

subscapular muscle. Finally, tissue specimens of the aneurysm were stained for CD68.

**Results** AWE was higher in induced aneurysm compared with control vessels ( $1.9 \pm 0.4$  vs  $0.9 \pm 0.1$ ). Compared to aneurysms that did not receive aspirin, aneurysms treated with aspirin had thinner walls ( $0.57 \pm 0.06$ mm vs  $0.62 \pm 0.10$ mm) and had less AWE at 8 weeks ( $2.11 \pm 0.15$  vs  $2.15 \pm 0.37$ ). Histological analysis revealed that aneurysms that received aspirin for 8 weeks had decreased expression CD68 (figure 1).

**Conclusions** Aneurysms that received aspirin had thinner walls and enhanced less than aneurysms not treated with aspirin. Aspirin also decreased expression of inflammatory mediators such as CD68 in the vessel wall.

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P-026

#### EXTRACELLULAR VESICLE NEUROTROPHIN EXPRESSION IN PLASMA COLLECTED DURING MECHANICAL THROMBECTOMY FROM PATIENTS WITH EMERGENT LARGE VESSEL STROKE

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**Introduction** Mechanical thrombectomy (MT) and tissue plasminogen activator are ischemic stroke treatments that assist in restoring blood flow to the brain tissue, but do not guarantee good outcomes. Detection of cellular alterations systemically in extracellular vesicles (EVs) could be invaluable to theragnostic. EVs are nanoparticles released from cells that carrying stimuli specific cargo (e.g. lipids, proteins, and nucleic acids) from one cell to another. We hypothesize that the ratio of pro brain derived neurotrophic factor (proBDNF) to BDNF expression (proBDNF/BDNF) can be clinically relevant and used to predict stroke outcomes.

**Methods** Human ischemic stroke plasma, collected during MT, and cardiovascular disease (CVD) control plasma, collected during diagnostic angiograms, were unbanked from the 'Blood And Clot Thrombectomy Registry And Collaboration' (BAC-TRAC; NCT03153683). EVs were isolated (Exoquick) then measured (Zetaview-NTA) before quantification of proBDNF and BDNF.

**Results** Stroke subjects (n=29) were significantly older (67 vs. 56 years;  $p=0.03$ ) than the controls (n=18), though there was no difference in the representation of sex ( $p>0.9$ ), body mass ( $p=0.64$ ), or the presence of hypertension ( $p=0.50$ ). Baseline EV characteristics also showed no significant difference in size (124.1 nm vs. 125.6 nm;  $p=0.9$ ) or concentration ( $1.88 \times 10^9$  vs.  $1.89 \times 10^9$ ;  $p=0.9$ ). Stroke subjects exhibited increased EV proBDNF/BDNF compared to the controls ( $10.56 \pm 1.8$  vs.  $4.13 \pm 0.78$ ;  $p=0.0008$ ). This was primarily driven by significantly higher EV BDNF in stroke patients compared to controls (59 pg/mg vs. 14 pg/mg;  $p=0.027$ ) and a lower variation of EV proBDNF expression in stroke ( $211.8 \pm 26.6$  vs.  $175.8 \pm 42.6$  pg/mL) compared to controls. EV proBDNF/BDNF positively correlated longer infarct time ( $p=0.0946$ ,  $r^2=0.12$ ) and decreased cognition (i.e., Montreal Cognitive Assessment (MoCA),  $p=0.03$ ,  $r^2=0.487$ ).

**Discussion** These data suggest that EV proBDNF/BDNF levels can reflect vascular changes that lead to decreased cognition and should be explored further for translational applications.

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P-027

#### THE SIZE OF THE TARGET VESSEL AFFECTS THE PERFORMANCE OF ASPIRATION THROMBECTOMY: PATTERNS OF REPERFUSION FAILURES REPRODUCED IN A SWINE LARGE VESSEL OCCLUSION MODEL

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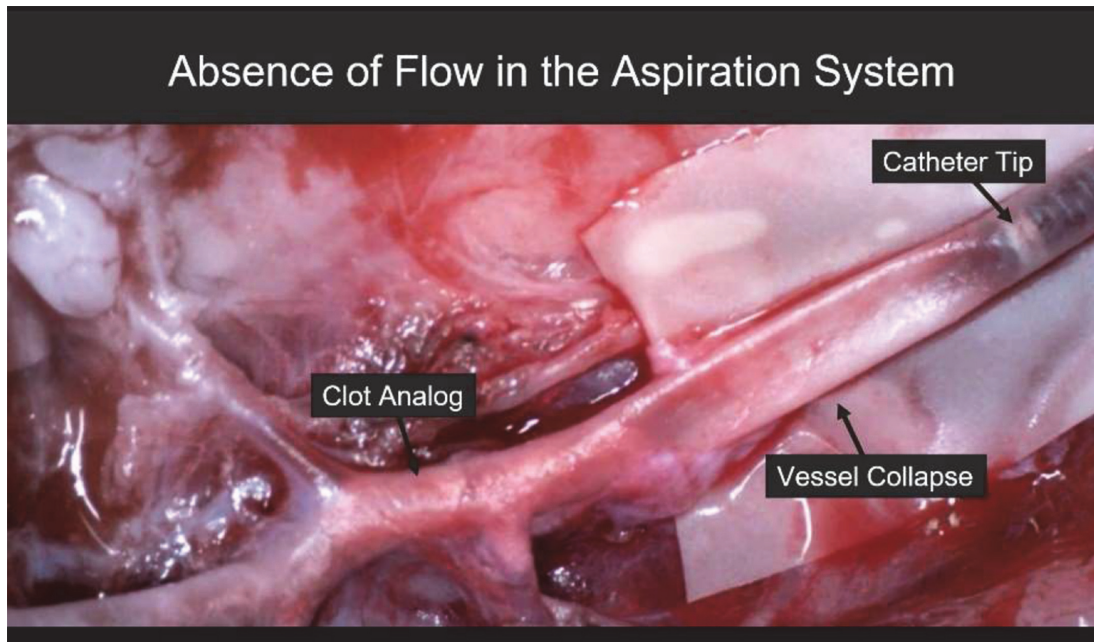
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**Purpose** Recent catheter technology has enabled the use of larger lumens and higher aspiration forces for the aspiration thrombectomy, yet the successful reperfusion rate of the first pass remains at 25.1- 40.9%. To investigate the mechanism of unsuccessful reperfusion, we performed aspiration thrombectomy in the different sizes of target vessels by using a unique swine large vessel occlusion (LVO) model, which allows transmural visualization of real-time vessel responses.

**Materials and Methods** Under general anesthesia, a common carotid artery (CCA) and a superficial cervical artery (SCA) of Yorkshire swine were surgically exposed, and an LVO was reproduced by injecting a radiopaque clot analog. Each target artery was treated with various sizes of aspiration catheters (0.058, 0.068, and 0.088 inches). The SCA group, with bifurcations, represented small diameter vessels (2-3mm) simulating a human MCA and the CCA group represented large diameter vessels (4-5mm) simulating a human internal carotid artery (ICA). Fluoroscopy and a high-resolution digital microscope camera were used simultaneously to monitor angiographic and transmural vessel behavior during the procedure. Thrombectomy was started as remote aspiration (5-20mm), and contact aspiration was performed if flow restoration was not achieved. Finally, Average vessel diameter, the presence or absence of vessel collapse/reverse flow during the procedures, and pre- and post-angiographic findings were evaluated.

**Results** A total of 13 aspiration thrombectomies were performed on 4 animals. Transluminal visualization was achieved in all vessels with real-time observation of thrombectomy. With remote aspiration, all vessels in the SCA group (Mean Diameter:  $2.34 \pm 0.49$ mm) showed immediate vessel collapse followed by absence-of-flow within the aspiration system, and all failed to recanalize the vessels regardless of their lumen size. Effective clot ingestion occurred only with direct contact aspiration (5 of 6 vessels). All vessels in the CCA group (Mean Diameter:  $5.16 \pm 0.54$  mm) showed constant blood flow in the aspiration system until the catheter ingested the clot and none showed vessel collapse. Six out of 7 vessels (85.7%) with remote aspiration generated a local reverse flow followed by complete reperfusion. One CCA vessel required direct contact aspiration to achieve clot ingestion.

**Conclusion** Vessel size appears to influence the performance of aspiration thrombectomy. Absence of flow in the aspiration system did not always reflect the clot engagement. It is important to apply contact aspiration especially in small vessels to



Abstract P-027 Figure 1

prevent vessel collapse and to increase efficacy of the treatment.

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P-028

#### IMPACT OF THE COVID-19 PANDEMIC ON THE INTRACRANIAL ANEURYSM TREATMENT AND ASSOCIATED OUTCOMES: A PROPENSITY SCORE MATCHING STUDY

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**Introduction** Coronavirus disease 2019 (COVID-19), a contagious infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has spread worldwide. The literature evaluating treating patients diagnosed with intracranial aneurysms during the COVID era is limited. To investigate the impact of COVID-19 on the overall complication rate, including ischemic stroke and subarachnoid hemorrhage rates in patients treated using an endovascular or open surgical approach for intracranial aneurysms (ICAs) using the National Inpatient Sample (NIS).

**Methods** This national, multicenter, retrospective cohort study included patients diagnosed and treated for ICAs from January 2016 to December 2020. A total of 57,715 admissions were identified. Of these, 45,979 occurred pre-COVID and 11,736 during the COVID period. The main outcome was an ischemic stroke, subarachnoid hemorrhage (SAH), death, non-routine discharge total charges (in US dollars), and length of stay (in days). Outcomes were compared pre- and post-COVID using piecewise joinpoint regression with the Mann-Kendall test. In addition, a 1:1 propensity score matching protocol was applied using a

nearest-neighbor approach with replacement to address confounding by indication and to evaluate adjusted comparisons in clinical endpoints between the pre- and during the COVID period.

**Results** The mean age was 65 years, with most of the patients being females (32,134; 69.9%). Endovascular treatments were performed in 7,759 (82.9%) pre-COVID admissions compared to 1,473 (82.4%) during the COVID period, while surgical treatment was performed in 1,600 (17.1%) pre-COVID patients compared to 314 (17.6%) during COVID. In addition, the mean total charges were higher during the pandemic. (\$120,067,463±157,775.6 vs. \$98,045,712±142,479.9;  $p<0.001$ ). There was no difference in treatment type for ICAs ( $p=0.776$ ), SAH ( $p=0.227$ ), or length of stay ( $p=0.266$ ) during the pandemic; however, the overall complication rate was higher (31.1%;  $p<0.001$ ) compared to the pre-COVID period. There was a significant increase in hospitalizations for ischemic stroke in patients treated for ICA (6.1% to 7.9%;  $p=0.04$ ), but no trend was observed for SAH or death ( $p=0.31$ ). Higher odds of ischemic stroke among ICA patients were found during COVID (OR 1.13; 95% CI 1.05 to 1.22;  $p=0.03$ ); however, these patients had similar odds of SAH during the pandemic (OR 0.97; 95% CI 0.88 to 1.06;  $p=0.89$ ).

**Conclusions and Relevance** The COVID-19 pandemic has significantly impacted the healthcare system and has led to changes in the treatment of various neurological conditions, including ICAs. The pandemic resulted in a shift in the treatment of SAH and an increase in endovascular procedures over open surgical clipping. COVID-19 infection has been associated with an increased risk of ischemic stroke and worsened outcomes for stroke patients. Further research is necessary to understand the long-term effects of the pandemic on the healthcare system and patient outcomes.

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