

Pneumococcal Vertebral Osteomyelitis after Epidural Injection: A Rare Event

Tamara M Johnson^{1,2}, Chandrika Chitturi^{1,3}, Michael Lange^{1,4}, Jin S Suh^{1,4}, Jihad Slim^{1,2}

¹Department of Medicine, New York Medical College, Valhalla, NY, ²Department of Infectious Diseases, St. Michael's Medical Center, Newark, Departments of ³Internal Medicine and ⁴Infectious Disease, St. Joseph's Regional Medical Center, Paterson, NJ, USA

ABSTRACT

Streptococcus pneumoniae vertebral infections have rarely been reported. Herein, we report a case of pneumococcal vertebral osteomyelitis with paraspinal and epidural abscesses as well as concomitant bacteremia following epidural injection. This will be the second case in the literature reporting pneumococcal vertebral osteomyelitis related to epidural manipulation.

Key words: Epidural injection, pneumococcal vertebral osteomyelitis, *Streptococcus pneumoniae*

INTRODUCTION

Streptococcus pneumoniae is a well-known cause of respiratory tract infections, otitis media, and meningitis. However, pneumococcal skin and soft-tissue infections and osteomyelitis, particularly vertebral infections, are an uncommonly reported occurrence.^[1] Cigarette smoking, alcoholism, splenic dysfunction, and chronic illnesses such as chronic obstructive pulmonary disease have long been identified as independent risk factors for pneumococcal disease.^[1-3] However, in the absence of these factors, there are seldom reports denoting invasive pneumococcal infections in healthy adults. We will report the second case of *S. pneumoniae* vertebral osteomyelitis associated with epidural manipulation.

CASE REPORT

A 62-year-old male with lumbago presented with acutely worsening back pain after receiving an epidural injection 1 month before evaluation. The pain was constant, aggravated by movement, and associated with bilateral lower extremity numbness and weakness. Furthermore, the patient reported a 2-day history of

fever (103.2°F maximum), chills, and decreased ambulation. No bowel/bladder dysfunction, saddle anesthesia, or incontinence was noted. Physical examination revealed tachycardia, L3–4 pinpoint tenderness, and reduced lower limb motor strength. Laboratory studies expressed leukocytosis without bandemia and elevated erythrocyte sedimentation rate (94 mm/h) and C-reactive protein (18.989 mg/dL). Chest X-ray was negative for infiltrate. Contrast magnetic resonance imaging of the lumbosacral spine revealed marrow enhancement of L3–4 including facet, multiloculated abscesses involving paraspinal musculature, epidural abscess, and cauda equina impingement [Figure 1]. Septic workup was obtained before empirically starting vancomycin and piperacillin-tazobactam. Computed tomography-guided aspiration of the paraspinal abscesses was completed, followed by surgical evacuation of epidural abscess and laminectomy due to worsening neurologic deficits. Two

Address for correspondence:

Dr. Tamara M Johnson, E-mail: tamaram_johnson@yahoo.com

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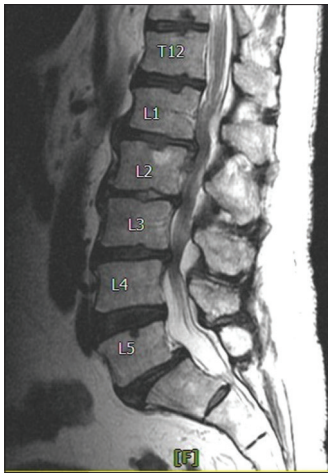


Figure 1: Magnetic resonance imaging of the lumbosacral spine with intravenous contrast showing epidural crescent collection posteriorly L1–2 consistent with epidural abscess, enhancement of the vertebral bodies L3–4, and multiple fluid collections extending in the paraspinal musculature from L2 to S1

days later, blood cultures taken on admission and before surgical intervention revealed growth of penicillin-sensitive *S. pneumoniae*. Extracted purulent materials expressed the presence of many white blood cells on Gram stain but no organisms. After surgical intervention, the patient's pain and neurologic function significantly improved and defervescence with continued antibiotics. He was subsequently deemed stable for discharge. Given the sensitivity profile of the pneumococcus isolated as well as the extent and severity of illness, he was treated with ceftriaxone 2 g twice daily for 6 weeks. Upon completion of antibiotic therapy, repeat magnetic resonance imaging noted resolution of bone marrow signaling changes.

DISCUSSION

There are limited reports of pneumococcal vertebral infections noted.^[1,4] In a case review conducted by McHenry *et al.* involving 253 patients with vertebral osteomyelitis, *Streptococcus* was deemed to be the causative organism in <10%, accounting for 24 cases.^[5] However, there was no denotation of the specific species involved.^[4] When Rueda *et al.* reviewed 136 case of invasive pneumococcal disease, defined as the isolation of *S. pneumoniae* from a sterile site such as bloodstream, cerebrospinal fluid, or joint fluid, only one patient was noted to have vertebral osteomyelitis due to hematogenous seeding of the spine associated with pneumococcal endocarditis.^[4]

Upon literate review, we found only one other case in which invasive procedure was associated with pneumococcal vertebral osteomyelitis. In this instance, Dhillon and Russell reported a 31-year-old female who received obstetric

epidural anesthesia 8 days before the development of T4-L1 osteomyelitis and epidural abscess.^[1,6] She was afebrile and exhibited no clinical signs of infection at the time of delivery. The patient subsequently delivered a healthy male infant without note of neonatal complications or infections.^[6] In our case, the proposed source of infection was paraspinal abscesses at the epidural injection site, leading to seeding of the vertebrae, epidural abscess, and subsequent bacteremia. Neither of these two patients was found to have any immunodeficiency or chronic illness. In addition, there were no clinical stigmata consistent with infective endocarditis exhibited. The only apparent predisposing factor was epidural injection. While epidural anesthesia carries the risk of introducing microorganisms into the dural space if aseptic techniques are not followed or if the injectable drugs are contaminated, the offending microbes are typically skin commensals such as *Staphylococcus* species or fungi, respectively.^[7]

The presence of vertebral osteomyelitis should be considered in any person with new onset or acutely worsening back pain, fever, and the development of neurologic symptoms.^[8,9] In addition, localized tenderness at the site of infection may be infrequently present.^[9] Laboratory testing may reveal elevated inflammatory markers, which is highly sensitive in making diagnosis and usually repeated to assess for clinical response during treatment.^[8,9] Other equally important diagnostic tests include blood cultures and radiologic imaging.^[8] Magnetic resonance imaging is generally preferred versus contrast tomography scan due to its greater sensitivity in detecting early osteolytic changes and marrow edema.^[8,9] Biopsy of the affected area is advised if blood cultures are negative for growth or if high suspicion of mycobacteria, fungi, or *Brucella* species.^[8,9]

The recommended duration of antibiotics for bacterial vertebral osteomyelitis ranges from 4 to 6 weeks minimum upward to 3–6 months depending on extent of disease, offending microorganism, and response to treatment.^[1,8-10] The goals of therapy include increased mobility and functionality, eradication of infection, and normalization of inflammatory markers.^[8,9] Owing to its rarity, the optimal treatment for pneumococcal vertebral osteomyelitis has not been established. In the most recent guidelines, Berbari *et al.* gave no specific recommendations for the treatment of *S. pneumoniae* vertebral osteomyelitis.^[8] The current mainstay of therapy is medical treatment with beta-lactams including penicillins and cephalosporins.^[1,4] In patients with severe penicillin allergy, fluoroquinolones may serve as a reasonable alternative given their good bone and blood–brain barrier penetrance; however, no

consensus can be made pertaining to the optimal antibiotic management given such limited incidence of cases.^[1] While surgical intervention is required in the presence of epidural abscess and neurologic symptoms, laminectomy and/or debridement of infected tissue has no proven mortality benefit in the absence of these aforementioned situations.^[1,8]

CONCLUSION

We have presented the second case in the literature of pneumococcal vertebral osteomyelitis related to epidural anesthesia. We conclude that *S. pneumoniae* should be considered as a causative bacterium in skin and soft tissue as well as osteomyelitis. While there are some well-studied and proven associations with the development of invasive pneumococcal disease and certain host immunodeficient states and chronic illnesses, such is not always the case. Therefore, we believe that more data are needed to assess the role that epidural steroid injection could play in the development of invasive pneumococcal disease and to form recommended treatment strategy for pneumococcal vertebral osteomyelitis.

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Conflicts of interest

There are no conflicts of interest.

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