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Influence of Serum Neuron-Specific Enolase on Functional Outcomes in Patients with Subarachnoid Hemorrhage

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Introduction

This study aims to investigate the correlation between neuron-specific enolase (NSE) and patient outcomes in the setting of subarachnoid hemorrhage (SAH).

Methods

We retrospectively reviewed medical records of SAH patients admitted to our institution from June 2008 to June 2012. Radiographic severity of hemorrhage was assessed by the Fisher scale, clinical severity by Glasgow Coma Scale (GCS), and World Federation of Neurologic Surgeons Scale (WFNS) at admission. Outcomes were assessed by the modified Rankin Scale (mRS) at the last follow-up visit. We included patients who had NSE lab results obtained within 48hrs of admission, excluding traumatic SAH cases. Of patients who had more than one NSE within 48hrs, only the first NSE was used in the statistical analysis. The time from SAH onset or thunderclap headache was noted as well as the time the NSE was collected and reported. For analysis, patients were grouped by NSE = 15 ng/mL versus NSE>15.

Results

Over a four-year period, we identified 309 nontraumatic SAH patients, 70 of which had NSE values available for analysis. 55% (39/70) were female with an average age of 54(range 23-87). Patients with an NSE of = 15 ng/mL had poorer clinical presentation (WFNS 4-5, and GCS <7, $p < 0.001$), and worse outcomes (mRS 4-6, $p= 0.001$) when compared to patients with NSE of =15 ng/mL. The Fisher grade did not show a significant correlation to NSE levels or patient outcome ($p = 0.69$).

Learning Objectives

Correlation between NSE and outcomes in SAH.

Conclusions

There is a statistically significant association between NSE levels = 15 ng/mL after nontraumatic SAH and clinical presentations as well as patient outcomes. The only measure of SAH severity that was not significantly associated with NSE level was radiographic severity (Fisher grade) ($p=0.43$).