

CASE REPORT

Pediatric epidural spinal abscess due to *Staphylococcus aureus*

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Received on April 12, 2023

Accepted on May 24, 2023

Key words:

Epidural abscess
Staphylococcus aureus
Pediatrics

Palabras clave:

Absceso epidural espinal
Staphylococcus aureus
Pediatría

Abstract

Spinal epidural abscess is a rare invasive infection in children, representing a medical-surgical emergency due to the risk of irreversible paralysis. The clinical triad of thoracolumbar pain, fever, and neurological involvement is not always evident, leading to potential delays in diagnosis. *Staphylococcus aureus* is the most common causative agent, and secondary septic foci should be ruled out when associated bacteremia is present.

We present the case of an 11-year-old patient with an unremarkable personal history, who consulted because of paresthesia and weakness in the lower limbs that developed over a few hours, as well as a 4-day history of fever and low back pain. Physical examination revealed hypoesthesia from D10 down, weakness of both lower limbs (strength 1/5), and absence of patellar and ankle reflexes. Magnetic resonance imaging confirmed a posterior dorsal spinal abscess causing spinal cord compression. Intravenous antibiotic treatment was started and urgent surgery involving laminectomy and drainage was performed. Methicillin-sensitive *S. aureus* was isolated from the abscess culture, but there was no associated bacteremia. The patient completed a 3-week course of intravenous cloxacillin, showing a favorable clinical outcome without neurological sequelae.

ABSCESO EPIDURAL ESPINAL PEDIÁTRICO POR STAPHYLOCOCCUS AUREUS

Resumen

El absceso epidural espinal es una infección invasiva infrecuente en pediatría que constituye una urgencia médico-quirúrgica por el riesgo de parálisis irreversible. La tríada clínica de dolor dorsolumbar, fiebre y afectación neurológica no siempre está presente, lo que puede demorar el diagnóstico. *Staphylococcus aureus* (*S. aureus*) es el agente causal más frecuente, debiendo descartarse focos sépticos secundarios cuando hay bacteriemia asociada.

Presentamos el caso de una paciente de 11 años, sin antecedentes personales de interés, que consultó por parestesias y debilidad en miembros inferiores de horas de evolución, junto con fiebre y dolor lumbar desde hacía 4 días. En la exploración física presentaba hipoestesia desde D10, debilidad de ambos miembros inferiores (fuerza 1/5) y abolición de reflejos rotulianos y aquileos. Se diagnosticó por resonancia magnética de absceso espinal dorsal posterior con compresión medular, se inició tratamiento antibiótico intravenoso y cirugía urgente con laminectomía y drenaje. Se aisló en cultivo del absceso *S. aureus* meticilín sensible, sin bacteriemia asociada, completando 3 semanas de tratamiento intravenoso con cloxacilina, con evolución clínica favorable sin secuelas neurológicas.

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INTRODUCTION

We present a rare case of an invasive infection due to *Staphylococcus aureus* (*S. aureus*), which is relevant because of the potential complications arising from delayed diagnosis, as this may lead to irreversible motor paralysis.

Spinal epidural abscess is a rare condition that occurs in approximately 1 in 100,000 individuals⁽¹⁾. It typically affects adults aged 50-60 years⁽²⁾, and is infrequent in children. The most common etiologic agent is *S. aureus spp*, which may reach the spinal area through direct extension or hematogenous dissemination from a secondary infectious focus⁽¹⁾.

CASE REPORT

An 11-year-old female patient with an unremarkable personal history presented to the Emergency Department because of paresthesia and acute loss of strength in the lower limbs, evolving over a few hours. In addition, she had high fever and lumbar pain radiating to the rib cage, persisting without response to oral analgesia for the past 4 days. Furthermore, bowel movements were absent, indicating a habitual constipation pattern. The PET scan was normal. The body temperature was 38.2°C, heart rate 111 bpm, and blood pressure 119-78 mmHg. Physical examination was normal. Neurological examination revealed no focal abnormalities, and normal cranial nerves. Upper-limb strength was 5/5, while lower-limb strength was 1/5. Tactile and painful hypoesthesia was observed at the level of D10. The patient could not walk or stand, and sitting was painful even with support. Achilles and patellar reflexes were absent. Lumbar flexion was impossible due to pain, and the Lasague sign was positive in both lower limbs. Blood analysis showed $9370 \times 10^3/\mu\text{l}$ leukocytes and $7300 \times 10^3/\mu\text{l}$ neutrophils, CRP 208 mg/L, with normal biochemistry and coagulation (except fibrinogen 862 mg/dl). Urgent spinal magnetic resonance imaging (MRI) showed a posterior epidural collection from D7 to D10, restricting diffusion and producing significant spinal cord compression of approximately 50% (Figure 1). During the diagnostic tests, there was a rapid progression of neurological symptoms, with a loss of strength and sensation in both lower limbs developing within the following 2 hours. Urgent surgical intervention was performed, consisting of laminectomy at the level of D8-D9 and drainage of the abscess, without complications. Empirical antibiotic therapy with intravenous (i.v.) cefotaxime was started. In the culture of the abscess, oxacillin-sensitive *S. aureus spp* was isolated; therefore, antibiotic therapy was switched to iv cloxacillin, given for 3 weeks. Blood culture on admission was negative. The postoperative dorsal CT scan showed a lesion in the base of the right lung suggestive of a necrotic infectious focus (Figure 2), and additional studies were performed to rule out other infectious foci (echocardiography, abdominal ultrasound, PET-CT). The outcome was highly favorable, with complete recovery of motor and sensory functions, allowing independent sitting and walking, with no surgical or neurological complications. The patient was discharged with an oral course of linezolid until completing 6 weeks of treatment and with satisfactory clinical and radiological improvement after hospital discharge.



FIGURE 1. MRI with contrast of the dorsal lumbar spine showing a posterior epidural collection extending from D7 to D10 (arrow), characterized by well-defined boundaries, elongated morphology, and heterogeneous signal intensity. No lesions are observed in the vertebral bodies.

DISCUSSION

A spinal epidural abscess is a rare invasive bacterial infection in children, resulting from the accumulation of purulent material between the dura mater and the spinal canal⁽³⁾. It is a medical-surgical emergency due to the risk of irreversible paralysis.

The most common etiology is *S. Aureus* observed in 60-70% of the cases⁽³⁻⁵⁾, followed by Gram-negative bacilli⁽¹⁾. Less common pathogens include coagulase-negative staphylococcus and Gram-negative bacteria, specifically *Escherichia coli* and *Pseudomonas*.

The pathogenic mechanisms include hematogenous seeding of a bacteremic process, dissemination from an adjacent infectious focus, or direct inoculation due to trauma, spinal surgery, or an epidural catheter⁽³⁻⁵⁾.

Different risk factors have been described, including diabetes, obesity, intravenous drugs, history of local trauma, spinal surgery, and recent placement of catheter or epidural injection, although in children these are described in only one third of the cases^(4,6).

The classic clinical triad (dorsolumbar pain, fever and neurological signs) manifests only in a minority of patients (9-33%)^(3,6,7), leading to potential delays in diagnosis. In our case, the patient presented with the classic triad, raising early suspicion of spinal cord compression due to a spinal

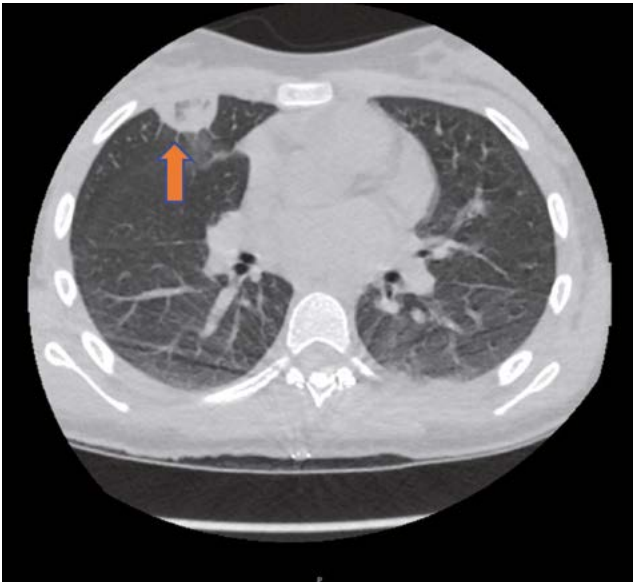


FIGURE 2. Postoperative dorsal CT scan showing increased density in the anterior pulmonary segment of the right upper lobe (arrow), with areas of lower density within, suggestive of a lesion in cavitation pathways (focus of necrosis/infarction or abscess). The remaining lung parenchyma is normal.

mass. None of the risk factors outlined in the literature were present in her case.

Four clinical stages were described by Heusner in 1948: stage 1: back pain at the level of the affected vertebrae; stage 2: radicular pain from the affected area; stage 3: motor and sensory impairment and/or bladder and bowel dysfunction; stage 4: paralysis. Once the patient enters stages 2 and 3, the spinal cord is involved and urgent spinal cord decompression is required, as was the case in our patient with rapid neurological progression.

MRI is the diagnostic test of choice due to its high sensitivity and multiplanar capacity, which helps to define the location and anatomical extension, assisting in surgical planning. CT with contrast is an option when MRI is not immediately available or is contraindicated⁽⁸⁾. Acute phase reactants are usually elevated and there is typically leukocytosis with a left shift. Blood culture may be positive in up to 50% of cases⁽³⁾.

S. aureus bacteremia is associated with secondary septic foci^(5,9). In adults with *S. Aureus* bacteremia, epidural abscesses are reported in up to 8%⁽⁹⁾. Although our patient had a negative blood culture, a lesion suggestive of pulmonary infection was found. Consequently, additional studies were performed to investigate other potential infectious foci, with negative results.

Treatment is based on iv antibiotic therapy and surgical drainage, including decompressive laminectomy and

urgent debridement in indicated cases. As *S. aureus* is the most frequent pathogen, it is recommended to start early empirical therapy according to the local resistance pattern (vancomycin/cloxacillin). The duration of treatment is 3-4 weeks, extending to 6 weeks if vertebral osteomyelitis is present⁽³⁾.

Irreversible paralysis is the most severe complication, resulting from spinal cord ischemia due to direct compression, abscess expansion, or ischemia secondary to vascular involvement^(3,10). The abscess can evolve rapidly and unpredictably, as occurred in our patient. The time of progression from one stage to another is highly variable and may develop from a mild neurological deficit to paraplegia within hours or days⁽¹¹⁾. Prognosis is related to the clinical stage at the time of diagnosis and depends on early diagnosis and treatment⁽⁷⁾.

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