Global Cerebral Edema Among Good Grade Patients with Intracerebral Hemorrhage. Results from the Antihypertensive Treatment of Acute Cerebral Hemorrhage (ATACH) Study

Shahram Majidi MD, Waqas I Gilani MD, Nauman Tariq MD, Haitham M Hussein MD, Yuko Y Palesch PhD, Adnan I Qureshi MD for ATACH I Investigators

Zeenat Qureshi Stroke Research Center, University of Minnesota
Division of Biostatistics and Epidemiology, Medical University of South Carolina

BACKGROUND

Background:
- Recent evidence suggests that the secondary injury seen consequent to ICH is not limited to the perihematomal region.
- In experimental and clinical studies, expression of inflammatory markers (such as matrix metalloprotease) altered cellular water diffusion, hypoperfusion and blood brain barrier breakdown have been detected in regions distant and contralateral to the hematoma.

Objective:
We aimed to ascertain the occurrence of global brain edema in patients with ICH and to explore the relationship between patient characteristics and three month outcomes.

DESIGN

- A post-hoc analysis of a traditional Phase I dose escalation multicenter prospective study recruited patients with ICH, elevated SBP≥170 mmHg, and Glasgow Coma Scale score ≥8, who presented within 6 hours of symptom onset.
- Computed tomographic (CT) scans at baseline, 24 hours, and any performed at later intervals were submitted to a core image laboratory.
- We were able to ascertain the presence and magnitude of global brain edema in 41 of 60 subjects with adequate CT scan resolution.

SETTING

- Emergency departments and intensive care units.

RESULTS

- A total of 18 (44%) of 41 patients had global cerebral edema that developed between initial CT scan and 24 hour CT scan. The median increase in brain volume among the 18 subjects was 35 cc ranging from 0.12 cc to 296 cc.
- The baseline GCS score (median 15 versus 15) and hematoma volume (mean±SD; 11.5±10.3 versus 13.9±17) were similar between subjects who experienced global cerebral edema and those who did not.
- The initial serum glucose was higher among subjects with global cerebral edema (150.5±74.3 mg/dl versus 119.7±34.6 mg/dl).
- Of the 18 patients who underwent a CT scan at 48 hours, 5 had either new or worsening global cerebral edema.
- Three of the 18 patients with global cerebral edema underwent neurological deterioration and 1 patient died during hospitalization.

CONCLUSION

- We found preliminary evidence of global cerebral edema in subjects with good grade and small ICHs. The pathophysiological basis and prognostic significance need to be investigated in future studies.