Spinal Epidural Abscess: Institutional Insights, Patient Outcomes, Epidemiology, and Prognostic Factors

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Introduction

- Spinal epidural abscess (SEA) is an infection within the epidural space, located between the dura mater vertebral periosteum, & can lead to severe neurological complications.
- The established gold standard for treatment involves a combination of decompressive surgery, abscess drainage, and antibiotics to eliminate the infectious agent.
- The classic triad of pain, fever, and neurological deficits is rarely encountered upon initial presentation.
- The rapid progression of a SEA underscores the critical need for early diagnosis and treatment.

<u>Objective</u>: This study aimed to identify prognostic factors and outcomes associated with SEAs and to determine the characteristics of patients & pathologies that benefit most from surgery by investigating the management of SEA at a single Level I Trauma Center.

Methods

A retrospective chart review was performed on patients who were diagnosed with a spinal epidural abscess at University Medical Center in New Orleans from January 2015 to December 2021. Information pertinent to the study that was collected included patient demographic data, neurological exam at presentation, medical comorbidities, drug usage, sepsis, in-patient care details, surgical procedures, readmission, vital status, disposition, and Rankin scale scores.

Results

Table 1. Comparison of patient demographics & comorbidities

Patient Demographics	Operative (*n=46*)	Non-operative (*n=73*)	p-value
Age (years), median (IQR)	54.5 (45, 61.75)	46 (40, 53)	< 0.001
Sex (%)			
Male	34 (73.9)	54 (74.0)	1
Female	12 (26.1)	19 (26.0)	
Race (%)			
White/Caucasian	25 (54.3)	43 (58.9)	0.85
Black/African American	20 (43.5)	28 (38.4)	
Other	1 (2.1)	2 (2.7)	
Smoking status (%)			1
Smoker	37 (80.4)	60 (82.2)	
Non-smoker	9 (19.6)	13 (17.8)	
IV Drug User (%)	40 (87.0)	58 (79.5)	
Comorbidities (%)			
Hypertension	11 (23.9)	23 (31.5)	0.49
Diabetes	4 (8.7)	11 (15.0)	0.46
Chronic Hepatitis C	13 (28.3)	25 (34.2)	0.63
Rheumatoid arthritis	3 (6.5)	1 (1.4)	0.32
Endocarditis	4 (8.7)	12 (16.4)	0.35
HIV	2 (4.3)	4 (5.5)	1
Alcohol abuse	2 (4.3)	7 (9.6)	0.49
Osteomyelitis	25 (54.3)	40 (54.8)	1

Table 2. Comparisons of operative & non-operative SEAs

Factor	Operative (*n=46*)	Non-operative (*n=73*)	p-value
Average length of stay (days), median (IQR)	17.5 (11.5, 29.5)	6 (1, 17.75)	<0.001
Followed up in clinic (%)	31 (67.4)	42 (57.5)	0.38
Location of the abscess (%)			
Cervical	15 (32.7)	14 (19.2)	0.15
Thoracic	18 (39.1)	11 (15.0)	0.006
Lumbar	13 (28.3)	46 (63.0)	<0.001
Sacral	2 (4.3)	2 (2.7)	1
Length of abscess (no. of vertebral levels), median (IQR)	2 (2, 3)	2 (2, 2.25)	0.58
mRS, median (IQR)*	2 (1, 3)	1 (1, 2)	0.042

**modified Rankin scale*

Table 3. Comparison of operative SEA cases

Factor	*Symptom Improvement or Resolved (n=36)*	*No Symptom Improvement (n=10)*	*p-value*
Time to surgery (days), median (IQR)	1 (1, 7)	1.5 (1, 2)	0.63
Less than 72 hours	20 (62.5)	6 (66.7)	
Greater than 72 hours	12 (37.5)	3 (33.3)	
Failed medical management and delayed surgical intervention (%)	15 (41.7)	3 (30)	0.71
Reoperation rates (%)	17 (47.2)	3 (30)	0.48
Smoker (%)	30 (83.3)	7 (70)	0.38
IVDU (%)	30 (83.3)	10 (100)	0.32
mRS, median (IQR)*	2 (1, 3.25)	1 (1, 3)	0.57

Table 4. Comparison of outcomes between IVDU and non-IVDU

Factor	IVDU (*n=94*)	non-IVDU (*n=25*)	p-value
Length of stay (days), median (IQR)	9.5 (1.75, 18.25)	24 (18, 33.25)	**<0.001**
Operative (n=46)	18 (10.75, 34.50)	17.5 (17.0, 18.0)	1
Non-operative (n=73)	3.5 (1.0)	28.5 (23.5, 37.75)	**0.001**
mRS, median (IQR)*	1 (1, 2)	2 (1, 2)	0.50

Table 5. Comparison of outcomes by age

Factor	< 50 years old (*n=62*)	> 50 years old (*n=57*)	p-value
Length of stay (days), median (IQR)	15 (6.75, 20.25)	9 (2.75, 25.5)	0.53
Required operation (%)	18 (29.0)	28 (49.1)	0.039
IVDU (%)			
Operative (n=46)	18 (100)	22 (78.5)	0.067
Non-operative (n=73)	25 (56.8)	29 (100)	<0.001
mRS, median (IQR.)*			
Operative (n=46)	2 (1, 2.75)	1 (1, 3.5)	0.32
Non-operative (n=73)	1 (1, 2)	1 (1, 2)	0.46

**modified Rankin scale*

Summary

Of the 119 patients diagnosed with a SEA, operative patients had longer hospital stays than non-operative patients (17.5 vs. 6.0 days, p<0.001). Within the operative group, 78.3% reported symptom improvement. IVDU patients in the operative group did not have prolonged hospitalizations (18.0 vs. 17.5 days, p=1), whereas in the non-operative group, IVDU patients had shorter stays (3.5 vs. 28.5 days, p=0.001). At discharge, patients with and without a history of IVDU displayed similar modified Rankin scale scores (p=0.50). Age did not significantly impact hospital stays (p=0.53) or modified Rankin scale scores (p=0.32) in either treatment group.

Conclusions

SEA presents a formidable challenge that demands early recognition and intervention. The choice between surgical and medical management hinges on a comprehensive evaluation of patient factors with age, comorbidities, and neurological status playing important roles. Notably, certain factors, such as intravenous drug use, correlate with extended hospital stays and suboptimal follow-up. Further research identifying specific patient factors will allow for tailored treatments, which could ultimately optimize patient outcomes.