

E-112 TRANSRADIAL APPROACH FOR INTRAOPERATIVE ANGIOGRAPHY IN NEUROSURGERY: A SAFE AND EFFECTIVE ALTERNATIVE

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10.1136/jnis-2023-SNIS.212

Introduction Intraoperative angiography (IOA) is an essential tool for neurosurgery to confirm aneurysm occlusion, parent vessel patency, and effects of other cerebrovascular surgeries. Although the transradial approach for neuroangiography is becoming more popular, it has not been thoroughly studied for IOA. Therefore, we aimed to evaluate the safety and feasibility of transradial IOA in various indications.

Methods We conducted a retrospective study at our academic institution on consecutive patients aged 18 years or older who underwent IOA between April 2019 and December 2022 with attempted vascular access to the upper extremity. Data were collected on patient characteristics and surgical indications, procedural variables, and complications.

Results Seventy consecutive patients were included. The mean age was 52.9 ± 14.0 years, 58.6% were female, 15.7% were current smokers, and the median body mass index was 27.6. Access was attempted via the radial artery in 60 (85.7%) patients [52/60 (74.3%) right arm, 29/60 (41.4%) distal transradial approach] and the ulnar artery in 14.3% of patients [3/10 (30.0%) right arm]. Of these patients, 60.0% had aneurysm clipping, 20.0% AVM resection, 15.7% dAVF resection, 2.9% decompression for bow hunter syndrome, 1.4% meningioma resection, and 1.4% bypass surgery for Moyamoya disease. Patients were positioned supine in 78.6% of cases, prone in 18.6%, and three-quarters prone in 2.9%. The procedure was successful in 98.6% of cases, as one required conversion to femoral access due to significant spasm in the proximal right radial artery. No procedure was aborted, and no patient experienced angiography-related or access-site complications. The median fluoroscopy time was 8 (5.4-11.4) minutes. IOA changed the surgical management in 3 (4.3%) cases. Re-access for follow-up angiography was unsuccessful in three (13.6%) of 22 cases due to radial artery occlusion.

Conclusion Our findings support that transradial IOA is a safe and feasible alternative to femoral access in various neurosurgical indications and positions.

Disclosures G. Sioutas: None. M. Salem: None. N. Muhammad: None. D. Romeo: None. A. Corral Tarbay: None. Y. Kim: None. J. Sussman: None. J. Ng: None. I. Rhodes:

None. A. Gajjar: None. E. Zager: None. V. Srinivasan: None. J. Burkhardt: None. B. Jankowitz: None. O. Choudhri: None.

E-113 LOWER LOW-DENSITY LIPOPROTEIN LEVEL INCREASES THE RISK OF DELAYED PARENCHYMAL HEMATOMA FOLLOWING ENDOVASCULAR THROMBECTOMY

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10.1136/jnis-2023-SNIS.213

Introduction Low levels of low-density lipoprotein (LDL) have been suggested to increase the risk of hemorrhagic transformation following acute ischemic stroke (AIS). However, the literature on the relationship between LDL levels and post-thrombectomy hemorrhagic complications is sparse. The aim of this study is to investigate the association between LDL level and delayed parenchymal hematoma (PH) following endovascular treatment for AIS.

Materials and Methods Upon obtaining institutional review board approval, we conducted a retrospective analysis of all patients with large vessel occlusion ischemic stroke who underwent thrombectomy at a comprehensive stroke center from 2018-2021. All patients received dual-energy head CT (DEHCT) immediately post-thrombectomy and MRI or CT at 24 hours as routine standard of care. The presence of contrast and/or hemorrhage was assessed by iodine map and virtual non-contrast images of DEHCT. Delayed PH was determined by 24-hour imaging. Patients with hemorrhage on DEHCT were excluded. For univariate analysis, chi-squared and Mann-Whitney tests were performed for categorical and continuous variables, respectively. We then performed multivariate logistic regression using stepwise backward elimination to determine independent predictors of delayed PH.

Results A total of 160 patients without hemorrhage on post-thrombectomy DEHCT were included in the analysis. Among them, 18 patients (11%) developed delayed PH on 24-hour imaging. On univariate analysis, delayed PH was associated with lower LDL level (75.83 mg/dL vs. 94.78 mg/dL, $p=0.040$), lower high-density lipoprotein level (35.94 mg/dL vs. 42.86 mg/dL, $p=0.048$), higher presenting NIHSS (20.00 vs. 14.80, $p=0.0194$), higher contrast volume (55.51 mL vs. 9.07 mL, $p<0.001$), higher mean contrast density (27.60 HU vs. 13.81 HU, $p<0.001$), larger standard deviation of contrast density (11.36 HU vs. 4.75 HU, $p<0.001$), and higher maximum contrast density (100.33 HU vs. 38.89 HU, $p<0.001$). Statin use and triglyceride level were not associated.

In the multivariate logistic regression model, contrast volume (OR:1.05, 95% CI:1.02-1.0877, $p=0.0035$, per 1 mL increase) and LDL level (OR:0.95, 95% CI:0.92-0.99, $p=0.01$, per 1 mg/dL increase) were associated with delayed PH following thrombectomy. After adjusting for potential confounders, LDL <50 mg/dL (OR:5.38, 95% CI:1.70-17.04, $p=0.004$) was an independent predictor of delayed PH, while LDL >100 mg/dL (OR:0.26, 95% CI:0.07-0.96, $p=0.041$) was a protective factor.

Conclusion LDL level <50 mg/dL independently predicted delayed PH following thrombectomy and LDL >100 was shown to be a protective factor, irrespective of statin use. Further study is needed to explore the underlying mechanism and

Abstract E-112 Table 1 Procedural characteristics

Variables	Patients/procedures (n=70)
Vessels selected, median (IQR)	1.0 (1.0-2.0)
Fluoroscopy time, median min (IQR)	8.0 (5.4-11.4)
Fluoroscopy time/vessel, median min (IQR)	5.4 (3.6-8.3)
Contrast dose, median mL (IQR)	50.0 (30.0-80.0)
Contrast dose/vessel, median mL (IQR)	30.0 (25.0-50.0)
Dose Area Product, median μGym^2 (IQR)	7025.9 (5255.5-9647.0)
Dose Area Product/vessel, median μGym^2 (IQR)	4758.6 (3493.4-7346.4)
Reference Air Kerma, median mGy (IQR)	482.2 (329.2-777.1)
Reference Air Kerma/vessel, median mGy (IQR)	327.6 (230.2-530.1)

identify the strategies to prevent post-thrombectomy delayed PH among patients with low LDL levels.

Disclosures S. Ahn: None. S. Roth: None. J. Jo: None. Y. Ko: None. N. Mummareddy: None. M. Fusco: None. R. Chitale: None. M. Froehler: None.

E-114 MIDDLE MENINGEAL ARTERY FISTULA: A SYSTEMATIC REVIEW AND POOLED COHORT ANALYSIS

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10.1136/jnis-2023-SNIS.214

Introduction Dural arteriovenous fistulas (dAVF) consists of the development of acquired abnormal shunts between a main arterial feeder and draining veins. Amongst this category, middle meningeal artery (MMA) fistula rarely presents as a complication of head trauma or iatrogenic procedures such as endovascular embolization and surgery.

Objective This study aims to perform a systematic review of the clinical predictor for acquired MMA fistula postoperative course.

Methods We searched in PubMed, Embase, Scopus, Web of Science, and Google Scholar until September 1st, 2022. The risk of bias (RoB) and quality of the studies were assessed using the Joanna Briggs Institute (JBI) assessment tool for case series and case reports. Primary outcomes were overall obliteration rate and mortality, while secondary outcomes were post-procedural complications rate. A logistic multivariate regression was performed to identify predictors of overall obliteration, mortality and postoperative complications.

Results A total of 57 studies with 74 pooled patients were included in the analysis. Predominant gender, type of population and mean age were male (55.07%), adult (59.46%) and 48.59 ± 20.99 years old, respectively. Three main fistula origin events were reported: Endovascular embolization (9.46%), surgery (12.16%) and head trauma (74.32%). The mean time to fistula diagnosis was 69.87 ± 291.87 days. The most frequent defined lesion was fistula with MMA as the only feeder (96.77%), on the left side (58.11%), with a class I, III or IIII (14.86%) venous drainage classification. The JBI risk of bias assessment revealed patient's history and site demographic information reporting as the most neglected components in case reports and case series, respectively. Reported overall obliteration rate were high (89.19%) using endovascular (95.56%), surgical (64.29%) or conservative treatment (93.33%). After running the logistic regression, only statistically clinical predictors of overall obliteration were identified: male gender (OR = 9.5 (3.01 -23.95), p < 0.001), conservative treatment (OR = 14 (1.84 - 106.46), p = 0.011), MMA as the only feeder (OR = 11 (4.4 - 27.48), p < 0.001) and class I venous drainage (OR = 10 (1.28 - 78.12), p = 0.028).

Conclusion Literature oddly reports case series and case reports of acquired MMA fistula, doing so with an inaccurate

methodological process. Most frequently occurring after head untreated head trauma. However, low mortality and postoperative complications rate might rely on its delayed and stable development. More primary studies with a larger sample size are required to identify further clinical predictors for its post-operative course.

Disclosures F. Terry: None. C. Quispe-Vicuña: None. M. Cabanillas-Lazo: None. E. Luther: None. G. Saal-Zapata: None. K. Zullo: None. J. Zila-Velasque: None. M. Padilla: None. R. Alkhaddash: None. J. Burns-Martin: None. C. Alva-Díaz: None. D. Hoit: None. A. Arthur: None. N. Goyal: None. J. Sequeiros: None.

E-115 TRANS-RADIAL VERSUS TRANS-FEMORAL ACCESS ROUTES FOR DIAGNOSTIC CEREBRAL ANGIOGRAMS: A LARGE SINGLE-CENTER COMPARATIVE COST-ANALYSIS STUDY

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10.1136/jnis-2023-SNIS.215

Background Cerebral angiography has long been established as the gold standard modality to diagnose and treat cerebral vascular pathologies. Conventionally, the trans-femoral approach has been well established in neuro-interventional community for such procedures. Recently, the trans-radial approach has become a common alternative given its safety profile and increased patient satisfaction compared to the transfemoral route. Both routes are associated with their respective associated costs and differences typically emerge based on patients' anatomy, operator expertise, and occurrence of complications. **Objective** In this study, we aim to compare and evaluate the overall costs of diagnostic cerebral angiography for both routes and shed light on individual equipment cost for each route. **Methods:** This a retrospective single-center study of 926 elective diagnostic angiograms performed between December 2019 and March 2022.

Results The study comprised of 314 and 612 angiograms done through the TF and TR routes respectively. Female patients were significantly higher in the TF cohort (79.3% vs 67.8%, p<.001), and most other demographic characteristics and baseline modified Rankin Scale score were comparable between both cohorts. Similarly, the number of devices used was comparable between both groups. The overall cost of patients utilizing the TR route was comparable to that of the TF route (12591.8\$ ± 19128 vs 12789.5\$ ± 18424, p=.88). However, the median cost of catheters was significantly higher in TR group (55.2\$ vs 12.4\$, p=.03), while the median cost of closure devices (87\$ vs 20.2\$ p<.001), and sheaths (44.6\$ ± 11.3 vs 41.1\$ ± 3.1, p<.001) was significantly higher in the TF group.

Conclusion Overall, our study shows that the TR approach can be less a less expensive option for patients undergoing diagnostic cerebral angiograms, especially if complications occur. Future studies can corroborate our findings and potentially lead to the adoption of TR as a low-cost, efficient, gold-standard technique for cerebral angiography.

Costs (dollars) Associated with Trans-Radial Versus Trans-Femoral Access

Disclosures K. El Naamani: None. E. Atallah: None. A. Momin: None. P. Jain: None. A. Hunt: None. A. Sambangi: