VASCULAR COLLATERALIZATION MAY NOT AFFECT HISTOTRIPSY FOR INTRACEREBRAL HEMORRHAGE IN A PORCINE MODEL

Introduction Ischemic stroke is a prevalent, devastating disease with high morbidity and mortality. Despite extensive research using animal models, there remains significant gaps in understanding processes of stroke in human patients. To address this, we developed a protocol to obtain and to analyze blood immediately proximal to and distal to thrombi in large vessel occlusive stroke. Vascular collateralization may not significantly affect the acid-base environment immediately distal to a large vessel occlusion.

Methods We analyzed blood samples from the first 62 patients in the BACTRAC registry. Bicarbonate, pO2, and pCO2 values of intracranial (distal) and systemic (proximal) arterial blood relative to the occlusive thrombus were analyzed. Changes were compared in patients according to vascular collateralization as measured by CTA collateral scores.

Results Mean age was 68.9 years (25 – 95 years). 29 were male, 33 were female. 15 were current smokers (24%), and 47 were non-smokers (no smoking within the last 6 months; 76%). Overall, intracranial gas values differed significantly from systemic. Compared to systemic, mean intracranial pO2 was decreased (211.39 vs. 246.91, p<0.001), pCO2 was decreased (32.19 vs. 38.12, p<0.001), and bicarbonate was decreased (18.91 vs. 18.39, p<0.001). Collateralization did not significantly affect distal blood gas values.

Discussion and Conclusion A compensated metabolic acidosis is present in arterial blood gas samples immediately proximal and distal to thrombi in large vessel occlusive stroke. Vascular collateralization may not significantly affect the acid-base environment immediately distal to a large vessel occlusion.

Results Histotripsy was able to liquefy the center of clots without direct damage to the perihematomal brain tissue. An average volume of 0.9 ± 0.5 mL was drained after histotripsy treatment. All groups showed mild ischemia and gliosis in the perihematomal region; however, there were no deaths or signs of neurological dysfunction in any groups.

Conclusion This study presents the first analysis of histotripsy-based liquefaction of ICH in vivo. Histotripsy safely liquefies clots without significant additional damage to the perihematomal region. The liquefied content of the clot can be easily evacuated, and the undrained clot has no effect on pig survival or neurological behavior.


O-007 TRENDS IN MORTALITY AND MORBIDITY AFTER TREATMENT OF UNRUPTURED INTRACRANIAL ANEURYSM IN THE UNITED STATES, 2006–2016

1S Majidi, 2A Mehta, 3R De Leacy, 1J Mocco, 1J Filii. 1Neurosurgery, Mount Sinai Hospital, New York, NY; 2Neurology, Columbia University, New York, NY

Background We aimed to assess nationally representative trends of in-hospital mortality and clinical outcome after treatment of unruptured intracranial aneurysms (UIA).

Methods The Nationwide Inpatient Sample (NIS) database from 2006 to 2016 was reviewed. Patients with unruptured intracranial aneurysm (UIA) who underwent aneurysm treatment during hospitalization were identified. Patients’ demographics, comorbid conditions, length of hospital stay, rate of in-hospital mortality, discharge destination for each treatment group (microsurgical clipping and endovascular embolization). Poor clinical outcome was defined as discharge to skilled nursing facility or hospice instead of home or acute rehabilitation facility. Multivariate regression model was used to identify independent predictors of mortality and poor clinical outcome.

Results A total of 21,609 patients with UIA were identified from 2006 to 2016. The overall rate of in-hospital mortality decreased from 0.9% in 2006 to 0.2% in 2016. Overall, 83% of the patients had favorable clinical outcome. The utilization of endovascular embolization increased from 60% in 2006 to 64% in 2016. Patients who had endovascular embolization had 3 days shorter hospital stay (1 vs 4, p<0.0001) and significantly higher rate of favorable clinical outcome compared to microsurgical clipping group (91% vs 74%, p<0.0001). Patients with age ≥ 80 years [OR (95% CI); p-value: 1.05 (1.02–1.11); p=0.03], female gender [OR (95% CI); p-value: 1.21 (1.07–1.37); p=0.002], those with higher comorbidity index [OR (95% CI); p-value: 1.11 (1.07–1.18); p=0.002], and patients who had microsurgical clipping [OR (95% CI); p-value: 1.29 (1.11–1.69); p: 0.021] had higher rate of poor clinical outcome. Similarly, age ≥ 80 years [OR (95% CI); p-value: 1.04 (1.01–1.06); p=0.04], higher morbidity index [OR (95% CI); p-value: 1.52 (1.25–1.85); p<0.0001] and