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Clinical Study

Is there a difference in neurologic outcome in medical versus early operative management of cervical epidural abscesses?

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Abstract

BACKGROUND CONTEXT: The ideal management of cervical spine epidural abscess (CSEA), medical versus surgical, is controversial. The medical failure rate and neurologic consequences of delayed surgery are not known.

PURPOSE: The purpose of this study is to assess the neurologic outcome of patients with CSEA managed medically or with early surgical intervention and to identify the risk factors for medical failure and the consequences of delayed surgery.

STUDY DESIGN/SETTING: Retrospective electronic medical record (EMR) review.

PATIENT SAMPLE: Sixty-two patients with spontaneous CSEA, confirmed with advanced imaging, from a single tertiary medical center from January 5 to September 11.

OUTCOME MEASURES: Patient data were collected from the EMR with motor scores (MS) (American Spinal Injury Association 0–100) recorded pre/posttreatment. Three treatment groups emerged: medical without surgery, early surgery, and those initially managed medically but failed requiring delayed surgery.

METHODS: Inclusion criteria: spontaneous CSEA based on imaging and intraoperative findings when available, age >18 years, and adequate EMR documentation of the medical decision-making process. Exclusion criteria: postoperative infections, Pott disease, isolated discitis/osteomyelitis, and patients with imaging findings suggestive of CSEA but negative intraoperative findings and cultures.

RESULTS: Of the 62 patients included, 6 were successfully managed medically (Group 1) with MS increase of 2.3 points (standard deviation [SD] 4.4). Thirty-eight patients were treated with early surgery (Group 2) (average time to operating room 24.4 hours [SD 19.2] with average MS increase 11.89 points [SD 19.5]). Eighteen failed medical management (Group 3) requiring delayed surgery (time to OR 7.02 days [SD 5.33]) with a net MS drop of 15.89 (SD 24.9). The medical failure rate was 75%. MS change between early and delayed surgery was significant ($p<.001$) favoring early surgery. Risk factors and laboratory data did not predict medical failure or posttreatment MS because of the high number of medical failures when abscess involves the cervical epidural space.

CONCLUSIONS: Early surgery results in improved posttreatment MS compared with medical failure and delayed surgery. In our patients, the failure rate of medical management was high,

FDA device/drug status: Not applicable.

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75%. Based on our results, we recommend early surgical decompression for all CSEA.

Keywords: Cervical; Epidural infection; Medical; Surgical; Outcome; Risk factors

Introduction

Spinal epidural abscess (SEA) is a rare condition that occurs when purulent material collects between the dura and osseous-ligamentous structures of the spine (Fig. 1). The ideal management of SEA is controversial. Many endorse early surgical decompression combined with intravenous (IV) antibiotics [1–5], whereas others report similar outcomes between those treated with surgery and IV antibiotics and those treated with IV antibiotics alone [6–9]. Similar controversy exists regarding cervical spine epidural abscess (CSEA) [10–13].

A decline in neurologic function is an indication for immediate surgical decompression of CSEA, but most clinical decisions for medical versus surgical management are based on anecdotal evidence. Because of the potential for severe and permanent neurologic deficits after failed medical management, it is unethical to perform randomized controlled trials to determine the best treatment for this condition [14]. Little is known about why some patients lose motor function while being managed medically and require delayed surgery. Even less is known about their clinical outcomes after failure of medical management.

When patients present with SEA, risk factors (namely diabetes, C-reactive protein level >115, white blood cell count >12.5, and bacteremia) can predict failure rates of medical management [15]. It is not known how applicable this is to epidural abscess of the cervical spine. We hypothesized that by studying the demographics, motor scores (MS), and medical comorbidities of patients at our institution with CSEA, we can identify those who will fail medical therapy (defined as a change for the worse in motor function while on IV antibiotics) and determine the effects of delayed versus early surgery on postoperative American Spinal Injury Association (ASIA) MS.

Materials and methods

A retrospective review of the electronic medical record (EMR) of patients diagnosed with spontaneous SEA from a single tertiary medical center from January 1, 2005 to December 31, 2011 was carried out.

Two hundred seven consecutive patients diagnosed with SEA in this time period were evaluated. Seventy-nine patients were excluded because of inadequate EMR information regarding the initial clinical decision-making process of medical versus surgical management or having treatment initiated at a referring facility. Without a clear understanding of the intention of the treating physician, accurately assigning patients to treatment groups is difficult, potentially confounded by a multitude of issues and logistical delays. Other exclusion criteria included postoperative infections, Pott disease, isolated discitis/osteomyelitis, and patients with imaging findings suggestive of CSEA but negative intraoperative findings and cultures. One hundred twenty-eight patients met these criteria and 62 had CSEA.

The EMR was evaluated for demographics, laboratory data, MS (Table 1), and risk factors (Table 2). Radiographic evaluation included abscess location (dorsal, ventral, or circumferential involvement), osteomyelitis, discitis, skip lesions, and total number of levels involved.

For pathogen identification in patients treated medically, routine blood cultures were obtained. In surgically treated patients, the pathogen was identified by blood cultures and, when possible, by intraoperative cultures. All patients had magnetic resonance imaging (MRI) studies with IV gadolinium contrast evaluated by attending neuroradiologists. Once an epidural collection or phlegmon was identified, additional whole spine MRI to assess for skip lesions was performed. All patients' clinical presentations were consistent with SEA (neck pain, constitutional symptoms [fever/chills/malaise], extremity pain, weakness, and/or numbness).

Patients were analyzed in three treatment groups. Initial treatment decisions were guided by presenting neurologic status (MS), medical comorbidities, and the discretion of the primary treating team (medicine vs. orthopedic or neurologic surgery as no protocol existed for the involvement of consulting services). Some patients were managed medically without consulting surgical teams until deterioration of MS began. Operating room/personnel availability also effected time to OR.

- Group 1: Treatment with IV antibiotics alone. Nonoperative management was selected as the treatment of choice.
- Group 2: Treatment with IV antibiotics and early surgical intervention. Based on the clinical presentation, some of these patients had IV antibiotics started preoperatively that affected intraoperative cultures, whereas others who were more stable received no IV antibiotics until intraoperative cultures could be obtained. Given the nature and volume of our hospital, operative start times were sometimes delayed. Occasionally pressing medical issues, such as the requirement for hemodialysis, required resolution before surgery. Intravenous antibiotics were continued postoperatively.