SHORT COMMUNICATION

Pressure sores and myiasis: flesh flies (Diptera: Sarcophagidae) complicating a decubitus ulcer

Myiasis is the infestation by dipterous larvae of the tissues of humans, other mammals and some other vertebrates, most commonly affecting cutaneous tissues close to natural orifices or wounds. Such infestation may be deleterious, when the larvae attack the host's healthy tissues, or it may be benign, when the larvae confine their activities to diseased and dead tissue. In clinical settings, carefully controlled myiasis can even be of benefit to the host, helping to clear areas of necrosis from wounds and ulcers, in an approach often known as 'maggot therapy' (Sherman *et al.*, 2000).

In Kuwait, a desert country where one might expect a fairly restricted insect fauna because of the hot and dry environment, several cases of human myiasis have been described, including ophthalmomyiasis caused by *Oestrus ovis* (in the family Oestridae), intestinal myiasis caused by *Megaselia* sp. (Phoridae) and *O. ovis*, and urinary myiasis caused by *Psychoda* sp. (Psychodidae) (Hira *et al.*, 1997). Although all of these infestations were community-acquired, nosocomial infections by the larvae of *Lucilia sericata* (Calliphoridae) and *M. scalaris* have also been reported in Kuwait (Hira *et al.*, 2004). An autochthonous case of human myiasis caused by a fly species from yet another family, the Sarcophagidae, which was complicating a decubitus ulcer, has also recently been observed in Kuwait (see below).

CASE REPORT

In April 2008, an 85-year-old Kuwaiti woman, who had been bed-ridden for 3 weeks, was admitted to the District General Hospital in Farwania, as a suspected

case of deep-vein thrombosis (DVT) of the left leg. On examination, the woman was conscious and afebrile but suffering from decubitus ulcers (i.e. bed or pressure sores) and showing evidence of osteoarthritis. She was diagnosed as a case of DVT and urinary-tract infection, with chronic iron-deficiency anaemia. Heparin was prescribed and the woman was discharged after 2 weeks. Seven weeks later, however, the woman was re-admitted, looking emaciated and possibly neglected, with multiple, malodorous, decubitus ulcers. While the tissue was being debrided from one of the worse ulcers, which had developed over the right greater trochanter and measured 7 × 10 cm, three fly larvae (described as 'worms' by the nursing staff) crawled out of the ulcer. These larvae were first placed in saline and then preserved in 70% (v/v) ethanol. All the ulcers were treated topically with ivermectin cream [1% (w/v) in propylene glycol, to give a total dose of 400 µg ivermectin/kg bodyweight] for 2 h (Victoria *et al.*, 1999) but no other larvae were detected.

The larvae were late second instar (one) or early third instar (two) and each measured approximately 10 mm in length and 3–4 mm in breadth. They were 'smooth', with short spines, and maggot-like in appearance, with pointed anterior ends and broadly truncate posterior ends. The anterior cephalo-pharyngeal skeleton showed prominent mouth hooks with associated sclerites. On the first thoracic segment were large fan-shaped spiracles, each with 10–12, short, finger-like processes terminating in the spiracular openings.

Spine bands were situated at the anterior margin of each body segment. The well-sclerotized short spines were very dark, and

FIG. Posterior spiracles on the terminal segment of a third-instar larva (Diptera: Sarcophagidae) removed from a decubitus ulcer. Scale bar=200 μ m.

especially prominent in the second-instar specimen. The posterior spiracles were deeply sunken in an invagination, hidden by overlapping fleshy processes. The peritreme of each specimen was open, with slits that were almost parallel to each other (see Figure).

DISCUSSION

On the basis of their habitat, size and shape and the morphology of their cephalo-pharyngeal skeletons and anterior and posterior spiracles, the three larvae were considered to belong to a species in the family Sarcophagidae. Although there are several species in this family that are known to occur in Kuwait and also might be involved in facultative myiasis, it was not possible to identify the larvae recovered from the elderly Kuwaiti woman to species level. The larvae appeared unlike the specimens of *Wohlfartia nuba*, *W. magnifica* and *W. pattoni*

held in the collections of the Natural History Museum in London. It is possible that the larvae were of *Bercaea africa* (Wiedemanin), the most common synanthropic sarcophagid species known in Kuwait; unfortunately, no voucher specimens of *B. africa* were available for comparison.

The predisposing features in this case were that the patient was comatose, possibly neglected, and chronically immobile. Under conditions that were presumably unhygienic, larvae must have been deposited in a decubitus ulcer that was necrotic, emitting odours that were probably attractive to gravid flies, and, therefore, prone to infestation. Although most female flies lay eggs, those of Sarcophagidae lay larvae and can do so directly into wounds or orifices (Yoneda *et al.*, 1998; Zardi *et al.*, 2002; Werminghaus *et al.*, 2008). If disturbed during larviposition, only a few larvae might be deposited, as appears to be the case here.

Although the larvae of facultative myiasis-causing species feed preferentially on necrotic tissues, clinicians checking for myiasis should ask the patient about any pain and itching, which can be caused by larval activity at the healthy margins of the wound/ulcer.

Myiasis in decubitus ulcers has been reported previously (Hokelek *et al.*, 2002). Although such ulcers may be complicated by various infections, sepsis, osteomyelitis, fistulas and/or carcinoma, the most common features are necrosis and discharges and unpleasant odours related to bacterial infection. The combination of necrotic tissue and fly-attracting odours can clearly encourage infestation by myiasis-causing flies.

Decubitus ulcers are quite common in Kuwait, partly because 20% of the population are diabetic. Although there are old, anecdotal reports of 'worms' in ulcers in Kuwait, the invertebrates involved were treated as contaminants and discarded before they could be identified (unpubl. obs.). The larvae involved in cases of human myiasis should be retained and identified, at least to family, to increase the knowledge of such clinically important infestations. Medical and nursing staff should be appraised of myiasis and be made familiar with the management of such infestation (which should include counseling, since larval infestation can be traumatizing). When patients present with ulcers and complain of pain, a check for larvae should be conducted. If surgical debridement is required, it is also important to keep the treated ulcers clean post-treatment, by the use of antiseptics. If larvae are found to be present then simple manual removal should be the first treatment option. The topical application of ivermectin cream for 2 h has been found to be a very effective way of driving out and/or killing the fly larvae involved in human cases of myiasis (Victoria *et al.*, 1999).

Identification, to species level, of the larvae involved in the present case was not possible because none was reared to

adulthood (the morphological characters of the larvae being insufficient). Based on the exclusion of several other possibilities, a likely candidate is, however, *B. africa*, simply because this is the most common synanthropic member of the Sarcophagidae that has been recorded in Kuwait and one known to have been involved in several other cases of human myiasis (Zumpt, 1965). The use of molecular biology to identify members of the Sarcophagidae to species level (Otranto and Stevens, 2002) would be well worth further investigation.

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J. IQBAL

P. R. HIRA

Department of Microbiology, Faculty of
Medicine, Kuwait University, P.O. Box
24923, Kuwait 13110, Kuwait

M. M. MARZOUK

Department of Surgery, Farwania
Hospital, P.O. Box 2, Safat 13001,
Kuwait

F. AL-ALI

Department of Laboratories, Farwania
Hospital, P.O. Box 2, Safat 13001,
Kuwait

N. KHALID

Department of Microbiology, Faculty of
Medicine, Kuwait University, P.O. Box
24923, Kuwait 13110, Kuwait

N. WYATT

M. J. R. HALL

Department of Entomology, Natural
History Museum, Cromwell Road,
London SW7 5BD, U.K

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Reprint requests to: J. Iqbal.
E-mail: iqbal@hsc.edu.kw.

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