

Klebsiella pneumoniae Spinal Epidural Abscess treated conservatively: case report and review

Filipe Araújo^{1,3}, Célia Ribeiro¹, Inês Silva¹, Patrícia Nero^{1,2}, Jaime C. Branco^{1,2}

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ABSTRACT

Spinal infections are rare but potentially life-threatening disorders. A high level of clinical suspicion is necessary for rapid diagnosis and treatment initiation. The treatment combines both antibiotics and surgical intervention in the vast majority of cases. The authors report the case of a 84-year old female patient with a three week history of persistent lumbar back pain radiating to both thighs following a lower respiratory tract infection. She had lumbar spine tenderness but no neurological compromise. Her inflammatory markers were elevated and lumbar spine magnetic resonance imaging revealed L4-L5 spondylodiscitis with spinal epidural abscess. Blood cultures isolated *Klebsiella pneumoniae* and, since she was neurologically stable, conservative treatment with two-week intravenous gentamicin and eight-week intravenous ceftriaxone was initiated with positive inpatient and outpatient evolution.

Keywords: *Klebsiella pneumoniae*; Spondylodiscitis; Epidural abscess.

INTRODUCTION

Spinal infections are severe but rare disorders. Spondylodiscitis and spinal epidural abscess (SEA) are two of the most important spinal infections and their incidence has been rising in the past decades owing to the growing number of patients with predisposing risk factors (such as diabetes mellitus, alcoholism, immunodeficiency, intravenous drug use, neurosurgery and

other spinal instrumentation) but also to a better and earlier diagnosis^{1,2}. Pathogens can access the spine through haematogenous spread from a distant focus (the predominant route), direct external inoculation or contiguous infected tissues (with SEA complicating 5-18% of spondylodiscitis through this latter mechanism)³. *Staphylococcus aureus* is the leading agent of both spondylodiscitis and SEA in developed countries, with *Klebsiella pneumoniae* being an uncommon one.

In the presence of SEA, aggressive treatment combining surgical drainage and systemic antibiotics should be performed in the overwhelming majority of cases, since serious infectious and neurological complications can occur⁴. Medical treatment alone might be used in exceptional circumstances.

The authors report the case of a *K. pneumoniae* lumbar spine spondylodiscitis with SEA managed conservatively.

CLINICAL CASE

An 84 year-old female caucasian patient presented to our Emergency Department with a three-week history of persistent lumbar back pain that radiated to both thighs. She had no fever, no weight loss or night sweats and no history of trauma. No lower limb neurological complaints were reported. One week prior to the beginning of her lumbar back pain she was diagnosed with a lower respiratory tract infection and was treated with amoxicillin and clavulanic acid (875+125 mg b.i.d.) for ten days on an outpatient basis with improvement of her respiratory complaints.

The patient had controlled hypertension for 10 years, currently treated with diltiazem (60 mg q.d.); peptic ulcer diagnosed 15 years earlier, currently treated with lansoprazol (30 mg q.d.); she had no history of drug reactions and no tobacco, alcohol or illicit drug abuse was reported.

1. Department of Rheumatology, Centro Hospitalar de Lisboa Ocidental, Hospital de Egas Moniz

2. CEDOC, Faculdade de Ciências Médicas, Universidade Nova de Lisboa

3. Institute of Microbiology, Faculdade de Medicina da Universidade de Lisboa

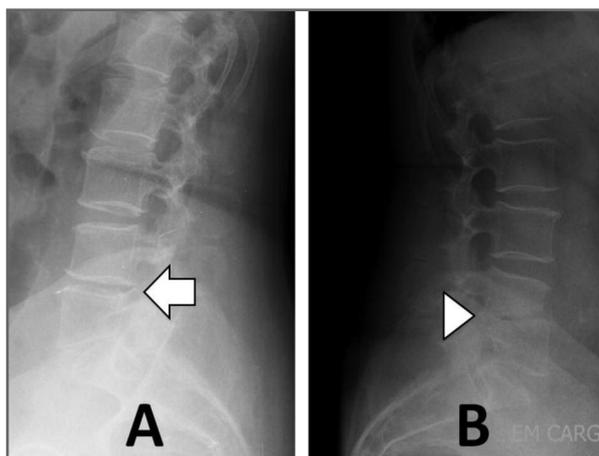


FIGURE 1. (A) Lumbar spine radiograph by the time the patient presented to our Emergency Department, showing early signs of spondylodiscitis: narrowing of the L4-L5 intervertebral disk space (arrow); (B) Lumbar spine radiograph after 8-week treatment with Ceftriaxone and 2-week treatment with Gentamicin showing narrowing of disk space and destruction of the superior endplate (arrowhead), towards vertebral fusion

Physical examination revealed normal blood pressure, pulse and respiratory rate. The temperature was 36.2°C. The skin was pale and she had no cyanosis. Chest and abdomen examination showed no abnormalities. Negative renal Murphy sign bilaterally. She had lumbar spine tenderness but with normal gait and normal lower limb rheumatologic examination including negative Laségue sign. Neurologic examination was unremarkable for lower limb motor or sensory function loss. Lower limb reflexes were also normal.

Initial laboratory test results revealed hemoglobin level of 9.1 g/dL, MCV 92.8 fl, MCHC 32.9 g/L, 7.8×10^9 leucocytes with 77.7% neutrophils, 331×10^9 platelets/L, normal reticulocyte count, iron 25 µg/dL (N: 37-170), ferritin 100 ng/mL (N: 13-264), TIBC 217 µg/dL (N: 250-450), normal folic acid and B12 vitamin levels. Kidney and liver function tests were within normal range. Serum protein electrophoresis revealed no abnormalities. C-reactive protein (CRP) level was 13.9 mg/dL and erythrocyte sedimentation rate (ESR) was 79 mm/h. Normal urinalysis. Chest radiograph and electrocardiogram were unremarkable. Lumbar spine radiograph showed osteophytosis and a slight narrowing of the L4-L5 intervertebral disk space (Figure 1). Renal ultrasound revealed normal sized and shaped kidneys with no signs of calculi or pyelonephritis.



FIGURE 2. Sagittal T2-weighted MRI showing L4-L5 spondylodiscitis complicated by anterior epidural abscess (arrow) and soft tissue phlegmon (arrowhead)

The patient was admitted with the clinical suspicion of spondylodiscitis.

Three days after admission the patient started daily fever spikes usually in the afternoon (maximum tympanic temperature of 38.8°C) that were easily resolved with cooling measures and paracetamol. Since she was clinically stable it was decided to postpone antibiotic empiric therapy until all microbiological samples were obtained. Thoracic and lumbar spine magnetic resonance imaging (MRI) confirmed L4-L5 spondylodiscitis and a voluminous epidural abscess with moderate dural sac compression. It was also visible a moderate sized soft-tissue phlegmon (Figure 2). Blood cultures isolated *Klebsiella pneumoniae*. Purified protein derivative (PPD) test was non-reactive. *Mycobacterium*-specific blood cultures and *Brucella* spp. polymerase chain reaction were both negative. Urine cultures were sterile. The patient was submitted to CT-guided intervertebral disc biopsy that was negative for causative organisms and showed only cartilaginous

tissue on histologic examination. After discussion with the Department of Neurosurgery it was decided that conservative treatment would be appropriate and the patient started ceftriaxone 1000 mg b.i.d. and gentamicin 80 mg q.d., both intravenously. She was treated with Gentamicin for two weeks with close antibiotic-level and kidney-function monitoring. Fever subsided 6 days after starting the antibiotic treatment and, at week 2 of treatment, control lumbar spine MRI showed persistence of L4-L5 spondylodiscitis but epidural abscess size reduction. At this time CRP level was 5.9 mg/dL. The patient completed 8 weeks of Ceftriaxone. By the time of discharge she reported significant pain improvement. Her CRP was negative and lumbar spine MRI continued to show positive evolution of both spondylodiscitis and SEA.

DISCUSSION

Spondylodiscitis represents 3-5% of all cases of osteomyelitis¹. Blood-borne spondylodiscitis can originate from the genitourinary tract (17%), infectious endocarditis (12%), skin and soft tissue (11%), intravascular devices (5%), gastrointestinal tract (5%), respiratory tract (2%) and the oral cavity (2%)⁵. Gram-negative bacteria are the third leading cause of pyogenic spondylodiscitis in developed countries with *Escherichia coli* as the main pathogen. *K. pneumoniae* is responsible for about 1.8% of pyogenic spondylodiscitis⁶ and 1% of SEA². Once the infection is settled in the intervertebral disc and vertebral bodies, it may originate local and systemic complications. Locally, it may spread to the myofascial tissues and epidural space or it may destroy the vertebral body and disc causing spinal instability and deformity⁷. Systemically, it can degenerate into uncontrolled sepsis.

In this case, the diagnosis of spondylodiscitis was suspected since a temporal relationship could be established between the lower respiratory tract infection and the beginning of a persistent and refractory lumbar back pain. This clinical suspicion is of utmost importance since the majority of spinal infections is confounded with spine degenerative disease and is consequently misdiagnosed at an early stage. Classical symptoms of both spondylodiscitis and SEA were present: spinal pain, fever and neurologic signs (radiculopathy)^{1,2,4}. Heusner proposed in 1948 a staging system for patients with SEA: stage 1, back pain; stage 2, nerve-root pain radiating from the involved spinal area

(radiculopathy); stage 3, motor weakness, sensory deficit and bowel or bladder dysfunction; stage 4, paralysis^{3,4}. This patient was included in the second stage.

The absence of leukocytosis is not an unusual finding since it is present in only one third of spondylodiscitis¹ and two thirds of SEA⁴. ESR and CRP, both elevated, are sensitive but not specific of spinal infections. All biological samples should be obtained previously to the beginning of antibiotics, although treatment should not be withheld in severe cases, for instance, sepsis⁶. The performed CT-guided intervertebral disc biopsy showed normal cartilaginous tissue and normal cultures, which suggests that it didn't reach the site of infection. Since there were already positive blood-cultures for *K. pneumoniae*, no second percutaneous or surgical intervertebral disc biopsy was executed. MRI is the imaging method of choice for spondylodiscitis and SEA for its excellent sensitivity and specificity¹⁻⁶.

It is consensual that, in the presence of a SEA and due to the possible adverse outcomes, surgical drainage combined with systemic antibiotics is the treatment of choice⁴. Posterior decompression (laminectomy) is reserved for isolated posterior SEA, whereas anterior decompression should be performed in anterior SEA with or without vertebral body and disc involvement³. However, there are a few exceptions to this invasive approach. If surgery is declined by the patient or is contraindicated because of elevated operative risk, if the paralysis is present for more than 36 hours or if the SEA is panspinal, medical treatment alone is recommended⁴. Patients not suffering from severe loss of spinal cord or cauda equina function may also qualify for conservative treatment as long as a microbial cause is identified and frequent clinical, laboratorial and imaging evaluation is performed². The patient was included in the second stage of Heusner classification. Since she was neurologically stable and had positive blood-cultures for *K. pneumoniae*, conservative therapy with antibiotic treatment alone was used based on the antibiotic sensitivity test. One of the most controversial issues is the duration of this treatment because no uniform recommendations exist for spinal infections. A minimum of 6 weeks of intravenous antibiotic seems appropriate in the published literature for concomitant SEA and spondylodiscitis. The treatment should be prolonged for a period varying from 8 to 12 weeks^{2,3,8}.

The authors decided to report this case because, to

our knowledge, this is the first reported *K. pneumoniae* lumbar SEA originating from the respiratory tract that was treated conservatively. In the existing literature there are three reported cases of *K. pneumoniae* SEA originated from the gastrointestinal tract, two of them treated with surgical intervention^{9,10,11}. In a recent review of 12 patients from Taiwan with Gram negative SEA, *K. pneumoniae* and *Salmonella* spp. were the most frequent causative pathogens (three cases each) and the majority were treated with a combination of surgery and antibiotics¹².

In conclusion, patients should be carefully selected for isolated conservative treatment based upon their clinical and neurological status and frequent clinical and imaging evaluation should be performed.

CORRESPONDENCE TO

Filipe Araújo,
Serviço de Reumatologia, Hospital Egas Moniz,
Rua da Junqueira, 126
1349-019 Lisboa, Portugal
E-mail: flipar@msn.com

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PARADIGM SHIFT III

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