Spinal epidural abscess case series

A retrospective cohort study analyzed data from patients with a new Spinal epidural abscess diagnosis at a single hospital from October 1, 2015, to April 1, 2018. They describe averages to time-to-imaging and interventions, and frequencies of risk factors and outcomes among patients presenting to the emergency department with SEA.

Of the 34 patients included, 7 (20%) died or were discharged with plegia during the study period. Those who died or were discharged with plegia (n = 7) had shorter mean time-to-imaging order (20.8 h versus 29.2 h). Patients with a history of intravenous drug use had a longer mean time-to-imaging order (30.2 h versus 23.7 h) as compared to those without intravenous drug use. Patients who died or acquired plegia had longer times from imaging completed to final imaging read (20.9 h versus 7.1 h), but shorter times from final imaging read to surgical intervention among patients who received surgery (4.9 h versus 46.2 h). Further, only three (42.9%) of the seven patients who died or acquired plegia presented with the three-symptom classic triad of fever, neurologic symptoms, and neck or back pain.

SEA is a potentially deadly infection that requires prompt identification and treatment. This research provides baseline data for potential quality improvement work at the study site. Future research should evaluate multi-center approaches for identifying and intervening to treat SEA, particularly among patients with intravenous drug use [1)].

In a retrospective cohort study of all patients with acid-fast bacillus testing and anterior epidural abscess diagnosed on spinal MR imaging between May 2014 and September 2019, with a final diagnosis of tuberculous or pyogenic spondylodiscitis. Six cases of tuberculous spondylodiscitis (mean age, 45.5 years; 80% male) and 35 cases of pyogenic spondylodiscitis were evaluated (mean age, 56.6 years; 49% male). Demographic characteristics were recorded. Cases were assessed for anterior meningovertebral ligament destruction on MR imaging, as demonstrated by the shape of the epidural collection. Segmental location of the infection was also assessed. Independent 2-sample t tests and $\chi 2$ tests of independence were performed to evaluate the significance of the difference between the groups.

Five of 6 (83.3%) cases of tuberculous epidural abscess had an intact anterior meningovertebral ligament, and 0/35 cases of pyogenic epidural abscess demonstrated an intact ligament ($P < .001$). The presence of an intact anterior meningovertebral ligament had 83.3% sensitivity and 100% specificity for tuberculous spondylodiscitis, a 100% positive predictive value, and a 97.2% negative predictive value.

The presence of an intact anterior meningovertebral ligament has high sensitivity and specificity for tuberculous spondylodiscitis-associated epidural abscess, though these results should be validated in a larger sample [2)].

2019

From January 2016 to June 2017, 13 patients who underwent biportal endoscopic spinal surgery under the diagnosis of SEA were retrospectively enrolled in this study. The surgical indications of the

enrolled patients included SEA with or without early-stage spondylodiscitis who had neurological symptoms. Perioperative data and clinical outcomes were assessed by regular serologic testing, imaging studies, physical examination, visual analog scale, Oswestry Disability Index and modified Macnab criteria. Offending pathogens were identified in seven (54%) of 13 biopsy specimens. Appropriate intravenous antibiotics for the identified pathogens isolated from infected tissue biopsy cultures were administrated to patients for at least 30 days. All patients reported satisfactory relief of pain and neurological symptoms after surgery. No surgery-related complications and recurrences were found after 2 years follow up. Biportal endoscopic spinal surgery may be an effective alternative to traditional open surgical decompression for the treatment of SEA [3].

For the 1053 patients with SEA in the institutional cohort, the 90-day postdischarge mortality was 134 (12.7%). Overall, 633 (60.1%) underwent surgery in the initial admission, with a 30-day postoperative mortality rate of 5.5% (n = 35). For the 1154 patients with SEA in the NSQIP database, the 30-day postoperative mortality rate was 3.6% (n = 42). The rate of 90-day postdischarge mortality in the institutional cohort for patients with albumin <2.3 g/dL was 25.1%. In contrast, the rate for patients with albumin >3.3 g/dL was 4.5%. On multivariate analysis of the NSQIP database, hypoalbuminemia was an independent prognostic factor for 30-day postoperative mortality. On multivariate analysis of the institutional cohort, hypoalbuminemia remained a prognostic factor for 90-day postdischarge mortality

Albumin was validated as an independent prognostic factor in patients with SEA. The lack of this marker in existing scoring systems underscores the need for updated models to optimize risk stratification and shared decision-making before surgery [4].

Yang et al. reviewed the electronic medical records of patients with SEA who were treated within our hospital system from 1993 to 2016. We only included SEA cases that were due to fungi. We also reviewed FSEA cases in the English language literature from 1952 to 2017 to analyze the features of FSEA.

From a database of 1,053 SEA patients, we identified 9 patients with FSEA. Aspergillus fumigatus was isolated from 2 (22%) patients, and Candida species were isolated from 7 (78%). Focal spine pain, neurologic deficit, and fever were demonstrated in 89%, 50%, and 44% of FSEA cases, respectively. Five of nine cases involved the thoracic spine, and eight were located anterior to the thecal sac. Three cases had fungemia, six had long symptom duration (>2 weeks) prior to presentation, seven had concurrent immunosuppression, and eight had vertebral osteomyelitis. Additionally, one case had residual motor deficit at last follow-up, one had S1 sensory radicular symptoms, two suffered recurrent FSEA, two died within hospitalization, and two died within 90 days after discharge.

In summary, the classic diagnostic triad (focal spine pain, neurologic deficit, and fever) is not of great clinical utility for FSEA. Biopsy, intraoperative tissue culture, and blood culture can be used to diagnose FSEA. The most common pathogens of FSEA are Aspergillus and Candida species. Therefore, empiric treatment for FSEA should cover these species while definitive identification is pending. FSEA is found in patients with poor baseline health status, which is the essential reason for its high mortality [5]

2018

An analysis of 154 consecutive patients who initially presented to a tertiary-care, academic medical center with SEA, and were subsequently treated with surgery between 2010 and 2015 was performed.

Postoperative pre-discharge ASIA impairment scale, 6-month follow-up encounter ASIA scores, need for revision surgery, and mortality during SEA surgery were the primary outcomes.

Fisher's exact and Wilcoxon rank-sum tests were used to assess the associations between patient-level factors and surgical outcomes. Moreover, an interactive, predictive model for postoperative pre-discharge ASIA score was developed using a proportional odds regression model. There was no funding secured for this study and there are no conflict of interest-associated biases.

154 patients (mean age of 58 years) were treated using surgical decompression in addition to antibiotics. The majority of patients were Caucasian (81%) and male (61%). No intraoperative mortality was reported. A second SEA surgery was performed in 8% of patients. A comparison of the preoperative and postoperative pre-discharge AIS scores showed that 49% of patients maintained a score of E or improved, while 45% remained at their preoperative status and 6% worsened. Among a subset of patients (n=36; 23%) for whom a 6 month follow-up encounter occurred, 75% maintained an AIS score of E or improved, 19% remained at their preoperative status, and 6% worsened. Both the presence and longer duration of preoperative paresis was associated with an increased risk of remaining at the same AIS score or worsening at the predischarge encounter (both $p < 0.001$). A predictive model for predischarge AIS scores was developed based on several patient characteristics.

Surgical decompression can contribute to improving or maintaining AIS scores in a high percentage of SEA patients. The presence and duration of preoperative paresis are prognostic for poorer outcomes and suggest that rapid surgical intervention before paresis develops may lead to improved postoperative outcomes. Our modeling tool enables an estimation of probabilities of patients' predischarge condition [6].

2017

A retrospective study of spinal epidural abscesses from 2004 to 2014 at a large academic hospital was conducted. Cases were identified using International Classification of Diseases, Ninth Revision (ICD-9) code 324.1, and a review of medical and radiographic records was performed to confirm each case. Data collected included sociodemographics, medical history, suspected route of infection, treatments, and outcome.

The incidence was 5.1 cases for each 10,000 admissions, with no significant changes during the study period. The route of infection was identified in 52% of cases, with bacteremia as the most common (26%), followed by recent surgery/procedure (21%) and spinal injection (6%). An identifiable underlying risk factor was present in 84% of cases, most commonly diabetes and intravenous drug use. A causative organism was identified in 84% of cases, most commonly Staphylococcus aureus; methicillin-resistant isolates accounted for 25% of S. aureus cases. All cases received intravenous antibiotic therapy, and 73% underwent a drainage procedure. Fifteen percent had an adverse outcome (8% paralysis and 7% death).

The incidence of spinal epidural abscesses may be increasing, with the present study demonstrating a ≥5-fold higher rate compared with historical data. Although the outcome in most cases was favorable,

spinal epidural abscesses continue to cause substantial morbidity and mortality and should remain a “not to be missed diagnosis.” [7].

2015

12 cases (8 males, average age 9.6 years). Clinical presentation was mainly fever, back pain and elevation of inflammation markers. All cases were initially misdiagnosed. Lumbar puncture was performed in 36% of patients. Etiological diagnosis was obtained in 8 cases. MSSA was isolated in 4 patients, methicillin-resistant S. aureus in 1 patient, and S. aureus with unknown susceptibility patterns in 2 cases. The average of therapy duration was 6 weeks. Patients' spine was always evaluated by gadolinium-enhanced magnetic resonance imaging; most abscesses were localized at thoracic and lumbar area, without osteomyelitis. In 8 cases, laminectomy and/or abscess drainage were performed in association with medical therapy; 3 cases were successfully treated with antimicrobial therapy only; no data were available in one case. A good outcome was obtained in all patients, except a reported residual headache and paraspinal pain lasting for 3 years. The rarity and the possible differential diagnosis can lead to underestimate SEA occurrence in children without risk factors. It seems therefore essential to maintain a high attention to pediatric SEAs. A prompt diagnosis and adequate therapy are essential prognostic factors for remission [8].

2014

Eighty-two patients underwent treatment for a spinal epidural abscess between 1999 and 2013. There were 46 men and 36 women, whose overall mean age (± SD) was 65 ± 8.58 years (range 50-82 years). The mean duration of clinical follow-up was 41.38 ± 86.48 weeks. Thirty patients (37%) underwent surgery for removal of the abscess, whereas 52 (63%) were treated more conservatively, undergoing CT-guided aspiration or receiving antibiotics alone based on the results of blood cultures. The correlation between pretreatment variables and outcomes was evaluated in a multivariate regression analysis.

Back pain and severe motor deficits were the most common presenting symptoms. Compared with baseline neurological status, the majority of patients (68%) reported being neurologically “better” or “unchanged.” Twelve patients (15%) had a good outcome (7 [23%] treated operatively vs 5 [10%] treated nonoperatively, p = 0.03), while clinical status in 41 patients (50%) remained unchanged (10 [33%] treated operatively vs 31 [60%] treated nonoperatively, p = 0.01). Overall, 20 patients (25%) died (9 [30%] treated operatively vs 11 [21%] treated nonoperatively, p = 0.43). In a multivariate logistic regression model, an increasing baseline level of pain, the presence of paraplegia or quadriplegia on initial presentation, and a dorsally located SEA were independently associated with poor outcomes.

The results of the study suggest that in patients 50 years of age and older, early surgical decompression combined with intravenous antimicrobial therapy was not associated with superior clinical outcomes when compared with intravenous antimicrobial therapy alone [9].

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