Polymicrobial Cervical Spondylodiskitis Post Esophageal Dilatation Mimicking Relapse in an Operated Gastric Cancer Patient: A Case Report

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Abstract

Native vertebral osteomyelitis is a serious infection involving the vertebral bodies. It usually occurs due to hematogenous spread and mostly involve the lumbosacral spines. Cervical vertebrae are less likely to be involved. Besides, the diagnosis may be challenging especially in patients with solid malignancy, where bone metastasis is high on the differentials. A 57-year-old man with history of gastric adenocarcinoma status post gastrectomy presented with shoulder pain plus worsening dysphagia a month after esophageal dilatation. A PET/CT scan was done for suspicion of bone metastasis revealed a prevertebral collection with spondylodiskitis. The patient underwent drainage and then surgical debridement in addition to three months of antibiotics. At the end of antimicrobial therapy, his symptoms improved and the inflammatory markers were back to normal levels. Cervical vertebral osteomyelitis can result from contagious spread of infection in patients with recent esophageal dilation. The infection is usually polymicrobial. Besides, vertebral osteomyelitis may mimic bone metastasis in patients with solid malignancies. For that, a correlation between clinical, laboratory and radiological findings is needed to prevent any delay in diagnosis.

Keywords: Spondylodiskitis, Gastric adenocarcinoma, Polymicrobial Infection, Esophageal Dilatation.

Introduction

Gastric adenocarcinoma stage is an aggressive malignancy requiring systemic long-term therapy. Metastases to the bone are frequent and usually multiple involving the spine among other bones. However, infective etiology should always be considered in the differential of isolated spine lesions. In the following we present a case of a middle-aged man who developed cervical native vertebral osteomyelitis post esophageal dilatation.

Case Report

A 57-year-old man with local gastric adenocarcinoma presented with outlet obstruction to Sultan Qaboos Comprehensive Cancer and Research Center (SQCCCRC) in July 2022. He was planned for surgery and

intraoperatively, he was found to have extensive peritoneal disease. A palliative subtotal gastrectomy with Roux-en-Y reconstruction was done, knowing the pre-operative CT staging was negative for distant metastases. Patient was planned post operatively for palliative chemotherapy, but he was not keen for any treatment and preferred to be kept on follow up despite medical counseling. Three months later, he presented to the oncology clinic complaining of dysphagia and odynophagia. A Computed tomography (CT) scan of his neck revealed no abnormalities. An upper endoscopy showed a stricture at the esophageal sphincter, for which an esophageal dilatation was performed in October 2022.

After one month, he was admitted to the hospital for pain in the back of his neck radiating to the bilateral shoulders associated with worsening of odynophagia and dysphagia to solid foods. Upon admission, his vitals showed a low-grade fever of 37.8 c. The physical examination revealed a focal tenderness on the C4-C5 levels.

The laboratory workup showed a white cell count of 7100 cells/ml with 88% neutrophils and lymphocytes 8%. His C-reactive protein (C-RP) level was 310 mg/L. A Positron Emission Tomography and Computed Tomography (PET-CT) revealed a soft tissue lesion in the prevertebral region extending from the C6 vertebra to the D4 vertebra with a significant fuorodeoxyglucose (FDG) uptake involving the body of the C6-C7 vertebra and intervertebral region with multiple air pockets are seen within the soft tissue lesion [Figure 1-A]. A spine magnetic resonance imaging (MRI) for more evaluation of the prevertebral tissue revealed an elongated hypointense fluid collection in the prevertebral region extending from the C6 vertebra to the D4 vertebra [Figure 2 A].

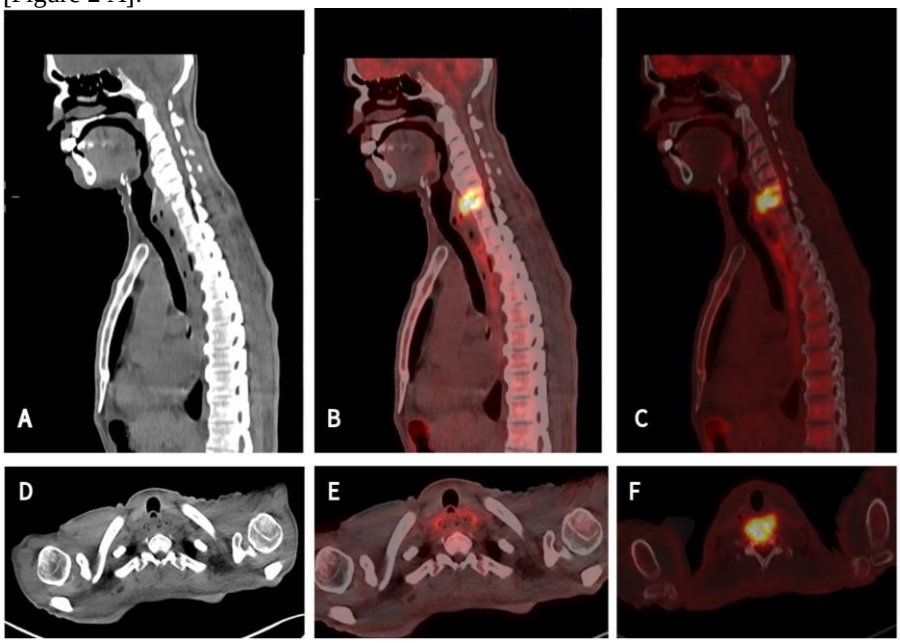

Figure 1: PET/CT scan of the C6-C7 osteomyelitis. (A, D) Sagittal and axial CT images (B, C, E, F): Fused F-18 FDG PET/CT images, sagittal and axial views with soft tissue and bone windows. PET/CT scan shows FDG avid soft tissue lesion with air pockets in the prevertebral region extending from C6 vertebra to D3/D4 vertebrae, involving the vertebral body and intervertebral disc of C6-C7 vertebrae.

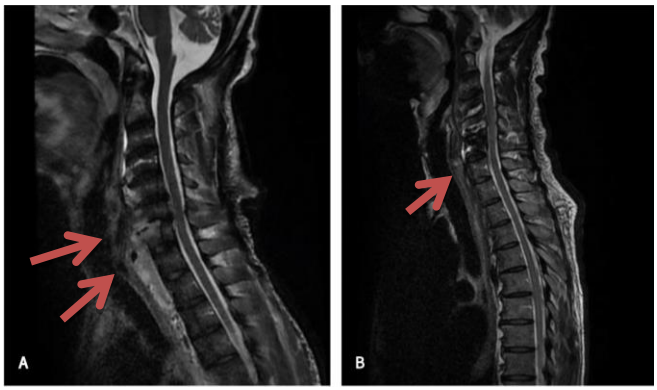

Figure 2: Sagittal MRI images showing C6-C7 vertebral osteomyelitis. Figure 2 A: Sagittal MRI image show an elongated hypo-intense fluid collection with suggestion of air foci in the prevertebral region extending from C6/C7 to the inferior endplate of T4 with erosion of the C6-C7 vertebrae. Figure 2 B: Resolution of inflammatory process at the C6/C7 vertebrae after medical and surgical management.

The patient was started empirically on Intravenous (IV) piperacillin-tazobactam 4.5 gm every 6 hours after taking two sets of blood cultures were taken. Under ultrasound guidance, the abscess was drained, and fluid was sent for gram stain and bacterial culture. The blood cultures turned out positive for *Streptococcus anginosus*, whereas the fluid culture grew both *Streptococcus anginosus* and *Pseudomonas aeruginosa*. Antimicrobials were de-escalated to IV ciprofloxacin 400 mg every 8 hours and IV clindamycin 600 mg every 8 hours. After two weeks of therapy, the patient's clinical symptoms improved dramatically, and his C-RP level dropped to 73 mg/l. Despite that, the patient was at risk for spine instability. For that, the patient went for debridement and plate fixation. The bone tissue was sent for microbiology and histopathology. The histopathology report came out negative for malignancy whereas the culture grew *Klebsiella pneumoniae* which was susceptible to carbapenems and quinolones. The patient was shifted to oral quinolones and completed a course of three months of therapy.

After three months, his C-RP level was 7 mg/L. Unfortunately, the patient underwent a follow-up CT scan in august 2023 that revealed peritoneal disease progression with the patient being currently unfit and unwilling for aggressive therapeutic approach. Nevertheless, the infection has been resolved on the MRI spine (Figure 2 B) without clinical recurrence in his dysphagia or back pain.

Discussion

Native Vertebral Osteomyelitis (NVO) is the most common site of hematogenous osteomyelitis in adult patients with a rate of 3% to 5% of all cases of osteomyelitis.[1] The incidence of NVO varies based on age, country and the underlying etiology.[1] While Lumbo-sacral vertebrae are the commonest site of infection, the cervical spine is considered the least with a rate of 3% to 6% of all patients presenting with NVO.[2]

The infection results from either a hematogenous spread from a blood-stream infection, or to a lesser extent from contagious spread from the surrounding tissue.[1] Among others, cervical vertebral osteomyelitis has been linked to esophageal pathologies including perforation, chest trauma, esophageal biopsy and post esophageal dilatation with only six cases been reported in the literature.[3,4]

The clinical presentation usually includes but is not limited to fever, neck pain with or without radiation the upper limbs or weakness of the upper limbs.[2] The laboratory workup may show elevated white cell count and elevated ESR and C-RP levels. The diagnosis should be based on the presence of radiological evidence of inflammatory process plus positive serologic or microbiologic diagnostic studies.[1] In case blood cultures were negative for typical microorganism particularly Staphylococcus aureus or the Brucella serology, a

computerized tomography (CT) or Ultrasound guided tissue biopsy should be sent for microbiology and molecular testing (16 S ribosomal RNA PCR).[1] If negative, a trial of either percutaneous endoscopic discectomy and drainage or excisional biopsy should be tried.[1] Despite that, negative culture may represent up to 20% of cases of osteomyelitis. In addition to that, the delay in diagnosis, inappropriate diagnostic and management and finally the presence of malignancy in the background may add a challenge to the diagnosis.[5] The treatment should be guided by positive microbiology with duration of at least 6-8 weeks with extension of therapy in case of paravertebral or epidural undrained abscess, presence of prosthesis and multi-drug resistant pathogens.[1,6] Surgical intervention may be indicated in patients with signs of spinal cord compression or there is evidence of antimicrobial therapy failure, significant vertebral destruction with instability, large epidural abscess formation and finally intractable back pain.[1]

Our patient had a fluid culture positive for *Streptococcus anginosus*, *Pseudomonas* aeruginosa and *Klebsiella pneumoniae* whereas the blood culture was positive for *Streptococcus anginosus* only. The histopathology report was negative for malignancy despite significant FDG uptake in a known stage 4 aggressive disease. Further radiological follow up of our patient ruled out the presence of malignant bone disease.

Conclusion

In conclusion, diagnosing vertebral osteomyelitis can be difficult, especially in patients with advanced malignancy. This is because bone metastasis can mimic infection, especially in patients with a single lesion with high FDG uptake on PET/CT scan. In such situations, it is crucial to correlate clinical, laboratory and radiological findings to avoid unnecessary investigations or contrary delays in diagnosis.

List of abbreviations: computerized tomography (CT), Native Vertebral Osteomyelitis (NVO), Intravenous (IV), Sultan Qaboos Comprehensive Cancer and Research Center (SQCCCRC), C-reactive protein (C-RP), Positron Emission Tomography and Computed Tomography (PET-CT), Intravenous (IV), computerized tomography (CT), magnetic resonance imaging (MRI).

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