P54 QUANTITATIVE HEMODYNAMIC ANALYSIS OF ANEURYSMS USING FUNCTIONAL MAGNETIC RESONANCE ANGIOGRAPHY TECHNIQUES. INITIAL EXPERIENCE

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Introduction Recently, a 3D phase-contrast technique called 4DFlow has been implemented at MRA in order to quantify blood velocity through the cardiovascular system.1 Due to the curvature and caliber of the cerebral arteries, 4DFlow acquisition and its post-processing has been clinically underdeveloped to pathologies such as aneurysms.2

Aim To standardize the 4DFlow acquisition and its post-processing at healthy (HT) and aneurysmal patients (AN).

Methods This retrospective study was approved by the IRB. Eight subjects (5 HC and 3 AN) were studied in a 1.5T Ingenia Philips scanner. The aneurysms analyzed had maximum radius between 19 and 2.6 mm, aneck/dome ratio between 3.4 and 1.1 were studied within three days prior to embolization. In addition to a standard high-resolution MRA, 4DFlow was acquired with a cubic resolution of 2 mm and 25 temporal phases (in a cardiac cycle). Post-processing was done with an in-house Python routine using finite elements and molecular dynamics algorithms.

Results In the vascular regions without pathology, flow, vortex, energy loss and wall shear stress (WSS) analyses were consistent with laminar flow. In aneurysms, turbulent flow (vortex) and pressure heterogeneity along the lesion (WSS) were demonstrated.

Conclusion Both the proposed changes to the standard 4DFlow acquisition (flip angle, sense, temporal/spatial resolutions, phases) and the designed post-processing allow to obtain expected hydrodynamic behaviors in the blood flow at the studied regions.

REFERENCES

Do you have any conflict of interest to declare?: No

P55 ACCURACY OF AUGMENTED REALITY-GUIDED (AR) DRAINAGE VERSUS STEREOTACTIC AND CONVENTIONAL PUNCTURE IN AN INTRACEREBRAL HEMORRHAGE PHANTOM MODEL

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Introduction Minimally-invasive intracranial drain placement using bedside techniques are common procedures in patients with intracerebral hemorrhage (ICH).1,2,3 There is little data on the accuracy of these techniques4 and accuracy may be significantly improved by using augmented-reality (AR) guidance.

Aim of the Study We aimed to retrospectively investigate the accuracy of conventional free-hand ICH drain placement4 and to prospectively compare the accuracy of AR versus frame-based stereotaxy-guided (STX) and freehand drain placement in a phantom model.

Methods A retrospective, single-center analysis evaluated the accuracy of drain placement in 73 consecutive ICH based on postinterventional CT. In a head phantom with a simulated deep ICH, five neurosurgeons performed four punctures for each technique: STX, AR and free-hand. The Euclidean distance to the target point and the lateral deviation of the achieved trajectory from the planned trajectory at target point level were compared between the three methods.

Results Analysis of the clinical cases revealed an optimal drainage position in 46/73 (63%). Correction of the drain was necessary in 23/73 cases (32%). In the phantom study, accuracy of AR was significantly higher than the free-hand method (p<0.001 for both Euclidean and lateral distances). The Euclidean distance using AR (median 3mm) was close to that using STX (median 1.95mm; p=0.023).

Conclusions The accuracy of the free-hand technique was low and subsequent repositioning was common. In a phantom model, AR drainage placement was significantly more precise than the free-hand method. AR has great potential to increase precision of emergency intracranial punctures in a bedside setting.

REFERENCES

Do you have any conflict of interest to declare?: No

P56 SAFETY AND EFFICACY OF TRANS-CAROTID INTERVENTION IN MULTIPLE SCENARIOS: MEDELLIN EXPERIENCE USING DIRECT CAROTID ACCESS

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Purpose This study was conducted to investigate the feasibility and safety of trans carotid Neuro intervention for a variety of pathologies.

Materials and methods Since 2018 we implemented a direct carotid access under special considerations to perform a therapeutic approach. A total of 18 patients from our centers were analyzed. Patients were divided into a variety of neurovascular conditions: Carotid Stenting CAS (n=6), Mechanical Thrombectomy MT (n=5), AVM’s treatment (n=2), Intracranial Aneurysms treatment (n=5).
Do you have any conflict of interest to declare?: No

Results Mean age was 64.3 ± 10.3 years. Major indication to this approach was: anatomical and access limitations. (Two patients with Leriche Syndrome) All cases performed with ultrasound. A 4 Fr, Micro-puncture set were used in all procedures and posteriorly a 6Fr. Introducer was inserted. Technical success in all cases (100%). For MT(n=5): a SOFIA 6Fr for ADAPT was used in 3 cases with TICI 2b-3 in all cases. Combined approach “Solumbra”-solitaire and aspiration catheter was used in two cases, one TICI 2a and one TICI 3. For the AVM’s treatment we use a 6Fr guiding catheter and non-detachable microcatheters to inject Onix with a high grade of obliteration. Five aneurysms were treated with this approach (2 ICA – ophthalmic; 2 MCA and one AcomA) Mean average time of the procedure was 34.5 min. (ranged 9–59 min) just one bleeding complication observed at the closure device use. In all cases but one we use Angio-Seal 6Fr as closure device.

Conclusion Trans Carotid Intervention was feasible and safe in selected patients in this small series.

REFERENCES

Do you have any conflict of interest to declare?: No