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Case Report Open Access

Wriggling Infestation: Myiasis Sepsis by *Myroides Odoratus*

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Abstract

Maggot therapy is a recognized treatment modality of acute and chronic wounds that should be applied by specialist healthcare professionals. Complications if this treatment is uncontrolled can have a fatal result, as we report in this 80-years-old Asian man that presented to our Accident & Emergency with signs of severe septic shock, hypothermia, hypovolaemia and bradycardia with extensive necrotic lesions over his extremities. Plastic bags containing maggots were found covering these lesions where the patient had introduced them himself to treat his necrotic ulcers. Admission blood cultures grew *Myroides odoratus*. He was commenced on empirical intravenous (IV) Piperacillin-Tazobactam, to which the organism was subsequently found to be susceptible. Despite optimal supportive measures his condition failed to improve, and he succumbed on the day after admission.

Keywords

Sepsis, Myiasis, *Myroides odoratus*, Shock, Palliative care

Introduction

Myiasis is an infestation of human tissue with larvae of diptera (maggots), which feed on dead or living host tissue. Maggot therapy is a recognized and approved by US Food and Drug Administration treatment modality for acute and chronic wounds; including pressure ulcers, chronic venous ulceration and diabetic ulcers [1]. Proteolytic enzymes secreted by the larvae of the green bottle fly *(Lucilia sericata)* breakdown necrotic tissue which is then ingested, leaving healthy tissue intact [2]. Additional purported benefits of maggot therapy include possible antimicrobial action and reduction in wound healing time [3]. In complex cases, maggot debridement has been demonstrated a therapy of considerable positive results, although possible infectious morbidity may appear within this treatment [4]. Despite other alternative treatment options (e.g. Hydrogel) and negative perceptions its utilization in Europe was high with a dispensation of 35,000 treatments during 2014 [5]. This points that, when used, maggots should be sourced from designated providers and should be applied by specialist healthcare professionals [6].

Myroides odoratus, previously known as *Flavo bacterium odoratus* [7], is a rare cause of infection in humans. It is commonly found in the environment and although not usually pathogenic, can cause infection through contaminated water or trauma [8]. Septicaemia caused by *Myroides* species has been previously reported and can cause severe infections in both immuno competent and immuno compromised individuals [9]. Although rare, *Myroides odoratus* can result in serious hospital acquired infections including urinary tract infections, cellulitis and necrotising fasciitis and therefore should be considered in severely ill patients with an ongoing infection, as it can rapidly progress to sepsis [10]. Cases of endocarditis and inflammation of the cerebral ventricles have also been reported [11].

Treating sepsis caused by *Myroides* species is a challenging task, as resistant strains have been observed. Resistance to beta-lactams is variable, and susceptibility

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has been demonstrated to co-trimoxazole and towards certain amino glycosides, quinolones and carbapenems [12,13]. The productions of metallo-beta-lactamases and KPC-2 carbapenemase have been proposed as potential mechanisms of resistance [14]. This highlights the importance of appropriate antimicrobial susceptibility tests when infection is suspected [15].

Case Presentation

This 80-years-old Asian man attended our Accident & Emergency department via the London Ambulance Service after he was found unconscious at home. He was hypothermic (28 °C), bradycardic, hypotensive and in metabolic acidosis. On admission, he was found to have extensive necrotic lesions on his feet that were covered by plastic bags with a dozen of maggots to treat his necrotic ulcers. Immediately, he was commenced on heated fluid, air warming and antibiotics. After 2 hours the patient remained hypotensive and oligoanuric, necessitating vasopressor support in the Intensive Care Unit. On examination he was disheveled, severely cachectic with compromised vital signs: HR: 46 bpm, BP: 60/48 mmHg, SpO_2: 95% on room air, RR: 10/min, Temp: 30 °C. Neurologically, his Glasgow Coma Score was 9 (Motor 6, Eye 2, Verbal 1) with rigid inferior limbs. No cardiac abnormalities were found on respiratory or cardiovascular examination and ECG, a part of the sinus bradycardia related to hypothermia. The most relevant part of the examination was the fruity offensive odour of erythematous, without rash, clean-debrided and with weak pedial pulses of his feet-lower legs infested by maggots. Laboratory test showed leukocytosis (11,000 mm/μL) with mild metabolic acidosis. Blood cultures were obtained on admission where *Myroides odoratus* was identified by using matrix-assisted laser desorption/ionization time of flight (MALDI-TOF) mass sprectometry (VITEK MS (bioMérieux, France) with a score of 2.13 indicating a match to species level. Empirical IV Amikacin and Piperacillin-tazobactam were commenced on admission. Subsequent sensitivity testing indicated that the gram negative isolate *(Myroides odoratus)* was fully susceptible to this combination. Despite aggressive fluid resuscitation, the patient required nor adrenaline whilst still in A & E. A central venous catheter, arterial line and urinary catheter were inserted. A multidisciplinary review in the following 24 h by the Care of the Elderly, Surgery and Intensive Care team recognized that the patient was pre-terminal stabilizing the decision for antibiotic treatment to be discontinued and for anticipatory medications to be prescribed. This was seen to be in the patient's best interests and ensured his comfort.

Discussion

It is not clear where, or from whom, the maggots that our Asian patient had applied himself were sourced from, and we cannot confirm that the sepsis by *Myroides* came directly from the maggots because unfortunately, we were not able to sample the maggots or identify the specie for further investigation. In our case, the patient likely had underlying necrotic lesions that were subsequently intentionally 'infested' by maggots. His admission and demise was due to overwhelming bacterial sepsis; with isolation of *Myroides odoratus* from blood cultures. Existing necrotic lesions provided a portal of entry for this organism into the blood stream that added to the risk factors for acquiring this particular organism: environmental contamination, relative immuno compromised state and poor wound care turned into a fatal complication. Myiasis itself can also be a potential source of bacteraemia as a recent study has reported the isolation of *Myroides sp.* from the gut of adult flesh flies *(Sarcophaga sp.)* [16] and hence, maggot therapy should be provided under healthcare professionals supervision.

Conclusions

In summary, *Myroides* species are a rare cause of life-threatening septicaemia and empirical combination treatment should be optimized according to sensitivities, being aware that resistant strains for beta-lactams have been observed. This infection can appear concomitantly with maggot therapy with fatal consequences.

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