

CASE REPORT

Nosocomial nasal myiasis in an intensive care unit

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Abstract

A 73-year-old Chinese man was admitted to the Accident and Emergency Premorbid Ward of a local hospital in Malaysia. The patient complained of shortness of breath with cough and was in a semi-conscious state. He was later admitted to an intensive care unit (ICU) of the hospital. Six days after admission 5-6 maggots were recovered from the nasal cavity. The maggots were identified as the third-instar larvae of *Lucilia cuprina* Wiedmann (Diptera: Calliphoridae) based on the morphological characteristics. This patient was classified as having nosocomial myiasis. The presence of the third instar larvae indicated that the infestation was not more than three to four days. An adult sarcophagid identified as *Parasarcophaga ruficornis* (Fabricius) caught in the ICU where the patient was warded provided further evidence of the potential for the nosocomial infestation.

Key words: nosocomial myiasis, nasal, hospital, flies, calliphoridae

INTRODUCTION

Nosocomial myiasis which is usually caused by a dipteran fly species is uncommon but its occurrence in hospitals either in a highly urbanized or a developing country is unavoidable to some extent. Nosocomial myiasis has been reported in the United States of America,¹ Germany² and Japan.³ Nosocomial myiasis normally occurs in debilitated patients.¹ In Malaysia, there has only been one report of nasal myiasis.⁴ The present report is of an interesting case of nosocomial nasal myiasis involving a semi-conscious patient in an intensive care unit.

CASE REPORT

The patient, a 73-year-old Chinese male was admitted to the Accident and Emergency Premorbid Ward of a local hospital in Malaysia. The patient complained of shortness of breath with cough and was in a semi-conscious condition. He was intubated on the same day upon admission due to respiratory distress and was sent to the Intensive Care Unit.

The patient was extubated 2 days later and reintubated the following day. He was treated

for community acquired pneumonia. Six days after admission 5-6 maggots were noted in the nasal cavity. The maggots were removed by the attending medical officer. Examination was conducted again using entoscopy under anesthesia on day 8 of admission. The report from the medical officer indicated that there were no more maggots seen in the left nasal polyps and no obvious lesion seen in the maggot infested area. There was an adult fly flying in the Intensive Care Unit on day 6 of the patient's admission in ICU and it was captured. The maggots removed from the nasal cavity were preserved in 70% alcohol. Both the adult fly and maggots were sent to the Institute for Medical Research (IMR) Kuala Lumpur for identification. The specimens were processed for study and identification according to standard procedures⁵ and examined under a microscope at 400X magnification.

Larva identification

Based on their length, morphology of anterior and posterior spiracles and cephalopharyngeal skeleton, the colour of the maggots and the spine on the surface of the larvae, the larvae were identified as *Lucilia cuprina* (Wiedemann)

(Diptera: Calliphoridae). Identification was conducted according to keys and descriptions of Ishijima.⁶ The presence of three respiratory slits each in the posterior spiracles indicated that the 4 maggots were third stage maggots. In the posterior spiracles, the peritreme is complete and the button was enclosed inside indicating that the fly belongs to family Calliphoridae. Gross identification features of the position of the anterior spiracle, posterior spiracle and the cephalopharyngeal skeleton are shown in Figure 1. The mean body length of these larvae was 10.46 ± 0.35 mm. The slits were wide and thin and the posterior spiracles each possessed a complete peritreme with a button which was distinct. The button was projected inwards. Peritreme was without inter-slit projection (Figure 2). There was an absence of accessory sclerite in the cephalopharyngeal (CP) armature in *L. cuprina* larvae (Figure 3). The anterior spiracles were situated at the anterior region

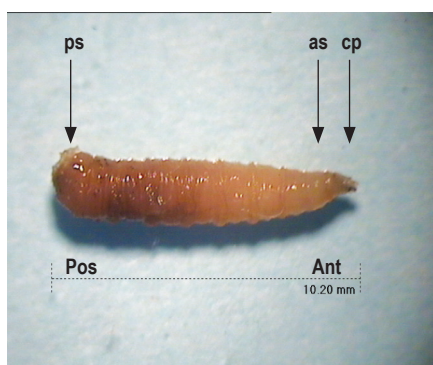


FIG. 1: Larva showing posterior spiracle (ps), anterior spiracle (as) and cephalopharyngeal skeleton (cp).

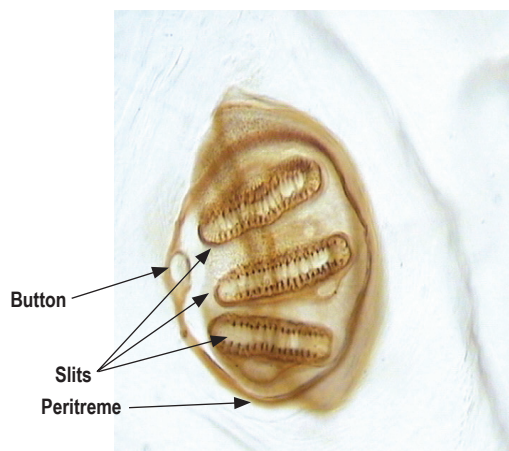


FIG. 2: Posterior spiracle of a third stage larva showing 3 slits with complete peritreme.

of the maggots (Figure 4). In *L. cuprina* the anterior spiracles usually have 5-6 papillae or finger-like projections. The spines were arranged in distinct rows each having 2-7 spines. The intersegmental spines were unicuspid with pointed end (Figure 5).

The adult fly

The adult specimen which was caught in the ICU was identified as *Parasarcophaga ruficornis* (Fabricius). It is a sarcophagid fly of the subfamily Sarcophaginae based on the following characteristics: hind coxa was hairy on posterior surface; notopleurol 4 with two strong primary bristles, two smaller subprimary bristles; sternites 3 to 4 fully exposed and overlapping with ventral margins of corresponding tergite and the features further classified the fly as a *Parasarcophaga*. In addition, sternite 4 was with sparsely haired mid-femur with comb-like posterior ventral in apical part and hind tibia usually fringed. The species was therefore identified as *Parasarcophaga ruficornis* (Fabricius). The distinctive characteristic of the antenna, palpus and genital segment being bright orange and ventralia reduced to tubercles are additional identification features. The fly which entered



FIG. 3: Cephalopharyngeal armature of a larva



FIG. 4: Anterior spiracle with 6 papillae (p) or finger-like projections

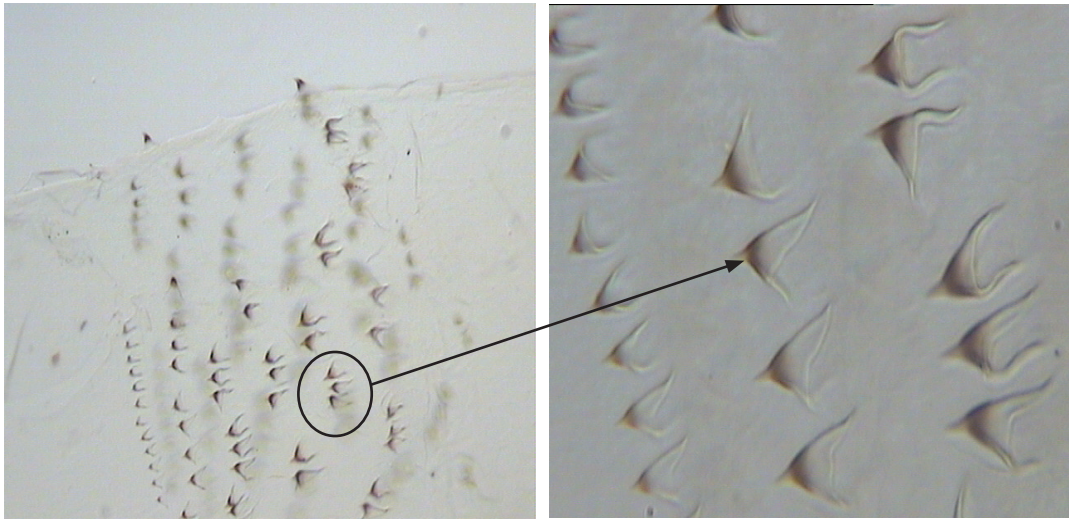


FIG. 5: The body spination of *Lucilia cuprina*

the ICU unit was a gravid fly and was attracted to malodorous tissue to oviposit eggs. This was confirmed when the fly was dissected and first instar larvae were found in the abdomen.

RESULTS AND DISCUSSIONS

The term myiasis was first proposed by Hope in 1840 to refer to diseases of humans originating specifically with dipterous larvae.⁷ Human myiasis is the infection of any part of the body by larvae of Diptera (flies) which feed on the host's tissue or body fluids. Myiasis can occur as primary myiasis, in which the fly must pass through a stage of its life within the host. On the other hand myiasis can be facultative which is known as secondary myiasis in which the host presents a convenient site of the body where the fly can lay its eggs. Such a site is often a necrotic wound or a malodorous orifice.

Infestation by *L. cuprina* is a rare human myiasis cases worldwide. This is the first reported case in Malaysia. It is well known that *L. cuprina* does cause sheep strike in animal host where they attack healthy tissue of sheep. It is not known why *Lucilia* species attack the healthy tissue of sheep and does not do the same to human tissue.⁸

The larvae of *L. cuprina* were noted 6 days after admission. Since the patient had been hospitalized for 6 days, the patient would have acquired the larvae in the hospital because on admission maggot infestation was not seen. Therefore, the myiasis was nosocomial in

nature. Based on the development rates of the larvae, which were approximately at the third instar, the infestation could not be more than three to four days old although the patient had been admitted for 6 days. If the egg deposition had occurred prior to admission, the larvae would have been at least matured post feeding third instar. The observation by the entomologist of an adult sarcophagid in the ICU where the patient was warded was further evidence of the potential for nosocomial infestation. Contributory conditions in this case included the patient's inability to fend off the flies because he was in a semi-conscious state, the presence of odour which could have attracted the fly because this patient was diagnosed with pneumonia, the warm humid environment, and the first floor location of the ICU. The presence of an adult fly in the ICU further strengthens the postulation and indicated that the nasal infestation occurred during hospitalization and is therefore considered nosocomial.

Nosocomial myiasis occurring worldwide in ICU's with causative agents of *Chrysomya bezziana*,⁹ *L. sericata*,^{10,11,12,13,14} *Megaselia scalaris*,¹³ *Sarcophaga peregrina*,^{3,15,16} *Wohlfahrtia magnifica*¹⁷ and *Cochliomyia macellaria*¹ have been documented. It is likely that some cases go unreported because hospital acquired infection by blowflies is a slur to a hospital's reputation. The main purpose of ICU guidelines is to prevent patients from infections of microbial pathogens.¹⁸ Such regulations however cannot prevent infestation of arthropods especially dipterous flies, which can easily gain access to

the ICU. Fly screens can be placed to prevent fly entry and fly electrocutors can be installed on the walls in rooms and corridors to kill any flies entering the facility in high risk areas.

In Sherman's¹⁹ review paper he stated that to decrease the possibility of myiasis, wounds and malodorous or draining orifices must be kept clean and covered at all times. Halitosis may attract flies, especially if the patient has an underlying airway infection such as sinusitis or pneumonia. Oral and nasal hygiene are essential but sometimes overlooked. He also advocated that the risk of myiasis can be minimized by reducing the population of flies in and around the healthcare facility. Reducing fly population is not a simple task. It requires the vigilant and integrated participation of multiple personnel. A pre-requisite for myiasis occurring in a hospital is poor awareness among staff who, although aware that flies are unhygienic and carry diseases, do not realize that they also cause myiasis. Education is paramount to a facility's overall myiasis preventing strategy. In conclusion, it appears that immobile, severely ill or comatose patients are at risk for myiasis and that the nasal cavity is a possible site for such an occurrence.

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