E-151 VOLUMETRIC ANALYSIS OF ENDOSCOPIC EVACUATION OF INTRACEREBRAL HEMORRHAGE

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Introduction Spontaneous intracerebral hemorrhage (ICH) is a neurologically-devastating form of stroke. Minimally-invasive evacuation is increasingly investigated as a primary treatment. Secondary analyses of the MISTIE III (Minimally Invasive Surgery Plus Alteplase for Intracerebral Hemorrhage Evacuation) trial, which used stereotactic catheter drainage, demonstrated promising results among functional outcomes within the surgical arm. A sustained functional outcome advantage was found among patients with less than 15 mL residual clot volume or greater than 70% volume reduction. There is limited research on the effect of post-surgical ICH volumes on functional outcomes for patients specifically undergoing endoscopic evacuations.

Objective Our primary objective is to study how the residual volume and percentage volume reduction of ICH after endoscopic evacuation affects the functional outcome of surgical patients. **Methods** We conducted a retrospective review of all endoscopic ICH evacuations performed between October 2016 and February 2020 by our institution's cerebrovascular neurosurgery service. Demographics, comorbidities, ICH radiographic characteristics, cardiac status, intra-operative

vital signs, medications, post-operative clinical course, and functional outcomes measured as mRS (modified Rankin Scale) were assessed. The mRS was assessed at discharge, 30 days, and >90 days. Pre-operative and immediate post-operative CT scans were evaluated. ICH volumes before and after evacuation were manually calculated using the ABC/2 method.

Results A total of 32 endoscopic evacuations among 31 patients were performed. The mean post-operative ICH volume was 15.3 mL (15.2), while the mean percentage volume reduction was 72.8% (24.4). There was a trend of lower post-operative ICH volumes correlating with lower mRS at discharge. Final data and analyses will be presented.

Conclusion Lower post-operative residual clot volumes correlate with improved functional outcome at discharge in patients undergoing minimally-invasive endoscopic evacuation of ICH.

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E-152 SUBARACHNOID HEMORRHAGE QUANTITATIVE VOLUME ANALYSIS: BLOOD VOLUME PREDICTS CEREBRAL VASOSPASM, DELAYED CEREBRAL INFARCTION AND CLINICAL OUTCOME

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Introduction Conventional grading scales in aneurysmal subarachnoid hemorrhage (aSAH) do not take into account the total blood volume and have been criticized for being open to variability in interpretation. We aimed to evaluate an automatic tool for quantification of the hemorrhage volume in aSAH.

Methods Blood volumes were retrospectively analyzed and added to a comprehensive prospectively maintained institutional SAH database. Patients with non-aSAH were excluded. We designed an automatic quantitative blood volume analysis tool that utilizes a segmentation system that differentiates seed points corresponding to the different intracranial compartments. Through logistic regression analysis, we evaluated the association of blood volume with clinical cerebral vasospasm, delayed cerebral infarction (DCI) and 3-months clinical outcome. The diagnostic accuracy (AUC) of the quantitative blood volume analysis was compared to the modified Fisher score, the Hunt and Hess score, the Hijdra score, and the World Federation of Neurosurgical Societies (WFNS) score.

Results 288 aSAH patients with a mean total blood volume of 74.9 ml ($\pm$ 39.7 ml) made up the study population. 73 patients developed clinical vasospasm (25.3%) and 52 patients developed DCI (18.06%). In univariate and multivariate analysis, total blood volume was significantly predictive of clinical vasospasm, DCI and clinical outcome. Blood volume had the highest AUC for clinical vasospasm as well as DCI when compared to conventional SAH scales. The modified Fisher score was not significantly predictive of either outcome.

Age in years mean (SD)	55.5(11.5)
Sex Male n (%)	23(74.2%)
BMI mean (SD)	31.1(7.4%)
Admission GCS median [range]	9[4-15]
Intracerebral hemorrhage score median (range)	2[0-4]
Hemodynamics	
Admission SBP mmHg mean (SD)	157(34)
Admission DBP mmHg mean (SD)	102(29)
Admission MAP mmHg mean (SD)	118(29)
Admission heart rate beats per minute mean (SD)	76(15)
Electrocardiographic findings	
Normal sinus rhythm	31(100%)
Prolonged corrected QT interval	18(58%)
ST-T changes	15(48.4%)
Left ventricular hypertrophy	7(22.6%)
Atrial enlargement	5(16.2%)
Atria-ventricular nodal block	2(6.4%)
Elevated troponin (n=20)	12(60%)
Chest x-ray with pulmonary edema	8(25.8%)
Intracerebral hemorrhage characteristics	
ICH side right	10(33.2%)
ICH location (deep)	24(77.4%)
Presence of intraventricular hemorrhage	13(42%)
Placement of external ventricular drain	5(16.1%)
Midline shift mm mean (SD)	5.5(2.5)
Pre-Operative ICH Volume cu.ml mean (SD)	54.3(24.4)
Post-Operative ICH Volume cu/ml mean (SD)	15.3(15.2)
Percentage Reduction mean (SD)	72.8(24.4)
Mechanical Ventilation Status	
Intensive care unit length of stay in days mean (SD)	8.3(9)
Hospital length of stay in days mean (SD)	49(95)
Tracheostomy	1(3%)
Percutaneous gastrostomy feeding tube	6(19.4%)
Discharge disposition	
In-hospital mortality	2(6.5%)
Home	3(9.7%)
Rehabilitation	13(42%)
Skilled nursing facility	12(38.7%)
Modified Rankin Score median[range]	
At discharge n=30	5[3-6]
At 30 days n=19	4[3-5]
At 90 months n=18	4[1-5]
At 12 months n=6	4[1-4]

Abstract E-151 Table 1 Characteristics of patients (n=31) undergoing minimally invasive evacuation of intracerebral hematoma