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Epidural Abscess Following Epidural Catheterization for Painless Mobilization after Total Knee Arthroplasty

Ju-Hong Lee, M.D., Seong-Il Wang, M.D., and Kyung-Jin Song, M.D.

Department of Orthopedic Surgery, Research Institute of Clinical Medicine, Chonbuk National University Medical School, Jeonju, Korea

Epidural analgesia is one of the effective methods for pain management after total knee arthroplasty. Although epidural analgesia has been reported to have very low epidural abscess rates, infection could be serious and life-threatening, if there is no early diagnosis and treatment. We report on a patient who developed an epidural abscess following epidural catheterization after total knee arthroplasty.

Key words: knee, arthroplasty, epidural analgesia, epidural abscess

To prevent complications from delayed rehabilitation and to promote early recovery of the joint function after total knee arthroplasty, various options of postoperative pain control have been suggested.[1,2]

Epidural analgesia is one of the effective methods for pain management after total knee arthroplasty.

However, epidural analgesia can cause dural puncture and lead to complications such as post-dural puncture headache, low back pain, cord injury, epidural hematoma and neurologic symptoms. Although, epidural analgesia has been reported to have very low epidural abscess rates,[3] infection could be a serious and life-threatening problem if there is no early diagnosis and treatment. Back pain is an early sign of infection related to epidural analgesia,[4] but may be ignored in postoperative elderly patients who had been having back pain prior to an operation. We report a patient who developed an epidural abscess following lumbar epidural catheterization for painless rehabilitation after total knee arthroplasty.

CASE REPORT

A 68-year-old woman undertook staged bilateral total knee arthroplasty. Her medical history included chronic hepatitis C and hypertension, which were well managed by medication. The patient immediately started straight leg raising and quadriceps isometric exercise after surgery, and range of motion (ROM) exercise using continuous passive motion (CPM) on the 2nd postoperative day. However, due to pain, she had difficulty in achieving scheduled ROM of operated knees. Therefore, fentanyl transdermal patch (Durogesic D-TRANS; Janssen-Cilag) was added to routine postoperative pain regimen, while intravenous patient controlled analgesia (IV PCA) was still maintained.

On the 24th postoperative day, the ROM of the right knee was 0°-90° and the left knee 0°-100°. She continuously complained about severe pain during ROM exercise. In order to restore the ROM of involved knees, epidural catheterization at lumbar 4-5 epidural interspace was done by an anesthesiologist. After installation of the epidural catheter, the patient conducted ROM exercise twice a day for 2 hours using CPM without any difficulties. On the 4th post-catheterization day, she complained about severe back and radicular pain that was aggravated by a supine position. Her core temperature was 37.8°C and a mild swelling was observed in her entire lower leg. Erythrocyte sedimentation rate and C-reactive protein were elevated respectively to 39 mm/h and 101.6 mg/L. But there was no sign of infection in both knees.

At first, to rule out a periprosthetic infection and deep vein thrombosis, lower leg doppler sonography and joint aspiration were done, then spinal magnetic resonance imaging (MRI) was subsequently performed to evaluate the patient's back pain. MRI of the

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Correspondence to: Seong-Il Wang, M.D.
Department of Orthopedic Surgery, Chonbuk National University Hospital, 20 Geonji-ro, Deokjin-gu, Jeonju 561-712, Korea
TEL: +82-63-250-1760 **FAX:** +82-63-271-6538 **E-mail:** wsi1205@naver.com

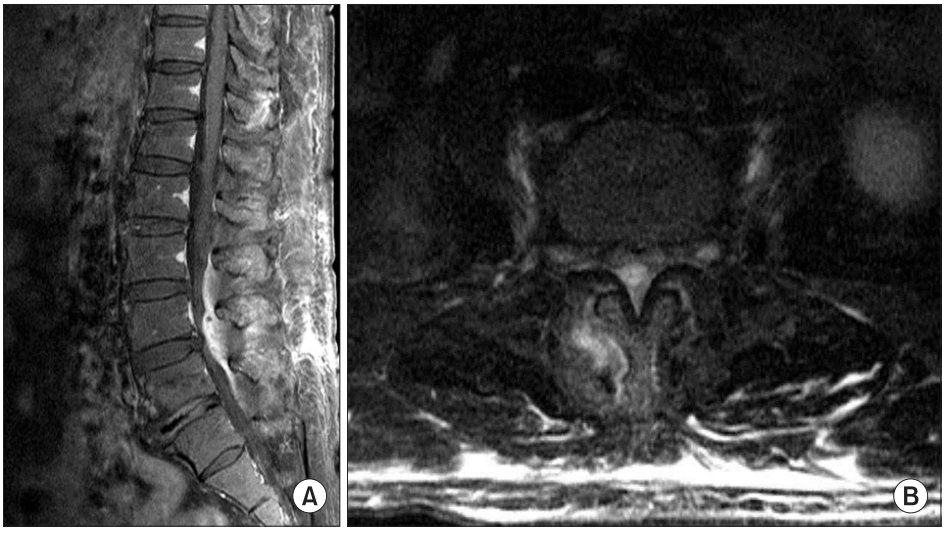

Figure 1. Preoperative imaging studies of epidural abscess. (A) Preoperative sagittal T1-weighted enhanced magnetic resonance image shows protruded disc material at lumbar 4–5 level and epidural lesion showing a high signal, compressing thecal sac at lumbar 4–5 posterior epidural lesion. (B) Axial T1-weighted enhance magnetic resonance image shows an abscess lesion showing high signal at the right facet joint and adjacent muscle.

lumbar spine revealed a 2×2×3 cm sized epidural abscess and spinal stenosis located at the lumbar 4-5 level which caused thecal sac compression. An abscess was also found around the vertebra facet joint and adjacent muscle (Fig. 1). That evening, posterior decompression and abscess drainage, back muscle debridement with antibiotic-cement beads insertion was performed as an emergent operation (Fig. 2A).

Methicillin resistant *Staphylococcus aureus* was detected by microbiological study. Antibiotic therapy was supplemented with intravenous vancomycin (1 g/12 h), which was continued for a total of 14 days. Two weeks later, posterolateral fusion using autogenous iliac bone and transpedicular screws was done after beads were removed. This procedure was for compensating instability caused by decompression of both facet joints which had been done to relieve infection and preexisting lumbar spinal spondylosis (Fig. 2B).

The patient was discharged after four weeks of antibiotic therapy. The patient had no more complaints about lower back after the surgery, and the ROM of the right knee indicated 0°-130° and that of the left knee 0°-135° at 10 months' follow-up.

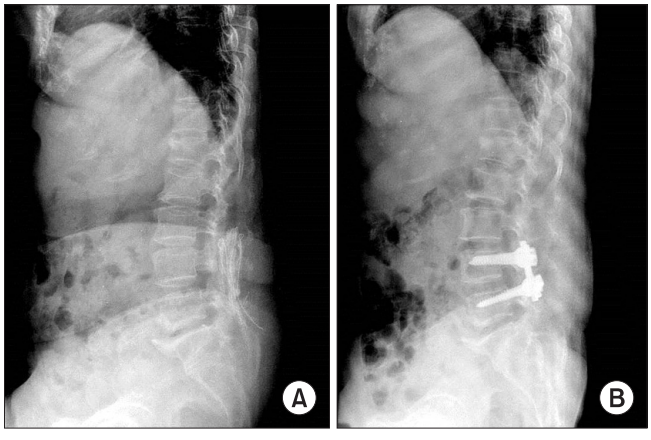

Figure 2. (A) Posterior spinal decompression and abscess drainage, back muscle debridement and antibiotic-cement beads insertion in the lesion was done as an emergency. (B) Two weeks later, posterolateral fusion using autogenous iliac bone and transpedicular screws was performed after beads removal.

DISCUSSION

Restoration of ROM after total knee arthroplasty is one of the biggest interests and we are constantly putting every effort to gain maximum ROM.[5] However, pain after surgery hinders active ROM exercise and prolonged immobilization can lead to muscle atrophy, and development of connective tissue adhesions.[6]

Thus, to prevent complications from delayed rehabilitation and to promote early recovery of the joint function postoperatively, various options of postoperative pain control have been suggested.[1,2] Epidural PCA provided better pain relief and speedy rehabilitation than IV-PCA in early postoperative period after total knee arthroplasty.[1]

Farag et al.[7] achieved conditions for early rehabilitation using epidural analgesia with only local analgesic after total knee arthroplasty. This benefit lead to excellent pain relief, and avoidance of the adverse effects of adding opioids to epidural infusion such as respiratory depression, nausea, vomiting, and pruritis.[7] But, epidural analgesia can cause dural puncture and ensuing post-dural puncture headache, low back pain, cord injury, epidural hematoma and neurologic symptoms as complications. Although Kindler et al.[8] in a survey from 1983 to 1995 reported 2 cases of epidural abscess after epidural analgesia in 13,414 patients, infection could be serious and life-threatening if there is no early diagnosis and treatment.

Risk factor for epidural abscess formation after catheter insertion according to Kindler et al.[8] is the duration of the catheterization. Immune deficient states such as acquired immune deficiency syndrome, malignancy, alcohol abuse, diabetes mellitus and steroid use may be also implicated.[9] Our patient had only active hepatitis C virus and hypertension which were properly managed with medication.

The early clinical manifestation of epidural abscess can be nonspecific, and its diagnosis is challenging. Diagnosis may be delayed or ignored in elderly patients who have had long history of back pain prior to operation. Thus, in case of severe back pain associated with systemic signs of infection, thorough evaluation should be performed, even in the absence of neurologic signs and symptomes. MRI is the modality of choice because of its superior morphological imaging and diagnostic value.

In our case, involvement of the posterior bony elements and the posterior epidural space were observed in MRI. The epidural catheter may have caused the epidural abscess by direct contamination. Hematoma formation or local tissue inflammation caused by the epidural catheter may also have constituted predisposing factors.

Although there are some cases of epidural abscess that have been successfully treated with antibiotics administration alone,[10] surgical treatment is usually indicated in the presence of an epidural abscess with uncontrolled severe back pain, spinal instability and neurologic deficits.[3] Our patient had no more complaints after spinal decompression and abscess drainage, and there was no recurrence at 10 months' follow-up.

Epidural analgesia is one of the effective methods to prevent complications from delayed rehabilitation and to promote early recovery of joint function after total knee arthroplasty. Although the incidence is seemingly low, epidural analgesia-related infections can occur, which may lead to serious complications. Vigilance for these infections, especially in elderly patients with a history of chronic low back pain is needed, prevent to delayed diagnosis and treatment.

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슬관절 전치환술 후 통증 없는 관절운동을 위한 경막 외 카테터 삽입 후 발생한 경막 외 농양

이주홍 • 왕성일 • 송경진

전북대학교 의학전문대학원 정형외과학교실, 임상의학연구소

경막 외 마취는 슬관절 전치환술 후 통증 조절에 효과적인 방법이다. 경막 외 마취 후 경막 외 농양은 드물게 발생하나 진단과 치료의 지연 시 생명까지 위협될 수 있다. 저자들은 슬관절 전치환술을 시행한 환자에서 경막 외 카테터 삽입 후에 발생한 경막 외 농양 1예를 경험하였기에 보고하는 바이다.

색인단어: 슬관절, 치환술, 경막 외 마취, 경막 외 농양

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책임저자 왕성일

전주시 덕진구 건지로 20, 전북대학교병원 정형외과

TEL 063-250-1760, **FAX** 063-271-6538, **E-mail** wsi1205@naver.com

