

## Impact of Hospital Volume on AHRQ Patient Safety Indicators in Electively Treated Unruptured Cerebral Aneurysms

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### Introduction

The Agency of Healthcare Research and Quality (AHRQ) has defined Patient Safety Indicators (PSIs) for assessments in the safety of inpatient care. This study defines the rates of PSIs and evaluates the impact of hospital volume on these indicators in patients treated electively for intracranial aneurysms.

### Methods

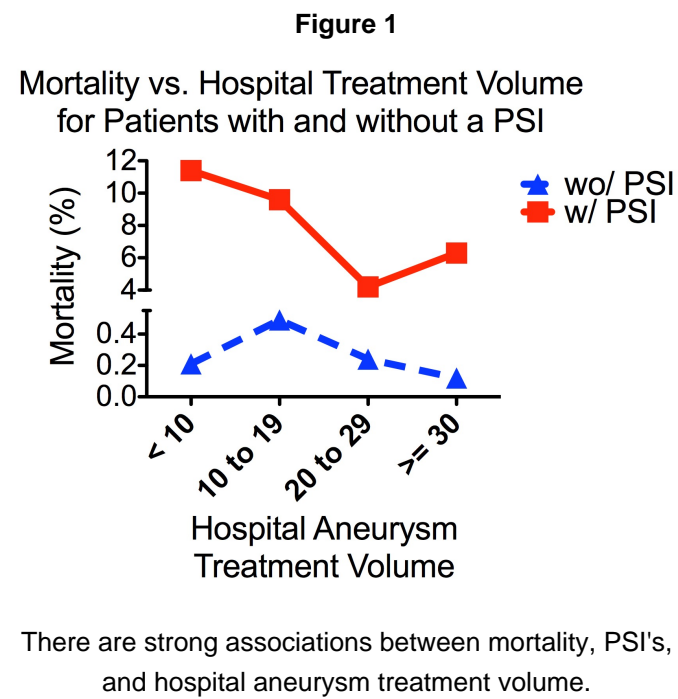
Using the 2002-2011 Nationwide Inpatient Sample, patients treated electively for a nonruptured cerebral aneurysm with clipping or coiling were selected. Patients were evaluated for PSIs defined by AHRQ specified ICD-9 codes. These included: retained foreign body, postoperative hemorrhage, respiratory failure, pulmonary embolism, and sepsis, among others. Hospitals were categorized by treatment volume into: group 1 (<10), group 2 ( $\geq 10$  and <20), group 3 ( $\geq 20$  and <30), or group 4 ( $\geq 30$ ).

### Results

A total of 68,938 patients underwent treatment for an unruptured cerebral aneurysm. There were 5,965 (8.7%) PSIs. The most common PSIs were respiratory failure (4%) and postoperative hematoma (2.8%). The overall mortality rate was 0.7%. In patients without a PSI, mortality was 0.2% and with a PSI, it was 6.7%. An increased risk of death was associated with a PSI (OR 48.9, CI 39.1-61.3).

In lowest volume centers the rate of PSI was 11.4% with an associated mortality of 1.5%. This is compared to the highest volume centers with a rate of PSI of 8.1% and mortality of 0.6%. In multivariate analysis, patients treated at the lowest volume centers were more likely to suffer a PSI (OR 1.4, CI 1.2-1.5) and mortality (OR 2.0, CI 1.5-2.5).

In Figure 1, we are able to see a strong association between mortality and the presence of a Patient Safety Indicator. Additionally, there is an associated decrease in both mortality and PSI rates as the aneurysm treatment volume of hospitals increase.



### Conclusions

PSIs occur relatively frequently in patients treated for unruptured aneurysms and are strongly correlated with inpatient mortality. There is an additional correlation between hospital volume and the occurrence of these events. Patients treated at higher volume centers have significantly lower rates of PSIs and mortality compared to the lowest volume centers.

### References

[http://www.qualityindicators.ahrq.gov/modules/psi\\_overview.asp](http://www.qualityindicators.ahrq.gov/modules/psi_overview.asp)  
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