Incidence and Risk Factors for 90-day Readmission Following Medical and Surgical Management of Spinal Epidural Abscess: A Multi-institutional Study

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Introduction

The incidence of spinal epidural abscess (SEA) is rising, yet there are few reports discussing readmission rates or predisposing factors for readmission after treatment. The aim of the present study is to determine the rate of 90-day readmission following medical and surgical treatment of SEA in an urban population and to identify patients at greater risk for readmission.

Methods

Neurosurgery records from two large urban institutions were reviewed to identify patients that were diagnosed with and treated for SEA. Patients that died during admission or were discharged to hospice were excluded from the study. Univariate analysis was performed using chi-square and Student's t-tests to identify independent variables predicting readmission with a p-value <0.10. A multivariate logistic regression model controlled for age, body mass index (BMI), gender, and institution was used to determine significant predictors of readmission.

Results

Of 103 patients in our database with SEA, 97 patients met the inclusion criteria. Mean age was 57.1 (±13.5) and 56 patients (57.7%) were male. The all-cause 90-day readmission rate was 37.1%. Infection (sepsis, osteomyelitis, persistent abscess, bacteremia) was the most common cause of readmission and accounted for 13 readmissions (36.1%). Neither pre-treatment Frankel grade (p=0.12) nor surgical versus medical management (p=0.33) were significantly associated with readmission. Multivariate analysis showed that immunocompromised status (p=0.016; OR 4.6 [95% CI 1.3-15.7]) and hepatic disease (chronic hepatitis or alcohol abuse) (p=0.015; OR 3.7 [95% CI 1.3-10.6]) were significantly associated with 90-day readmission.

Conclusions

Patients with hepatic disease and patients who were immunosuppressed demonstrated significantly increased odds of 90-day readmission after SEA treatment. These patients may require closer follow-up upon discharge to reduce overall morbidity and hospital costs associated with SEA. There was no significant difference in readmission rate between surgical and non-surgical patients.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe characteristics of SEA patients which predispose them to readmission; 2) Identify the most common cause of readmission in SEA patients; and 3) Discuss whether there is a difference between surgical and medical management of SEA with respect to readmission

References

Table 1: Pretreatment characteristics, comorbidities, implicated organism, neurologic status, and management characteristics

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Variable	Mean or number of patients	Standard deviation or % of patients
Total patients	97	
Age	57.1	±13.5
BMI	29.3	±7.2
Male	56	57.7
Comorbidities		
Diabetes	36	37.1
Hypertension	62	63.9
Intravenous drug use	21	21.7
Hepatic disease	34	35.1
Immunosuppression	17	17.5
Organism		
MRSA	22	22.7
MSSA	31	32.0
Pre-treatment Frankel A, B, or C	31	32.0
Urinary retention	22	22.7
Surgical patients	67	69.1
Non-surgical patients	30	30.9
90-day readmission*	36	37.1

Abbreviations: BMI = body mass index kg/m²; hepatic disease = chronic hepatitis or alcohol abuse; MRSA = methicillin-resistant Staphylococcus aureus; MSSA = methicillin-sensitive Staphylococcus aureus

* 13 patients (36.1%) of 90-day readmissions were for infectious reasons (i.e. sepsis, osteomyelitis, persistent abscess, bacteremia)

Table 2: Univariate analysis for 90-day readmission

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Variable	Not readmitted within 90-days (n=61 patients)	Readmitted within 90-days (n=36 patients)	p-value
Mean age	57.4	56.7	0.81*
Mean BMI	29.2	29.3	0.95*
Male	39	17	0.11*
Comorbidities			
Diabetes	19	17	0.11
Hypertension	38	24	0.67
Intravenous drug use	12	9	0.54
Hepatic disease	16	18	0.018*
Immunosuppression	6	11	0.010*
Organism			
MRSA	10	12	0.054*
MSSA	23	8	0.11
Pre-treatment Frankel A, B, or C	16	15	0.12
Urinary retention	10	12	0.054*
Surgical patients	40	27	0.33
Non-surgical patients	21	9	

Abbreviations: BMI = body mass index kg/m²; hepatic disease = chronic hepatitis or alcohol abuse; MRSA = methicillin-resistant Staphylococcus aureus; MSSA = methicillin-sensitive Staphylococcus aureus

* indicates p-value <0.10 and inclusion in multivariate model; + indicates variable was controlled for in multivariate

Table 3: Significant risk factors for 90-day readmission in multivariate analysis

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Variable	Odds ratio (OR)	p-value	95% CI
Hepatic disease	3.7	0.015	1.3-10.6
Immunosuppression	4.6	0.016	1.3-15.7

Variables included in multivariate model: age, BMI, gender, institution, MRSA, immunosuppression, hepatic disease, urinary retention

Note: urinary retention was also significant with a p-value of 0.015