A 73-Year-Old Male with Cervical Spine Osteomyelitis Presenting as Urosepsis

H. Kakkarlapudi1, S. Speirs2, A.P. Lal3, D. Alarie4, R. Petrello5, M.B. Ashraf6, B. Kolanuvada6 and M. Bhargava2

1PGY2 Resident, Montefiore Mount Vernon Hospital, Mount Vernon, NY, USA. 2Medical Student, St. George’s University School of Medicine, Grenada. 3PGY3 Resident, Montefiore Mount Vernon Hospital, Mount Vernon, NY, USA. 4Program Director, Internal medicine residency program and Director of Cardiology, Montefiore Mount Vernon Hospital, Mount Vernon, NY, USA. 5Chairman, Department of Medicine, Montefiore Mount Vernon Hospital, Mount Vernon, NY, USA. 6Attending Physician, Montefiore Mount Vernon Hospital, Mount Vernon, NY, USA.

ABSTRACT: Vertebral osteomyelitis is a serious debilitating infection if not detected early. Involvement of cervical vertebrae is usually seen in the presence of specific risk factors. Urinary tract infection commonly spreads to the lumbar vertebrae. This is a case presentation of an elderly male who, in the absence of specific risk factors for cervical osteomyelitis, presented with symptoms of urinary tract infection and was found to have cervical spine osteomyelitis.

KEYWORDS: vertebral osteomyelitis, bacteremia, urinary tract infection, bacteriuria

INTRODUCTION
Vertebral osteomyelitis is primarily a disease of adults, commonly seen in the fifth decade of life. Isolated involvement of cervical vertebrae is not known to occur unless there are predisposing risk factors, such as immunocompromised status,1 chemoradiotherapy for malignancies of the neck,2–5 instrumentation in various tissues of the neck including but not limited to surgeries of the spine, pharynx, and upper respiratory tract,2,6 trauma,7 dental extraction,8 and intravenous (IV) drug abuse.9

Hematogenous spread of urosepsis to the vertebral causing secondary osteomyelitis has been reported, but involvement of cervical vertebrae in urosepsis is rare.10–13 The case presented here is peculiar because the presenting complaint was the symptom of urinary tract infection, and on further investigation, vertebral osteomyelitis was diagnosed.

CASE PRESENTATION
A 73-year-old male presented with an one-week history of anorexia, worsening neck pain, and dysuria. Past history included fracture of right leg and appendicitis. He used to work as a handyman. He reported a 25 pack-year smoking history and social alcohol use. Physical examination revealed tachycardia, fever, dry mucosa, mildly tender prostate, and pain on active and passive movements of the neck, whereas no deficits were noted on neurological examination.

Investigation revealed leukocytosis, neutrophilia, urinalysis positive for blood, white blood cells, and bacteria, and no valvular vegetations on echocardiogram. Prostate specific antigen (PSA), erythrocyte sedimentation rate (ESR), and C-reactive protein (CRP) were grossly elevated at 28.30 ng/mL, 87 mm/hour, and 258 mg/L, respectively. High PSA level was investigated with renal bladder ultrasound, which revealed a normal-sized prostate. High PSA level was attributed to acute prostatitis secondary to urinary tract infection. No predisposing factors for urinary tract infection, such as renal stones, diabetes, immunosuppressive states, catheter use, and recent urological procedure, were identified. The patient was noted to be independent with respect to his activities of daily living.

The patient was empirically treated for urosepsis and prostatitis with levofloxacin. Urine and blood cultures both isolated methicillin-susceptible Staphylococcus aureus (MSSA). Short T1 inversion recovery (STIR) sequence cervical spine magnetic resonance imaging (MRI) showed septic diskitis of C5–C6 disk, as well as marrow edema in C5, C6, and C2 suggestive of osteomyelitis (Fig. 1). The clinical condition was discussed with Orthopedics and Neurosurgery specialists. No operative intervention was suggested as the patient had no neurological deficit. Ceftriaxone was started to cover MSSA.

The patient’s prognosis was good because at the time of diagnosis, he did not develop any skeletal deformity of cervical spine or neurological deficit. His symptoms started to improve on treatment with IV antibiotics and a neck brace to prevent compression fracture of the vertebral bodies. He was discharged with a peripherally inserted central venous catheter.
line to a nursing home to receive six weeks of IV antibiotic therapy with 1 g of ceftriaxone given daily. The patient was followed up three months later and had an uneventful recovery with complete resolution of symptoms and no neurological deficit. No functional deterioration in the quality of life was observed. Written consent was obtained from the patient to reproduce the information and images in this case report.

Discussion
Hematogenous spread of infection is the most common cause of vertebral osteomyelitis. Common sources of hematogenous spread include the genitourinary tract, skin and soft tissue (eg, injection drug use), respiratory tract, infected IV catheter sites, postoperative wound infection, endocarditis, and dental infection. Contiguous spread of infection may occur from tissues such as the aorta, esophagus, or bowel that are adjacent to the spine.14

The lumbar vertebral bodies have the highest incidence of involvement, followed by the thoracic and cervical vertebrae, in that order. S. aureus is the most prevalent organism in pyogenic spinal osteomyelitis. Spinal pain usually begins insidiously and progressively worsens over several weeks to several months, and the pain is often worse at night. Rarely, the patient may present with a visible mass or spinal deformity.

The physical examination should include the assessment of organ systems for the primary cause of the dissemination. Abnormal laboratory findings may include an elevated leukocyte count with a left shift, an elevated ESR, and an increased CRP. MRI is the most sensitive diagnostic imaging tool for the detection of pyogenic spinal infection.

Vertebral osteomyelitis is usually treated conservatively with antibiotics for four to six weeks and spinal immobilization; in a few cases, surgical management may be indicated.15 If the infectious organism is identified as MSSA, nafcillin, oxacillin, or ceftriaxone are the recommended antibiotics; if the organism is methicillin resistant, vancomycin is recommended. Symptomatic improvement is noted upon starting antibiotics. Neck bracing for two to four weeks after initiation of antibiotic therapy can help in preventing pathological fracture of the cervical vertebrae. Initial suspicion of vertebral osteomyelitis should be treated early and empirically with broadspectrum antibiotics, which can be changed once blood culture and sensitivity results are available. Early and prompt diagnosis and timely initiation of appropriate antibiotics are essential to prevent complications such as epidural abscess, vertebral fractures, neurological deficits, severe sepsis, and septic shock.

In the case presented here, it is unclear whether S. aureus bacteriuria (SABU) was secondary to S. aureus bacteremia (SAB) or it was the primary infection causing SAB. In a cohort study, Asgeirsson et al concluded that SABU appeared to be secondary to SAB in some cases, and the primary infection causing SAB in others. SABU was seen in 27 of 166 (16.3%) SAB patients having urine cultured before the administration of antibiotics, but after excluding those with SAB of urinary tract origin, SABU was seen in 16 of 152 (10.5%) SAB patients.16 Another study suggests that SABU is frequently associated with SAB.17 In patients without an indwelling urinary catheter, 25 of 128 (19.5%) SAB patients were positive for SABU. Concurrent SABU was associated with methicillin susceptible, community-onset SAB, urinary tract obstruction/surgery, urinary tract infection, and vertebral osteomyelitis in patients with SAB.

Conclusion
In conclusion, we have reported a rare case of an elderly male presenting with symptoms of a urinary tract infection for whom further workup revealed cervical vertebral osteomyelitis. In this case, it is a possibility that bacteremia from the cervical spine resulted in the seeding of the urinary tract, causing the patient to present with symptoms of a urinary tract infection.16,17 The main learning point in this case is that unexplained localized persistent back or neck pain in the presence of urinary tract infection should prompt the physician to consider the differential diagnosis of an infectious lesion of the vertebral column. Hence, early diagnosis is necessary in preventing secondary infection of the spine and other complications resulting from cervical spine osteomyelitis.

Author Contributions
Wrote the first draft of the manuscript: HK, SS, APL, MB. Contributed to the writing of the manuscript: APL, MB. Agree with manuscript results and conclusions: DA, RP, MBA, BK. Jointly developed the structure and arguments.
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for the paper: HK, SS, APL, MB. Made critical revisions and approved final version: HK. All authors reviewed and approved of the final manuscript.

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