

Chronic *Pseudomonas aeruginosa* cervical osteomyelitis

ABSTRACT

Pseudomonas aeruginosa is a rare cause of osteomyelitis of the cervical spine and is usually seen in the background of intravenous drug use and immunocompromised state. Very few cases of osteomyelitis of the cervical spine caused by *pseudomonas aeruginosa* have been reported in otherwise healthy patients. This is a case presentation of a young female, who in the absence of known risk factors for cervical osteomyelitis presented with progressively worsening neurological signs and symptoms.

Key words: Cervical osteomyelitis; *Pseudomonas aeruginosa*; Spondylodiscitis.

Introduction

Vertebral osteomyelitis of nontuberculous origin of the cervical region is relatively less common. Isolated involvement of cervical region is mostly associated with predisposing factors such as intravenous drug abuse, immunocompromised state, instrumentation of neck and adjacent structures, and trauma. *Pseudomonas aeruginosa* causing chronic cervical osteomyelitis in the absence of intravenous drug abuse is very rare. Here, we report a case of *P. aeruginosa*-induced cervical osteomyelitis following gynecological procedure 6 months earlier.

Case Report

A 37-year-old female, a native of Sierra Leone with no significant medical history, presented with history of progressively worsening neck pain, limitation of neck movement, tingling, and paresthesia of medial aspect of right arm and forearm over the last 3 months. She also complained of weakness of right upper limb muscles. There was no history of exposure to pulmonary tuberculosis. She had undergone dilatation and evacuation procedure about 6 months back. She denied intravenous drug abuse.

On clinical examination, she was afebrile. Her vital signs were normal. Torticollis was noted with severe restriction of neck movement in all direction. There was weakness of all muscles

of right upper limb, grade 3/5, but small muscles of hand were spared. There was loss of sensation of all modality along right C5, C6, and C7 dermatomes. Right biceps and triceps jerk were depressed. Other limbs were normal and rest of the nervous system were found to be grossly normal. X-ray of cervical spine taken 3 months back was essentially normal [Figure 1] whereas her recent X-ray showed remarkable destruction of C5 and C6 vertebral body and resulting kyphosis [Figure 2]. CT scan of cervical spine revealed extent of vertebral body destruction [Figure 3]. Magnetic resonance imaging of the cervical spine revealed spondylodiscitis of C5, C6 and C7 vertebrae, with anterior epidural and adjacent pre- and paravertebral enhancing soft tissue [Figure 4]. Erythrocyte sedimentation rate was 21 mm/h (0–20 mm/h). C-reactive protein was 15.89 (0.0–0.8 mg/dl). Her white blood cell count was 7600/cumm.

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The patient underwent C5, C6 median corpectomy, adjacent discectomy, autologous iliac crest grafting, and anterior cervical plating. There was considerable thickening and inflammation of prevertebral tissue and destruction of C5, C6 vertebral bodies. Acid-fast *Bacillus* stain was negative, and Gram stain showed Gram-negative bacilli. Tissue specimen culture was positive for *P. aeruginosa*. Histopathological examination revealed only inflammatory lesion. Blood culture was negative. The patient was started on intravenous antibiotics as per the culture-sensitivity report for 2 weeks, followed by oral antibiotics. The patient had an uneventful recovery and was asymptomatic at the last follow-up.

Discussion

Vertebral osteomyelitis and discitis are common manifestations of osteomyelitis in adults. Lumbar vertebrae are the most commonly

involved level, followed by thoracic and cervical vertebrae in that order.^[1] *Staphylococcus aureus* is the most common prevalent organism in pyogenic vertebral osteomyelitis. Other Gram-positive organisms such as *Staphylococcus epidermidis* and *Streptococcus* species are the second most common organisms.^[2]

Patients with diabetes mellitus, chronic renal failure, long-standing steroid intake, history of intravenous drug abuse, chronic immunosuppression, or human immunodeficiency virus are more vulnerable to vertebral osteomyelitis.^[3] Urinary tract infection, respiratory tract infections, and intravenous drug abuse are the most common sources of spinal osteomyelitis.^[3]

Osteomyelitis of the cervical region is rare and is seen in about 3%–10% of cases of vertebral osteomyelitis.^[2] However, incidence of cervical spine involvement in intravenous drug



Figure 1: X-ray of cervical spine taken three months ago does not reveal any bony destruction



Figure 2: X-ray of cervical spine, lateral view reveal substantial bony destruction of C5 and C6 vertebral body with resulting kyphosis



Figure 3: Computed tomography scan of cervical spine showing extent of vertebral body destruction



Figure 4: Magnetic resonance imaging of cervical spine showing pre- and peri-vertebral inflammation

user is around 27%.^[4] Cervical osteomyelitis usually affects patients in the fifth through seventh decade of life.^[5]

The most common route for spread to the cervical spine is hematogenous.^[5] Cervical spine is also affected by infection spreading from adjacent tissues or due to contamination after invasive or therapeutic procedures.^[6]

Spinal pain usually begins insidiously and progresses over several weeks. Pain is often worse at night. Neurological symptoms are found in about 60% of cervical osteomyelitis whereas it is seen in 5%–20% of patients with lumbar or thoracic spine involvement.^[5] High incidence of neurological deficits in cervical osteomyelitis can be explained by the relatively small cross-sectional diameter of the spinal canal compared to the diameter of the cervical spinal cord. Neurological deficits occur as a result of direct spinal cord compression by epidural abscess, segmental deformity, instability, and as a result of disc rupture.^[7]

P. aeruginosa is a relatively uncommon cause of vertebral osteomyelitis, incidence ranging around 5%.^[8] *P. aeruginosa* cervical osteomyelitis has mostly been reported intravenous drug users.^[9] One case of *P. aeruginosa* cervical osteomyelitis in a nonintravenous drug user healthy male has been described and the source was proposed to be the urinary tract.^[10] A few cases of *P. aeruginosa* cervical osteomyelitis has been reported following dental extraction when patients developed neck pain within 24 h of dental extraction but were managed as cases of retropharyngeal abscess or muscle spasm and later on developing progressive neck pain, systemic manifestations, and neurological symptoms.^[11,12] Cervical osteomyelitis due to *P. aeruginosa* has also been described in panfacial polytrauma patients.^[13]

Vertebral osteomyelitis is usually treated conservatively with antibiotics for 4–6 weeks and spinal immobilization; in a few cases, surgical management may be indicated in case of absence of clinical improvement after 2–3 weeks of intravenous antibiotics, presence of persistent pain, development of biomechanical instability, vertebral collapse with progressive deformity.^[14]

Conclusion

We present a rare case of *P. aeruginosa* cervical osteomyelitis in a young female without any history of intravenous drug abuse and no comorbidity. In this case, possibly bacteremia following genital tract intervention resulted in bacteremia and secondary infection of cervical vertebrae. Persistent

and progressive neck pain in the background of operative intervention of urogenital tract should be viewed with suspicion and calls for a differential diagnosis of infectious lesion of cervical vertebrae. Hence, early diagnosis is paramount in prevention of neurological deficits resulting from cervical spine osteomyelitis.

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Conflicts of interest

There are no conflicts of interest.

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