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ASSESSMENT OF THROMBECTOMY PROCEDURE DIFFICULTY BY NEUROINTERVENTIONALISTS BASED ON VESSEL GEOMETRY PARAMETERS FROM CAROTID ARTERY 3D RECONSTRUCTIONS

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Introduction Stroke is one of the leading causes for neurological disability and death worldwide. Specifically, acute ischemic strokes (AIS) account for most cases encountered by interventionists. Interventionists are challenged with effectively diagnosing and treating AIS patients within a narrow timeframe. The time taken to access carotid vasculature and begin recanalization is dictated by the availability of information regarding vascular anatomy and trajectory. Currently, there is only a handful of published data regarding the influence of vessel radius of curvature and tortuosity on internal carotid access time. The absence of such information potentially impacts device selection, procedure success, and stroke outcomes. While the cervical carotid vessels allow interventionists to navigate catheters to the site of the occlusion, procedures are often encumbered if the pathway exhibits tortuosity. The purpose of this retrospective study was to determine how neurointerventionalists consider the physical nature of carotid segments when evaluating a procedure's difficulty.

Methods Seven interventional neuroradiologists reviewed 3D reconstructions of CT angiograms of left and right carotid arteries from 49 subjects and rated how challenging the procedure would be on a three-point scale (easy, medium, difficult) to reach the targeted proximal M1 with a thrombectomy device. Fifteen vessel metrics were quantified by dividing the carotids into 5 segments (figure 1) and measuring the radius of curvature, tortuosity, and vessel length of each segment.

Results The tortuosity and length of the arch-cervical and cervical regions significantly impacted difficulty ratings, i.e. longer and more tortuous segments will lose device length affecting the support of the device, thus increasing the procedure difficulty. Additionally, a two-way interaction between the radius of curvature and tortuosity on the arch-cervical region was significant ($p < 0.0001$) wherein an inverse relationship was established (table 1). For example, at a given arch-cervical tortuosity, an increased radius of curvature reduced case difficulty.

Conclusions Examining these vessel qualities can enable procedures to be tailored to patient characteristics. Prioritizing

Abstract O-015 Figure 1 3D reconstruction of the left and right carotid arteries from the aortic arch to the M1 segment of a representative patient showing a difficult case agreed upon by all neurointerventional readers. The five segments are defined as arch to the cervical region (arch-cervical), cervical, petrous, cavernous to the T-junction (cavern T), and M1

detailed cerebral vasculature data for physician use can allow for better interventional preparation, facilitate faster vessel access time, and improve thrombectomy outcomes. Additionally, documenting these correlations can enhance device design to ensure they suitably function under various vessel conditions.

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ASPIRATION THROMBECTOMY FOR ACUTE ISCHEMIC STROKE PATIENTS PRESENTING AFTER 6 HOURS

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Introduction/Purpose The purpose of this analysis was to evaluate the safety and performance of aspiration thrombectomy in patients with late onset to treatment (> 6 hours) acute ischemic stroke (AIS) in a real-world setting.

Materials and Methods This is a subset analysis of a global prospective multicenter registry (COMPLETE) that enrolled adults with large vessel occlusion AIS and a pre-stroke mRS of 0–1 who underwent aspiration thrombectomy with the Penumbra System. Data are presented for all patients with late presentation (> 6 hours onset to puncture) anterior circulation LVO and ASPECTS ≥ 6 . Primary endpoints for COMPLETE were successful revascularization (mTICI score 2b-3) post-procedure, good functional outcome at 90 days (mRS 0-2), and all-cause mortality at 90 days. Imaging findings were core lab

Abstract O-015 Table 1 Vessel metrics associated with neurointerventionalists' difficulty rating for thrombectomy procedure

Vessel metric	Odds Ratio (95% CI)	P-value
Tortuosity of Petrous	61.18 (11.26 – 332.42)	$P < 0.0001$
Tortuosity of arch cervical	517.15 (102.56 – 2607.74)	$P < 0.0001$
Tortuosity of cervical	6.9 (2.47 – 19.32)	$P = 0.0002$
Length of cervical	1.013 (1.004 – 1.024)	$P = 0.0008$
Length of arch cervical	1.014 (1.004 – 1.024)	$P = 0.0042$
Interaction between Radius of curvature and tortuosity of arch cervical	0.704 (0.615 – 0.806)	$P < 0.0001$