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Mortality Rates in Shunt-Dependent Hydrocephalus as a Function of Treatment Modality in Subarachnoid Hemorrhage: a Retrospective NIS Analysis

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Introduction

Since the publication of the International Subarachnoid Aneurysm Trial (ISAT) in 2002, endovascular treatment has been increasingly preferred to open surgical clipping for a majority of ruptured aneurysms1-4. Although subsequent studies have supported the role of endovascular therapy for ruptured aneurysms, many questions remain, including the effect of treatment modality on secondary outcomes such as shunt dependency. Here, we review data from the Nationwide Inpatient Sample to assess rates of cerebrospinal fluid (CSF) diversion following subarachnoid hemorrhage (SAH) treatment and evaluate outcomes in a dataset representing current, broad clinical practice.

Methods

Data were extracted from the 2004-2014 Nationwide Inpatient Sample from all patients who underwent endovascular aneurysm treatment (International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) procedure codes 39.72, 39.75, 39.76, and 88.41) or aneurysm clipping (39.51). Within this group, patients who underwent a CSF diversion procedure were identified using the ICD-9-CM procedure code 02.3x. Weighted survey counts of the two groups were used to compare mortality in this population.

Results

There was no difference in rates of CSF diversion between the endovascular and open surgical treatment groups (15.06% for surgical vs. 14.93% endovascular; p=0.56). However, among patients who required CSF diversion, those managed endovascularly had a higher mortality (7.46% endovascular vs 5.69% surgical; Odds Ratio 1.33, 95% CI 1.16-1.56, p<0.0001).

Conclusions

Although the proportion of patients undergoing CSF diversion was similar between open and endovascular treatment groups, we found that the mortality rates in those patients with shunt-dependent hydrocephalus was significantly higher in the endovascular cohort as compared to the group managed surgically. This may help direct treatment for SAH patients, especially if their initial presentation includes acute hydrocephalus for which a shunt may be required long term. Future directions include time trend analysis of mortality with regards to treatment modality.

Learning Objectives

Mortality rates in shunt-dependent hydrocephalus are increased in SAH patients treated with endovascular coiling.

References

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