

Melioidosis and the vacuum-assisted closure device: a rare cause of a discharging neck wound, and a new approach to management

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Abstract

Objective: We report a case of melioidosis presenting as a discharging neck abscess, and we describe the use of a vacuum-assisted closure device in its management.

Method: We report the case of a 44-year-old, Afro-Caribbean woman with melioidosis. We also present the results of a literature search using the search terms ‘melioidosis’, ‘*Burkholderia pseudomallei*’ and ‘vacuum-assisted closure device’.

Results: Microbiological analysis identified the causative organism as being the bacterium *Burkholderia pseudomallei*, and its antimicrobial sensitivities to imipenem and ciprofloxacin. A vacuum-assisted closure device was used to manage the patient’s melioidosis of the neck; we believe this is the first report of such treatment.

Conclusions: Melioidosis is rare in the UK and western world; however, exposure can occur during travel to endemic areas. We therefore draw attention to this infection as part of the differential diagnosis of a neck abscess. We propose the use of vacuum-assisted closure devices as useful adjuncts to the management of discharging neck wounds.

Key words: Melioidosis; *Burkholderia Pseudomallei*; Vacuum Pump

Introduction

Melioidosis is a severe, multisystem, infectious disease caused by the bacterium *Burkholderia pseudomallei*.¹ It is uncommon in the western world, and is known as ‘the great mimicker’ as it can mimic virtually any other disease. This makes its diagnosis particularly challenging.^{2,3}

We report a case of melioidosis presenting as a discharging neck wound. We also describe a novel approach to the management of neck melioidosis, using a vacuum-assisted closure device. From the limited number of cases reported in the literature, it appears that vacuum-assisted closure pumps are under-utilised in the management of head and neck wounds.^{4–6} We believe that the success of such treatment in the reported case warrants further exploration of the role of vacuum-assisted closure pumps in head and neck surgery.

Case report

A 44-year-old, Afro-Caribbean woman presented with an enlarging, right-sided neck swelling causing compressive symptoms of the airway and dysphagia. There was no preceding history of note. She had multiple co-morbidities including diabetes mellitus type II and vasculitis. Her travel history included visits to Jamaica and Thailand many years ago.

On examination, the patient was afebrile. There was a firm, tender mass in the right anterior triangle of the neck, discharging pus through two sinuses.

Fibre-optic pharyngolaryngoscopy revealed a mass effect pushing the pharynx and larynx to the left.

On admission, the patient’s erythrocyte sedimentation rate was 74 mm/h. The rest of her blood test results were unremarkable. Empirical, intravenous co-amoxiclav and dexamethasone treatment was commenced, but the patient showed no signs of improvement.

A neck ultrasound and computed tomography scan confirmed the presence of a large, heterogeneous, soft tissue mass in the right side of the neck.

Intra-operatively, this mass was found to consist of multiple superficial and deep abscesses. The collections were small (less than 1 cm) and sited in close proximity to the great vessels (Figures 1 to 4). Incision and drainage yielded small amounts of pus.

Initial microbiology results identified coliforms, and intravenous meropenem was commenced. However, post-operative wound dehiscence occurred, with copious purulent discharge. Another change of antibiotic therapy, to ciprofloxacin, again failed to provide any benefit. Surgical debridement of the wound provided further specimens for histological and microbiological analysis. The results demonstrated growth of *Burkholderia* species with sensitivity to ciprofloxacin. Further results confirmed the species as *pseudomallei*.

Intravenous antibiotics were continued, with daily neck dressing changes. However, clinical progress was slow.

Following discussion, it was decided to use a vacuum-assisted closure dressing to promote healing. This dressing remained in situ for seven days, and proved beneficial. On subsequent inspection, there was considerably less discharge and the wound edges were obviously healing, with visible granulation tissue.

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Accepted for publication: 10 December 2009. First published online 11 March 2010.

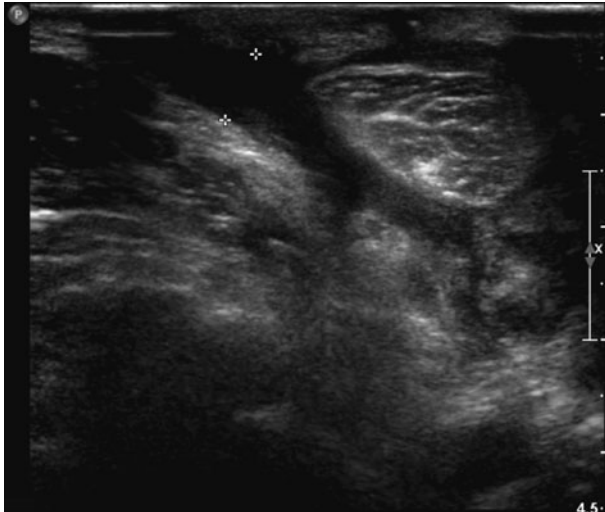


FIG. 1

Ultrasound scan showing irregular sinuses discharging through the right side of the neck. Distance between two markers = 0.647 cm. P = posterior

Following removal of the vacuum-assisted closure dressing and pump, intravenous antibiotic therapy was continued for another two weeks. The patient made good progress and was discharged from the hospital on oral antibiotics (ciprofloxacin), which was continued for three months, until full clinical and radiological resolution of disease was achieved.

At the time of writing, the patient was asymptomatic but remained under regular follow up.

Discussion

Melioidosis

Melioidosis, also known as Whitmore's disease, is a severe, multisystem, infectious disease.¹ It is also known as pseudoglanders, Vietnamese time bomb and Rangoon beggar's disease.⁷ Its main endemic foci are Northern Australia and Southeast Asia.^{1,8}

The causative organism is *Burkholderia pseudomallei*, a Gram-negative, aerobic bacillus. Its natural habitat is soil



FIG. 2

Ultrasound scan showing clearly defined, superficial collection of mixed heterogeneity. Beyond this, there appears to be a further collection extending around the great vessels and muscles of the neck. P = posterior

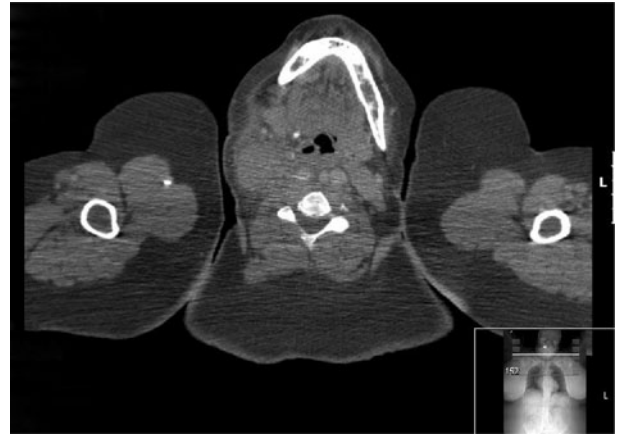


FIG. 3

Axial computed tomography scan demonstrating a large, heterogeneous mass within the right side of the neck, extending across level II from the right carotid sheath to the deep lobe of the parotid gland. The mass is obliterating the parapharyngeal fat space and is contiguous with the right sternocleidomastoid muscle. L = left

and water in the tropics and subtropics.^{1,7,9} *Burkholderia pseudomallei* is a very resilient micro-organism, able to survive inside host cells for many years – hence the long latency period between infection and onset of clinical features.^{1,8,10}

Melioidosis can be acquired via ingestion, inhalation and direct inoculation.³ The commonest mode is percutaneous inoculation.¹¹ Once infected, patients may be asymptomatic (i.e. subclinical melioidosis) or may develop acute or chronic suppurative disease, or rapidly progress to fulminant sepsis.^{1,9}

Risk factors for melioidosis include diabetes mellitus, mycobacterial disease and steroid use.^{7,12,13} The association



FIG. 4

Axial computed tomography scan demonstrating a large, soft tissue density area within the right side of the neck on the sternocleidomastoid muscle, displacing the right common carotid artery medially. It is obliterating the right parapharyngeal fat space, and indenting and displacing the pharynx to the left. L = left; P = posterior

with diabetes mellitus is particularly strong (conferring a 100-fold increased risk of infection).^{13,14}

Melioidosis has been termed 'the great mimicker' due to the exceptionally broad spectrum of clinical syndromes with which it can present.³ Unless there is a high clinical index of suspicion, diagnosis is very difficult and can only be confirmed by isolation of *B pseudomallei* from body fluids.^{2,11}

Mortality varies widely amongst different countries (19–60 per cent).^{15–17} The overall mortality rate is currently 45 per cent, half what it was prior to the advent of antibiotics.^{7,18} It is this very high mortality, in conjunction with the disease's mode of transmission, which have led to concerns that *B pseudomallei* could be used as a biological warfare weapon.¹

Melioidosis can affect any organ. The commonest presentation is pneumonia, accounting for almost half of all cases. It can also cause acute respiratory distress syndrome, septic shock, abscesses, peritonitis, septic arthritis and osteomyelitis. Skin infections can have a very rapid rate of development, presenting similarly to necrotising fasciitis.^{1,7,9,11,15,19} The central and peripheral nervous systems can be affected (with abscesses, encephalitis, meningitis, sagittal sinus thrombosis and Guillain–Barre syndrome), as can the cardiovascular system (with pyopericardium, endocarditis and mycotic aneurysms).^{11,14,15,18,20,21} Ocular involvement can lead to corneal ulcers, subconjunctival abscesses and hypopyon.¹¹

In the head and neck, melioidosis has several modes of presentation. Examples include parotid abscess, thyroid abscess, chronic otitis media, cutaneous neck infections, cervical lymphadenopathy, sinusitis and periorbital cellulitis.^{1,3,18,22,23}

Melioidosis causing suppurative cervical lymphadenitis can be very difficult to distinguish from tuberculosis or lymphoma on clinical grounds. Hence, a good (travel) history and high clinical index of suspicion are vital. Missing the diagnosis can have disastrous consequences. Melioidosis should always be considered in the differential diagnosis of a neck abscess where there is a relevant travel history.^{1,3}

The management of melioidosis remains a challenge.²⁴ It consists of two phases: initial eradication therapy with intravenous antibiotics (ceftazidime or a carbapenem for 10–14 days), followed by maintenance oral antibiotic therapy (high-dose trimethoprim–sulfamethoxazole for three months).^{8,18,24} Long-term follow up, possibly life-long, is essential.¹

In summary, melioidosis is a severe, multisystem, infectious disease caused by the bacterium *B pseudomallei*.¹ It constitutes a particular diagnostic challenge as it can mimic virtually any disease.^{2,3} In the western world, where it is uncommon, melioidosis is often not considered in the differential diagnosis. If not diagnosed early and treated with appropriate antibiotics, the prognosis is very poor.⁷

Vacuum-assisted closure devices

Negative pressure dressings, also known as vacuum-assisted closure devices, were first brought to prominence in 1991.^{4,25,26} The negative pressure applies suction across the wound, aiding closure and promoting local blood supply.⁶ Although use of these devices has been reported in the management of head and neck wounds; they are primarily used on the trunk and limbs.^{4,27–29}

Vacuum-assisted closure pumps were initially employed in general surgery to aid the closure of dehiscant abdominal wounds.⁶ Their uses today are extensive, and include the management of soft tissue lesions such as leg ulcers, infected wounds, necrotising fasciitis, denuded bone, fistulae and skin graft donor sites.^{6,30–32}

Negative pressure is believed to have multiple healing effects. The interstitial fluid is sucked out of the wound, decompressing the local microvasculature and thus increasing regional blood flow. This increases wound oxygenation, which, in addition to the mechanical debridement produced by the negative pressure, decreases the bacterial load. Moreover, the vacuum-assisted closure device produces a homogeneous distribution of force in the wound edges, promoting healing through granulation tissue formation.^{5,26}

In the presented case, the negative pressure dressing was prepared at a pressure of –75 mmHg and left in situ for seven days (therapy times of 3–12 days have been reported).⁶ It was continuously applied via a portable device which allowed the patient full mobility. When removed, the purulent discharge had significantly decreased, with evidence of granulation tissue covering the wound surface. Following the application of the negative pressure dressing, wound management consisted of dry dressings and oral antibiotics.

- **Melioidosis is a severe, multisystem, infectious disease with a high mortality rate**
- **Diagnosis is particularly challenging**
- **Melioidosis should be considered in the differential diagnosis of a neck abscess, particularly where there is a relevant travel history**
- **Vacuum-assisted closure pumps appear to be under-utilised in the management of head and neck wounds**
- **This is the first report of a vacuum-assisted closure device used in the management of melioidosis of the neck**
- **The successful outcome warrants further exploration of the role of vacuum-assisted closure pumps in head and neck surgery**

From the limited number of reported cases, it would appear that vacuum-assisted closure pumps are under-utilised in the management of head and neck wounds.^{4–6} The largest case series, reported by Rosenthal *et al.*, comprised 23 applications in the head and neck over three years. Some of the cases reported were managed solely by vacuum-assisted closure pumps.⁶

Negative pressure dressings can be beneficial adjuncts in the management of head and neck wounds. We believe that the successful use of a vacuum-assisted closure device in the presented case warrants further exploration of the role of vacuum-assisted closure pumps in head and neck surgery.

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Dr G Garas takes responsibility for the integrity of the content of the paper.
Competing interests: None declared
