Extensive Spinal Epidural Abscess: The Usefulness of Minimal Invasive Surgical Technique using Epidural Irrigation Catheter

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Spinal epidural abscess (SEA) is a rare infection but may be devastating and fatal. We describe a case of a 42-year-old male who presented with a posteriorly located SEA extending from C2 to the sacrum with severe neurologic deficits. We had the emergency surgery with the minimal invasive technique using epidural irrigation catheter, and then obtained an excellent recovery. The purpose of this report introduces the usefulness of minimal invasive surgical technique for extensive SEA.

Key Words: Spinal epidural abscess • Minimal invasive surgical technique

INTRODUCTION

Spinal epidural abscess (SEA) is unusual, however, severely infectious condition that may cause serious neurological disability. An accumulation of pus between the spinal dura mater and the surrounding fat is called SEA. With the increases of the abscess in size, it spread both laterally and vertically out along the dural sheath, choosing the line of least resistance. For this reason, it could spread out over the whole spine causing so-called extensive SEA. We describe a case of extensive SEA and discuss about the surgical strategies of this rare infection.

CASE REPORT

A 42-year-old man was transferred from a local clinic complaining of sudden both upper and lower limb weakness. One month previously, he had a traffic accident and development back pain, so he admitted local clinic diagnosed lumbar sprain. Before he admitted to our hospital, he had no medical history. He had the epidural block. A day before he came, he complained myalgia and back pain. And then three hours before he visited to our hospital, his legs were paralyzed. On physical examination, his body temperature was 38°C and he had moderate nuchal rigidity and tenderness along the cervical spine.

Neurologic examination showed a G1/G5 motor power in right upper limb muscle groups and G0/G5 in left side. Motor power of lower limb muscle groups was G0/G5, bilaterally. Digital rectal examination revealed reduced anal sphincter tone. He felt anesthesia below C8 dermatome.

The initial blood profile showed leukocytosis (16,600/uL) with neutrophil dominant (85.5%). C-reactive protein level (CRP) was 187.9 mg/L (normal range < 5 mg/L) and erythrocyte sediment rate (ESR) was 58 mm/hr (normal range < 10 mg/L). X-ray of the whole spine scan showed no significant abnormality. Emergent whole spine MRI scan was performed and posterior located epidural mass from C2 level to S1 was found, which were highly enhanced on T1 weight image with Gadolinium enhancement (Fig. 1). The maximum accumulation mass was observed C2-3, and T11-12 level and L5-S1.

Emergent unilateral partial laminectomies were performed at C2-3 (left side) and T11-12 (right side) level, and well-formed pus was found outside of dura. We removed it using suction and saline irrigation carefully. The soft silicon catheter (EVD catheter 12F, Yushin, Korea) was inserted in the epidural space through C2-3 laminectomy site and advanced downward direction and then irrigated with abundant saline. The nature of pus was yellowish, high viscosity and foul odor. After the removal of abscess, the catheter was removed instead of placed on epidural space.
No organism was found on pus culture. Empirical antibiotics with intravenous vancomycin, 3rd generation cephalosporin (ceftriaxone 2 g bid), and metronidazole were injected for six weeks after the surgery. A week after the surgery, CRP decreased to 48.7 mg/L, ESR to 54 mm/hr each and six weeks after the operation CRP was down to 15.4 mg/L, ESR to 22 mm/hr, respectively. Follow-up MRI scan performed 6 weeks after the surgery revealed complete resolution of the epidural abscess (Fig. 2). The muscle power of the upper limbs got better to G3/G5 in week and became normal in six weeks, and the muscle of the lower limbs got better and the patient was able to walk with minimal support.

**DISCUSSION**

SEA is a rare infectious condition but potentially devastating and fatal that requires early detection and prompt management.

The incidence of SEA which has been reported as 0.2 to 1.2 cases per 10,000 hospital admissions, however, is on the rise as many as 12.5 cases per 10,000 hospital admissions. Although SEA is a rare infection, predisposing factors were well established. These include an aging population, AIDS, diabetes mellitus, alcoholism, chronic renal failure, malignancy, spinal instrumentation, and intravenous drug abuse. Most cases arise from hematogenous seeding from a distant source such as intravenous lines, urinary catheter, implantable device, endocarditis, respiratory tract infection, urinary tract infection, dental abscess, and so on. A few cases are the result of direct extension from contiguous structures, or direct inoculation from trauma or invasive procedures such as spinal surgery, epidural injection or catheters. In our case, he had the epidural block at the low back.

The clinical symptom triad of SEA are back pain, fever and progressive neurological deficit, but their simultaneous occurrence is not common. The most frequent symptom-severe localized tenderness-should lead to laboratory and imaging studies. It can cause severe neurological deficits by either compression of abscess on the spinal cord or nerve roots or ischemia due to compression. SEA may be involvement of the vascular supply to the spinal cord and subsequent infarction. It is more clinically significant effects rather than direct compression.
Early diagnosis significantly decreases the morbidity and mortality rates. Contrast-enhanced MR imaging is the imaging treatment of choice as it is less invasive and describes both the longitudinal and extensive spinal extension of the abscess. Epidural abscesses usually show hyperintense signals on T2-weighted images, with enhancement in post contrast studies.

Surgical decompression in combination with long term systemic antibiotics treatment is generally considered as the treatment of choice for SEA. Non-surgical treatment with antibiotics alone have been indicated for patients who are high operative risk, have complete paralysis for more than 72 hours and in patients having no neurologic deficit and no mass effect. However, Progressive neurologic deficit, persistent severe pain, or persistent fever and leukocytosis are indications for decompressive surgery.

There were a few articles about surgical technique for extensive SEA. It can be treated by multilevel laminectomies or interlaminar fenestration, however it could increase the risk of postoperative pain and instability potentially. Richmond, et al. reported 17 level laminectomies but the patient has unfavorable outcome. We did C2-3 unilateral partial laminectomies and T11-12 unilateral partial laminectomies and then using silicon catheter; it was inserted epidural space gently with minimal resistance and removed pus by suction and saline irrigation. The catheter was enough long to reach the proximal and distal part of abscess from C2 and T11 laminectomies. Although the organism was not growth, empirical antibiotics were successful to control inflammation and did not developed postoperative instability.

We introduce that this minimal invasive surgical technique and irrigation of epidural abscess using catheter through laminectomy sites can be good modality to treat for extensive SEA instead of multilevel laminectomies, and it can also avoid postoperative instability.

REFERENCES