

## Paraspinal Abscess Communicated with Epidural Abscess after Extra-Articular Facet Joint Injection

Moon-Soo Park,<sup>1</sup> Seong-Hwan Moon,<sup>2</sup> Soo-Bong Hahn,<sup>2</sup> and Hwan-Mo Lee<sup>2</sup>

Department of Orthopaedic Surgery, <sup>1</sup>Hangang Sacred Heart Hospital, Hallym University College of Medicine, Seoul; <sup>2</sup>Yonsei University College of Medicine, Seoul, Korea.

Facet joint injection is considered to be a safe procedure. There have been some reported cases of facet joint pyogenic infection and also 3 cases of facet joint infection spreading to paraspinal muscle and epidural space due to intra-articular injections. To the author's knowledge, paraspinal and epidural abscesses after facet joint injection without facet joint pyogenic infection have not been reported. Here we report a case in which extra-articular facet joint injection resulted in paraspinal and epidural abscesses without facet joint infection. A 50-year-old man presenting with acute back pain and fever was admitted to the hospital. He had the history of diabetes mellitus and had undergone the extra-articular facet joint injection due to a facet joint syndrome diagnosis at a private clinic 5 days earlier. Physical examination showed tenderness over the paraspinal region. Magnetic resonance image (MRI) demonstrated the paraspinal abscess around the fourth and fifth spinous processes with an additional epidural abscess compressing the thecal sac. The facet joints were preserved. The laboratory results showed a white blood cell count of  $14.9 \times 10^9$  per liter, an erythrocyte sedimentation rate of 52 mm/hour, and 10.88 mg/dL of C-reactive protein. Laminectomy and drainage were performed. The pus was found in the paraspinal muscles, which was communicated with the epidural space through a hole in the ligamentum flavum. Cultures grew *Staphylococcus aureus*. Paraspinal abscess communicated with epidural abscess is a rare complication of extra-articular facet joint injection demonstrating an abscess formation after an invasive procedure near the spine is highly possible.

**Key Words:** Complication, infection, injection, facet joint

Foot notes: The authors did not receive grants or outside funding in support of their research or

preparation of this manuscript. They did not receive payments or other benefits or a commitment or agreement to provide such benefits from a commercial entity. No commercial entity paid or directed, or agreed to pay or direct, any benefits to any research fund, foundation, educational institution, or other charitable or nonprofit organization with which the authors are affiliated or associated.

### INTRODUCTION

Facet joint injection is generally considered to be a safe procedure with few significant side effects. There have been previously reported cases of facet joint pyogenic infection and 3 cases of facet joint pyogenic infection with a spread to paraspinal muscle and epidural space due to intra-articular facet joint injections.<sup>1-7</sup> To the author's knowledge, paraspinal and epidural abscesses after facet joint injection without facet joint pyogenic infection have not previously been reported in the literature. This report describes a case of paraspinal abscess with contiguous extension into the epidural space due to extra-articular facet joint injection without pyogenic infection of the facet joint.

### CASE REPORT

On September 15, 2003, a 50-year-old man presenting with severe acute back pain and high fever was admitted to the hospital. He had a history of diabetes mellitus and had undergone

Received November 29, 2005  
Accepted July 5, 2006

Reprint address: requests to Dr. Moon-Soo Park, Department of Orthopaedic Surgery, Hangang Sacred Heart Hospital, Hallym University College of Medicine, 94-200 Yeongdeungpo-dong, Yeongdeungpo-gu, Seoul 150-719, Korea. Tel: 82-2-2639-5650, Fax: 82-2-2637-1605, E-mail: amhangpark@yahoo.co.kr

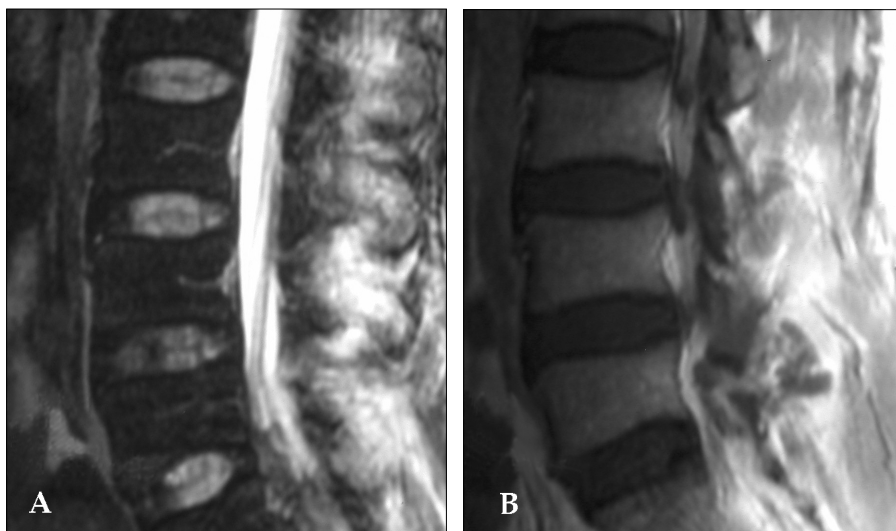
the extra-articular facet joint injection on the lumbar spine due to a facet joint syndrome diagnosis at a private clinic 5 days earlier. The medical doctor at the private clinic performed extra-articular facet joint injection without involvement of ligamentum flavum according to his report. The patient described his pain as a continuous and severe with a temperature reaching 38°C. Physical examination showed local direct tenderness over the right paraspinal lumbar region. The results of a clinical neurological examination were normal except for neck stiffness. Plain radiographs taken did not show any specific finding. Sagittal magnetic resonance imaging (MRI) demonstrated the inflammatory lesion involving the paraspinal muscle around the fourth (L4) and fifth lumbar (L5) laminae and spinous processes with an additional epidural abscess compressing the thecal sac (Fig. 1A). Gadolinium-enhanced MRI showed peripheral rim enhancement with a low-signal at the core of the abscesses (Fig. 1B). Axial MRI showed a paraspinal and epidural abscess with hyperintense signal intensity on T2-weighted images and with isointense signal intensity to the spinal fluid on T1-weighted images (Fig. 2). The facet joints and posterior arch of the L4 and L5 vertebrae were preserved. The initial diagnostic laboratory results showed a white blood cell count of  $14.9 \times 10^9$  per liter, an erythrocyte sedimentation rate of 52 mm/hour (normal range: below 15 mm/hour) and 10.88 mg/dL of C-reactive protein. Blood cultures

were negative before the antibiotic therapy. Initial and fasting blood glucoses were 494 mg/dL and 135 mg/dL respectively.

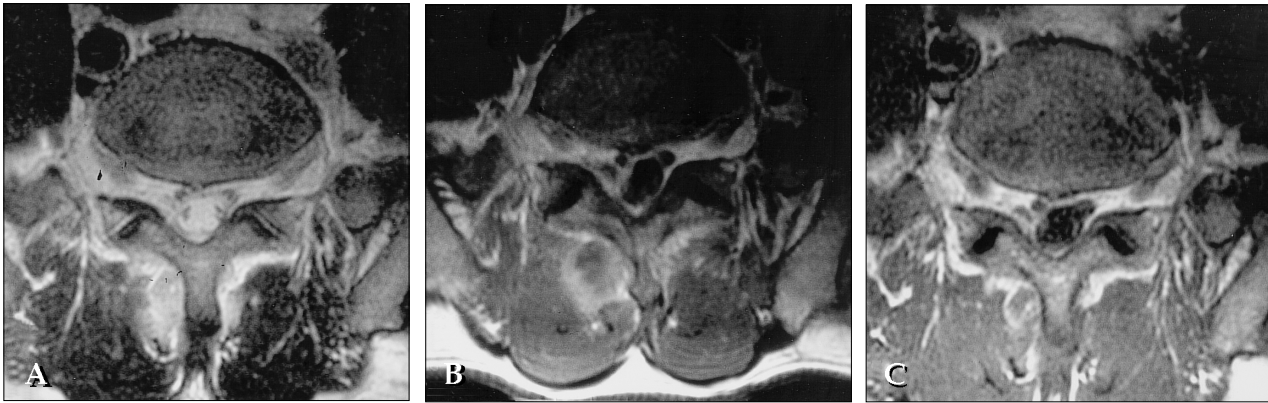
The infection did not respond to intravenous antibiotic therapy for 3 days and a new radicular pain developed, thus an operation was performed. A midline posterior approach was used to expose from L3 to the sacrum. Laminectomy of L5 and drainage of the paraspinal and epidural abscesses were performed. Thorough debridement of all necrotic musculature and irrigation with an antibiotic saline was performed. Posterior wounds were closed over 1 closed suction drain.

Intraoperative findings in the reported case showed inflammatory tissues in the paraspinal muscles surrounding the L4-L5 spinous processes. In addition, a significant amount of pus was detected in the paraspinal muscles, which communicated with the epidural space at the L4 and L5 vertebrae through a hole in the ligamentum flavum.

Multiple cultures of granulation tissue from abscesses grew *Staphylococcus aureus*. Pathologic examination of the granulation tissue showed acute and chronic inflammation in the skeletal muscle and adipose tissue. An antibiotic (levofloxacin) was administered intravenously for 7 weeks after surgery until the sedimentation rate returned to normal. At the latest follow-up assessment, 6 months after surgery, the patient remained afebrile and had a marked reduction in low back pain.



**Fig. 1.** (A) Sagittal T2-weighted magnetic resonance image (MRI) showing an epidural mass compressing the thecal sac between the laminae of L4 and L5. (B) Gadolinium-enhanced MRI showing peripheral enhancement of the mass in the paraspinal muscle.



**Fig. 2.** Axial MRI showing a mass of hyperintense signal intensity on T2-weighted image (A) and isointense signal intensity to the spinal fluid on T1-weighted image (B). Gadolinium-enhanced axial MRI showing a mass of high-signal peripheral rim enhancement with a low-signal at the core with expansion of the inflammation into the epidural space (C). There is no involvement of facet joints.

## DISCUSSION

Facet joint injections as a stand-alone treatment for low back pain are controversial. When they are used as a diagnostic tool, they can be helpful in managing low back pain as they can identify facet joint syndrome in the lumbar region of the spine.<sup>6</sup>

It is believed that the intra-articular facet joint injection is more useful than the extra-articular injection as a diagnostic tool when an injected anesthetic/steroid mixture is delivered directly into the facet joint space.<sup>8</sup> Intra-articular facet joint injection is generally considered to be a safe procedure but it can complicate facet joint pyogenic infection and although this is described in the literature, it is rare.<sup>1,7</sup> More than half of all reported facet joint pyogenic infections had additional risk factors, such as extra-spinal infection and diabetes mellitus.<sup>9</sup> Immunocompromised patients, such as those with diabetes mellitus, liver disease, alcohol abuse, intravenous drug abuse, or chronic steroid usage, may be at risk for development of facet joint pyogenic infection without infection elsewhere in the body.<sup>3,9-13</sup>

The facet joint pyogenic infection may spread from the lumbar facet joint with subsequent decompression into the epidural space and paraspinal muscles.<sup>10,14,15</sup> An epidural abscess may cause changes in reflexes and sensory and motor dysfunction with a fast progression to paralysis.<sup>1,16</sup> There have been 3 cases of facet joint pyogenic

infection with a spread to epidural and paraspinal abscesses due to intra-articular facet joint injections.<sup>1,2,6</sup> The paraspinal and epidural abscesses due to facet joint injection without facet joint pyogenic infection have not previously been reported in the literature.

In addition, extra-articular facet joint injection can complicate paraspinal abscesses.<sup>4</sup> Paraspinal and epidural abscesses due to extra-articular facet joint injection have not previously been reported.

In a few reported cases, the epidural catheter in anesthesia inserted through the hole in the ligamentum flavum, complicating both paraspinal and epidural abscesses.<sup>17-20</sup> Intraoperative findings in the reported case showed a significant amount of pus in the epidural space communicated with paraspinal abscess through a hole in the ligamentum flavum, although neither inflammatory tissue nor obvious pus was observed in the L4-L5 facet joints. It could be suggested that the secondary epidural abscess was spread through the hole in the inflamed ligamentum flavum after the primary abscess occurred in the paraspinal muscles.

Paraspinal abscess communicated with epidural abscess is a rare complication of extra-articular facet joint injection. Epidural abscess may cause paralysis and a rapid progression to death by sepsis.<sup>1,16</sup> This shows the epidural or paraspinal abscess formation after an invasive procedure near the spinal canal when neurological symptoms or new back pain occur without another

apparent cause is highly possible.

## REFERENCES

1. Alcock E, Regaard A, Browne J. Facet joint injection: a rare form cause of epidural abscess formation. *Pain* 2003;103:209-10.
2. Cook NJ, Hanrahan P, Song S. Paraspinal abscess following facet joint injection. *Clin Rheumatol* 1999;18: 52-3.
3. Ergan M, Macro M, Benhamou CL, Vandermarcq P, Colin T, L'Hirondel JL, et al. Septic arthritis of lumbar facet joints. A review of six cases. *Rev Rhum Engl Ed* 1997;64:386-95.
4. Magee M, Kannangara S, Dennien B, Lonergan R, Emmett L, Van der Wall H. Paraspinal abscess complicating facet joint injection. *Clin Nucl Med* 2000;25: 71-3.
5. Okazaki K, Sasaki K, Matsuda S, Yuge I, Omiya K, Kido H, et al. Pyogenic arthritis of a lumbar facet joint. *Am J Orthop* 2000;29:222-4.
6. Orpen NM, Birch NC. Delayed presentation of septic arthritis of a lumbar facet joint after diagnostic facet joint injection. *J Spinal Disord Tech* 2003;16:285-7.
7. Pilleul F, Garcia J. Septic arthritis of the spine facet joint: early positive diagnosis on magnetic resonance imaging. Review of two cases. *Joint Bone Spine* 2000; 67:234-7.
8. Lynch MC, Taylor JF. Facet joint injection for low back pain. A clinical study. *J Bone Joint Surg Br* 1986;68: 138-41.
9. Muffoletto AJ, Ketonen LM, Mader JT, Crow WN, Hadjipavlou AG. Hematogenous pyogenic facet joint infection. *Spine* 2001;26:1570-6.
10. Baltz MS, Tate DE, Glaser JA. Lumbar facet joint infection associated with epidural and paraspinal abscess. *Clin Orthop Relat Res* 1997;339:109-12.
11. Dauwe DM, Van Oyen JJ, Samson IR, Hoogmartens MJ. Septic arthritis of a lumbar facet joint and a sternoclavicular joint. *Spine* 1995;20:1304-6.
12. Rousselin B, Gires F, Vallée C, Chevrot A. Case report 627: Septic arthritis of lumbar facet joint as initial manifestation of spondylodiscitis. *Skeletal Radiol* 1990; 19:453-5.
13. Swayne LC, Dorsky S, Caruana V, Kaplan IL. Septic arthritis of a lumbar facet joint: detection with bone SPECT imaging. *J Nucl Med* 1989;30:1408-11.
14. Marson F, Cognard C, Guillem P, Sévely A, Manelfe C. Septic arthritis of a lumbar facet joint associated with epidural and paravertebral soft tissue abscess. *J Radiol* 2001;82:63-6.
15. Roberts WA. Pyogenic vertebral osteomyelitis of a lumbar facet joint with associated epidural abscess. A case report with review of the literature. *Spine* 1988;13: 948-52.
16. Kannangara DW, Tanaka T, Thadepalli H. Spinal epidural abscess due to *Actinomyces israelii*. *Neurology* 1981;31:202-4.
17. Bertol V, Ara JR, Oliveros A, Gros B. Neurologic complications of lumbar epidural analgesia: spinal and paraspinal abscess. *Neurology* 1997;48:1732-3.
18. Hill JS, Hughes EW, Robertson PA. A *Staphylococcus aureus* paraspinal abscess associated with epidural analgesia in labour. *Anaesthesia* 2001;56:873-8.
19. Pegues DA, Carr DB, Hopkins CC. Infectious complications associated with temporary epidural catheters. *Clin Infect Dis* 1994;19:970-2.
20. Raj V, Foy J. Paraspinal abscess associated with epidural in labour. *Anaesth Intensive Care* 1998;26:424-6.