E-053 TIME IS BRAIN: STANDARDIZING THROMBECTOMY METRICS LEADS TO FASTER RECANALIZATION

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Background Acute stroke treatment has been proven to be most effective when performed immediately. The objective of our study was to describe the steps taken to improve time metrics for patients receiving intra-arterial therapy (IAT), and compare metrics before and after implementation of interventions.

Hypothesis Through streamlining the evaluation and treatment process of IAT, we predict our times between patient arrival, imaging, puncture and recanalization will be reduced.

Methods On June 1, 2013, we instituted a series of interventions in the interventional radiology suite to streamline care, including requiring the thrombolytic team to meet all transferred patients in the imaging room within 30 minutes of arrival, as well as introducing a wheeled stroke cart replete with a stroke tray containing all devices needed to perform a thrombectomy, standardizing the thrombectomy procedure, switching from general anesthesia to conscious sedation for all stroke patients, and no longer shaving the groin or using a foley catheter. We also added an additional biplane INR room, doubling our room capacity. We compared time metrics of patient arrival to imaging, imaging to puncture, and puncture to recanalization of acute ischemic stroke patients that received IAT before (1/1/12–5/31/13) and after (6/1/13–5/31/15) the interventions using univariate analysis.

Results Three hundred twenty-two patients received IAT during the study period. Nearly three quarters (73.3%) of the population was transferred from a referring facility. There were significantly less female patients in the post-intervention cohort (59.5% v 48.0%, $p = 0.04$); there were no significant differences in age, race, or initial NIHSS. We found statistically significant reductions in time between patient arrival to imaging (19.2 ± 9.6 v 13.6 ± 6.7, $p < 0.000$), imaging to puncture (57.9 ± 36.2 v 46.9 ± 40.5, $p = 0.04$), and puncture to recanalization (70.7 ± 47.3 v 53.1 ± 40.4, $p = 0.004$) after implementation of the interventions.

Conclusions Our initiatives allowed us to refine our process of care, resulting in a significant reduction of time between patient arrival and imaging, imaging to puncture, and puncture to recanalization.

Disclosures D. Frei: 1; C; Penumbra, Medtronic, Stryker, MicroVention, Sequent, Siemens, Codman. 2; C; Penumbra, Stryker, MicroVention, Codman, Siemens. 3; C; Penumbra, Stryker, MicroVention, Codman, Siemens. 4; C; Penumbra. **D. Loy:** None. **R. Bellon:** None. **D. Huddle:** None.

E-054 CORRELATION BETWEEN THROMBUS DENSITY AND RECANALIZATION OR STROKE ETIOLOGY IN ACUTE ISCHEMIC STROKE

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Background and purpose The hyperdense middle cerebral artery (MCA) sign is a well-established marker of thrombus in the MCA. Studies have suggested that a hyperdense MCA is a common finding when a non-contrast head CT is performed within a few hours of stroke symptoms onset.[1] The hyperdensity of the basilar artery has also been described in basilar artery occlusions.[2]

Previous studies have correlated recanalization success with thrombus density on non-enhanced CT scans.[3,4] In our study, we aimed to identify if thrombus density predicted revascularization success or suggested a specific etiology in acute ischemic stroke patients.

Methods and Materials We retrospectively studied 118 patients with acute ischemic stroke that were treated with mechanical thrombectomy devices and/or intravenous tPA from February 2009 to December 2015. The maximum and mean thrombus and normal vessel density was measured in Hounsfield units (HU) on a non-enhanced cranial CT in our institution's proprietary image archiver and viewer. Recanalization was assessed either post-procedurally or upon review by an interventional neuroradiology fellow using the Thrombolysis in Cerebral Infarction (TICI) grading system with successful recanalization defined as TICI 2 b-3. The ratio of clot to normal vessel density was calculated for the maximum and mean HU values. T-tests were used to study the association between clot density and recanalization or etiology. A subgroup of only MCA occlusions was also analyzed.

Results Of the 118 patients (mean age 66; 47% female), there was no statistically significant difference in mean ($p = 0.17$) or maximum clot density ($p = 0.22$) between the successful and unsuccessful recanalization groups (Table 1). There was also no difference in the mean ($p = 0.36$) or maximum clot ($p = 0.22$) to normal vessel ratio. When comparing densities between the large vessel and cardioembolic etiology, there was no difference in mean or maximum clot density or the clot to vessel ratios. In the subgroup analysis of MCA occlusions, similar findings were noted (Table 2). No difference was found when between the successful and unsuccessful recanalization groups in mean clot density ($p = 0.37$), max clot density ($p = 0.46$), mean clot to vessel ratio ($p = 0.46$), or max clot to vessel ratio ($p = 0.48$).

Conclusion In conclusion, our study found no relationship between thrombus attenuation and recanalization success or stroke etiology. While prior studies have suggested that higher attenuation is associated with good recanalization, our study could not find such a link.[4] More studies are required to identify factors that predict successful recanalization in acute ischemic stroke patients.

Abstract E-054 Table 1 Correlation between thrombus density and recanalization success or etiology

(mean, SD)	Successful recanalization (n = 80)	Unsuccessful recanalization (n = 38)	p value
Mean Clot Density (HU)	50.1 (7.4)	53 (12.7)	0.17
Max Clot Density (HU)	58.1 (8.9)	61.4 (15.2)	0.22
Mean Ratio	1.31 (0.22)	1.37 (0.34)	0.36
Max Ratio	1.32 (0.19)	1.40 (0.39)	0.22
	Large Artery (n = 35)	**Cardioembolic (n = 56)**	
Mean Clot Density (HU)	51.5 (7.7)	49.7 (8.5)	0.31
Max Clot Density (HU)	60.9 (10.1)	57.4 (8.6)	0.09
Mean Ratio (HU)	1.33 (0.16)	1.30 (0.25)	0.51
Max Ratio (HU)	1.36 (0.16)	1.31 (0.22)	0.31

Abstract E-054 Table 2 Correlation between Thrombus density and recanalization success or etiology in MCA only

(mean, SD)	Successful recanalization (n = 51)	Unsuccessful recanalization (n = 14)	p value
Mean Clot Density (HU)	49.2 (5.8)	53.5 (17.1)	0.37
Max Clot Density (HU)	57.4 (6.9)	62.1 (22.6)	0.46
Mean Ratio	1.27 (0.20)	1.37 (0.46)	0.46
Max Ratio	1.30 (0.19)	1.41 (0.59)	0.48
	Large Artery (n = 10)	**Cardioembolic (n = 36)**	
Mean Clot Density (HU)	49.8 (5.6)	48.8 (6.4)	0.62
Max Clot Density (HU)	59.5 (8.6)	57.2 (6.5)	0.44
Mean Ratio	1.31 (0.15)	1.26 (0.22)	0.36
Max Ratio	1.30 (0.17)	1.30 (0.21)	0.98

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E-055 ENDOVASCULAR THERAPY FOR PATIENTS WITH ACUTE LARGE MCA TERRITORY ISCHEMIA: ITS EFFECT ON THE RISK OF SUBSEQUENT DEVELOPMENT OF DEEP VENOUS THROMBOSIS

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Introduction Deep venous thrombosis (DVT) is a well-known complication for patients after acute ischemic stroke, due to decreased mobility of the affected extremities and/or prolonged bedrest. Endovascular recanalization therapy (ERT) for acute ischemic stroke has been shown to be superior to the use of intravenous thrombolytic agents alone. Recent randomized trials demonstrated that qualified patients who presented with acute ischemic stroke and underwent endovascular thrombectomy had improved functional outcome. The authors hypothesize that successful ERT decreases the risk of subsequent DVT development in patients with acute large middle cerebral artery (MCA) territory ischemia.
Methods A retrospective review of an imaging database from January 2011 to January 2016 was performed for patients who had acute large MCA territory ischemia based on CT perfusion and CT angiography and subsequent upper or lower extremity duplex ultrasound and/or chest CT for evaluation of DVT or PE. Patents who underwent successful ERT were identified based on operative reports from electronic medical record. Ultrasound or CT reports were retrieved from PACS to identify patients who developed subsequent DVT or PE. Statistical analysis was performed using IBM SPSS 21.0.
Results A total of 88 patients with acute large MCA territory ischemia secondary to major vessel occlusion were identified. Sixty-three patients, 26 (41.3%) male and 37 (58.7%) female, either were not qualified for ERT or had persistent occlusion despite attempted ERT. The remaining 25 patients, 11 (44.0%) male and 14 (56.0%) female, had complete revascularization (TICI 3). Number of patients who received intravenous tPA was 23 (36.5%) in the occluded group and 11 (44.0%) in the revascularized group, respectively. The percentage of patients who developed subsequent DVT or PE was greater in the occluded group than the revascularized group (14.3% vs. 4.0%). However, the difference was not statistically significant ($p = 0.159$). Interestingly, 80% of patients developed DVT on the side of the extremity contralateral to the affected cerebral hemisphere or the expected side of the limb affected by the stroke.
Conclusions In patients with acute large MCA territory ischemia, endovascular recanalization therapy appeared to decrease the risk of developing subsequent DVT or PE. However, a larger sample size is needed to demonstrate statistical significance. Interestingly, majority of DVT were developed on the side of the extremity contralateral to the affected cerebral hemisphere.
Disclosures Z. Li: None. **M. Cox:** None.

E-056 ASSOCIATION OF ENGORGED PERFORATING ARTERY OF BASILAR TOP WITH NON-ANEURYSMAL PERIMESENCEPHALIC SUBARACHNOID HEMORRHAGE

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Introduction Perimesencephalic subarachnoid hemorrhage (PM-SAH) accounts for about 10% of all SAHs, and digital subtraction angiography (DSA) is mostly found to be normal in such patients. The purpose of this study is to investigate the relationship between counts and diameter of engorged perforating artery of basilar top and non-aneurysmal PM-SAH.
Methods DSA findings of all patients who underwent catheter angiography for evaluation of non-aneurysmal PM-SAH between May 2014 and March 2015 were reviewed. Patients with anterior circulation aneurysms were excluded. PM-SAH and control group were evaluated by DSA 3D reconstruction images. Perforating artery diameters were measured and were counted engorged artery. Non-aneurysmal PM-SAH were identified: (1) center of bleeding located immediately anterior and in contact with the brain stem in the prepontine, interpeduncular, or posterior suprasellar cistern; (2) blood limited to the prepontine, interpeduncular, suprasellar, crural, ambient, and/or quadrigeminal cisterns and/or cisterna magna; (3) no extension of blood into Sylvian or interhemispheric fissures; (4) intraventricular blood limited to incomplete filling of the fourth ventricle and occipital horns of the lateral ventricles (ie, consistent with reflux); (5) no intraparenchymal blood.
Results 4 patients with non-aneurysmal PM-SAH and control group with posterior circulation aneurysms or dissection were identified. In patients with non-aneurysmal PM-SAH, mean diameters and counts of perforating artery were 1.002 mm (min-max, 0.85–1.26) and 3.75 (min-max, 3–4). In control group, diameters and counts were 0.663 mm (min-max, 0.5–1.12) and 2.4 (min-max, 1–4).
Conclusions There is a relationship between PM-SAH and engorged perforating artery counts and diameters. In patients of PM-SAH, there were found increased counts and diameters of perforating artery of basilar top.