Vertebral osteomyelitis due to an unusual pathogen: a case report

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ABSTRACT

Background: Vertebral osteomyelitis most often presents with back pain and is usually a secondary complication of a distant infection with hematogenous seeding. A source of infection is detected in about half of the cases. *Burkholderia cepacia* has rarely been implicated as an etiology.

Case presentation: We present a 50-year old Caucasian male with low back pain for 10 days associated with urinary incontinence without any fever or chills. He had laboratory and imaging evidence of vertebral osteomyelitis. Patient underwent bone biopsy and was diagnosed with vertebral osteomyelitis and discitis caused by *B. cepacia*. The patient was treated with intravenous meropenem for initial 2 weeks and, thereafter, oral ciprofloxacin and continues to do well several weeks later.

Conclusion: Vertebral osteomyelitis due to *B. cepacia* has rarely been reported as a cause and though rare this organism should be considered in the differential diagnosis of vertebral osteomyelitis in the appropriate clinical setting.

Keywords: Vertebral osteomyelitis, *Burkholderia cepacia*, bone biopsy, mechanism of resistance.

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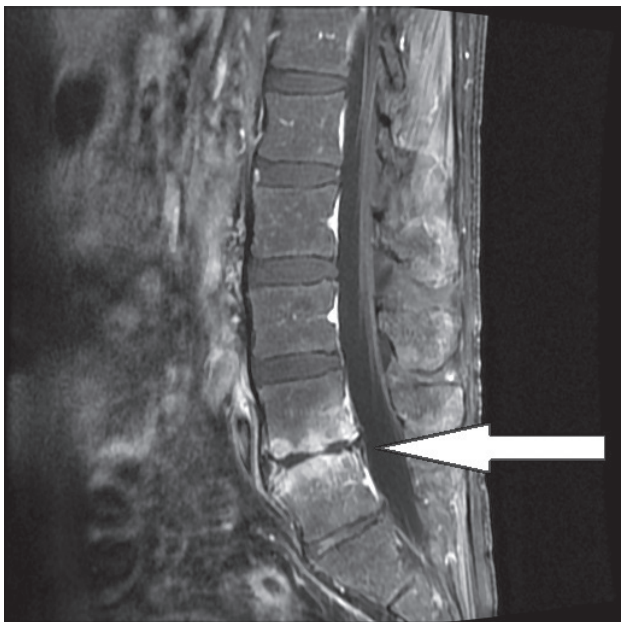
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Background

Native vertebral osteomyelitis is a serious condition and it is estimated to occur in 2.4 cases per 100,000 [1]. Vertebral osteomyelitis most often results from hematogenous seeding. Direct inoculation from spinal procedures or due to contiguous spread from adjacent site of infection have been described [2]. *Staphylococcus aureus* is the most commonly implicated pathogen followed by *Escherichia coli*. Patients at risks are elderly, immunocompromised, intravenous drug users, have indwelling intravascular catheters or have undergone spinal instrumentation procedures [3,4]. The diagnosis of vertebral osteomyelitis is often delayed as nonspecific low back pain and neck pain are extremely common in office practice. Vertebral osteomyelitis due to *Burkholderia cepacia* has rarely been described [5].

Case Presentation

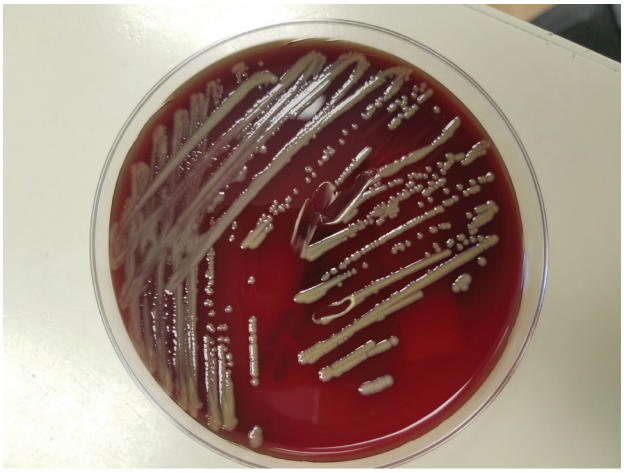
A 50-year old Caucasian male with renal stones and cervical spondylolisthesis presented with low back pain for 10 days associated with urinary incontinence without any fever or chills. He had received methylprednisolone 80 mg (2 cc) epidural injection at C7-T1 level 4 months prior to presentation for right sided cervical radiculopathy. He denied any intravenous drug use. He had leukocytosis of 18.20 K/µl. His C-reactive protein (CRP) was elevated 114 mg/l. MRI of the lumber vertebrae demonstrated L4–L5 hyperintense lesion in T1 flair sequence with contrast (Panel A).



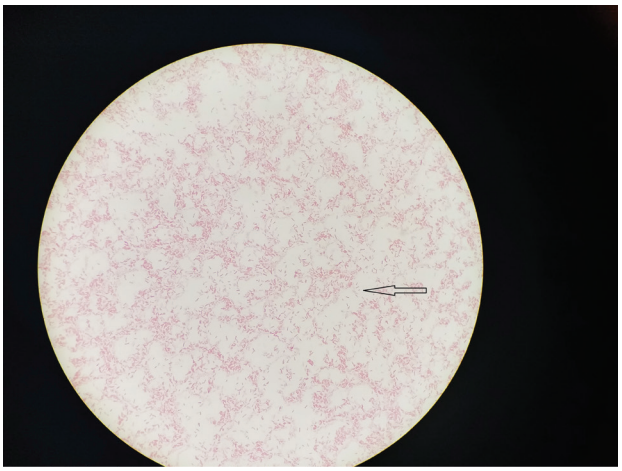
Panel A. *MRI lumbar vertebrae demonstrate L4-L5 hyperintense lesion in T1 flair sequence with contrast, narrowed L4-L5 disc space, enhancing soft tissue along the posterior margins of L4 and L5 vertebal bodies.*

Interventional radiology guided bone biopsy culture grew white mucoid colonies in blood agar (Panel B) and Gram stain revealed Gram negative rods (Panel C). These Gram negative rods were motile, produced catalase, and did not ferment lactose. The patient underwent decompressive surgery of the spine. Based on histopathology and culture data, he was diagnosed with vertebral osteomyelitis and discitis caused by *B. cepacia*. *Burkholderia cepacia* was identified using VITEK MS MALDI-TOF (bioMerieux, INc Durham, NC). He was treated with 2 weeks of intravenous meropenem and, thereafter, oral ciprofloxacin based on antibiotic susceptibilities.

The organism was resistant to trimethoprim-sulfamethoxazole. His CRP trended down and he was discharged after 3 weeks of hospitalization. He completed 8 weeks of oral ciprofloxacin and was followed up in the outpatient infectious diseases clinic. He continues to do well and repeat MRI 6 months later demonstrated radiological improvement (Panel D).



Panel B. *White mucoid colonies in blood agar plate.*



Panel C. *Gram stained smear of bone biopsy culture aspirate showing gram negative rods. (Original magnification, x 1000).*

Discussion

Burkholderia cepacia is a motile, catalase-producing, and non-lactose fermenting, Gram negative bacterium belonging to a group commonly known as the *B. cepacia* complex (Bcc) [6]. This bacterium is transmitted through person-to-person spread, medical devices, contaminated disinfectants and the environment [7,8]. An outbreak of infection due to *B. cepacia* has been reported when using saline flush, oral docusate solution, and certain nasal spray [9]. Human infections such as bacteremia, endocarditis, septic arthritis, wound infection, osteomyelitis, meningitis, peritonitis, urinary tract infection, and respiratory tract infection have been described in the literature. Vertebral osteomyelitis due to *B. cepacia* has been reported following rhinoplasty, in intravenous drug abusers and rarely in immunocompetent persons [10].

In our patient, we suspect that the infection may have been introduced during the epidural injection procedure. We identified this bacterium in bone biopsy culture as



Panel D. *MRI lumbar vertebrae done 6 months later with interval improvement in disc space and adjacent vertebral body signal abnormality and enhancement and decrease in surrounding anterior epidural and paraspinal soft tissue thickening and enhancement surrounding the proximal right L5 nerve root.*

B. cepacia, but 16 S ribosomal RNA sequencing can be done to rapidly identify this bacteria. Mechanisms of resistance in *Bcc* include changes in lipopolysaccharide structure, efflux pumps, inducible chromosomal β-lactamases, and altered penicillin-binding proteins [11]. *Bcc* organisms are difficult to eradicate because of their innate resistance to a wide range of antibiotics and their capacity to form biofilms. Trimethoprim-sulfamethoxazole and fluoroquinolones are the most active drugs followed by ceftazidime and meropenem based on a recent study [12].

Conclusion

Though rare, *B. cepacia* should be considered in the differential diagnosis of vertebral osteomyelitis in the appropriate clinical setting. Early diagnosis and proper treatment could lead to a better outcome.

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Author Contributions

Rabindra Ghimire writing the whole manuscript and managing/treating the patient. Jaffer Hussain writing the manuscript and managing/treating the patient. Ahmed Abubaker managing/treating the patient. Triona Henderson writing the manuscript, revision from microbiology standpoint, and obtaining imaging. Paul Cook revision of manuscript, managing/treating patient.

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Summary of the case

Patient (gender, age)	1	Male, 50-year old
Final diagnosis	2	Vertebral Osteomyelitis due to *B. cepacia*
Symptoms	3	Back pain, urinary incontinence
Medications	4	Meropenem, methylprednisone, ciprofloxacin
Clinical Procedure	5	Epidural injection, Interventional radiology guided bone biopsy
Specialty	6	Infectious Diseases, Orthopedics.