E-175 INTRAVENOUS 3D DSA: READY FOR PRIMETIME?

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10.1136/neurintsurg-2020-SNIS.207

Introduction Catheter-based angiography has long been the gold standard for assessment of cranial vascular anatomy. In patients where arterial access is contraindicated, or a fast assessment is needed, a 3D-DSA with an intravenous injection of contrast might be an acceptable substitute. We assessed our experience in consecutive IV 3D-DSA acquisitions from January 2018 to present.

Methods 42 patients underwent an IV 3D-DSA acquisition at our institution. Acquisitions were performed on angiography systems of different generations. Upon room arrival, an 18Fr injection needle was placed in the patient's right antecubital vein. Data acquisition was similar to a conventional 3D-DSA, using manual instead of automatic triggering for starting the mask and fill acquisitions. In one sequence, a mask acquisition was performed, followed by IV contrast injection and 2D-DSA to determine contrast arrival at the skull base, then manual triggering of the fill acquisition. Acquisition duration for each rotation was 9, 10 or 12 seconds, depending on the chosen acquisition protocol. Non-diluted contrast injection ranged from 80–100 ml of 370 mg/ml concentration iodinated contrast. Data was reconstructed into 3D-DSA, 3D Dual Volume, depicting device to vasculature relationship in a volume rendering, and as a CBCTA. Motion and metal artifact corrections were applied depending on system generation. Data was retrospectively analyzed for case indication, conversion to

Abstract E-175 Figure 1 Pipeline follow up. 3D Dual volume rendering (A) and CBCTA (B) of pipeline embolization device. Device to

catheter-based arterial angiography (a surrogate for image quality), room time, use of anesthesia, complications and missed diagnoses.

Results The primary indication for IV 3D-DSA was aneurysm evaluation (35/42 cases), primarily post-surgical clipping (25) and stent assisted embolization (10). Other case indications included intracranial stenosis/occlusion (4/42) and extracranial stent evaluation (3/42). Three of 42 cases were converted to catheter-based arterial angiography due to non-diagnostic image data (7%). Room time was on average 26 minutes and two cases used anesthesia (one due to intra-operative image acquisition and one due to a history of epilepsy and cognitive delay). No complications were observed and no diagnoses were missed.

Conclusion IV 3D-DSA has significantly improved over the recent years and now offers the opportunity to obtain superior spatial resolution imaging compared to MDCT and is non-invasive compared to catheter angiography. Technological improvement such as motion/metal artifact correction allows for close inspection of neck residuals and aneurysm re-growth. Its use in the hybrid OR setting is promising for immediate post-operative confirmation of device placement and long term follow up of patients where catheter-based angiography is contraindicated.

Disclosures D. Dawkins: None. A. Ahmed: 2; C; Siemens. D. Niemann: None. S. Schafer: 1; C; Siemens Research Support. B. Aagaard-Kienitz: None.

E-176 ASSESSMENT OF COMPOSITION OF BLOOD CLOT BY OPTICAL COHERENCE TOMOGRAPHY (OCT)

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10.1136/neurintsurg-2020-SNIS.208

Purpose Optical coherence tomography (OCT) has been reported for potential use for differentiation of clot composition in cardiac patients. We tried to further validate its use for stroke patients using in-vitro clots with different percentage of red blood cells (RBCs) and fibrin.

Methods Blood was collected from a healthy volunteer and separated into plasma, buffy-coat, and erythrocyte-rich layers after centrifugation. The plasma and erythrocytes were harvested separately and then recombined in controlled ratios to form five different clot analogues with 2% thrombin added (5 analogues for each composition): Group A, fibrin-rich (95% plasma:5% RBCs); Group B, fibrin-rich (75% plasma:25% RBCs); Group C, intermediate (50% plasma:50% RBCs); Group D, RBC-rich (25% plasma:75% RBCs,) and Group E,

Abstract E-176 Figure 1

RBC-rich (5% plasma:95% RBCs). The blood mixture was injected in 6F guide angiographic catheter through a syringe. OPTISTM Integrated System (St. Jude Medical Inc., St. Paul, Minnesota) was used to perform OCT testing for each clot. A Dragonfly™ OPTIS™ imaging catheter (St. Jude Medical GmbH, St. Paul, Minnesota) was advanced into the catheter to pass the clot. The rate of automatic pullback was 0.5 mm/s. The blood clot was identified by OCT on mass images with different signal characters. OCT images were processed and analyzed according to the intensity of OCT signals from different compositions of clot.

Results Homogeneous signal of clot was shown in all the clots in Group A and B, less signal attenuation from its surface to inside was noted, which indicated high penetration (low-back scattering). Intermediate signal attenuation from its surface to inside was shown in all the clots in Group C, in which some signals still existed at the periphery of the clot. Clot in Group D and E was superficial signal rich with more signal attenuation from its surface to inside, which indicated low penetration (high-back scattering). Three clots in Group E showed signal-free shadowing (figures A to E).

Conclusion Different composition of clots can be assessed by OCT. Fibrin-rich clots have homogeneous signal with high penetration (low-back scattering), while RBC-rich clot can be recognized as superficial signal rich with low penetration (high-back scattering).

Disclosures Y. Ding: None. M. Abbassi: None. D. Jakaitis: None. D. Dai: None. R. Kadirvel: None. D. Kallmes: None. W. Brinjikji: None.

E-177 CARDIOVASCULAR RISK FACTORS ARE ASSOCIATED WITH CAROTID ARTERY INTRAPLAQUE HEMORRHAGE

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10.1136/neurintsurg-2020-SNIS.209

Background Intraplaque hemorrhage (IPH) has been shown to be a predictor of symptomatic carotid artery disease, independent of degree of carotid stenosis. The association between modifiable cardiovascular risk factors, demographics and lab values has not been extensively studied.

Methods We reviewed our institutional series of patients who have undergone dedicated carotid plaque imaging over a 3-year period and report the association between various demographic and clinical variables and the presence of plaque hemorrhage. Patients with dedicated carotid plaque imaging were categorized into two groups: those with IPH and those without.

Results 643 total patients were reviewed. 114 patients (17.7%) had intraplaque hemorrhage on carotid plaque imaging sequences compared to 529 patients (82.3%) without. Patients with IPH had a mean age of 76.0 years compared to 60.1 years in those without IPH ($P \leq 0.0001$). 79% of patients with IPH were male, compared to 49.5% without IPH ($P \leq 0.0001$). 39.5% of patients with IPH had coronary artery disease compared to 23.1% of patients without IPH ($P = 0.0003$). The IPH group also had higher proportions of patients with hypertension (77.2% vs. 60.7%, $P = 0.009$), hyperlipidemia (89.5% vs. 62.4%, $P \leq 0.0001$), diabetes mellitus (89.5% vs. 62.4%, $P = 0.01$) and a history of tobacco smoking (63.2% vs. 52.6%, $P = 0.003$) as compared those without IPH.

Abstract E-177 Table 1

	IPH	Without IPH	P
N Total	114 (17.7)	529 (82.3)	-
Any Carotid Stenosis >30%	93 (81.6)	154 (29.1)	<0.0001
Mean Age (SD)	76 (8.0)	60.1 (17.4)	<0.0001
N (%) Male	90 (79.0)	262 (49.5)	<0.0001
Comorbidities			
CAD	45 (39.5)	122 (23.1)	0.0003
HTN	88 (77.2)	321 (60.7)	0.0009
HLP	102 (89.5)	330 (62.4)	<0.0001
DM	33 (29.0)	99 (18.7)	0.01
PAD	6 (5.3)	41 (7.8)	0.35
OSA	28 (24.5)	114 (21.6)	0.53
A-fib	18 (15.8)	64 (12.1)	0.28
Current or Former Smoker	72 (63.2)	278 (52.6)	0.003
Lab Values			
BMI	28.7 (5.0)	28.3 (5.6)	0.52
LDL	86.6 (33.4)	91.9 (36.0)	0.15
HDL	46.1 (13.7)	50.7 (16.1)	0.003
TG	145.8 (129.8)	150.5 (288.8)	0.81
BG	123.4 (51.4)	113.8 (39.1)	0.07
CRP	24.2 (49.7)	19.2 (43.4)	0.56

Abbreviations: BMI = body mass index, CAD = coronary artery disease, HTN = hypertension, HLD = hyperlipidemia, DM = diabetes mellitus, IPH = intraplaque hemorrhage, PAD = peripheral artery disease, OSA = obstructive sleep apnea, A-fib = atrial fibrillation, LDL = low density lipoprotein, HDL = high density lipoprotein, TG = triglycerides, BG = blood glucose, CRP = c-reactive protein

Conclusions IPH is associated with well-known non-modifiable and modifiable cardiovascular risk factors. Patients with these risk factors are therefore more likely to have IPH within carotid plaques as compared to patients without these risk factors. These factors likely play a role in IPH pathophysiology. Consideration of such risk factors is important in considering patients to be at risk for ischemic stroke from carotid plaque. **Disclosures** A. Larson: None. J. Benson: None. G. Lanzino: None. W. Brinjikji: None.

E-178 A RADIAL FIRST APPROACH FOR DIAGNOSTIC CEREBRAL ANGIOGRAPHY: COMPARISON OF PROCEDURE AND SAFETY PARAMETERS FOR TRANSRADIAL AND TRANSFEMORAL ACCESS

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10.1136/neurintsurg-2020-SNIS.210

Background and Purpose Transradial diagnostic cerebral angiography is slowly gaining acceptance due to significant safety advantages over transfemoral angiography, but there is limited data comparing other procedure parameters between the two techniques. We document the impact of adopting a 'radial first' diagnostic cerebral angiography in a busy multihospital setting.

Methods Six hundred forty-five consecutive patients referred for diagnostic 4-vessel cerebral angiography were considered for primary radial access over a three-year period. Radial access procedure data were analyzed retrospectively using prospectively maintained data. Radial procedure parameters were