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Case Report

Vertebral Osteomyelitis: A Potentially Catastrophic Outcome after Lumbar Epidural Steroid Injection

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Background and Objective: Epidural steroid injections are commonly used to palliate the symptoms of spinal stenosis. Deep tissue infection is a known potential complication of these injections. There have been no previous published cases of osteomyelitis without epidural abscess after such injections. We present a case in an elderly patient who presented only with persistent axial low back pain following a lumbar epidural steroid injection (LESI). We emphasize early patient evaluation, consideration of infectious predisposing factors, sterile technique, and skin disinfectant.

Design: Open-label case report.

Case description: A 77-year-old diabetic male with a history of radicular pain related to lumbar spinal stenosis was treated successfully several years prior with a series of lumbar epidural steroid injections (LESI) and was re-treated with LESIs for recurrent symptoms. Following his second epidural injection, he presented with back pain and induration at the injection site without fever or neurological deficits. Urgent magnetic resonance imaging (MRI) revealed a soft tissue abscess extending close to the epidural space around the corresponding L4/L5 vertebral level. The patient recovered after incision and drainage of the abscess which was associated with an osteomyelitis of the L4 and L5 vertebral spine. The causative organism was methicillin-resistant *Staphylococcus Aureus*.

Conclusion: This case demonstrates that even with proper aseptic techniques, immune-compromised patients who are colonized with an aggressive micro-organism may develop a potentially catastrophic infectious complication if subtle persistent symptomatic complaints are not promptly and carefully evaluated.

Key words: osteomyelitis, epidural steroid injection, methicillin-resistant staphylococcus aureus (MRSA)

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Interventional pain physicians routinely use fluoroscopically guided lumbar epidural steroid injections (LESI) with depo-corticosteroids to treat chronic pain associated with lumbar central spinal stenosis (1-4). As the life expectancy of our patient population increases, the prevalence of pain secondary to spinal stenosis in the pain patient population will likely increase. The use of LESI has in fact risen as reflected in a 271% increase in Medicare claims between the years 1994 to 2001 (5).

Complications associated with epidural steroid injections are uncommon with few published reports of serious adverse events (6). Infection after any interventional pain procedure is uncommon but is a known potential complication. Although epidural abscess complications have been described, there has not been a published report of osteomyelitis without epidural abscess after lumbar epidural steroid injection (6). Our goals in this report include:

1. To report a case of osteomyelitis following LESI.
2. To emphasize careful clinical evaluation of patients with persistent pain following a LESI particularly in those patients with predisposition for infection.
3. To describe factors to consider when choosing a skin disinfectant for spinal injections.

Case Description

This is a 77-year-old male with a history of Type 2 insulin-dependent diabetes mellitus and severe coronary artery disease, who was referred for the treatment of radicular symptoms related to multilevel spinal stenosis. The patient complained of pain that radiated down the anterior left leg to the knee and was exacerbated by stair climbing or lying on his back. He denied any significant numbness, weakness, or bowel/bladder dysfunction. Magnetic resonance imaging (MRI) of the lumbosacral spine revealed multilevel degenerative disc disease, facet arthropathy, and multilevel central canal stenosis from L3 to L5. In the past, a series of 3 LESI provided remission of his radicular pain for 2 years. Unfortunately, his symptoms reoccurred in the same distribution, which prompted him to return to our clinic. After careful re-evaluation, his symptoms were felt to be due to spinal stenosis and he was treated with a LESI at L4-5.

At our clinic, all LESIs are performed under fluoroscopic guidance using radiographic contrast. A strict sterile technique is maintained, with the operator wearing a surgical cap, mask, and sterile gloves. The skin is cleaned thoroughly with 10% povidone iodine solution skin preparation and allowed to dry prior to the procedure. The injectate consists of 80 mg of depo-methylprednisilone acetate diluted in 2 ml of preservative-free normal saline.

The patient followed up 3 months later and had a sustained 50% reduction in his pain intensity and reported improvement in his daily activities. Because of this encouraging result, a second LESI was done at the L4/5 level (Fig. 1). His pre-procedural blood glucose was 153 mg/dL.

Twenty days later after the second LESI, the pa-

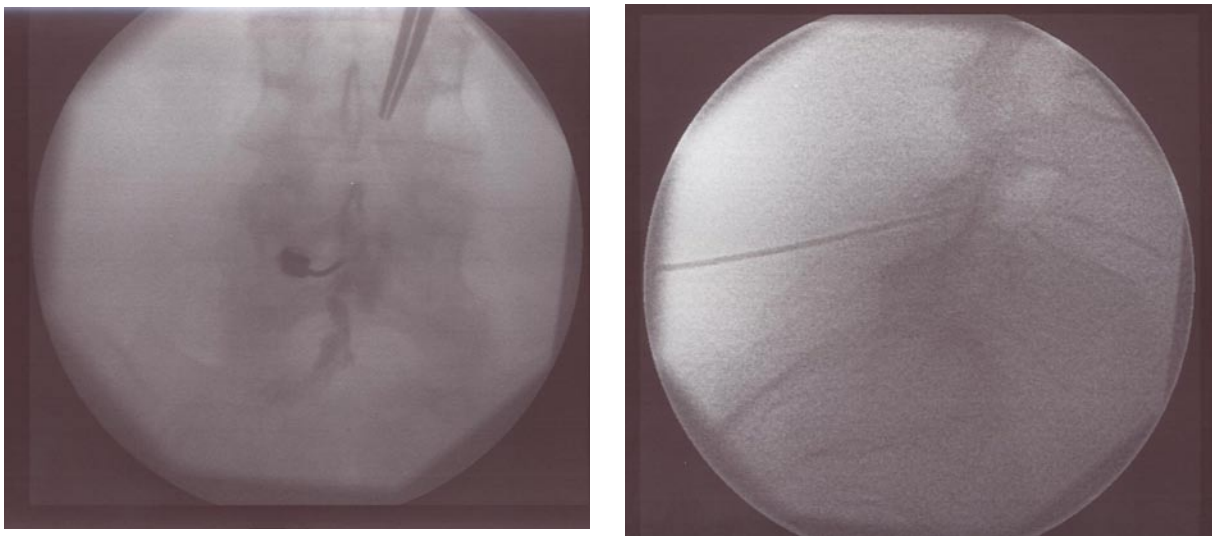

Fig. 1. *Anteroposterior and lateral views of an L4/5 epidural steroid injection with contrast.*

tient developed progressive back pain and tenderness around the area where the epidural injection was performed. He denied any fever, chills, leg weakness, or bladder or bowel dysfunction. The physical examination on admission was unremarkable, except for the presence of tenderness to palpation around the site of injection with a 3-centimeter area of induration. The patient was afebrile and presented without any motor or sensory deficits. Laboratory studies did not demonstrate a leukocytosis. The erythrocyte sedimentation rate (ESR) was elevated to 114 mm/hour and the C-reactive protein (CRP) was 13.9 mg/L.

Because of progressive low back pain, an urgent MRI without contrast was ordered and revealed a soft tissue abscess extending close to the epidural space around L4-L5 level. Figure 2, a sagittal view of the lumbar spine, demonstrates T1 abnormalities of the soft tissue extending close to the epidural space. Figure 3, an axial view, demonstrates that the epidural fat is preserved, confirming that the infection did not extend into the epidural space.

Five hours after admission, the patient was taken to the operating room for incision and drainage of the abscess. The skin was incised in the midline over the L4-L5 levels, and dissection was carried down through the skin and subcutaneous tissue. There was evidence of grossly purulent material, which was encountered at the level of the fascia and extended below the fascia into the interspinous ligament. A portion of the spinous process and interspinous ligament was removed. There was no evidence of continuation of this purulence below the lamina; it did not extend to the epidural space confirming the finding on MRI. A sample of the bony material was sent for culture and sensitivity. This culture indicated an infection with methicillin-resistant staphylococcus aureus (MRSA).

Fig. 2. *Areas of T1 abnormalities within the soft tissue, paraspinal muscles, all the way toward the lamina.*

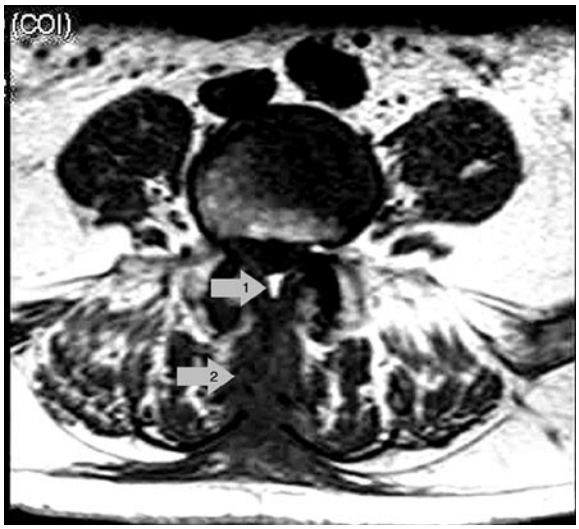

Fig. 3. *Inflammatory reactive tissues spreading to the lamina with epidural soft fat preserved, confirming that the infection did not extend into the epidural space: 1) preserved epidural fat, (2) inflammatory reactive tissue. Exam limited due to lack of contrast.*

Vancomycin was started after the surgery, upon recommendations from an infectious disease consultation. Urinanalysis, blood cultures, and transesophageal echocardiography performed after surgery were negative for growth and vegetations. The patient was discharged home 4 days after surgery with a peripherally inserted central catheter line (PICC) and he completed 45 days of Vancomycin with resolution of the infection.

Discussion

The prevalence of low back pain in the elderly population ranges from 31.5% to 40% (7). Spinal stenosis is the most common cause of low back pain with radiculopathy in elderly patients, and epidural steroids injections are a commonly used treatment for symptomatic spinal stenosis in these patients with emerging efficacy data (1-4,8). The treatment of lumbar spinal stenosis with LESIs has been considered a relatively weak indication in the past (9). Surgery is another available treatment, although many patients have co-morbidities which may increase the risk of surgery and limit recovery. In addition, prospective 5-year outcome studies for surgical intervention have shown that older patients have a greater risk of recurrence of symptoms in less than 5 years (10). For these reasons, LESIs have been viewed as having a favorable risk/benefit ratio in the elderly with spinal stenosis and this is reflected in their common clinical application (11). In our elderly patient with a coexisting disease, we viewed his positive response to LESIs in the distant past as well as one recent treatment as a clinically favorable trend to proceed with an additional injection.

Unfortunately, this patient had several of the factors that predispose to an increased risk of infection, such as advanced age, diabetes mellitus, and potential immunosuppression from the previous injection (12). Unknown to the treating physician, he was also colonized with an aggressive pathogen, MRSA. Even though infectious complications from lumbar epidural steroids injections are rare, there is a higher incidence associated with multiple injections over a prolonged time period (6,13).

The only symptom after injection in this patient was back pain, which is common complaint following a spinal injection. Mild soft tissue pain related to the injection itself can persist for days to weeks after an injection. Other typical symptoms of infection were not present, although fever is not a sensitive finding for vertebral osteomyelitis, with up to 50% of patients with confirmed vertebral osteomyelitis being afebrile (14). Therefore, a patient complaining of increasing pain after a LESI should be assessed for changes in the quality or location of pain, headache, neck pain or stiffness, leg pain, changes in leg weakness or sensation, fever, saddle anesthesia, and bladder or bowel dysfunction. The differential diagnosis should include new pathology such as meningitis (chemical, aseptic, or bacterial), arachnoiditis, inadvertent subdural or subarachnoid injection, epidural abscess, and epidural hematoma.

Skin flora is suspected to be the most common source of infection for epidural abscess (15). Some skin bacteria may not be completely eliminated during skin disinfection with iodine preparations, and these bacteria may seed deeper structures during needle placement, potentially causing an epidural abscess or osteomyelitis (16). Previous studies have demonstrated that bacteria beneath the stratum corneum and in hair follicles are the cause of contamination because of the difficulty in eradicating bacteria from those structures (17). Staphylococcus aureus is the most common organism in pyogenic vertebral osteomyelitis (18). It has been shown that after adequate skin application of 10% povidone iodine solution, epidural needles can have a contamination rate as high as 34.6% after placement (19). Alcohol-based iodophor cleaning solutions have been shown to have greater disinfectant activity than 10% povidone iodine solutions prior to epidural catheterization (20). In multiple prospective randomized trials, chlorhexidine-based solutions provided a greater decrease in the number of positive skin cultures compared to povidone, and perhaps should be considered for immuno-compromised patients (21-23).

The Center of Disease Control (CDC) and Prevention, recommends the use of 2% chlorhexidine-based preparations over either 10% povidone iodine or 70% alcohol to minimize the risk of central line catheter related bloodstream infections (24). If a chlorhexidine-based solution is available, one should consider following these recommendations in patients with significant infectious risk factors who are receiving interventional procedures. It should be noted though that there is no direct, conclusive data on the optimal disinfectant solution for preventing infections in this setting, and this should be studied further.

Conclusion

Even though lumbar epidural injections are considered safe, the routine use of lumbar epidural steroid injections in patients with diabetes or any other state of immunological compromise should be done with caution and only in patients who demonstrate a clear response to the treatment. This case demonstrates that even with strict aseptic techniques, infection after a lumbar epidural steroid injection is a potentially catastrophic complication. Our patient did not suffer any permanent neurological complications, but if the treatment had not been as timely, the scenario could have been very different. Only a high index of suspicion will improve the diagnostic process and decrease the severity of an infectious complication. Chlorhexidine-based solutions may be associated with better skin disinfection for pain procedures in patients with risk factors for immunosuppression.

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