

Epidural Steroid Injection in the Setting of Epidural Granulation Tissue on Pre-procedure Imaging

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Abstract

Spinal epidural abscesses are an uncommon, but potentially devastating complication associated with interventional pain procedures performed on the spine. Unfortunately, the signs and symptoms of an infection of the spine can be nonspecific. The significance of certain findings on pre-procedure imaging may be ambiguous, which presents a challenge when developing a treatment plan for patients. One such finding is that of epidural granulation tissue, which is associated with multiple etiologies, ranging from benign to emergent. In this report, we present a case where granulation tissue seen on pre-procedure imaging may have been associated with the development of osteomyelitis and discitis of the spine, as well as an epidural abscess.

Keywords: *Pain Medicine; Epidural Steroid Injection; Epidural Abscess; Granulation Tissue*

Abbreviations

MRI: Magnetic Resonance Imaging; TFESI: Transforaminal Epidural Steroid Injection; WBC: White Blood Cell; ESR: Erythrocyte Sedimentation Rate; CRP: C Reactive Protein; UTI: Urinary Tract Infection

Introduction

Low back pain is one of the most commonly encountered complaints in pain management. It can significantly impair patients' function and result in economic burden through decreased productivity and increased healthcare costs. There are many possible sources of low back pain. While it is often benign in nature, this symptom can be indicative of life-threatening pathologies, such as malignancy or infection [1,2]. Medical decision making in the treatment of this condition relies on information gathered from a combination of history, physical examination, and diagnostic testing. Imaging studies are very useful in determining etiology and identifying potentially emergent conditions; therefore, it is important to have a thorough understanding of the findings one may potentially encounter [3]. In this report, we present a case where granulation tissue seen on pre-procedure imaging may have been associated with the development of an infection of the spine.

Case Presentation

A 50-year-old male initially presented for evaluation of low thoracic back pain, lumbar back pain, and right shoulder pain. Pertinent past medical history included nephrolithiasis and a T9 fracture. His past surgical history was significant for a right rotator cuff repair six months prior to presentation. Previous pain procedures included three lumbar epidural steroid injections approximately one year prior

to presentation, which were performed at another pain medicine practice. The patient was given an oral prednisone taper and referred for magnetic resonance imaging (MRI) of the lumbar spine. This was significant for degenerative changes in the lower lumbar spine, including central disk herniation at L5-S1, with prominent reactive granulation tissue posterior to the herniated disc space, severely compressing the thecal sac at this level (Figure 1).

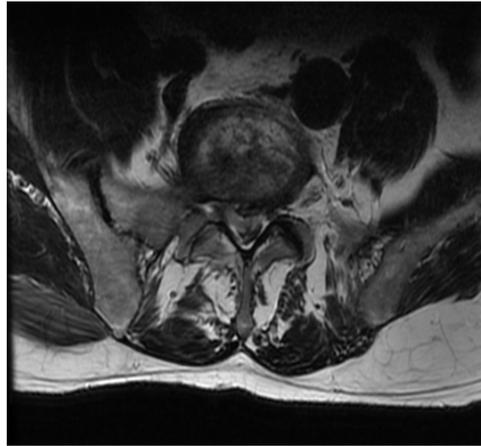


Figure 1: Pre-procedure MRI.

A T2 weighted image from the pre-procedure MRI of the lumbar spine without contrast demonstrating a central disc herniation extending to the left and a prominent amount of granulation tissue posterior to the herniated disc space at the L5-S1 level. This results in marked compression of the thecal sac with severe spinal canal stenosis.

The patient was initially scheduled for a transforaminal epidural steroid injection (TFESI), however the procedure was delayed due to his MRI findings and he was instructed to follow up with orthopedic surgery. The following day, the patient obtained a referral from his orthopedic spine surgeon for a TFESI. He was then evaluated in the pain clinic and displayed no signs or symptoms concerning for infection or other contraindications to the procedure. A bilateral TFESI at the L5 level was performed without complication. The patient reported minimal pain relief at a follow up phone call the next day.

On post procedure day eleven, the patient presented to the emergency room of an outside hospital with complaints of low back pain, gait instability, and intermittent fevers. Additionally, he reported having right shoulder pain that was more severe over the past week. He was afebrile and hemodynamically stable. Laboratory values were notable for a WBC count of 12,000/mm³, an ESR of 77 mm/hr and a CRP of 29.8 mg/dL. Urinalysis was indicative of a urinary tract infection. An MRI of the lumbar spine with and without contrast was performed, which was significant for L4-5 and L5-S1 discitis and L4, L5, and S1 osteomyelitis. A ventral epidural abscess/phlegmon was noted extending from the L4 through S1 levels. The infection of the spine was treated conservatively with intravenous antibiotics secondary to lack of neurological changes and sepsis criteria. MRI of the right shoulder revealed tears of the supraspinatus and infraspinatus tendons and a large joint effusion. The patient was brought to the operating room twice over the course of his hospitalization for irrigation and debridement of a presumed infection of the right shoulder. Blood and urine cultures from presentation and intraoperative fluid cultures from the right shoulder were positive for *Staphylococcus aureus*.

The patient requested a second opinion with an orthopedic spine surgeon, who agreed to perform a surgical drainage in the setting of his slow recovery. A L4-S1 laminectomy and evacuation of the epidural abscess with irrigation and debridement was performed three

weeks after presentation to the emergency room. The patient recovered well from this procedure. Throughout his hospitalization, he never displayed any signs of neurological compromise. He was discharged to home with a peripherally inserted central catheter for a prolonged course of intravenous antibiotics. Repeat lumbar MRI performed five months after presentation demonstrated improvement in the osteomyelitis and discitis and absence of abscess in the spine or soft tissues.

Discussion

Epidural abscess is a much-feared complication of interventional spine procedures. However, it is an uncommonly encountered condition, with an incidence of 1.2 per 10,000 patients. Of note, in up to one third of cases, there is no identifiable etiology [2]. Sources of infection include hematogenous spread, direct extension from surrounding infected tissue, and direct inoculation from a procedure or surgery. Timely diagnosis of an epidural abscess is essential due to the potential for neurologic injury. Unfortunately, this may be hindered by its nonspecific signs, symptoms, and associated laboratory values [4]. The preferred test for diagnosis of an epidural abscess and spondylodiscitis is MRI. The accuracy is improved with the use of contrast [5]. Unfortunately, the early MRI findings of an infection of the spine are nonspecific and can be associated with multiple noninfectious etiologies [6].

Of particular interest in this case is the finding of prominent reactive granulation tissue at the L5-S1 level on the pre-procedure MRI. Granulation tissue is an important part of the healing process and can be associated with multiple different conditions. Unfortunately, these conditions can range from benign to emergent. With an intervertebral disc herniation, a local inflammatory reaction and granulation tissue can be seen in the setting of post injury tissue repair [7]. Surgery involving the spine can also lead to the development of post-operative granulation tissue, which may be associated with recurrent pain or neurological deficit [8]. Granulation tissue is also seen with infections of the spine, such as an epidural abscess, especially in the chronic form [9,10]. Of note, posterior disc herniations can increase the collection of bacteria in the epidural space by interfering with blood flow through the epidural venous plexus. The subsequent development of a small epidural abscess adjacent to the posterior annulus may mimic a disc herniation on MRI [6].

In the presented case, there are multiple possible sources of infection (UTI, septic joint, TFESI-related) and it is unclear which, if any, of these was the initial source of infection. Since a central disc herniation was seen at the L5-S1 level, the presence of granulation tissue may have been an expected finding on imaging. On the other hand, it may have been indicative of infection or an abscess mimicking a disc herniation. This is supported by the fact that the subsequent infection of the spine was centered on the area where the granulation tissue was discovered. The evaluation of imaging findings was limited by the lack of contrast in the pre-procedure MRI. Additionally, there were no clinical signs or symptoms concerning for infection. Aside from the TFESI, the patient had no other significant risk factors for developing an epidural abscess. The MRI report noted no suspicion of infection or need for contrast or further imaging. This case highlights the importance of maintaining a high index of suspicion for infectious etiologies when evaluating the patient with back pain. In the interventional pain management setting, further evaluation with repeat imaging, contrast, or laboratory tests may lead to the diagnosis of infection, which would radically alter the planned treatment of the patient.

Conclusion

The significance of epidural granulation tissue on pre-procedure imaging may be ambiguous due to its association with multiple etiologies, ranging from benign to emergent. However, it is prudent to maintain a high index of suspicion for infection, especially in the interventional pain management setting.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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