Nonoperative treatment of spinal epidural infections

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Spinal epidural infections were diagnosed before the onset of neurological deficits in six patients and treated nonsurgically. The diagnosis was based on the clinical presentation and on the results of myelography and computerized tomography scanning. Positive cultures were obtained from blood in all six patients, from aspiration of a paraspinal infection in two, and from a skin abscess and a pulmonary empyema in one patient each. Staphylococcus aureus was the causative organism in five cases. All patients were treated with intravenous antibiotics and remained neurologically intact throughout the course of treatment. Five patients have had no recurrence of their symptoms. One patient eventually required surgery for persistent discitis.

KEY WORDS ▪ spinal infection ▪ epidural infection ▪ Staphylococcus aureus ▪ Streptococcus viridans

The possibility of spinal epidural infection must be considered in any patient with spinal pain, localized tenderness to percussion, and fever. The infection may take the form of a purulent abscess or a granuloma, which rarely contains pus. Although the term “spinal epidural abscess” is often used, the distinction between a granuloma and an abscess can usually be made only at operation. Because of the risk of rapid neurological deterioration to paralysis, the standard therapy for acute spinal epidural infections has included urgent laminectomy for decompression, drainage, and culture of any purulent material. Recently, nonsurgical treatment for spinal epidural infections has been reported in patients with medical contraindications to surgery or minimal neurological deficits. This report describes the treatment of spinal epidural infections with antibiotic agents alone in six patients and reviews the indications for the approach.

Summary of Cases

Between August, 1985, and January, 1988, six patients with spinal epidural infections were treated nonsurgically at San Francisco General and Moffit-Long Hospitals. This analysis is based on a retrospective review of the medical records, hospital notes, laboratory data, and radiological images that were available in each case. The diagnosis of spinal epidural infection was based on clinical presentation, the demonstration of an epidural mass by myelography and computerized tomography (CT) scanning, and the identification of a pathogenic organism from the blood or other sources.

Clinical Presentation

The clinical data are summarized in Table 1. There were four men and two women with a mean age of 43.5 years. Chronic intravenous drug abuse was the most common predisposing factor. Localized spinal pain and tenderness to percussion were present for 1 week to 2 months before diagnosis in each patient. Five patients had fever, two had headaches, and one had meningismus. None of the patients had voluntary muscle weakness, sensory deficits, sphincter disturbances, or abnormal deep-tendon reflexes. There were no medical contraindications to surgery.

Diagnostic Evaluations

Two patients had an elevated peripheral white blood cell count (> 11,000 cells/mm). The erythrocyte sedimentation rate was elevated (> 30 mm/hr) in five patients and was not recorded in one. Cerebrospinal fluid (CSF) was analyzed in all six patients. In one patient, the CSF glucose level was less than 60% of the serum glucose level. Four patients had elevated CSF protein (> 45 mg/dl). The CSF white blood cell count was 0 to 5 cells/cu mm in two patients, 5 to 15 cells/cu mm in three, and 300 cells/cu mm (80% lymphocytes, 17% neutrophils) in one.
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Cultures of blood were positive for Staphylococcus aureus in five patients and for Streptococcus viridans in one patient (Table 1). Staphylococcus aureus was identified in cultures from forearm abscesses in one patient and from a pulmonary empyema in a patient who underwent thoracostomy. Computerized tomography-guided aspirations of paraspinal muscle infections were performed in two patients; one culture grew Staphylococcus aureus and one grew Streptococcus viridans.

Each patient underwent plain radiography, myelography, and CT scanning of the spine. One patient had evidence of osteomyelitis on plain radiographs. Myelography and CT scanning showed an epidural mass in each patient. These lesions were cervical in two patients, lumbar in two, and thoracic in one; one patient had both cervical and lumbar lesions. One of the patients with a lumbar lesion had a complete myelographic block, and five other patients each had a partial block and minimal distortion of the spinal cord.

### Treatment

Each patient received intravenous antibiotic agents for 4 to 6 weeks and was carefully monitored for neurological deterioration. The initial antibiotic regimen consisted of a third-generation cephalosporin and an antistaphylococcal agent such as vancomycin or nafcillin. The antibiotic regimen was subsequently modified according to the results of sensitivity testing. After leaving the hospital, three patients took oral antibiotic agents effective against Staphylococcus aureus for 2, 8, and 12 weeks, respectively.

### Outcome

Within 48 hours after the start of therapy, each patient became afebrile, with markedly diminished spinal pain and tenderness, and remained afebrile and neurologically normal throughout the hospital course. Over a mean follow-up period of 16 months (range 4 to 34 months), five of the patients have had no recurrence of their spinal infections. After treatment with intravenous antibiotic therapy for 6 weeks and with oral antibiotic agents for 7 weeks, the patient who had both cervical and lumbar lesions was readmitted with increased low-back pain and fever. Myelography showed no residual spinal epidural mass, but CT scanning demonstrated discitis at L5–S1. A laminectomy was performed to obtain tissue for biopsy and culture. The culture grew Staphylococcus aureus. The symptoms resolved after additional treatment with intravenous antibiotics for 6 weeks and with oral antibiotics for 2 months.

### Discussion

Patients with spinal epidural infections fall into two groups — those with little or no neurological deficit and those with significant or progressive deficits. The definitive treatment for the latter patients remains urgent laminectomy for decompression, drainage, and culture; medical contraindications to surgery, such as coagulation abnormalities and recent myocardial infarction, would have to be most severe to justify nonsurgical treatment. In the absence of neurological deficits, the primary goal of an operation is to obtain adequate material for culture and to remove liquid collections of purulent material. If the causative organism can be identified from an evident bacterial source, surgery may not be necessary. Staphylococcus aureus is the most commonly reported pathogenic organism; common sources include cutaneous abscesses, sites of intravenous drug injection, and respiratory tract infections. Nonpenetrating spinal trauma may also cause a hematoma or inflammation susceptible to bacterial infection.

Delayed diagnosis after the onset of neurological deterioration appears to be largely responsible for the poor outcome associated with spinal epidural infections in several reports. Four patients in this series had symptoms for 2 weeks or more before the diagnosis was made. Patients with subacute or chronic clinical symptoms are more likely to have granulomatous masses than liquid, purulent abscesses; surgical decompression is indicated only if a significant neurological deficit develops.

Leys, et al., recommended four criteria for nonsurgical treatment of spinal infections: 1) poor surgical risk...
because of severe medical problems; 2) involvement of
a considerable length of the spinal canal and extensive
"epiduritis;" 3) the absence of a significant neurological
deficit; and 4) complete paralysis for more than 3 days.
These authors reported four patients in whom spinal
epidural abscesses were treated effectively with antibi-
ocids alone. The lesions were identified by CT scanning
after the administration of contrast material. Each pa-
tient had urinary retention or incontinence, and three
had absent deep-tendon reflexes in the legs. Two of
the patients had medical contraindications to surgery; one
had cirrhosis of the liver and coagulation factor defi-
ciencies, and the other had inoperable carcinoma of the
sigmoid colon extending into the pelvis. Messer, et al.,
reported the successful nonsurgical treatment of a spinal
infection in a patient with gastrointestinal bleeding,
renal failure, and possible acute endocarditis. Stewart,
et al., used antibiotics alone to treat an acute epidural
spinal infection that spanned at least 12 vertebrae. The
patient had urinary hesitancy and extensor plantar re-
sponses at the time of diagnosis. Bouchez, et al.,
reported a patient with a cervical epidural infection
who was treated nonsurgically because there was no
neurological deficit.

Five patients in this series had partial myelographic
blocks. Diagnosis while the epidural infections were still
relatively confined may have allowed treatment before
the onset of significant compression or venous infarc-
tion of the cord. One of our patients and the patients
of Messer, et al., and Bouchez, et al., had complete
myelographic blocks. The success of nonoperative treat-
ment in these cases suggests that a complete myelo-
graphic block in the lumbar region is not an absolute
indication for surgical drainage. However, we recom-
mand that patients who have had symptoms for less
than 2 weeks and who have myelographic evidence of
significant spinal cord compression (especially in the
cervical or thoracic region) should undergo surgery even
if they have no neurological abnormalities.

In summary, nonsurgical therapy of spinal epidural
infections should be reserved for patients in whom a
diagnosis is made before the onset of neurological def-
cits. The success of this approach depends on the early
identification of a pathogenic organism to guide the
selection of antibiotics. Because marked neurological
deterioration may develop in as little as a few hours,3,7
the patient must be closely monitored during intrave-
nous antibiotic therapy. Close follow-up monitoring
after the patient has been discharged from the hospital
is also important. The recurrence of fever, spinal pain,
and tenderness or the onset of a neurological deficit
should prompt rapid reevaluation.

Acknowledgments
The authors thank Mary Ellen Kuhlmann for manuscript
preparation and Stephen Ordway for editorial assistance.

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Manuscript received November 14, 1988.
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