International Journal of Case Reports in Orthopaedics

E-ISSN: 2707-8353
P-ISSN: 2707-8345
IJCRO 2021; 3(2): 114-117
Received: 07-05-2021
Accepted: 18-06-2021

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Septic arthritis of the lumbar facet joint with associated epidural abscess treated with endoscopic spinal surgery - A case report

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DOI: https://doi.org/10.22271/27078345.2021.v3.i2c.80

Abstract
Septic arthritis of the facet joint is a rare but severe infection of the spine. Diagnosing septic arthritis of the facet joint may be challenging due to an unusual clinical presentation or confounding symptoms. Most cases are treated with antibiotics with or without surgical debridement, depending on clinical symptoms or severity. Surgical debridement and drainage was traditionally open, but, recently, there has been an increasing interest in the use of minimally invasive surgery for the treatment of spinal infections. We report a case of a 56 year old woman with septic arthritis of the L4/L5 facet joint with an associated epidural abscess that was initially diagnosed as pyelonephritis. The patient was treated with a transforaminal endoscopic debridement, abscess drainage and a course of antibiotics. The outcomes were good, with a rapid improvement in the patient's health and resolution of her fever and back pain.

Keywords: Facet joint, septic arthritis, spine, endoscopic spine surgery, minimally invasive spine surgery

1. Introduction
Septic arthritis of the facet joint is a relatively rare but severe infection of the spine that can lead to significant morbidity or even death due to local or systemic spread The most important prognostic factor for outcome is early diagnosis and treatment. Most cases are treated with intravenous antibiotics, with or without surgical debridement, depending on clinical symptoms or severity [1-6].

In recent years there has been a shift towards the use of minimally invasive surgical (MIS) techniques in spine surgery. Although MIS techniques have, historically, been most commonly utilized for degenerative spinal conditions, in the last few years there has been an expansion of its indications, with an increasing role in spinal infections [7-10].

The authors present a case of septic arthritis of the facet joint with an associated epidural abscess, treated with percutaneous endoscopic lavage and drainage and antibiotics.

2. Case report
A 56 year old, caucasian, female patient, with a medical history of hypertension, depression and repetitive urinary tract infections, presented to the authors´ institution with complaints, that had been ongoing for 2 weeks, of back pain, predominantly right-sided, that irradiated to her right leg, fever and dysuria. On physical examination the patient had local tenderness on the right lumbar region and presented a positive renal Murphy´s sign. No neurologic deficits were present on physical examination. Her blood tests showed leukocytosis ($17{,}5\times10^3$) and an elevated C reactive protein (CRP) (13.02). Her urinalysis, also showed an elevated leukocyte count, but was, eitherwise, normal and her urine culture was negative. The lumbar spine radiographs were unremarkle (figure 1).

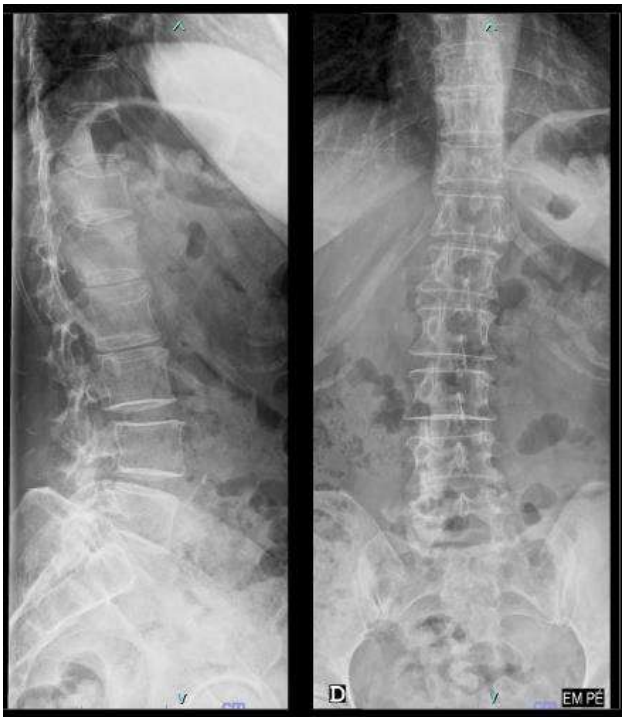

Fig 1: Plain AP and lateral spine radiography's

Based on the patients complaints and her history of repetitive urinary tract infections, an initial diagnosis of pyelonephritis was made and the patient was treated with a course of antibiotics. Despite adequate treatment with antibiotics and analgesics, the patients symptoms did not subside. Due to this, an MRI of the lumbar spine was ordered, which allowed the diagnosis of septic arthritis of the facet joint by showing a fluid collection in the right lumbar L4/L5 facet joint and an epidural abscess (figure 2 a and 2b).

Fig 2a: MRI STIR sagittal view. Fluid collection around the L4/L5 right facet joint

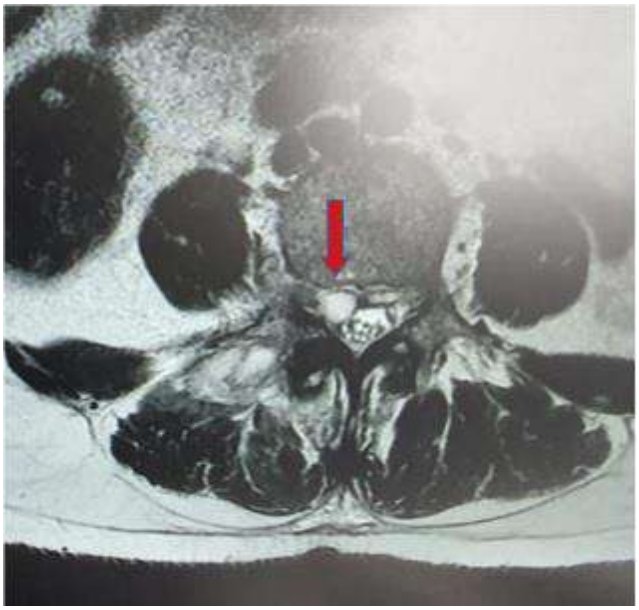

Fig 2b: MRI axial view showing the epidural abscess (red arrow)

The patient was then treated with endoscopic debridement and abscess drainage through an extreme-lateral transforaminal approach (figure 3).

Fig 3: Intra-operative image showing the epidural abscess (red arrow)

A normal saline solution was used for irrigation. Several tissue samples were sent for microbiological cultures, which came back positive for M*eticillin-sensitive Staphylococcus aureus*. The patient completed a six week course of amoxicillin with clavulanic acid. The patient was ambulating on the first post-operative day and her health rapidly improved with resolution of her fever and relief of her back pain. Follow-up blood tests at 1 week post-operative were improving, with normalization of the leukocyte count ($6{,}2\times10^3$) and a decrease of CRP (10,0). At six months follow-up, the patient was pain free and there was a complete normalization of her inflammatory markers. The six months follow-up MRI, showed no signs of bone destruction and the disappearance of the epidural abscess

3. Discussion

Septic arthritis of the facet joints commonly affects patients in the 6th decade of life, with no gender preference [1]. Various risk factors have been proposed and include a history of diabetes, intravenous drug use, end stage renal

disease, alcoholism, neoplastic disease and other immunocompromised states [1, 2, 3, 5]. Hematogeneous spread from an infection elsewhere in the body is the most frequent cause of septic arthritis of the facet joints [1, 2, 3, 5]. *Staphylococcus aureus* is the most common causative agent [1, 3, 5]. The lumbar spine is the most frequently involved [1, 3, 5]. The disease is usually unilateral without a preferential side [1, 5].

Back pain is the predominant presenting symptom, and is frequently characterized by being unilateral, present at rest and during activity and exacerbated by back extension due to pressure on the facet joint [1-5]. Radicular pain is seen in nearly 40% of cases [1, 2]. Neurological deficits may be present, usually due to extension of the infection to the epidural our intradural space, and are a sign of severity [1, 2, 4]. Fever is only present in half the patients [1, 5]. Pain can irradiate to the flank, butt ox and thigh and extension of the infection to the psoas muscle or erector spinal muscles may cause symptoms similar to those of abdominal or urological diseases [1, 2, 5].

On investigation it is common to find an elevated erythrocyte sedimentation rate and/or CRP, and approximately 50% of patients show leukocytosis [1, 2, 3, 5]. Blood cultures are positive in 50-80% of cases [1, 2].

Plain radiographs play a limited role in the diagnosis of septic arthritis of the facet joint, since radiographic evidence of a septic facet or epidural abscess is typically absent. This is because bony changes consistent with resultant osteomyelitis are only visible several weeks after the onset of symptoms [4-6].

CT scans are more sensitive (96%) and show abnormalities similar to plain radiography [1, 5].

MRI is both sensitive and specific in the diagnosis of facet joint septic arthritis, with signs of infection being present as early as 2 days after onset of symptoms. MRI scans demonstrate the presence of joint effusion and erosion and parapsinal muscle edema. Contrast enhancement may reveal the presence of paraspinal or epidural abscess. Gadolinium-enhanced MRI is therefore the imaging modality of choice in the diagnosis of pyogenic facet infection and in delineating the extent of bone and soft tissue involvement. Advancements in imaging technology and the easy access to MRI, have allowed the diagnosis of an increasing number of cases of septic arthritis of the facet joint, but, despite these improvements, septic arthritis of the facet joint is still a diagnostic challenge due to an unusual clinical presentation or confounding symptoms [1, 2, 5, 6].

Treatment of septic arthritis of the facet joint usually consists of parenteral antibiotics with or without surgical debridement depending on clinical symptoms or severity [1, 2, 3, 4] Surgical intervention must be considered in patients with mechanical instability, neurological impairments, epidural abscesses, failed conservative treatment, or when there is need of a biopsy [1-5].

The role of MIS in spinal infections has grown significantly in the last years, whether it be for diagnostic biopsy, decompressing neural structures or for maintaining or restoring spinal stability [7-10].

With percutaneous endoscopic debridement and drainage one can directly observe the lesion, collect sufficient specimen, drain pus directly, release intraductal pressure and irrigate inflammatory factors with the advantage of less blood loss during surgery, less surgical wound pain, quicker patient recovery and less approach related complications compared to traditional open surgery [7-10].

In our case the diagnosis of septic arthritis of the facet joint was made after an MRI in a patient with a diagnosis of pyelonephritis that did not respond to appropriate treatment. Due to the presence of an epidural abscess, we opted for surgical debridement, which was done by endoscopy. This allowed us to directely observe the lesion, as well as collect specimens for culture and drain the epidural abscess.

Due to the risk of a Dural tear with an interlaminar approach we used a transforaminal approach, which was in this case an extreme-lateral transforaminal approach, because of the abscess' ventral location, this allowed us to enter directly in the epidural space, without the need of a foraminotomy. Due to the adherence of the epidural abscess to the dura mater, we did not excise the epidural abscess, and only preformed its drainage. Our approach allowed the patient to weight-bear the next. No post-operative complications were registered and the patient had a favorable outcome.

4. Conclusion

In conclusion, septic arthritis of the facet joint is a diagnostic challenge, and should be suspected in patients with back pain, fever and spine tenderness. Minimally invasive surgery, like endoscopy, is a good option in the diagnosis and treatment of this condition, with less complications and a faster patient recovery.

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