischemia or illness (Moreo, 2005). Chronic wounds generally never heal or may take years to do so. The wound in the present study did not heal probably due to the continuous pressure exerted on the wound during walking. Moreover neglecting the wound and non-seeking of medical advice might have worsened the condition which could have resulted in recurrence of myiasis. Chronic wounds cause severe emotional and physical stress and create a significant financial burden on the patient and the whole health care system. Moreover repeated infestation with the maggots is considered embarrassing and inflicts mental agony to the patient.

The effective treatment of myiasis comprises of the removal of all the maggots, debridement of the necrotic tissue, thorough washing with antiseptic solutions, sterile dressing and administration of broad spectrum antibiotics so as to control any possible bacterial infections (Sesterhenn *et al.*, 2009). Early control of myiasis is of utmost importance to remove the patient's afflictions and to prevent the establishment of myiasis producing flies in the close vicinity of patients (Hakeem and Bhattacharyya, 2009). It is important that initial examination are through because small maggots are easily overlooked as they may be hidden in pockets or folds of skin due to their aversion to light and sensitivity to disturbances. Larvae frequently assemble into closely packed groups while feeding with their oral hooks pointed down into the wound. The efficient protection for all the wounds in any part of the body is of utmost importance and when invaded, all the larvae should be removed and destroyed so as to avoid further

pupariation and emergence into adults. It is important to protect infants, aged and insane people from becoming parasitized and the patients with offensive discharge from their body openings or chronic wounds should be advised to cover the same with an antiseptic swab.

CONCLUSION

Maggot infestation diagnosed in non self-sufficient patient may indicate inadequate health care. It may have significant psychological impact on the patients and can adversely affect the reputation of involved health care facility. Physicians should focus on treating secondary bacterial infections and proper debridement of maggot infested wounds. Control of fly population, reduction of odours of decomposition and cleaning and covering of wounds are some of the effective means of prevention of myiasis. Moreover educating the patients and creating awareness among masses about this problem can be greatly helpful in avoiding the onset and recurrence of human myiasis.

CONFLICT OF INTEREST: Authors declare that they have no conflicts of interest.

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