Vertebral osteomyelitis following transrectal ultrasound-guided biopsy of the prostate

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Abstract

Transrectal ultrasound-guided needle biopsy of the prostate (TRUS) is a well-tolerated and standardized procedure for the diagnosis of prostate cancer. Complications associated with TRUS requiring emergency room visits or hospital admissions are relatively low and include complications, such as a 1% risk of urinary retention and less than 1% chance of bacterial sepsis. Vertebral osteomyelitis is a rare complication of TRUS; there are 3 reported cases. Vertebral osteomyelitis has an insidious onset and usually resolves following medical intervention. We present an extremely rare case of vertebral osteomyelitis following TRUS, its clinical outcome and management.

Introduction

In most cases, transrectal ultrasound-guided biopsy of the prostate (TRUS) provides the histologic diagnosis of prostate cancer that gives the pathologic disease parameters to guide further therapy or monitoring. Prostate cancer is the third most common cancer in men and therefore, many TRUS procedures are performed.[1]

The most common complications of TRUS include hematospermia, hematuria, fever and rectal bleeding.[2] Osteomyelitis of the spine is an uncommon complication of a prostatic biopsy or surgery with only 3 documented cases occurring in 1954, 1965 and 2010.[3-5] Only one documented case has occurred following a TRUS procedure.[5] Little is known about the pathophysiology of this complication. Osteomyelitis is an acquired infection of the bone and, in the spine, most commonly occurs in the vertebrae. Osteomyelitis may occur acutely by hematogenous spread following biopsy-related transient bacteremia or by contiguous spread from an adjacent soft tissue infection. We present the second documented case of acute osteomyelitis following TRUS.

Case report

A 57-year-old male underwent a TRUS due to a rising prostate-specific antigen (3.23 ng/mL on serial testing) and a digital rectal exam that revealed the presence of very mild prostatic enlargement only. Levofloxacin 500 mg orally once a day for 3 days and initiated one day prior to the TRUS was used for prophylaxis.[6] The patient was healthy, on no medications and had no history of any known treated bone trauma. However, this patient did have a history of playing professional football. One day following his TRUS, he developed fever, chills and rigors and was later diagnosed with an *Escherichia coli* urinary tract infection that was sensitive to cephalosporins. Therapy consisted of two courses of cephalexin due to persistent positive urine cultures growing *E. coli*. One month later, the patient developed further mid-back pain resulting in a reduction in his ability to ambulate and bear weight. He denied any fever or chills at this time.

The patient's white blood cell (WBC) count was 14.7, neutrophil count was 12.3, c-reactive protein (CRP) was 104.87 and erythrocyte sedimentation rate (ESR) was 66. A computed tomography (CT) scan of the thoracic spine revealed findings compatible with a diagnosis of T8 and T9 osteomyelitis and discitis, including paravertebral soft tissue swelling, lucency of the vertebral bodies and disc space irregularity of T8-9 (Fig. 1). A chest x-ray demonstrated poor visualization of T7-T9 endplates, consistent with CT findings. Treatment was initiated with a combination of cloxacillin and cefotaxime until blood cultures grew *E. coli*. A peripherally inserted central catheter was used to administer a 7-day course of 2 g of cefazolin every 8 hours. The patient denied any neurological symptoms and was discharged and placed on a 6-week intravenous home course of cefazolin 2 g every 8 hours.

The prostate biopsy revealed high-grade prostatic intraepithelial neoplasia in the right mid-peripheral zone. All other zones were negative. The transrectal ultrasound revealed no lesions for neoplasia and a mild component of benign

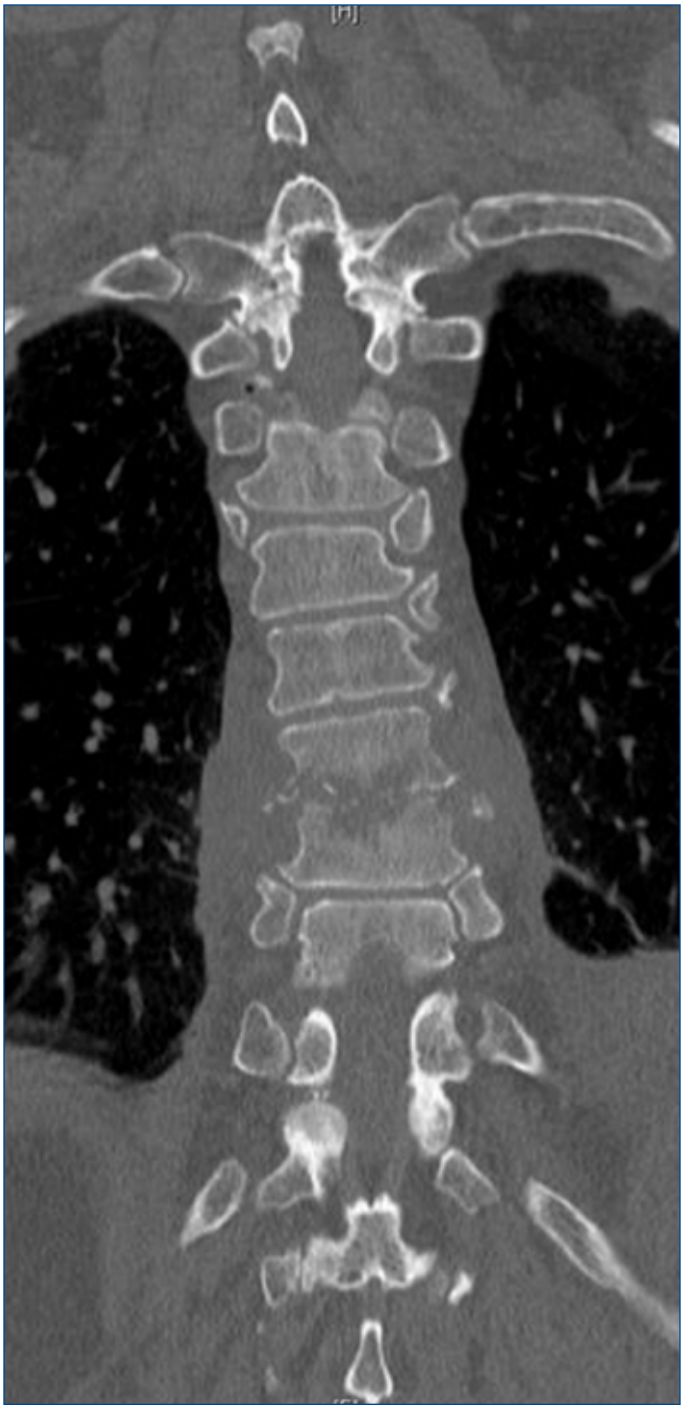

Fig. 1a. Anteroposterior view: Computed tomography of the thoracic spine revealed findings compatible with a diagnosis of T8 and T9 osteomyelitis and discitis including paravertebral soft tissue swelling, lucency of the vertebral bodies and disc space irregularity of T8-9.

prostatic hyperplasia was present with a mildy enlarged transition zone with some calcification and cystic areas, but no focal mass lesions.

Discussion

Vertebral osteomyelitis is a rare complication with an incidence of 1 in 250 000 to 450 000. Men are affected about twice as often as women.[7,8] Most patients are over the age of 50 and the incidence rises with increasing age.[9] Vertebral osteomyelitis most commonly occurs through a hematogenous route.[5] A systematic review of all reported cases series of osteomyelitis demonstrated that 3% cases of vertebral osteomyelitis are associated with previous deficit to the vertebrae, which suggests that individuals with previous vertebral injury have an increased predisposition to infection.[10] Perhaps the current patient may have been predisposed to this rare complication with subclinical vertebral trauma secondary to his engagement in a high impact sport for many years. Although *Staphylococcus aureus* is the most common pathogen causing vertebral osteomyelitis, gram-negative rod infection has been associated with urologic instrumentation.

The clinical presentation of vertebral osteomyelitis is variable but frequently includes insidious, progressive back pain. Pain may worsen over the course of weeks or months with the mean duration of symptoms lasting 48 ± 40 days.[11] The current patient denied any neurological symptoms, which would be apparent if infection had spread posteriorly into the epidural space causing an epidural abscess. Fever has low specificity and is reported in 30% to 52% of patients.[9,12] Physical examination may illicit tenderness during spinal percussion. This is often associated with spasm of surrounding muscles and a decrease in back mobility.

Hematological investigations reveal that most patients with vertebral osteomyelitis have an increase in ESR, CRP and blood cultures are positive in up to 72% of cases.[11,13,14] X-rays may be useful if they demonstrate destructive changes in two adjacent vertebral bodies with an accompanying narrowing of the disc space. This finding was present in our patient. A CT will reveal changes earlier than X-rays and will more readily detect soft tissue abscesses. Magnetic resonance imaging (MRI) is the most sensitive imaging modality to detect vertebral osteomyelitis, particularly for visualization of epidural abscess.[15] Our patient did not tolerate MRI.

The initial management of osteomyelitis is a pathogen-directed approach if blood cultures are positive. Gram-negative bacilli are typically treated with third or fourth generation cephalosporins or fluoroquinolones. Treatment duration is typically 6 weeks, but may be up to 12 weeks in the event of advanced disease, such as significant bony involvement and/or infection of paravertebral areas. The prognosis of vertebral osteomyelitis is variable and is dependent on neurological involvement, whether it was a hospital-acquired infection and the time to diagnosis. One study demonstrated that relapse occurred in 14%, residual symptoms in 31% and death in 11%.[16] However, a more recent

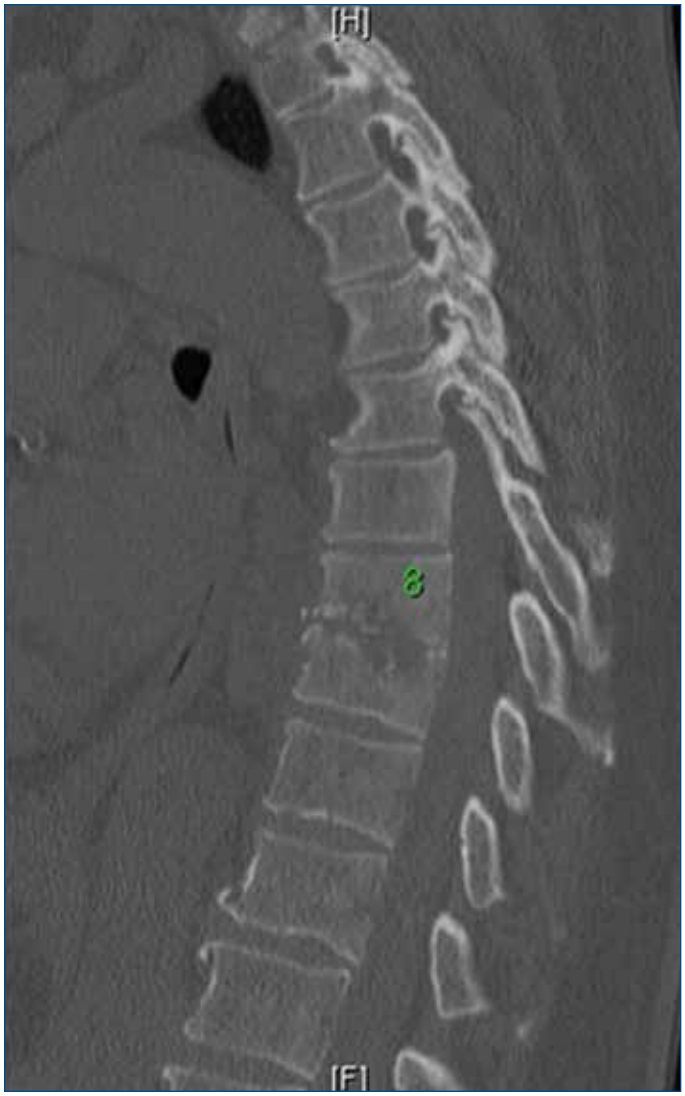

Fig. 1b. Coronal view: Computed tomography of the thoracic spine revealed findings compatible with a diagnosis of T8 and T9 osteomyelitis and discitis including paravertebral soft tissue swelling, lucency of the vertebral bodies and disc space irregularity of T8-9b).

study reported a 5% mortality rate, with 95% of patients having a complete resolution of symptoms with no relapse.[17]

Conclusion

In contemporary studies, the risk of sepsis following TRUS appears to be significantly increasing.[18] Therefore, heightened awareness of all septic complications is necessary. The development of insidious back pain following TRUS requires appropriate investigation and treatment. Osteomyelitis, although extremely rare, must remain in the differential diagnosis until appropriate testing is performed.

Competing interests: None declared.

This paper has been peer-reviewed.

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