Texas Society of Neuroradiology (TSNR)
Scientific Abstract
2026 Annual Meeting – Dallas, TX
February 21–22, 2026

Impact of Hospital Setting on the Utilization of Percutaneous versus Open Drainage for Spinal Epidural Abscess

Fatmaelzahraa Badr[1], Raphael Miller[2], Hossam Ibrahim[1], Sarah Meribout[2], Daniel Masri[2]

[1]Department of Internal Medicine, Maimonides Medical Center

[2]Department of Radiology, Maimonides Medical Center

Purpose

To assess the impact of hospital setting on the utilization of percutaneous versus open surgical drainage for spinal epidural abscess (SEA)[1], and to compare associated clinical and economic outcomes.

Materials and Methods

We conducted a retrospective analysis of the National Inpatient Sample (NIS) from 2020 to 2022. Patients with a diagnosis of SEA (ICD-10: G06.1) were identified; those who did not undergo interventional treatment were excluded. Bivariable analysis was performed to compare baseline characteristics and outcomes between the two intervention groups. Multivariable logistic regression was used to determine the independent association between intervention type and in-hospital mortality, adjusting for age, sex, race, Elixhauser Comorbidity Index, primary payer, and hospital characteristics.

Results

A total of 21,160 patients undergoing interventional treatment for SEA were identified. Open surgical drainage was performed in the majority of cases (93.6%, n=19,814), while percutaneous drainage was performed in 6.4% (n=1,346). Treatment modality varied significantly by hospital setting (p=0.007). Percutaneous drainage was utilized more in urban non-teaching hospitals (9.5%), followed by urban teaching hospitals (6.1%) and rural hospitals (2.5%). There were no significant differences in in-hospital mortality between percutaneous and surgical drainage (3.72% vs. 3.66%, p=0.96), nor in mean length of stay (16.7 vs. 18.0 days, p=0.243). By contrast, patients undergoing percutaneous drainage demonstrated significantly better discharge disposition ($p < 0.001$). While 50.2% of patients in this group were discharged home (with or without home health services), only 35.6% of surgically treated patients were discharged home. Conversely, surgically managed patients were much more likely to be discharged to skilled nursing facilities (SNF) or acute rehabilitation (57.43% vs. 39.03%). Additionally, surgical drainage was associated with substantially higher mean total hospital charges compared with percutaneous drainage ($284,689 ± 6,597 vs. $180,203 ± 10,529; $p < 0.001$). No difference in mortality was observed between treatment groups after multivariable adjustment (adjusted OR 1.03, 95% CI 0.85–1.24; p=0.75). Mortality was instead driven by advanced age (OR 1.03, p<0.001) and comorbidity burden (OR 1.31, p<0.001).

Conclusion

Our findings suggest that the selection of drainage modality for SEA is driven in part by hospital level factors, rather than clinical indications alone. The higher utilization of percutaneous drainage in urban settings compared to rural settings suggests that a subset of rural surgical patients may benefit from minimally invasive management if interventional radiology services were more widely available [2,3]. Additionally, teaching hospitals appear to favor surgical intervention relative to non-teaching hospitals, likely reflecting the presence of more comprehensive surgical programs[4]. Considering that percutaneous drainage is associated with comparable mortality, improved discharge outcomes, and lower healthcare costs, these results underscore the potential benefit of expanding patient access to minimally invasive management.

References

1. Spinal Epidural Abscess: A Review Highlighting Early Diagnosis and Management. JMA Journal. 2019. https://www.jmaj.jp/detail.php?id=10.31662%2Fjmaj.2019-0038.
2. Ran B, Chen X, Zhong Q, Fu M, Wei J. CT-Guided Minimally Invasive Treatment for an Extensive Spinal Epidural Abscess: A Case Report and Literature Review. European Spine Journal 2017;27(S3):380-85. doi:10.1007/s00586-017-5307-0.
3. Tanaviriyachai T, Pornsopanakorn P. 'Through and Through' Fluoroscopically Guided Catheter Drainage of Extensive Spinal Epidural Abscess: A Case Report. Journal of Southeast Asian Orthopaedics. 2022. doi:10.56929/jseaortho-022-0155.
4. Khuri SF, Najjar SF, Daley J, et al. Comparison of Surgical Outcomes between Teaching and Nonteaching Hospitals in the Department of Veterans Affairs. Annals of Surgery 2001;234(3):370-83. doi:10.1097/00000658-200109000-00011.

Figures

Table 1: Multivariable Logistic Regression Analysis of Factors Associated with In-Hospital Mortality

Predictor	Odds Ratio (OR)	95% Confidence Interval	P-value
Percutaneous drainage (Ref: Surgical)	0.97	(0.81 – 1.18)	0.75
Age	1.03	(1.02 – 1.04)	< 0.001
Elixhauser Comorbidity Index	1.31	1.27 – 1.36	< 0.001
Primary Payer (Ref: Medicare)			
Medicaid	1.42	(1.07 – 1.87)	0.01

Hospital Setting (Ref: Urban Teaching)			
Urban Non-Teaching	0.83	(0.47 – 1.47)	0.528
Rural	0.84	(0.50 – 1.41)	0.51