

Trueperella bernardiae: an unusual cause of septic thrombophlebitis in an injection drug user

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Abstract

The clinical spectrum of human disease caused by *Trueperella bernardiae* is poorly described, partly as a result of historical difficulties with microbial identification. With the introduction of powerful new technologies, such as matrix-assisted desorption ionization–time of flight mass spectrometry, into routine microbiology laboratories, new insights into diseases caused by such organisms are being made. Here we report a case of septic thrombophlebitis with bacteraemia caused by this organism, together with a retrospective description of laboratory isolation of this organism over a period of 6 years in a hospital in London, UK.

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Introduction

Trueperella bernardiae is a facultatively anaerobic catalase-negative, Gram-positive bacillus. Originally placed within the *Actinomyces* and then the *Arcanobacterium* genera, its current taxonomic position was established in 2011 [1]. Before the advent of matrix-assisted desorption ionization–time of flight mass spectrometry (MALDI-TOF MS), accurate identification of bacteria such as *T. bernardiae* in routine laboratories was difficult. Thus, in the past, isolation of such organisms in blood cultures may well have been dismissed as contamination.

Clinical case

A 45-year-old male injection drug user (IDU) was admitted to our hospital with a week's history of painful, discharging swellings in his left leg and groin, as well as fever and cough with

pleuritic chest pain. He injected heroin and crack cocaine into his left groin and lower leg on a daily basis and admitted to frequently licking the injecting needle before use. He had a negative HIV test several months before admission. Examination revealed fever and tachycardia with a 4 × 6 cm tender necrotic abscess overlying a venous injection site on the medial aspect of the left thigh; further injection sites over the left groin and left calf were tender with surrounding erythema. Admission laboratory tests showed a white blood cell count of $16.4 \times 10^9/L$, a reduced platelet count ($75 \times 10^9/L$) and a C-reactive protein of 316 mg/L with evidence of acute kidney injury (creatinine 215 $\mu\text{mol/L}$). A transthoracic echocardiogram was performed and revealed no evidence of endocarditis. A chest radiograph showed multiple cavitating lesions with air fluid levels (Fig. 1). Computed tomographic angiogram of his left leg revealed a 6 cm abscess in his groin with gas and thrombus in the common femoral, common iliac and long saphenous veins.

Definitive antibiotic therapy consisted of intravenous cefuroxime 1.5 g three times a day plus metronidazole 500 mg three times a day. The venous thrombosis was managed with low-molecular-weight heparin. The groin and thigh abscesses required surgical drainage with excision of a section of thrombosed long saphenous vein; needle aspiration of the calf abscess was also required. Blood cultures drawn at admission and 2 days later grew a Gram-positive bacillus in both aerobic

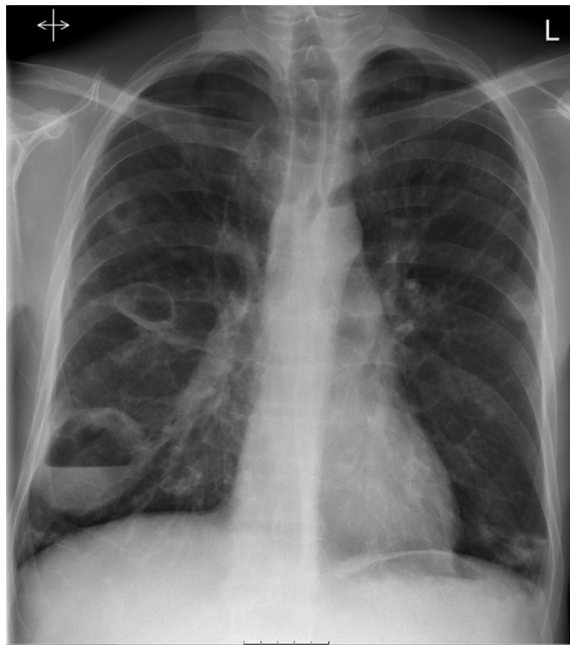


FIG. 1. Chest radiograph showing multiple lung abscesses consistent with diagnosis of septic emboli.

and anaerobic bottles after 2 to 5 days. The organism was subsequently identified as *T. bernardiae* by MALDI-TOF MS (Bruker Biotyper 3.0; Bruker, Bremen, Germany). Pus samples evacuated from the groin, thigh and calf abscesses all grew mixed anaerobic organisms, with *T. bernardiae* isolated from thigh and calf lesions. Thrombus from the excised long saphenous vein grew *T. bernardiae* as well as *Peptoniphilus harei*.

Identification of the *T. bernardiae* isolate was confirmed by partial sequencing of the 16S rDNA gene by the National Reference Laboratory (Public Health England). MIC testing at the same institution was undertaken using Iso-Sensitest agar with blood incubated anaerobically for 48 hours with MICs established using gradient strips (Etest; bioMérieux, Marcy l'Étoile, France; and Gradient strips, Liofilchem, Launch Diagnostics, Longfield, UK). Susceptibility testing revealed susceptibility to most agents with the following MICs: penicillin 0.004 mg/L, co-amoxiclav ≤ 0.016 mg/L, cefuroxime ≤ 0.016 mg/L, cotrimoxazole 0.016 mg/L, erythromycin >256 mg/L, linezolid 0.064 mg/L, ciprofloxacin 0.5 mg/L, doxycycline 0.064 mg/L, imipenem 0.004 mg/L, amikacin 0.125 mg/L. The patient experienced defervescence a week into his admission, and after receiving 2 weeks of therapy with cefuroxime and metronidazole, he was switched to a 4-week course of oral amoxicillin 500 mg three times a day plus co-amoxiclav 625 mg three times a day. He did not attend a scheduled follow-up appointment. We subsequently interrogated our laboratory system to identify all isolates of

T. bernardiae identified by MALDI-TOF MS from 2012 to 2017 (Table 1).

Discussion

Our case highlights the current ease of identification of organisms such as *T. bernardiae* with the advent of MALDI-TOF MS technology; its rapidity and accuracy provide new insight into the pathogenic role of this bacterium in human disease. It also illustrates the invasive potential of the bacterium, albeit in a patient with increased susceptibility to bloodstream infection due to injection drug use. In the literature, we only found four previous reports of bacteraemia due to this organism [2–5], with several other reports describing septic arthritis and brain abscess [4,6–9].

Here we describe what is to our knowledge the first case of *T. bernardiae* causing bacteraemia in an IDU. The organism, together with a mixture of anaerobic organisms, caused septic thrombophlebitis of the patient's deep veins, leading to septic emboli, lung cavitation, and deep soft tissue abscesses. The source of the organism in our patient was uncertain, but we postulate that it originated in the oral cavity, gaining access to subcutaneous structures as a result of his habit of licking the injecting needle.

Our retrospective analysis of previous isolates in our laboratory revealed the ability of the organism to cause soft tissue abscesses and bloodstream infection, including another case of bloodstream infection in an IDU, also in association with anaerobes. The relative frequency of isolation, including from blood, suggests that it is not a rare cause of invasive infections. Our case also highlights the importance of septic venous thrombosis as a cause of bacteraemia in IDUs. In a prospective bacteraemia database from St Thomas' Hospital, almost a third of all community-acquired bloodstream infections in IDUs over

TABLE 1. *Trueperella bernardiae* isolates from patients at St. Thomas' Hospital during 2012–2017 (excluding current case)

Year	Age	Gender	Sample type	Clinical setting	Other organisms coisolated
2014	56	Male	Bone (foot)	Diabetic foot infection	None
2014	42	Female	Urine	Ileal conduit	<i>Enterococcus faecalis</i>
2014	32	Female	Pus	Breast abscess	None
2015	42	Male	Bone (foot)	Diabetic foot infection	<i>Enterobacter cloacae</i> , <i>Citrobacter koseri</i> , <i>Corynebacterium</i> sp.
2016	43	Male	Blood	Septic thrombophlebitis in injection drug user	<i>Fusobacterium gonidiaformans</i> and <i>Actinomyces funkei</i>
2016	50	Female	Blood	Metastatic cervical cancer	<i>Escherichia coli</i>
2017	32	Male	Blood	Still disease (uncertain clinical significance)	<i>Fusobacterium gonidiaformans</i>

a 10-year period (70 of 224 episodes from 2007 to 2016) arose from a vascular focus, with the vast majority being venous.

Conflict of interest

None declared.

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