Case Report

*Escherichia coli* septic arthritis of a lumbar facet joint following urinary tract infection

José Ignacio Herrero Herrero *, Judit García Aparicio

Servicio de Medicina Interna, Hospital Los Montalvos, Hospital Universitario de Salamanca, Los Montalvos, s/n, 37192 Salamanca, Spain

1. Introduction

Infection of a facet joint represents a minority of cases of hematogenous pyogenic spinal pathology and is a rare, although perhaps underdiagnosed, cause of back pain. Staphylococcus aureus is the organism most frequently responsible for this condition and magnetic resonance imaging is the technique of choice in its diagnosis.

We report the case of a senior, diabetic woman who was admitted to the hospital referring a subacute history of fever and back pain 15 days after she had been diagnosed with a genitourinary infection for which she had received ciprofloxacin. Physical examination showed fever (38.8 °C) and pain on pressure over the lower lumbar spinous vertebral apophyses and over the lower left paraspinal musculature. Investigations showed a white cell count of 8.4 \times 10^9/l, neutrophils 85.3%, erythrocyte sedimentation rate of 125 mm/h, and C-reactive protein of \geq 9 mg/dl. Two blood cultures were both positive for *Escherichia coli* resistant to ciprofloxacin. There was no growth of pathogens from the urine cultures. Scintigraphy with gallium citrate Ga^{67} showed vertical lower lumbar (L4–L5) radionuclide uptake lateralized to the left. Magnetic resonance imaging of the lumbar spine demonstrated signal changes and alteration of the structure at the left interapophyseal L4–L5 joint, an adjacent small collection of 1 cm in diameter, and infiltration of the surrounding soft tissues, which extended to the epidural area, left conjunction hole, and paraspinal muscles. The patient was treated with intravenous cefotaxime and gentamicin and bed rest for 21 days, and recovered. This is the first report of interapophyseal arthritis caused by *E. coli*.

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2. Case report

A 77-year-old diabetic woman was admitted to the hospital with a 15-day history of general malaise, fever (38.5 °C), urinary frequency, dysuria, and altered glycemic profiles. She had recently been diagnosed with a genitourinary infection (based on symptoms plus positive results on an over-the-counter dipstick test) as an outpatient, and had received two courses of ciprofloxacin antibiotic treatment. Two days prior to this admission, she developed left-sided lumbar paravertebral pain with radiation into the homolateral buttock and proximal thigh. The patient had a previous history of hypertension, type 2 diabetes mellitus, osteoporosis, and gonarthrosis. She had not undergone any instrumentation procedures prior to this episode and had not been given any corticosteroid or immunosuppressive medication.

On admission, she appeared conscious, oriented, and well hydrated. She had no skin lesions. Her blood pressure was 140/65 mmHg, she had a regular heart rate of 95 per minute, axillary temperature was 38 °C, and O2 saturation (pulse oximetry) was 93%. There was no lymphadenopathy. Cardiac and pulmonary physical examinations were unremarkable. The abdomen showed no clinical signs of peritoneal irritation, masses, or enlarged organs. Bilateral renal percussion was negative. There was pain on pressure over the lower lumbar spinous vertebral apophyses and over the lower left paraspinal musculature. Flexo-extension and especially rotation of the lumbar spine was painful. Laségue's sign was negative bilaterally. The strength, sensitivity, and osteotendinous reflexes of the lower limbs were normal.
Investigations showed normochromic normocytic anemia with a hemoglobin of 9.9 g/dl, white cell count of \(8.4 \times 10^9/l\) (85.3\% neutrophils), platelets of \(195 \times 10^9/l\), and an erythrocyte sedimentation rate of 125 mm/h. Coagulation was within the normal range. Glucose was 18 mmol/l, osmolarity 286 mOsm/kg, and the pH 7.54. C-reactive protein was \(\geq 9\) mg/dl (normal range 0–1 mg/dl). Renal function, serum electrolytes, lipid profile, liver indices, thyroid hormones, serum tumor markers, vitamin B\(_{12}\), folic acid, and protein electrophoresis were normal. The ferritin level was 824 ng/ml (normal range 12–200 ng/ml) and soluble transferrin receptors was 16.3 nmol/l (normal range 8.5–33.3 nmol/l). Glycated hemoglobin was 8.1%. Urine analysis was negative for nitrites and showed 20 white cells/\mu l. Glucosuria and proteinuria were positive and ketonuria was absent. Her electrocardiogram and chest X-ray were normal. X-ray of the lumbar spine showed L4–L5 spondylolisthesis and plain films of the sacroiliac joints were normal.

Two blood cultures from samples obtained at admission were both positive for E. coli resistant to ciprofloxacin and co-trimoxazole and responsive to beta-lactams and aminoglycosides. There was no growth of pathogens from the urine cultures (including those with growth enhancing media for mycobacteria). The Mantoux tuberculin test was negative (0 mm).

Scintigraphy with gallium citrate Ga\(^{67}\) showed vertical lower lumbar (L4–L5) radionuclide uptake lateralized to the left (Fig. 1). Magnetic resonance imaging of the lumbar spine demonstrated degenerative changes with multiple osteophytes, loss of intervertebral disc signal, disc protrusion, and hypointense areas on T1- and T2-weighted sequences, suggestive of osteosclerotic islets; L4–L5 lysis was also evidenced. At the level of the left interapophyseal L4–L5 joint, signal changes and alteration of the structure were noted, associated with an adjacent collection of 1 cm in diameter and infiltration of the surrounding soft tissues, which extended to the epidural area, left conjunction hole, and paraspinal musculature (Fig. 2).

Upper and lower gastrointestinal endoscopies were performed, which excluded an underlying malignancy at those levels.

The patient was treated with intravenous cefotaxime and gentamicin and bed rest for 21 days. The fever and back pain gradually resolved. Magnetic resonance imaging was repeated at three weeks from the start of treatment and showed the disappearance of the epidural involvement, the persistence of a minimal edema of the paraspinal muscles, and a residual collection around the left interapophyseal joint L4–L5.

3. Discussion

Septic arthritis of the facet joints (SAFJ) is a rare entity: no more than 50 cases have been reported so far, none of them caused by E. coli.

SAFJ is thought to represent 4–20\% of cases of hematogenous pyogenic spinal infection\(^1\)\(^,\)\(^2\) and its diagnosis is probably becoming more common with the increasing availability of more sensitive imaging techniques. The lumbar region is more frequently affected by this condition, particularly the L4–L5 level, as in our patient. Infection affects the facet joints bilaterally only rarely.\(^3\)

Underlying immunodepressive states and simultaneous infectious processes can be documented at the time of diagnosis. From the clinical point of view, SAFJ is usually community-acquired, manifests as an acute–subacute lateralized inflammatory back pain and fever, and is difficult to differentiate from spondylodiscitis without the help of imaging techniques. Extension to the epidural space and/or paraspinal structures is common, and variable types (e.g., radiculopathy, hemiparesis, etc.) and degrees of neurological impairment are observed during its course in some cases.\(^1\)\(^,\)\(^2\)

Staphylococcus aureus is, by far, the organism most frequently responsible for cases of SAFJ, and the most common form of dissemination is hematogenous. Potential sources of propagation are the skin, intravenous catheters, and more rarely, respiratory and urinary tract infections, although cases of direct inoculation (therapeutic joint infiltration,\(^4\) epidural catheter,\(^5\) mesotherapy,\(^6\) and acupuncture procedures\(^7\)) have been reported. The hematogenous spread to the spine from a urinary source could occur through the Batson venous plexus. Etiologic diagnosis is established on the basis of blood cultures; guided percutaneous aspiration or surgery is only necessary when these are negative.

Magnetic resonance imaging is both sensitive and specific and is the technique of choice in the diagnosis of SAFJ and in the monitoring of its course. When gallium citrate Ga\(^{67}\) scintigraphy (also sensitive, but not specific) is applied, the radionuclide uptake is characteristically vertically oriented and lateralized, in contrast to what is observed in cases of spondylodiscitis.

Treatment of SAFJ consists primarily of antibiotics, and in selected cases of severe neurological compromise, surgical decompression is needed. Systemic complications can occur, and relapses,\(^8\) functional sequelae, and death are infrequent.

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Fig. 1. Scintigraphy of the patient with gallium citrate Ga\(^{67}\), showing vertical lower lumbar (L4–L5) radionuclide uptake lateralized to the left.
This work was approved by the Ethics Committee of the Hospital Universitario de Salamanca and the subject gave informed consent to the work.

Conflict of interest

No competing interest declared.

References


Fig. 2. Lateral (A1 and A2), axial (B), and oblique (C) T2-weighted magnetic resonance imaging scan of the lumbar spine demonstrating degenerative changes, L4–L5 listhesis, and, at the left interapophyseal L4–L5 joint, signal changes and alteration of the structure associated with infiltration of the surrounding soft tissues, which extends to the epidural area, left conjunction hole, and paraspinal musculature. A small collection of 1 cm adjacent to the left interapophyseal L4–L5 joint is also identified (C, arrow).