strategies of interventional pain management, neuroradiology, and conventional spine surgery, it is now feasible to treat spinal axial pain using permanent fixation techniques and local anesthesia in the setting of a fluoroscopy suite using mild sedation and local anesthesia.

Methods The author presents a series of percutaneous thoracolumbar fusion procedures performed in a biplane neuroangiographic suite and without general anesthesia for the treatment of spondylytic pain. All procedures utilized pedicle screw fixation, harvesting of local bone autograft, and application of bone fusion material.

Results In this series of 13 patients, a statistically significant reduction of pain was seen at both the 2 week post-operative timepoint, as well as at the time of longest follow-up (mean 40 weeks). Specifically, axial spine pain as rated by the Visual Analog Scale was reduced from a preoperative mean level of 7.827 to a level of 4.000 at 2 weeks, and a level of 2.192 at longest follow-up. Five of the 13 patients were still taking narcotic medications for axial spine pain at the point of longest follow-up.

Discussion The advanced and rapid imaging capabilities afforded by a neuroangiographic biplane suite can be safely combined with percutaneous fusion techniques so as to allow for fusion therapies to be applied to patients where the avoidance of general anesthesia is desirable. Expanding instrumented fusion procedures into a non-traditional operating room setting requires sensitivity towards the inherent cultural differences between angiography suites and operating theaters in order to ensure sterility and best patient outcomes.

Disclosures B. Chopko: 2; C; Vertos Medical, Bacterin International.

E-076 INTRAVASCULAR ULTRASONOGRAPHY FOR CEREBROVASCULAR INTERVENTION

W Yoon. *Neurosurgery, The Catholic university of Korea, Seoul, Republic of Korea*

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Purpose We want to share our limited, but unique experience on the use of intravascular ultrasonography (IVUS) for the cerebrovascular intervention and discuss its feasibility and usefulness.

Methods A retrospective image and medical record review was completed for the patients who underwent IVUS during various cerebrovascular intervention. Image findings with the IVUS and angiography were compared and recorded at the time of the procedure. The diameter of the vessel and the lesion, feature of the stent apposition and in-stent environment and complications were reviewed.

Results Seventeen IVUS cases were enrolled for the current study. The IVUS was performed in 11 cases of stent angioplasty: 5 cases of extracranial carotid artery, 2 for orifice of vertebral artery (V1), 1 for extracranial vertebral artery (V2) and 3 intracranial arteries (V4, basilar artery and petrous ICA). And 4 diagnostic cerebral angiographies and 2 follow-up angiographies of stents were carried out with IVUS. For the carotid artery stenting (CAS), the IVUS revealed hyperacute in-stent thrombosis which was invisible on angiography because they were judged as severe and unstable stenosis on IVUS. Intracranial and vertebral artery orifice stenosis were treated with stent angioplasty safely with guidance of IVUS. It was helpful for deciding the size of the the stents and limitation of post-dilation with balloon catheters. And IVUS revealed a severe stenosis with vulnerable plaque of vertebral artery orifice which seemed to be moderate stable stenosis on diagnostic angiography. The other diagnostic IVUS findings were in the semblance of angiographic findings. Follow up IVUS for the stents showed mild in-stent restenosis.

Conclusion IVUS in cerebrovascular intervention could provide valuable information about the intravascular environment which was not available on conventional angiography. This information could affect the treatment strategy or give concrete evidence for the further treatment for each lesion.

Disclosures W. Yoon: None.

E-077 REDUCTION IN RADIATION EXPOSURE DURING INTERVENTIONAL NEURORADIOLOGY PROCEDURES IN A MODERN BIPLANE ANGIOGRAPHIC SYSTEM

[1]**A Hassan**, [2]S Amelot. [1]*Department of Neurology and Radiology, Valley Baptist Medical Center, Harlingen, TX;* [2]*GE Healthcare, BUC, France*

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Objective To evaluate patient exposure to radiation during common interventional neuroradiology procedures performed with a recent Flat Panel Detector (FPD) angiographic system and compare to recently published values.

Method All consecutive patients from February 2015 to November 2015, who underwent cerebral diagnostic angiogram or Intervention, including embolization of arteriovenous fistula, arteriovenous malformation, aneurysms, stroke mechanical thrombectomy and other types of interventional procedures, on two modern FPD angiographic biplane systems (Innova IGS 630, GE Healthcare, Chalfont St Giles, UK), were retrospectively analyzed. Dose-area product (DAP), cumulated Air Kerma (CAK) per plane, fluoroscopic time (FT) and total number of Digital Subtracted Angiography (DSA) frames were collected and analyzed for each category. Results are expressed as median (interquartile range). The data was compared with previously published literature on other modern FPD systems only.

Results 755 consecutive cases were performed in our institution, including 398 cerebral angiograms, 33 AVF/AVM embolizations, 71 aneurysm embolizations, 73 mechanical thrombectomies and 180 Other Interventions.

The DAP (Gy.cm²), Fontal and Lateral CAK (Gy), FT (min) and total number of DSA frames were as follows: 43 (33–60), 0.26 (0.19–0.33), 0.09 (0.07–0.13), 5.6 (4.2–7.5), 245 (193–314) for Cerebral Diagnostic and 66 (41–110), 0.46 (0.25–0.80), 0.18 (0.10–0.30), 18.3 (9.1–30.2), 281 (184–427) when combining all interventional cases.

Radiation data is summarized in Table 1, as well as published reference levels.

Conclusion Our diagnostic group had a lower median and in the 75 th percentile of DAP and fluoroscopy time, when compared with published literature, with the number of DSA frames comparable.

In our intervention group, both DAP and number of DSA frames were significantly lower than values reported in the literature, despite a higher fluoro time. The sub-group analysis by procedure type also revealed a lower or comparable DAP.

Abstract E-077 Table 1

First Author	Year	N	DAP (Gy.cm²)	CAK (Gy) Frontal Plane	CAK (Gy) Lateral Plane	FT (min)	Number of DSA frames
CEREBRAL ANGIOGRAPHY							
CW Chun[1]	2014	439	136.6[a] (154.2[b])			12.6[a] (14[b])	251[a] (273[b])
M Söderman[2]	2013	174	47 (28–76)	0.21 (0.13–0.37)	0.06 (0.03–0.11)	6 (4–9)	278 (173–402)
C Chung[3]	2015	Range 42-50		System 1: 1.499[a] System 2: 1.184[a] System 3: 0.973[a]			
This study	2015	398	43 (33-60)	0.26 (0.19-0.33)	0.09 (0.07-0.13)	5.6 (4.2-7.5)	245 (193-314)
INTERVENTION							
CW Chun[1]	2014	111	226.0[a] (272.8[b])			52.9[a] (61.1[b])	241[a] (276.0[b])
M Söderman[2]	2013	138	109 (67–196)	0.68 (0.38–1.35)	0.21 (0.10–0.45)	12 (5-16)	464 (299-845)
E. Vano[4]	2013	Year 2009 N: 90 Year 2010 N: 92	Year: 2009 242 (386[b]) Year 2010 270 (392[b])	Year: 2009 2.4[c] (3.9[b]) Year 2010 2.5[c] (3.3[b])			
N Kien[5]	2011	628	188 (272[b])				
This study	2015	357	66 (41-110)	0.46 (0.25-0.80)	0.18 (0.10-0.30)	18.3 (9.1-30.2)	281 (184-427)
Sub-group analysis:							
AVF/AVM Embolization		33	150 (118-206)	0.99 (0.65-1.55)	0.56 (0.28-0.74)	57.0 (36.4-76.1)	706 (522-904)
Aneurysm embolization		71	79 (60-112)	0.71 (0.48-0.94)	0.29 (0.23-0.40)	25.7 (19.9-34.8)	300 (212-428)
Mechanical thrombectomie		73	86 (60-110)	0.46 (0.36-0.75)	0.19 (0.15-0.29)	19.9 (13.1-29.0)	359 (286-458)
Other Interventions		180	43 (30-78)	0.27 (0.17-0.53)	0.11 (0.07-0.17)	10.1 (5.2-20.0)	206 (158-306)

Values are given as median (IQR) unless otherwise indicated.
FT fluoroscopy time; DAP dose area product; CAK cumulative air kerma.
[a] Mean ; [b] third quartile

Disclosures A. Hassan: 2; C; GE Healthcare. **S. Amelot:** 5; C; GE Healthcare.

E-078 ENDOVASCULAR VEIN APPROACH AND DIRECT PUNCTURE RETROGRADE VEIN APPROACH FOR CURATIVE AVM TREATMENT: A NEW UNREPORTED TECHNIQUE

W Yakes. *Vascular Malformation Center, Englewood, CO*

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Purpose To evaluate the role of Retrograde Vein and Direct Puncture Retrograde Vein Endovascular Repair of Large Peripheral AVMs.

Materials and methods Eighty-seven patients (45 males, 42 females; age: 14–72, mean age: 27 years) presented for repair of AVMs involving head and neck, shoulder, chest wall, intrathoracic, abdominal, renal, pelvic, buttock, and extremities. Ethanol and ethanol/coils were the embolic agents used. Retrograde transvenous catheterizations and vein direct puncture retrograde vein approaches were used in all patients.

Results Eighty-five of 87 patients are cured at long-term follow-up (f/up: 14 months to 138 months; mean: 42 months) and 2 patients' therapy is on-going. Complications include 1 pelvic AVM post-Rx small bleed not requiring transfusion; 1 pelvic AVM coils eroded into bladder wall removed uneventfully via trans-urethra endoscopy; 2 infections treated with antibiotics; 2 patients' coils superficially eroded and uneventfully removed; and 1 patient subcutaneous hematoma removed (7/87 patients; 8% minor complications).

Conclusions Retrograde vein and direct puncture vein access and embolization of AVMs in many anatomic locations have proven curative at long-term f/up of AVMs in multiple anatomic locations with a low complication rate. Reproducible and consistent results of this technique have been reported by Yakes (1990) et al, Jackson (1996) et al and Cho (2008), et al.

Disclosures W. Yakes: None.

E-079 ANGIOGRAPHIC ANATOMICAL FEATURES FOR TRANSBRACHIAL CAROTID CANNULATION OF A BALLOON-GUIDE CATHETER

T Mori, S Kasakura, T Iwata, Y Tanno, K Yoshioka. *Stroke Treatment, Shonan Kamakura General Hospital Stroke Center, Kamakura, Japan*

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Background and purpose Transfemoral approach has been a common technique for advancing a balloon-guide catheter (BGC) for emergency clots removal therapy in acute stroke patients. When aortic or peripheral arterial conditions limit transfemoral access, transbrachial approach is attempted as the alternative. The purpose of our study was to investigate anatomical features of the aortic arch (AA) for transbrachial carotid cannulation (TCC) of a BGC.

Patients and methods Included were patients who underwent endovascular reperfusion therapy with transbrachial BGC between Jan 2014 and Jun 2015. Evaluated were successful cannulation of the BGC and anatomical features of the aortic arch.

Results Fourteen patients were analyzed. TCC was successful in 10 (71%) of 14 lesions: 6 of 7 right carotid artery (CA) lesions and 4 of 7 CA lesions. Two left CA lesions of a bovine type AA were transbrachially cannulated, whereas only two of five left CA lesions of a non-bovine AA were cannulated and their angle (BC-ltCA) between the brachiocephalic artery and the left CA was 20 degree or more. However, three lesions with BC-ltCA angle of less than 20 degree were not cannulated. Six right CA lesions with the angle (SA-rtCA) between the right subclavian artery and the right CA of 30 degree or more were cannulated; however one lesion with SA-rtCA angle of less than 30 degree was not.

Conclusion A BGC can be transbrachially cannulated to the CA in patients with the left CA of a bovine AA, the left CA of a non-bovine AA with the BC-ltCA angle of 20 degree or more or the right CA with the SA-rtCA angle of 30 degree or more.

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