CASE REPORT

Vertebral osteomyelitis in an immunosuppressed patient with rheumatoid arthritis

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Accepted 30 October 2014

SUMMARY

We report a case of spontaneous osteomyelitis of the cervical spine complicated by epidural abscess due to methicillin-resistant *Staphylococcus aureus* (MRSA) in a patient with rheumatoid arthritis with no obvious focus of infection or bacteraemia. The patient was on immunosuppressants and complete blood count revealed neutropaenia. He was successfully treated with intravenous antibiotics and surgery.

BACKGROUND

Vertebral osteomyelitis commonly results from haematogenous spread, direct inoculation during spinal procedures or contiguous spread from soft tissue infection. This case highlights the fact that methicillin-resistant *Staphylococcus aureus* (MRSA) vertebral osteomyelitis can occur without a definite source of infection and bacteraemia, particularly in the context of immunosuppression and neutropaenia. Cervical spine, which is the least common site to be affected with vertebral osteomyelitis, was involved in this case and the osteomyelitis was complicated by an epidural abscess. In spite of this, the patient had no neck pain, fever or neurological deficits. Owing to the vague symptoms associated with vertebral osteomyelitis, a high index of suspicion and imaging studies are needed for early diagnosis. Once diagnosed, the condition must be promptly treated with intravenous antibiotics and surgery, if required, for a favourable outcome.

CASE PRESENTATION

A 49-year-old man with a history of rheumatoid arthritis for the past 10 years, currently on steroid therapy and azathioprine, presented to the emergency department with back pain worsening over a period of 3 days following a fall. He did not have any weakness, neck pain or fever. On physical examination the patient was afebrile and haemodynamically stable. He had tenderness over lower thoracic vertebrae and limited range of motion due to pain. Tenderness was elicited at multiple joints, with swelling of bilateral knee and ankle joints and deformity of the small joints of the hands. There was no lymphadenopathy, organomegaly or neurological deficits. Cardiac and respiratory systems were within normal limits. No soft tissue or skin infections were present.

INVESTIGATIONS

Laboratory investigations revealed anaemia (haemoglobin 8.8 g/dL), leucopaenia ($2000/\text{mm}^3$), neutropaenia ($500/\text{mm}^3$), C reactive protein 9.4 mg/dL

and erythrocyte sedimentation rate 60 mm/h. Serum electrolytes and renal function tests were normal.

MRI of the cervical spine revealed vertebral osteomyelitis of C5–C6 with epidural abscess at C5–C6 interspace (figure 1). Thoracic spine MRI showed compression of T10, T11 and fracture of spinous process of T9. Multilevel disc changes and degenerative changes were noted.

Blood culture and urine culture showed no growth for 48 h. Chest X-ray and echocardiography were normal. Bone marrow study was abandoned as the patient was unwilling for the procedure.

TREATMENT

Azathioprine was discontinued and steroid was tapered and stopped. The patient was empirically started on intravenous vancomycin owing to the fact that the most common organism involved in vertebral osteomyelitis is *S. aureus* and methicillin resistance is rampant.^{1 2} The patient was further transferred for neurosurgical intervention that involved discectomy and drainage of epidural abscess. The discectomy specimen and the fluid drained yielded MRSA and sensitive to vancomycin.

OUTCOME AND FOLLOW-UP

Follow-up MRI confirmed osteomyelitis of C5–C6 vertebral bodies and complete drainage of epidural

Figure 1 MRI of the cervical spine showing increased signal in disc with moderate loss of disc height and epidural abscess.

To cite: Giri U,
Thavalathil BC, Varghese R.
BMJ Case Rep Published
online: [please include Day
Month Year] doi:10.1136/
bcr-2014-206944

Figure 2 Follow-up MRI showing resolution of epidural abscess, interval discectomy and enhancement of C5–C6 vertebral bodies with end-plate irregularities.

abscess (figure 2). Blood culture following surgery did not grow any organisms. In addition to intravenous vancomycin for 12 weeks, the patient also received blood transfusion, filgrastim and physical therapy. The vertebral compression fracture was managed conservatively. With treatment, the patient improved clinically and his blood counts normalised.

DISCUSSION

Vertebral osteomyelitis or disc space infection or discitis often presents with back pain, fever or neurological deficits.³ Lumbar spine is commonly affected followed by thoracic and cervical spine.⁴ This may be complicated by paravertebral, epidural or psoas abscess. Discitis complicated by epidural abscess occurs most commonly in cervical vertebra followed by thoracic and lumbar spine.⁵ Common comorbidities include degenerative joint disease, spinal injury, diabetes, immunosuppression, renal insufficiency, cirrhosis and malignancy.⁶ *S. aureus* is the most common organism causing vertebral osteomyelitis followed by *Escherichia coli*.³

Favourable treatment outcome depends on early diagnosis, which is often delayed for an average of 6–12 weeks due to ambiguous symptoms. As with any inflammation, vertebral osteomyelitis may result in leucocytosis, elevated erythrocyte sedimentation rate and C reactive protein. MRI has high specificity and sensitivity in diagnosing vertebral osteomyelitis.⁷ Earliest features on imaging include narrowing of disc space and erosion of vertebral end plates. Eventually, progressive destruction of the vertebral bodies occurs.⁷ Once diagnosed, successful treatment requires identification of the causative microorganism. This is made by blood culture or by CT-guided or open biopsy for culture of the specimen. A negative blood culture must be followed by any of the aforementioned invasive procedures.³

Prior to starting definitive antibiotic therapy based on culture and sensitivity, the patient should be started on empirical therapy to cover the possible organisms. Most cases can be managed with intravenous antibiotics and conservative measures such as immobilisation. The optimal duration for antibiotic therapy is controversial and ranges from 6 to 12 weeks based on duration of infection and level of complications. Surgery is necessary in all cases presenting with neurological deficit, infection of surgical implant, severe bone damage and poor response to antibiotic therapy.³ Severe cord compression due to osteomyelitis or subsequent abscess is a surgical emergency and requires immediate

decompression. Various surgical options are available for vertebral osteomyelitis and the optimal modality is still controversial. Some commonly employed surgical interventions are anterior decompression with or without bone graft, and anterior decompression and fusion with posterior stabilisation or anterior instrumentation.⁸ Posterior decompression is performed in cases such as isolated epidural abscess.⁸ Resolution of symptoms and declining values of C reactive protein correlate well with clinical healing more so than MRI.³ No specific association has been demonstrated between follow-up MRI and clinical condition of patients.⁹ However, follow-up MRI may be required in case of epidural abscess or lack of clinical improvement.¹

Our patient, who was on immunosuppressants for rheumatoid arthritis, had neutropaenia and developed cervical osteomyelitis with epidural abscess due to MRSA despite the absence of common clinical symptoms and a definite focus of infection. He improved with prompt initiation of antibiotics and surgical intervention. The probable source of infection could be transient bacteraemia from colonised MRSA acquired either from the community or during his prior hospitalisation.

Learning points

- ▶ Vertebral osteomyelitis even when complicated with an epidural abscess can present with vague symptoms or be asymptomatic, leading to delay in diagnosis.
- ▶ Methicillin-resistant *Staphylococcus aureus* vertebral osteomyelitis can occur without obvious focus of infection or bacteraemia (demonstrated by blood culture) especially in the immunosuppressed.
- ▶ High index of clinical suspicion, imaging studies, early initiation of empirical antibiotics to cover the likely organisms while awaiting culture reports, and sometimes surgical interventions are required for effective management and prevention of complications due to vertebral osteomyelitis.

Contributors UG, BCT and RV were involved in conceptualising the report. UG and BCT collected the data, reviewed the literature and drafted the article. RV revised the article and approved the final version.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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