cytotoxicity of organic solvents (e.g., Dimethyl Sulfoxide (DMSO)). Aqua Embolic System (AES) is a new LEM, which is mainly composed of multiple polysaccharides. AES, when injected via a microcatheter, immediately forms a solid and elastic hydrogel cast upon exposure to Ca²⁺ in the bloodstream. The use of organic solvents, e.g., DMSO, is not required. The performance of AES was evaluated using an established AVM model utilizing swine rete-mirabile.

Methods Under general anesthesia, the left ascending pharyngeal artery (APA) of Yorkshire swine (40 kg) was catheterized using a microcatheter (ID:0.013 inches), and AES was slowly injected into the rete-mirabile under fluoroscopy. The following parameters were assessed to evaluate the embolization performance of the AES; 1) the amount of AES required for the complete occlusion of the feeding artery, 2) injection speed, 3) radiopacity during the deployment, and 4) incidence of catheter entrapment after the injection. The same evaluation was performed on the contralateral rete-mirabile and the left renal artery as well.

Results 12 arteries in 4 swine were treated, and all arteries were completely occluded without technical complications. The injected materials immediately formed AES cast in all vessels, followed by the reflux over the tip of the microcatheter. All catheters were withdrawn without any sign of catheter entrapment. The AES mixed with tantalum-based contrasts medium showed sufficient radiopacity under fluoroscopy. With the injection speed of 0.02ml/sec, the average volume required was 0.85mL for the APA and 2.9mL for the renal artery. No increased thrombogenicity or vasospasm near the treated lesion was observed during the procedure.

Conclusions AES, which is a DMSO free, non-adhesive polysaccharides based LEM, may be used as an embolic material for the treatment of hemorrhagic stroke caused by cerebrovascular diseases, such as brain AVM.

A: common carotid artery injection (AP view) shows left ascending pharyngeal artery (APA) and left rete mirabile (red arrow). B: AES is injected from the microcatheter. The AES reflux is reaching the tip of the microcatheter. C: With continuous injection of AES, the microcatheter tip is embedded in the cost of AES. D. Post treatment angiogram shows complete occlusion of the left rete mirabile and APA

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P-027

ULTRA-EARLY FUNCTIONAL IMPROVEMENT AFTER STROKE THROMBECTOMY – PREDICTORS AND IMPLICATIONS

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Introduction Neurocritical care is routinely offered to patients post neurothrombectomy of anterior large vessel occlusion (LVO) strokes. We aim to study the relationship between immediate improvement in NIHSS score on outcomes post thrombectomy and potential implications for requiring neurocritical care.

Methods We performed a retrospective review of anterior LVO (internal carotid/proximal middle cerebral artery) patients undergoing neurothrombectomy between January 2015-

December 2018. Demographic, clinical (NIHSS score on admission and within 30 minutes post recanalization, time last known well-TLKW), and imaging (ASPECTS, TIC1, intracranial hemorrhage) information was analyzed. Ultra-early functional improvement (Ultra-EFI) was defined as NIHSS score <6 within 30 minutes of successful recanalization. We analyzed the incidence and predictors of ultra-EFI and explored reasons for neurological decline post ultra-EFI.

Results Of the 343 anterior LVO patients undergoing neurothrombectomy, mean age was 71 ±15 and 46% were males. Mean NIHSS was 17±6 and TLKW to arrival was 9±11 hours. Ultra-EFI was observed in 23% (79/343) of patients. Independent predictors of ultra-EFI include lower pre-treatment NIHSS (), favorable ASPECTS (), and lower systolic blood pressure (). Rates of 90-day-mRS 0-2 were higher (71% VS 33%, P<0.01) and the rate of mortality (8% VS 28%, P<0.01) was lower in the ultra-EFI group compared to the non-ultra-EFI group. Amongst patients with ultra-EFI, 1.3% (1/79) experienced increase in NIHSS by ≥4 points. This patient received thrombolysis, achieved TIC1-2B recanalization, and follow-up neuroimaging revealed a parenchymal hemorrhage and an infarct volume of 44 ml. None of the patients required continuous antihypertensive infusions.

Conclusion Approximately 23% of anterior LVO stroke patients undergoing neurothrombectomy have a NIHSS score of <6 within 30 minutes of successful recanalization. Approximately 1% of them experience significant decline in neurological status within 24 hours of the procedure with the majority achieving functional independence at 90 days. Need for advance neurocritical care should be re-evaluated in these patients.

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P-028

OPHTHALMIC ARTERY FLOW DIRECTION CHANGES IN INTRA-ARTERIAL TREATMENT OF RETINOBLASTOMA

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Introduction/Purpose The introduction of catheter-administered intra-arterial chemotherapy (IAC) has changed the treatment paradigm for retinoblastoma (RB), the most common ophthalmologic malignancy in children. The variable nature of ophthalmic artery flow has led to the development of multiple endovascular techniques for drug delivery. These methods are based on the direction of ophthalmic artery filling, either retrograde from anastomoses with branches of the external carotid artery (ECA) or anterograde from the internal carotid artery (ICA). These include direct catheterization of the ophthalmic artery, ECA branch selection, use of an ICA balloon occlusion with proximal IAC administration, and balloon occlusion of the ECA to halt anastomotic flow to the OA. We sought to evaluate both direction of ophthalmic artery flow at the onset of IAC, as well as identify reversal of ophthalmic artery flow during the course of treatment.

Materials and Methods We performed a retrospective analysis of the most recent 15 consecutive patients with RB who completed treatment with IAC at our tertiary care center.

Results Of the 15 patients, 18 eyes were treated with IAC. 46% had left-sided disease (n=7), 33% had right-sided disease (n=5), and 20% had bilateral disease (n=3). The majority were male (n=10). Average age at the start of treatment was 1 year 5.5 months. A total of 66 treatments were performed, with a median of 4 per patient or 3.5 per involved eye. Of the 18 eyes treated, 12 (66%) initially had antegrade ophthalmic artery flow. Drug delivery was accomplished using direct ophthalmic catheterization (n=35), ICA balloon technique (n=18), ECA balloon technique (n=7), and via ECA branch catheterization (n=6). A flow reversal event was observed a total of 5 times (28% of eyes), each necessitating a change in drug delivery technique. All 5 events were in patients receiving multi-agent chemotherapy. These events occurred in 4 patients and involved 5 separate eyes, never more than once per eye. Flow reversal events were seen in both eyes (left=3, right=2). On average, events occurred between the third and fourth treatment (range 2 to 6). No correlation was found between reversal event and treatment technique.

Conclusions Ophthalmic artery flow is variable in RB patients treated with IAC. Further, mid-treatment shifts between antegrade and retrograde ophthalmic artery filling are common and necessitate variation in delivery methods throughout a single treatment course. In our analysis all flow reversal events were associated with multi-agent chemotherapy (as opposed to Melphalan alone). Although the correlation was not statistically significant, our analysis is limited by power. Future investigation is necessary to elucidate the nature of these variations, such as if they are a direct response to the number of chemotherapy agents utilized. Regardless, interventionalists should be comfortable and prepared to use various techniques independent of a given patient's treatment history.

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P-029

IMPACT OF IN-HOSPITAL DELIRIUM ON OUTCOMES OF ACUTE ISCHEMIC STROKE

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Introduction Delirium is a common complication after acute ischemic stroke(AIS) and is usually associated with worse outcomes. Nationally representative estimates on the prevalence of in-hospital delirium after AIS are not well established. Similarly, how delirium affects the clinical outcomes and hospitalization costs is also unexplored.

Methods We reviewed Nationwide Inpatient Sample(NIS), a database containing 20% inpatient admissions across the United States between 2012-2014. Standardized ICD-9-CM

codes were used to identify incidence of delirium, its association with reperfusion therapy(IV-tPA and endovascular thrombectomy(EVT)) and outcomes including in-hospital mortality, discharge disposition, length of stay(LOS) and hospitalization costs in patients presenting with AIS, overall and in a propensity-matched cohort.

Results Of 356,952 cases with AIS between 2012-2014, delirium was present in 12,412 (3.5%). Patients who exhibited delirium were older (non-delirium (ND):72 (60-82) years vs delirium (D):76 (65-85) years, $p<0.001$) and delirium was more common in females (ND:176,267 (51.2%) vs D:6,748 (54.4%), $p<0.001$), caucasians (ND:229,094 (70.1%) vs D:8,532 (72.9%), $p<0.001$) and patients with Medicare as the primary payer (ND:226,351 (65.8%) vs D:9250 (74.7%), $p<0.001$). These patients also exhibited more frequent history of congestive heart failure (ND:50,665 (14.7%) vs D:2189 (17.6%), $p<0.001$), hypothyroidism (ND:47446 (13.8%) vs D:1901 (15.3%), $p<0.001$), renal failure (ND:54,388 (15.8%) vs D:2313 (18.6%), $p<0.001$) and concurrent fluid and electrolyte disorders (ND:90,242 (26.2%) vs D:4989 (40.2%), $p<0.001$).

These patients demonstrated history of neuropsychiatric conditions including depression (ND:36,270 (10.5%) vs D:1,638 (13.2%), $p<0.001$), psychosis (ND:12,559 (3.6%) vs D:883 (7.1%), $p<0.001$), alcohol abuse (ND:15,498 (4.5%) vs D:633 (5.1%), $p<0.001$) and other neurological diseases (ND:16,638 (4.8%) vs D:2,514 (20.3%), $p<0.001$) more frequently.

Overall, the prevalence of delirium was lower in patients receiving reperfusion therapy (No reperfusion:11870/321805 (3.6%) vs Only IV-tPA:435/19079 (2.23%) vs only EVT:64/1999 (3.1%) vs tPA + EVT:43/1657 (2.5%), $P<0.001$).

Older age (aOR 1.02,95%CI:1.01-1.02, $p<0.001$), history of alcohol abuse (aOR:1.25,95%CI:1.15-1.37, $p<0.001$), history of depression (aOR:1.18,95%CI:1.11-1.24, $p<0.001$), psychosis (aOR:1.88,95%CI:1.75-2.03, $p<0.001$) and other neurological diseases (aOR:4.45,95%CI:4.23-4.67, $p<0.001$) were significant predictors of developing in-hospital delirium after acute ischemic stroke.

Delirium was associated with higher in-hospital mortality (D:1111(9.0%) vs ND:23203(6.7%), $p<0.001$), increased length of in-hospital stay (D:6(3-10) vs ND:4(2-7) days, $p<0.001$) and total charges associated with inpatient admissions (D: \$39423 (21513-83927) vs \$34087 (19970-64254), $p<0.001$). After adjusting for baseline patient characteristics including demographics and comorbidities, hospital characteristics and utilization of IV tPA and EVT, delirium was associated with an 8% increase in the risk of in-hospital deaths (aOR:1.08, 95%CI:1.01-1.15, $p=0.024$), an increase of 1.4 days in hospital LOS (adj. β :1.39,95%CI:1.23-1.54, $p<0.001$), ~\$8734 increase in total hospital charges (adj. β :8734,95%CI:6764-10705, $p<0.001$) and 31% decrease in odds of home discharge (aOR:0.69,95%CI:0.67-0.72, $p<0.001$). The results were confirmed in the propensity matched cohort of 12,107 matched pairs of patients with and without delirium (in-hospital death-aOR:1.10,95%CI:1.01-1.20, $p=0.044$; LOS-adj. β :1.11,95%CI:0.86-1.36, $p<0.001$; total charges-adj. β : \$5914,95%CI:2623-9206, $p<0.001$ and home discharge-adj. OR:0.74, 95%CI:0.70-0.78, $p<0.001$).

Conclusions Delirium complicates ~3.5% of AIS admissions, and is associated with increased risk of in-hospital death, longer stay, higher charges and decrease in likelihood of home discharge.