



Society of Vascular and Interventional Neurology

9th Annual Meeting & 4th Annual Stroke Center Workshop

Poster Session and Reception

Friday, November 18, 2016 | 4:30-6:30 pm | Grand Ballroom E-F

Reception: 4:30-5:00 pm

Odd Poster Presentation Time: 5:00-5:45 pm

Even Poster Presentation Time: 5:45-6:30 pm

Join experts in the field and “Walk Around with the Professor” during this year’s poster session. Below is a list of the Professors and the schedule. Poster numbers, titles and authors are included in the program. View the complete abstracts electronically on the attendee portal and via the mobile app!

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Steve M. Cordina, MD		Even Posters 2-20
Ameer E. Hassan, DO, FAHA, FSVIN	Odd Posters 21-39	
Dileep Yavagal, MD, MBBS, FSVIN, FAHA, FAAN		Even Posters 22-40
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Tanzila Shams, MD		Even Posters 42-60
Edgar Samaniego, MD, MS	Odd Posters 61-81	
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New This Year - Don't miss the late breaking abstracts!

Complete late breaking abstract information is available in the mobile meeting app and start with poster #81 and up.

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ABSTRACT DISCLAIMER: All Abstract information is published as submitted.

Poster 1

Off-label Use of the 6/7F Mynx Closure Device for 8F Sheath Closures: A Single-Center Experience

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Introduction:

Femoral artery closure devices allow for earlier mobilization and improved comfort for patients after vascular access. The Mynx device (Cardinal Health, Inc.) is an extravascular closure device that deploys a polyethylene glycol plug, and is maximally labeled for 6/7 French sheath closure. Here we report our experience using the device to close 8F sheaths in patients post endovascular treatment of ischemic stroke.

Methods:

We performed a retrospective analysis of all stroke cases where the 6/7F Mynx device was used with 8F sheaths. Operating room flowsheets, physician and nursing notes up to 2 weeks post angiography were reviewed and data on deployment and complications were analyzed

Results:

87 consecutive stroke embolectomy cases at an academic center were reviewed from 2014 through 2016. 8F short sheaths were utilized in 23 patients, and all 23 were closed with 6/7F Mynx device. Average compression time following Mynx deployment was 18 minutes. The mean patient age was 70.7 years. The average BMI was 27. Ten patients (38%) had received IV tPA ; 6 patients were on anticoagulation(27%); and 2 patients had coagulopathies. Two (8%) patients had documented groin bruising post Mynx; both resolved spontaneously. No patients had loss of ipsilateral distal pulses post mynx; in 1 patient, distal pulses changed from palpable to dopplerable. No patient had significant pain or swelling at the site. There were no groin site infections.

Conclusions:

Off-Label use of 6/7F Mynx for 8F closure is safe and efficacious, and was not associated with an increased complication rate in our small cohort.

Keywords: Closure Devices

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 2

Case Reports: Use of Low Dose of Alteplase in High Risk of Bleeding Patients

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Introduction:

Stroke is the leading vascular disease cause of death, and the tenth cause of adult disability in Peru. An increasing tendency has been report, causing a huge public health impact. Acute management in hospitals in Peru is limited to IV thrombolysis and is only available in referral hospitals. Most of the patients don't get into hospitals in the therapeutic window, and many of them complain of multiple comorbidities, and might be included in the relative exclusion criteria. The authors present 20 patients with a high risk of bleeding, treated with a dose of 0.6 mg/kg of tissue plasminogen activator (tPA) aiming to assess equal efficacy and safety than the 0.9 mg/kg dose.

Methods:

20 case reports of patients treated with a dose of 0.6 mg/kg of tPA, with 15% of the dose given as a bolus over 1 minute followed by continuous infusion of the remainder over 1 hour, between September 2013 and 2016. The NIHSS was evaluated before, during and after thrombolysis. The mRS was evaluated before and 3 months after. We had CT scans done before treatment and after 24 hours.

Results:

20 patients between 40 and 92 years were treated within an average time of stroke symptom onset of 3:37 hours. The median baseline NIHSS score was 10.7. Good clinical outcomes (mRS score 0–2) were seen in 75% of cases. The rate of symptomatic ICH (sICH) within 24 hours was 5%. The 3-month mortality rate was 10% (2), due to atrial fibrillation with acute decompensated heart failure and sICH.

Conclusions:

We observed a good clinical outcome after the administration of tPA at a dose of 0.6 mg/kg. The followed up of these patients after 3 months of the event also show a good prognosis. We propose further studies are needed to confirm these resulta.

Keywords: Acute Stroke, Thrombolytics, Treatment, MRS, ICH

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 3

Endovascular treatment of a Torcular dural arteriovenous fistula, from Ascending Pharyngeal Artery: a technical report

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Introduction:

The incidence of dural Arteriovenous fistulas (dAVF)s located at the torcula is unknown and is frequently supplied by ascending pharyngeal artery (APA). Use of APA for transarterial embolization is rare due to dangerous anastomosis and crucial supply to cranial nerves (CN) IX-XII. The authors present a case of torcular dAVF with arterial supply arising from the jugular branch (JBr) of the neuromeningeal trunk (NMT) of APA. The dAVF was successfully treated with Onyx embolization. Knowledge of anatomy and risks of embolization via the APA is vital when approaching treatment of such a dural AVF.

Methods:

A 64 year old male presented with a chronic headaches and projectile vomiting. He underwent workup which demonstrated vasogenic edema and mass effect in the posterior fossa. Diagnostic cerebral angiogram revealed a type IV torcular dAVF arising from the JBr of the APA.

Results:

The microcatheter was advanced past the pharyngeal trunk into the NMT of the APA, navigated past the hypoglossal artery (HA), and into the prominent JBr, beyond the jugular foramen where the JBr supplies CN IX-XII and dura. The tip of the microcatheter was advanced into the distal segment of JBr, just proximal to dAVF nidus. Onyx embolization was employed to obliterate the fistula with controlled penetration. Post embolization run demonstrates patent NMT, HA, and JBr of APA. The patient demonstrated immediate postprocedural improvement.

Conclusions:

Torcular dAVF location poses unique technical challenges despite availability of multimodal treatment options. In this case, the added challenge lies in the arterial feeders exclusively from branches of the APA, an artery that carries risk of inadvertent embolization of branches of the NMT as well as the risk for extracranial to intracranial embolization. An awareness of the highly variable anatomy of the APA is necessary for the safe treatment of lesions supplied by this artery.

Keywords: Avm Embolization, Cerebral Arteriovenous Malformations, Embolization, Endovascular Therapy, Onyx

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 4

May-Thurner Syndrome as a Cause of Embolic Stroke of Undetermined Source in a Young Patient

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Introduction:

May-Thurner Syndrome (MTS) consists of chronic compression of the left common iliac vein (CIV) by the right common iliac artery (CIA) and may predispose to local deep venous thrombosis (DVT) formation, which can result in paradoxical embolus in patients with a right-to-left cardiac shunt (RLS).

Methods:

We report a case of embolic ischemic stroke in a young patient with patent foramen ovale (PFO) and atrial septal aneurysm (ASA) likely due to MTS.

Results:

A 35-year-old woman with migraine history and current intrauterine device presented with left hemiparesis, numbness, and left field cut. She received IV rt-PA with symptom resolution. No family history of stroke or hypercoagulable disorder was reported. Neurological exam significant for minimal left-sided incoordination. MRI revealed right lentiform, caudate, and corona radiata infarct. CTA head and neck, ECG, holter monitor, bloodwork and urine toxicology were unremarkable. Hypercoagulable labs revealed borderline low antithrombin III activity at 79% [80-117%]. TTE bubble study showed RLS. TEE revealed a PFO with ASA. Lower extremity (LE) Doppler showed no DVT. Magnetic resonance venogram (MRV) of the pelvis revealed compression of the left CIV by the right CIA, without evidence of thrombus. This finding was felt to be consistent with MTS. Impression was that her stroke was due to paradoxical embolus originating in the iliac vein, perhaps precipitated by venous stasis in the setting of a prolonged car trip. She was started on anticoagulation with apixaban for presumed pelvic DVT.

Conclusions:

MTS is an important consideration in young patients with embolic strokes of undetermined source (ESUS) who are found to have RLS. MRV pelvic imaging is a useful non-invasive diagnostic tool to assess for thrombus and abnormal anatomy. Discovery of MTS affects clinical decision-making and thus, pelvic imaging should be pursued in patients with ESUS who are found to have a PFO.

Keywords: Pathophysiology, Stroke, Vascular Imaging

Financial Disclosures: The authors had no disclosures.

Grant Support: None

Poster 5

Successful Endovascular Approach for Anteroinferior Cerebellar Artery Aneurysm with Concomitant Arteriovenous Malformation: A Case Report

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Introduction:

The tendency of posterior fossa arteriovenous malformations (pAVM) to develop associated aneurysms (AA) is well-known. This association imposes more risk of rupture than either lesion alone. Most pAVM's and AA's develop in the territory of posteroinferior cerebellar artery (PICA) while the involvement of anteroinferior cerebellar artery (AICA) is extremely rare. Herein, we present an unusual case of a pAVM supplied by AICA with a "proximal" aneurysm on the same artery. This unique combination of vascular lesions was described only in four cases previously [1-3], with no clear recommendations available in literature regarding therapeutic options.

Methods:

Data were collected through chart review and patient encounter.

Results:

A 59-year-old female presented with a compromised consciousness, headache and vomiting. CT angiography revealed an AVM located on the right cerebellar hemisphere (14×20 mm), draining superficially to the transverse sinuses (Spetzler-Martin grade II). The arterial supplier was right AICA, with a proximal aneurysm measuring (7×3mm) that was ruptured. The aneurysm was accessed with a wire-guided catheter inserted into the femoral artery and coiled using a platinum-made coil. During the same session, the AVM was embolised using a liquid-based solution consisting of Ethylene-Vinyl-Alcohol copolymers. Subsequent angiography confirmed the successful resolution of both lesions. The patient had no residual deficit at 4-month follow-up

Conclusions:

To the best of our knowledge, this case is the first report in English literature describing a proximal AICA aneurysm and AVM treated by endovascular means. The outcome was highly promising, considering the technically demanding location and the complexity of the target lesions. In comparison, all previously reported cases with exactly similar lesions were managed surgically, with inconclusive outcomes. Though a previously published report did theoretically support our approach [4], a large study, with proper patient selection, is warranted. This can clearly delineate the utility of endovascular interventions for similar lesions and potentially influence future practice.

Keywords: Interventional Neuroradiology, Cerebral Arteriovenous Malformations, Aneurysm, Endovascular Therapy

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 6

Hyperacute Carotid Stenting for Acute Ischemic Stroke After Systemic Thrombolysis with IV rt-PA

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Introduction:

Patients with acute ischemic stroke (AIS) due to internal carotid artery (ICA) disease are at high risk of early recurrence. In patients who receive IV rt-PA, use of anti-platelet therapy in the first 24 hours is usually contraindicated (1) Anti-platelet therapy is required in patients undergoing carotid stenting to prevent in-stent thrombosis.

Methods:

We report two patients with AIS who received IV rt-PA, had worsening neurological status and underwent hyper acute ICA stenting and received antiplatelet therapy.

Results:

Patient #1: 83-year-old man with known ICA stenosis presented a full left middle cerebral artery (MCA) syndrome with NIHSS of 23. Head CT showed no early infarct signs and CT angiogram showed severe left ICA stenosis and no distal clot. He improved to NIHSS 3 after thrombolysis with IV rt-PA. He then worsened to NIHSS of 10 and was taken to angiography suite. ICA stent was placed and he received a clopidogrel load about six hours after IV rt-PA. He had full resolution of deficits and no intracranial hemorrhage. Patient#2: 62-year-old man presented with left hemiparesis and dysarthria that progressed to a full right MCA syndrome. CT showed no early infarct signs. He was thrombolysed within the hour but did not show significant improvement. He underwent emergent angiography that showed critical occlusion of the right proximal ICA. ICA stent was placed and he received a clopidogrel load and aspirin 11 hours post IV rt-PA. He had profound improvement with only minor facial asymmetry.

Conclusions:

These 2 cases demonstrate a successful use of hyperacute carotid stenting and anti-platelet agent load in patients who received systemic thrombolysis with IV rt-PA. Both had excellent outcomes and no complications. This management may be considered in patients with similar clinical and imaging characteristics.

Keywords: Acute Ischemic Stroke Intervention, Carotid Stenting And Angioplasty, TPA, Endovascular Therapy, Carotid

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 7

Success of Intravenous Infusion of Verapamil for Refractory Vasospasm in Aneurysmal Subarachnoid Hemorrhage

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Introduction:

Calcium channel blockers have been shown to reduce the severity of cerebral vasospasm and confer neuroprotection after aneurysmal subarachnoid hemorrhage (aSAH). Intra-arterial verapamil has been used for cases in which noninvasive means of alleviating vasospasm are unsuccessful. However, successful rescue therapy using continuous intravenous verapamil after failure of sustained relief of vasospasm from intra-arterial verapamil has not been described.

Methods:

Comprehensive evaluation of a patient who underwent acute endovascular intervention for refractory vasospasm at a community based, university affiliated comprehensive stroke center was done. Patient was monitored in a dedicated Neurocritical Care Unit.

Results:

A 33-yr-old woman presented 6 days after a thunderclap headache with nuchal rigidity, found to have subarachnoid hemorrhage in right sylvian and suprasellar fissure, Hunt/Hess 1, Fisher 1. During hospitalization, patient developed sudden left sided hemiparesis. Urgent digital subtraction angiography (DSA) revealed severe distal right ICA/right MCA flow limiting stenosis consistent with vasospasm. She had improvement of vasospasm following total of 10 mg of IA verapamil in right ICA. She had worsening of symptoms the following 2 days and was taken for emergent IA verapamil infusion two more times with significant improvement of vasospasm radiographically and clinically. Following the third recurrence she was considered responsive to verapamil but refractory for lasting benefit. Intravenous verapamil 2.5mg/hr continuous drip was initiated and continued for 96 hours. Daily Transcranial Doppler studies revealed sustained reversal of vasospasm. There were no hemodynamic instability or Intracranial Pressures (ICP) fluctuations throughout the infusion.

Conclusions:

This report indicates that intravenous continuous infusion of verapamil may be used for rescue therapy in transiently responsive cerebral vasospasm to IA verapamil. This therapy did not seem to compromise hemodynamic stability or increase ICP.

Keywords: Vasospasm

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 8

Provocative testing prior to anterior cerebral artery fusiform aneurysm embolization

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¹Department of Neurology, University of Pittsburgh Medical Center, Pittsburgh, Pennsylvania, USA; ²Department of Neurosurgery, Barrow Neurological Institute, Phoenix, Arizona, USA; ³Department of Neurosurgery, University of Pittsburgh Medical Center, Pittsburgh, Pennsylvania, USA

Introduction:

To evaluate the feasibility of clinical and electrophysiological studies in predicting clinical significance and evaluate collateral viability of a branch artery sacrifice to treat dissecting aneurysm or pseudoaneurysm in the brain.

Methods:

Two cases were identified: Case #1, a 21-year old man presented with thunderclap headache in the setting of subarachnoid hemorrhage and a right anterior cerebral artery dissecting aneurysm measuring 20mmx10mm. Case #2, a 45-year old man with an unruptured but enlarging 5-mm pseudoaneurysm of the right mid-pericallosal artery. Several treatment options were considered, including coil sacrifice of the vessel, microsurgical sacrifice with or without bypass, stent assisted coiling, or flow diversion. To evaluate the safety of a terminal occlusion of the parent vessel, we simulated sacrifice of aneurysm by the temporary balloon test occlusion of the distal A2 under continuous neurophysiological monitoring (for Case #1) and provocative testing with 30-mg of intra-arterial sodium amobarbital under continuous clinical testing (for Case #2). Following favorable results of stimulated tests, coil sacrifice and embolization were employed for both cases.

Results:

For the first patient temporary balloon occlusion distal to the aneurysm at the A2/A3 junction did not cause any changes in the normal baseline SSEP 15 minutes after balloon occlusion. During balloon test occlusion, ICA contrast injections revealed robust pial collaterals. Following the procedure patient followed commands with no weakness. For the second patient intra-arterial injection of amobarbital did not lead to any change in his speech or left side weakness. Embolization of the right pericallosal artery did not lead to any motor deficits.

Conclusions:

Neurophysiological and clinical monitoring are viable options to provide physiological information and estimate the clinical burden of terminally obliterating a branch artery to treat a dissecting aneurysm or pseudoaneurysm. More studies are necessary to understand the predictive value of clinical or electrophysiological interrogation of brain tissue with provocative testing.

Keywords: Neuromonitoring, Aneurysm Embolization

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 9

Complex Dural Ateriovenous Fistula Masquerading as Pseudotumor Cerebri

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Introduction:

Pseudotumor cerebri is a diagnosis of exclusion once other causes of elevated intracranial pressure (ICP) are ruled out. Aside from mass lesions more readily seen on conventional imaging, vascular malformations as a cause of elevated ICP, especially those with venous drainage to the dural sinuses and resultant dural venous hypertension, can be more easily overlooked. We report a case of dural AV fistula (dAVF) with venous hypertension, and demonstrate the consequences of misdiagnosis as idiopathic intracranial hypertension.

Methods:

Case Report

Results:

A 55-year-old woman (BMI 28) with several-year history of pulsatile tinnitus and previous diagnosis of pseudotumor cerebri presented to the emergency department with intractable headache. Prior work up included dilated fundus examination demonstrating papilledema, and LP with opening pressure of 32 cm water. On initial presentation in 2011, imaging showed evidence of an AV fistula that was misdiagnosed at that time. The patient was treated with anticoagulation for a presumed transverse sinus thrombosis. The patient's elevated ICPs and papilledema were controlled with Diamox for 5 years. At the time of re-presentation, CTA showed progression of the dAVF. The patient underwent a diagnostic cerebral angiogram demonstrating a complex borden type IIB AV fistula draining into the right transverse sinus only. The patient is currently undergoing staged transarterial and transvenous embolization as management of her fistula.

Conclusions:

Thorough investigation should be undertaken for secondary causes of headache and intracranial hypertension, especially in normal weight patients when other symptoms are present. Misdiagnosis can complicate future treatment of the underlying cause, and in the case of undiagnosed vascular malformations, result in delayed cerebral hemorrhage or ischemia.

Keywords: Cerebral Arteriovenous Malformations, Avm Embolization, Onyx, Pathophysiology, Vascular Imaging

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 10

Complete Resolution Of Quadriplegia Following Cervical Dural Arteriovenous Fistula (DAVF) Embolization Using n - Butyl Cyanoacrylate

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Introduction:

Spinal vascular malformations constitute approximately 9% of all the vascular malformation of the CNS. DAVF accounts for approximately 50-85% of all malformations. Cervical DAVF is a devastating neurological disorder, if not diagnosed and treated in a timely manner may lead to spastic quadriplegia with high mortality and morbidity. In this case, we would like to describe a rare presentation of a Cervical DAVF with spastic quadriplegia and complete resolution of symptoms with n-BCA embolization.

Methods:

We present a case of 61-year-old male with paroxysmal spells of quadriplegia for 6 months lasting for 2-3 hours each with multiple falls. He was referred to our university hospital for acute myelitis evaluation. Examination showed double vision, dysphagia, dysarthria, proximal muscle weakness in all four extremities with spasticity, brisk reflexes with bilateral ankle clonus along with upgoing plantars and progressed to persistent quadriplegia with subjective shortness of breath on day 2. MRI of spine with and without contrast showed extensive cord swelling extending from lower pons to the lower thoracic spinal cord along with multiple flow voids in the cervical region raising suspicion for DAVF. Spinal fluid is negative for infection and demyelinating disorders. Digital subtraction angiography showed DAVF with an intradural primary single arterial nidus arising from right meningo-hypophyseal trunk with two large draining veins on the anterior aspect of spinal cord. Complete embolization was achieved by using a detachable Apollo microcatheter with 1:5 ratio of n-BCA and Ethiodized oil followed by detachment of catheter with traction.

Results:

Post embolization, patient was able to get up and walk within 48 hours and follow up at 1 month showed complete resolution of symptoms except for brisk reflexes with no ankle clonus.

Conclusions:

DAVF is a rare cause of spastic quadriplegia in the elderly population. With early diagnosis and endovascular embolization, patients can achieve complete recovery.

Keywords: Embolization, Avm Embolization

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 11

Stent-assisted Coiling of a Complex 18 mm Basilar Apex Aneurysm using Bilateral Transcirculation Approaches.

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Introduction:

We describe our successful treatment of an anatomically complex 18 mm basilar tip aneurysm with stent-assisted endovascular coiling and bilateral transcirculation approaches.

Methods:

A transcirculation approach was used to advance a LVIS Jr intraluminal stent through the right internal carotid artery and the right posterior communicating (P-comm) artery and into the right posterior cerebral artery (PCA). The stent was then deployed from the left superior cerebellar artery to the right PCA. The aneurysm was then coiled using a microcatheter that was jailed in the aneurysm via the basilar artery. Post-coiling angiograms showed persistent filling of the aneurysm via the origin of the left PCA. A second transcirculation approach was used to coil the aneurysm via the left P-comm artery and then to trap the origin of the left PCA with more coils.

Results:

Post-procedural catheter angiograms and a follow-up MRI/MRA showed minimal filling of the aneurysm and no significant complications.

Conclusions:

This case demonstrates the feasibility and safety of treating a complex basilar tip aneurysm in a patient with an intact circle of Willis using transcirculation approaches and stent-assisted coiling with a LVIS JR stent.

Keywords: Aneurysm, Coiling, Basilar, Stent Assisted

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 12

Cross-circulation Thrombectomy With Use of a Stent-Retriever Device

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Introduction:

The endovascular treatment of acute ischemic stroke (AIS) has become standard of care since the recent publication of several randomized trials. While intra-arterial therapy has significantly progressed in the past years, anatomic cerebrovascular variants can present challenges to timely recanalization. We present the first reported case of anterior-to-posterior mechanical clot retrieval with use of a stent-retriever.

Methods:

A 53-year-old man with a history of Diabetes type 2 and hypertension presented with acute onset slurred speech and right hemi-paresis. IV tPA was administered in the ED and a CT angiogram revealed a basilar artery thrombosis. The patient was taken for intra-arterial treatment of his AIS. Antegrade removal of the basilar thrombus was precluded by the findings of a hypoplastic left vertebral artery and an occluded proximal right vertebral artery. Given a number of factors including the patient's worsening symptoms and the high morbidity and mortality associated with basilar stroke, cross circulation—anterior-to-posterior—intra-arterial therapy was attempted.

Results:

Thrombectomy of the basilar thrombus was achieved via the right internal carotid artery and right posterior communicating artery.

Conclusions:

To our knowledge, we report the first case of cross-circulation, anterior-to-posterior thrombectomy, with the use of a stent-retriever device. The need for cross-circulation treatment arises due to 'antegrade' vessel occlusion or anatomical constraints. Larger studies will be needed to evaluate the safety and efficacy of these approaches.

Keywords: Acute Ischemic Stroke Intervention, Basilar, Stentriever, Ischemic Stroke, Endovascular Therapy

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 13

Retrieval of Migrated Coils Using Stent Retrievers: A Case Report and Literature Review

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Introduction:

Coil migration is a recognized complication of endovascular embolization of saccular aneurysms. If untreated it can lead to parent artery occlusion and subsequent neurological disability. We report the use of a stent retriever (Trevo[®], Stryker[®]) to retrieve a stretched and migrated coil that was refractory to treatment with other retrieval devices.

Methods:

A 49-year-old woman with subarachnoid hemorrhage (SAH) secondary to ruptured right posterior communicating artery aneurysm (PCOM) underwent endovascular treatment. During the procedure a 6 mm x 25 cm framing coil could not be placed into the aneurysm, it became stretched and fractured while attempting to remove it. Standard techniques for coil retrieval using snares and the alligator retrieval device were unsuccessful. The proximal coil segment in the internal carotid artery (ICA) eventually caused occlusion of the parent artery.

Results:

Successful coil retrieval and complete recanalization of the artery was achieved using a 6 mm stent retriever with one pass. Subsequent coil embolization of the aneurysm was successful during the same procedure. The patient sustained no neurological deficits clinically or ischemia on the post procedure magnetic resonance imaging (MRI), and remained neurologically normal at 3 month follow up.

Conclusions:

Our case report and literature review demonstrates feasibility, preliminary efficacy and safety of using stent retrievers for retrieval of migrated coils.

Keywords: Stent retriever, Trevo, Intracerebral Aneurysm, Coiling

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 14

Varicella zoster vasculopathy presenting with multifocal fusiform aneurysms.

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Introduction:

Varicella zoster virus (VZV) is an under-recognized yet treatable cause of stroke. Infection of cerebral arteries by VZV can produce unifocal or multifocal vasculopathy. Unifocal large-vessel vasculopathy usually affects elderly immunocompetent persons, whereas multifocal vasculopathy occurs primarily in immunocompromised individuals.

Methods:

We present a case of acute ischemic stroke in the setting of untreated HIV, newly diagnosed acquired immune deficiency syndrome (AIDS) and VZV-associated vasculopathy.

Results:

25-year-old HIV positive right-handed male presented with sudden onset right-sided hemiparesis and dysarthria. CT angiography was negative for large vessel occlusion but showed multiple areas of focal narrowing and dilatation in the left M3 and A3 branches. Brain MRI showed an acute infarction in the left internal capsule, putamen, and sub-insular area. Erythrocyte sedimentation rate (ESR) was elevated (79 mg/dL). A four-vessel cerebral angiogram confirmed fusiform aneurysms in the distal anterior and middle cerebral arteries bilaterally. Rheumatologic and hypercoagulable work up was unremarkable except for a positive anti-nuclear and anti-scleroderma 70 antibodies. Absolute CD4 count was low (33 cells/mm³). Serum syphilis IgG was positive. Cerebrospinal fluid (CSF) WBC was 5 with high protein (48) and normal glucose. CSF VDRL, toxoplasma antibodies, herpes simplex virus 1/2, and cytomegalovirus were negative. 7200 copies per milliliter of VZV were detected in the CSF by quantitative real-time PCR. The patient was treated with intravenous acyclovir for 2 weeks. He was discharged and continued to improve without recurrence strokes. Follow up MR angiogram 2 weeks later showed persistent but stable fusiform dilatation.

Conclusions:

VZV is not an uncommon cause of infectious CNS vasculopathy. Previous case series revealed that VZV vasculopathy pattern is different than that of HIV vasculopathy. Treatment with IV antiviral medications with or without corticosteroids has been shown to prevent recurrence of vascular events and improve the vessel wall abnormalities caused by the infection.

Keywords: Vascular Imaging, Intracerebral Aneurysm, Angiogram

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 15

Multiple Acute Ischemic Strokes due to Cerebral AVM Vascular Steal Phenomenon

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Introduction:

An arteriovenous malformation (AVM) is an abnormal connection between an artery and a vein. There have been conflicting opinions about the in vivo existence of vascular steal phenomenon associated with cerebral AVM manifesting as focal neurological deficits. We present a case of multiple acute infarcts which may have been secondary to a vascular steal phenomenon due to the presence of the cerebral AVM.

Methods:

Case report.

Results:

Case description: 51-year-old right handed male with multiple cardiovascular risk factors and a known old right temporo-parietal AVM presented with new onset (>6h) left hemiparesis and dysarthria. His vital signs were unremarkable and his neurological exam demonstrated an upper motor neuron left facial palsy and left hemiparesis (MRC grade 3/5). MRI brain showed a large right hemispheric AVM and multiple cortical and subcortical areas of restricted diffusion bilaterally concerning for acute infarcts. A Transcranial Doppler with vasomotor reactivity (TCD VMR) was performed which showed severely decreased VMR bilaterally - 5% on the right side and 8% on the left side. Cerebral angiography showed a Spetzler-Martin (SM) grade 4 AVM measuring 3.7cm x 3.4cm x 3.4cm supplied predominantly by right PCA branches and draining into the superficial cortical veins, superior sagittal sinus, and transverse sinus on the right. A complete stroke workup including 2D echo, 24-hour holter monitor, and carotid ultrasound were otherwise unremarkable. He subsequently underwent partial embolization of the AVM and was discharged to rehab in a stable condition.

Conclusions:

This is a case of multiple bilateral cortical and subcortical ischemic strokes in a setting of a large, long-standing cerebral AVM and an otherwise unremarkable stroke workup. TCD showed severely dampened VMR bilaterally which strongly suggests a failure of cerebral autoregulation and a potential vascular steal phenomenon secondary to the AVM.

Keywords: Cerebral Arteriovenous Malformations, Cerebral Blood Flow, Transcranial Doppler, Pathophysiology

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 16

Successful Mechanical Thrombectomy in a 96 Year Old Female with Large Vessel Occlusion

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Introduction:

Patients older than 80 undergoing mechanical thrombectomy for stroke therapy were previously considered high-risk due to the perception of excess risk of hemorrhage and lower likelihood of clinical benefit. In fact, older data suggested that patients greater than 80 had twice(18%) the risk of mortality compared to younger patients(9%). However, newer data from MR CLEAN and ESCAPE trials has shown a positive treatment effect of mechanical thrombectomy in the elderly population, including those greater than 80. We present a case report of a 96 year old who underwent successful mechanical thrombectomy.

Methods:

A review of SPOTRIAS, MR CLEAN, and ESCAPE trials regarding mechanical thrombectomy in stroke patients greater than the age of 80 to determine the historical clinical benefit.

Results:

A 96 year-old African-American Female with a history of Hypertension and Coronary Artery Disease presented one hour after acute onset of symptoms with left facial droop, right gaze deviation, and left sided hemiplegia in the setting of new onset atrial fibrillation with rapid ventricular rate. NIHSS was 18 on arrival. Non-contrast CT head revealed no early ischemic signs and ASPECTS score of 10. CTA Head and Neck revealed a distal R M1 occlusion. Patient received IV tPA 1hour and 29 minutes after onset of symptoms. Her symptoms improved to an NIHSS 3 rapidly. 1 hour after tpa administration, she acutely progressed to NIHSS 16. The Neuro-Interventional team was re-activated. Angiography revealed a distal R M1 occlusion. TICI 3 reperfusion of the distal, frontal division of the R MCA. No cerebral hemorrhage was noted on 24-hour post tPA CT head without contrast. Her 24 hour NIHSS was 3. The patient was discharged with an NIHSS of 1.

Conclusions:

In appropriately selected elderly patients, age in and of itself is not a reason to forego IV t-PA and/or Endovascular therapy.

Keywords: Acute Ischemic Stroke Intervention, Decision Analysis, TICI, Mechanical Thrombectomy, Revascularization

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 17

Utility of pressure measurements using pressure-guide wires in evaluation and management of cerebral venous diseases.

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Introduction:

Pressure measurements using pressure guide wires is an invaluable diagnostic tool in management of many endovascular revascularization therapies. Its role is well established in coronary artery disease management such as use of fractional flow reserve (FFR) as a standard diagnostic tool to determine need for stenting, angioplasty or bypass. Renal fractional flow reserve remains an integral physiologic parameter used in endovascular revascularization therapy of renal artery stenosis. Despite the wide spread use of pressure wires in endovascular therapies, its application in the management of cerebral venous diseases remains vastly unexplored. We sought to evaluate the safety and applicability of pressure guide wires by Volcano in several cerebral venous diseases.

Methods:

Patients undergoing diagnostic angiography for possible venous outflow obstruction had pressures measured by pressure guide wires (Volcano Verrata[®] or Prestige PrimeWire[®]) across the following vessels: superior sagittal sinus, torcula, right and left transverse sinus, right and left sigmoid sinus, and right and left internal jugular vein. Venous pressures were also collected from patients undergoing venous thrombectomy, venous stenting, or an arteriovenous malformation embolization (AVM).

Results:

Five patients who underwent diagnostic angiography for pseudotumor cerebri showed no major variability in their pressures across the cerebral venous architecture which was confirmed by lack of stenosis or thrombi on intravascular ultrasound (IVUS). Four patients had a pressure difference above 10 which was suggestive of a stenosis and later confirmed by IVUS. Patients undergoing pressure measurements that had evidence of stenosis or thrombosis by IVUS showed improvement in pressure measurements by > 20 post stenting or thrombectomy across major venous structures. No variability in pressures was noted in a patient that underwent AVM embolization.

Conclusions:

Pressure measurements using pressure guide wires can improve diagnostic accuracy and guide management of several diseases of the cerebral venous system.

Keywords: Angiographic Technology, Cerebral Sinus And Venous Thrombosis, New Technique

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 18

Mechanical Reperfusion in Extensive Cerebral Venous Thrombosis

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Introduction:

Cerebral venous sinus thrombosis(CVST) is a rare cause of stroke. Few reports indicate that mechanical reperfusion may be an effective treatment for CVST, however insufficient data exist to allow strong recommendation by the American Stroke Association, and anticoagulation alone remains the first-line standard of care.

Methods:

CASE

Results:

A 29 yo female with a PMH of hypertension, obesity on phentermine, and usage of an estrogen-containing vaginal contraceptive presented with worsening headache, emesis, and aphasia. Shortly after arrival to our institution, she developed acute left hemiplegia. Head CT and CTV were concerning for right hemispheric ischemia with thrombosis of the superior and inferior sagittal sinuses, deep cerebral veins on the right, and bilateral transverse/sigmoid sinuses. Given her progressive deterioration and extensive clot burden, she was taken for emergent thrombectomy. Using a combination of balloon and separator agitation as well as direct catheter aspiration, revascularization of the superior sagittal sinus, vein of Galen, straight sinus, right transverse sinus, right sigmoid sinus, and the right internal jugular vein was achieved. No attempt was made to open the left transverse/sigmoid given the absence of infarction on the left on non-invasive imaging and her relatively mild left-hemispheric symptoms. She demonstrated improvement in hemiparesis after intervention. Labs were unrevealing for a hypercoagulable state. She was started on anticoagulation and estrogen contraception was removed. At one month follow-up she exhibited mild difficulty with attention and tandem gait but had otherwise returned to her neurological baseline.

Conclusions:

CVST should be considered in patients with acute neurological deficit. Given the relatively good prognosis for reversal of neurological deficits compared to arterial occlusion, aggressive therapy is generally indicated. This case lends support to mechanical reperfusion as an effective first-line tool for cerebral venoocclusive disease in the setting of disabling neurological deficits and large cerebral territory at risk for infarction.

Keywords: Cerebral Sinus And Venous Thrombosis, Endovascular Therapy

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 19

Smoking ; The Most Frequent Controllable Risk Factor Of Restenosis in Internal carotid Stenting

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Introduction:

Restenosis after carotid stenting is a poorly described phenomenon. We aimed to investigate the risk factors and incidence of restenosis in ICA stenting.

Methods:

195 patients with ICA stenting since 2013 – 2015 were enrolled. They followed up at least 18 months after stenting with TCCS every 3 months and when stenosis in stent was seen, cerebral angiography was done to investigate restenosis. In cases of restenosis risk factors was analyzed and compared with risk factors of stroke of 1033 patient that admitted in our center in this interval with ischemic stroke.

Results:

The incidence of restenosis was 4.1% (8 patients). The most frequent risk factors in restenosis cases were HTN (85.7 %), smoking (42.8%) and DM (28.5%) and in all 1033 patient prevalence of HTN, smoking and DM was 78.9%, 19.6 % and 42.1%. Risk of smoking was significantly higher (P value < 0.05). In 4 patients, restenosis was repaired with restenting and in 3 patients with balloon and one patient had complete occlusion. All patients were male with average age of 59.2 years. Average of age in all 1033 patient was 63.4 years, 596 male (57.6%) and 437 female (42.4%). Risk of restenosis in male was significantly greater than female (P value < 0.05).

Conclusions:

The incidence of restenosis in ICA stenting is low and the most important controllable risk factor is smoking but the most frequent risk factor was male sex. In patients with ICA stenting, HTN and DM should be well controlled and smoking should be cessationed.

Keywords: Carotid Stenting And Angioplasty, Carotid, Stenting, Angiogram, Cerebral

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 20

Safety Outcome of Carotid Artery Stenting in Lesions >10mm with Proximal Versus Distal Embolic-Protection Devices

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Introduction:

Embolic Protection Devices can prevent the atherosclerotic emboli during carotid artery stenting (CAS) and reduce the risk of stroke. Long carotid lesion >10mm have been reported with increased stroke and cardiovascular events. Theoretically, there is a higher risk of embolism during deployment of DPD in patients with long lesions. Newer PPD reverses the flow of blood in internal carotid and may reduce this risk. Our study aims to study the difference in safety outcome between DPD and PPD in carotid lesion >10mm.

Methods:

We conducted a retrospective review of consecutive patients undergoing CAS with either PPD or DPD respectively at a tertiary care University center. Long carotid lesions >10mm were identified. Peri-procedural outcomes including minor/major stroke and MI were recorded.

Results:

From January 2010 to December 2014, we included 43 consecutive patients with long carotid lesion undergoing CAS, 20 in PPD group and 23 in DPD group. There was a technical success rate of 100% in stent placement with either protection device. Mean lesion length was 14.9±1.3mm vs. 17.3±2.94mm for PPD and DPD respectively. In PPD group, none of the patients developed coronary or stroke event, whereas 2/23 patient in DPD group developed a minor (NIHSS ≤4) and a major stroke (NIHSS >4) respectively (p=0.345).

Conclusions:

Patients with carotid lesion length >10mm undergoing CAS with PPD shows a trend to better safety outcomes including perioperative stroke than patients with DPD. A larger prospective study is needed to confirm this finding.

Keywords: Carotid Stenting And Angioplasty, Carotid, Cerebrovascular Disease, Endovascular Therapy, Stenting

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 21

Addressing post-angioplasty recoil for interventional management of tandem occlusions: Balloon-assisted guide catheterization, Technical Report

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Introduction:

Emergent treatment of tandem ICA- MCA occlusion can be challenging. Techniques that allow faster access to the MCA clot will lead to improved patient outcomes. Elastic recoil after balloon angioplasty can preclude device access to the distal ICA/MCA. Although stenting is an option, it is less desirable due to the need for dual antiplatelet therapy (especially after IV tPA) and the potential for device entanglement with a stent retriever. We describe a partial balloon inflation technique to maintain luminal patency in order to advance the guide catheter through the cervical ICA stenosis, allowing access for successful treatment of MCA occlusion.

Methods:

Case: A 55 year old male with history of smoking, presented with right MCA stroke, NIHSS 12, from a right ICA- MCA tandem occlusion. We performed Balloon angioplasty of right ICA occlusion. There was elastic recoil following angioplasty, resulting in inability to advance the guide catheter (7F shuttle) across the occlusion. We then performed an additional angioplasty, and as the balloon was slowly deflated, we gently advanced the guide catheter over the deflating balloon, which allowed unobstructed access to the cervical ICA. Subsequently, thromboaspiration of right supraclinoid thrombus was performed followed by thrombectomy of the right MCA thrombus with a Trevo stent retriever resulting in mTICI grade 3 reperfusion. Importantly, the cervical ICA lesion remained patent after removal of the guide catheter.

Results:

Patient improved over the next day to NIHSS 4 which persisted through discharge. There was no haemorrhage on the repeat CT head. MRI on day 3 revealed mild extension of the baseline right MCA infarct.

Conclusions:

We believe the technique described here provides an important adjunct to balloon angioplasty in situations of carotid recoil. Moreover, sustained presence of the guide catheter across the stenosis during the case may serve to create a more durable lumen after removal of the catheter.

Keywords: Carotid, Acute Ischemic Stroke Intervention, Balloon Angioplasty, Recanalization, Access Catheters

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 22

Initial Experience of Carotid Revascularization Without Embolic Protection Device in Pakistan.

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Introduction:

To assess the safety and clinical efficacy of Carotid Artery Stenting [CAS] for patients with symptomatic and asymptomatic carotid disease

Methods:

We retrospectively reviewed our patient data from 2014 to August 2016 and present thirty six patients with both symptomatic ($\geq 50\%$ occlusion by digital angiography (DA), $\geq 70\%$ by ultrasound, computed tomography [CT], magnetic resonance angiography [MRA]) and asymptomatic patients ($\geq 60\%$ by DA, $\geq 70\%$ by ultrasound, $\geq 80\%$ by CT, MRA) with extracranial carotid stenosis undergoing carotid stenting/angioplasty revascularization. All symptomatic patients had either experienced recurrent transient ischemic attacks (TIAs) or one or more stroke attacks and were treated with best medical management and followed-up post procedure per CREST criteria [Carotid Revascularization Endarterectomy vs Stenting Trial]. The Primary endpoints were a peri-procedural any stroke, myocardial infarction (MI) or death, and ipsilateral stroke during the follow-up period.

Results:

Of the 36 patients 26 were males and 10 females; mean age 67 years. Eight percent were asymptomatic and 92% symptomatic with mean stenosis of 70%. There was no difference in age or cardiovascular risk factors. Embolic Protection Device [EPD] was used in only eight cases [22%]. Minor stroke rate during the first 30 postoperative days was 2.7% with and 0% without EPD. No MI or mortality was observed in the entire cohort. There was no difference in outcomes in those under 69 years of age or older than 70. No stroke occurred during the median 1.5 years of follow-up.

Conclusions:

Carotid revascularization with stenting and angioplasty without EPD in experienced hands is both safe and effective for patients with both symptomatic and asymptomatic carotid stenosis. Our results are comparable to those of previously reported major trials and well within the complication thresholds suggested in current guidelines for both symptomatic and asymptomatic patients.

Keywords: Carotid, Carotid Stenting And Angioplasty, Extracranial Stenosis, Atherosclerosis, Stenting

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 23

Carotid Revascularization and Medical Management for Asymptomatic Carotid Stenosis:CREST-2 Update

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Introduction:

Over 100,000 carotid revascularization procedures are done annually in the US for asymptomatic carotid arterial stenosis. The safety of carotid endarterectomy (CEA) and carotid stenting (CAS), and the efficacy of medical therapy in altering the progression of atherosclerosis have improved. Therefore, the applicability of prior randomized trials in asymptomatic carotid stenosis to current treatment decisions has been called into question.

Methods:

The aim of the NINDS-funded CREST-2 is to compare CEA and intensive medical therapy (IMT) versus IMT alone (n=1240), and CAS and IMT versus IMT alone (n=1240), through two parallel randomized clinical trials at approximately 120 medical centers, including collaboration with NIH-StrokeNet. The composite primary outcome is any stroke or death within 44 days after randomization or ipsilateral ischemic stroke thereafter up to 4 years. Secondary outcomes include cognitive function, which is assessed on a regular schedule through computer-assisted telephone interview. IMT is directed centrally and includes tight control of blood pressure (systolic target < 140 mm Hg) and cholesterol (LDL target < 70 mg/dl) as well as lifestyle coaching.

Results:

As of October 10, 2016, 110 centers have been approved to randomize by the CREST-2 Site Selection Committee, and site selection is ongoing for up to 120 sites. Three hundred forty-seven patients have been randomized. The Surgical and Interventional Management Committees have credentialed 285 surgeons and 128 interventionists. An additional 123 interventionists have been approved to submit additional cases via the CREST-2 Companion Registry which provides a CMS-reimbursed pathway for full credentialing in CREST-2.

Conclusions:

CREST-2 is designed to identify the best approach for asymptomatic carotid stenosis. An update will be provided regarding the numbers of patients randomized, centers certified, as well as surgeons and interventionists fully approved. The CREST-2 Registry will provide the option of CAS while enhancing interventionists' credentials for participation in CREST-2.

Keywords: Stroke

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 24

Intra-arterial ALD401 Cell Therapy is Associated with Reduction in Stroke Volume at 90 Days:RECOVER-Stroke Trial

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Introduction:

Stroke is a leading cause of major long-term disability worldwide. Despite availability of IV tPA and mechanical thrombectomy, over half of treated patients have significant disability. Cell based therapy is a promising in pre-clinical studies in improving stroke recovery. Final brain infarct volume is a major predictor of stroke outcome and may decrease with this treatment. We hypothesized that patients treated with intra-arterial stem cell therapy will have a significant reduction in stroke volume compared to non-treated patients.

Methods:

The RECOVER-Stroke trial is a randomized, sham-controlled study to determine the safety and efficacy of processed autologous bone marrow cells (ALD-401) injection via intracarotid infusion in ischemic stroke patients. Anterior circulation ischemic stroke patients were double-blind randomized into 2 groups, receiving ALD-401 injection or sham procedure between 9-19 days post stroke. All enrolled patients at 1 of 8 sites were included. Two blinded physicians used OSIRIX software to analyze stroke volume on DWI/24h CT brain and MRI at 90,180,365 days post intervention. Volumes were compared between the 2 groups at these timepoints.

Results:

A total of 11 patients at our center(out of 48 multicenter patients) were included in this study, 6 patients receiving sham procedure and 5 patients receiving ALD-401. There was no significant difference in baseline variables. Mean baseline stroke volumes were not significantly different between ALD-401(102.6±97.4ml) and sham groups(65.56±49.6ml),p=0.53. The stroke volume reduction in the ALD-401 was 21.6±19.3ml vs. -0.62±7.5ml in the sham group (p=0.0139). On day 180 and 365, both groups did not show any further significant stroke volume reduction from day 90.

Conclusions:

In this exploratory analysis from one center in the multi-center RECOVER-Stroke trial, intra-arterial stem cell injection with ALD-401 was associated with significant reduction in stroke volume at 90 days post therapy compared to sham procedure in subacute ischemic stroke patients.

Keywords: Stem Cell Therapy, MRI, Ischemic Stroke

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 25

Stent Deployment Protocol for optimized real-time visualization during endovascular Intervention.

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Introduction:

Successful application of endovascular neurosurgery depends on high-quality imaging to define the pathology and the devices as they are being deployed. The authors sought to optimize real-time image guidance using a simple algorithm that can be applied to any existing fluoroscopy system

Methods:

After expert optimizing of fluoroscopic settings by the manufacturer, we further requested a customized protocol. Over multiple sessions with the system deployment team, we developed a custom protocol. We serially adapted the 2 modifiable parameters in the fluoroscopy system to create the stent deployment protocol: exposure management, and image post-processing. In comparison with a typical angiographic run and the fluoroscopic run, the stent deployment protocol used a voltage of 70 kV (compared with 73 kV for angiographic and 73 kV for fluoroscopic protocols, respectively), a pulse width of 25 msec (40 msec, 16 msec), a dose of 0.54 microGy/frame (2.4 microGy/frame, 55 nGy/pulse). The image post-processing was set to edge enhancement 90% (30%, 25%), window center 1600 and width 1900 (1900 and 2700, 1650 and 2475), with linear windowing (sigmoid, linear), gamma correction G05/C1 (gamma log, G06/C3), gain correction -1.0 EP (0.0 EP, 0.0 EP), K-factor auto7 (off, auto6).

Results:

The stent deployment protocol optimizes the exposure parameters and image post-processing to attain superior intraprocedural visualization. No comparable image optimization protocols are currently available as standard configuration and optimization through fluoroscopy manufacturers.

Conclusions:

The stent deployment protocol can be applied to any existing system. We have used this protocol during nearly all flow diverter and WEB device deployments over a 6-month period, as well as during approximately 5% of aneurysm coiling procedures. We observed an increased contrast ratio in intraoperative images captured when using the stent deployment protocol versus fluoroscopy, allowing for better appreciation of coil density and device features during deployment

Keywords: Imaging

Financial Disclosures: The authors had no disclosures.

Grant Support: Acknowledgment :

Henry A. Muler, MSEE, of Siemens Medical Solutions, USA, and Peter O'Rourke, Lead Neurointerventional Technician at Brigham and Women's Hospital, collaborated extensively with the group in optimizing the protocol prior to clinical use and provided education to the team about principles of fluoroscopy.

Poster 26

Safety of Using Self-expanding Stent (SES) For Treating Posterior Circulation Stroke In The Stentriever Era.

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Introduction:

Recent positive endovascular trials have proven mechanical thrombectomy as standard of care for large vessel occlusion (LVO) of Anterior Circulation (AC). None of these endovascular studies included patients with Posterior Circulation (PC) strokes. However, there are few trials evaluating the benefit of clot retrieval in posterior circulation strokes. Best treatment options for PC LVO are a focus of intense investigation. We explore the safety and early efficacy of self-expanding stents (SES) in acute PC LVO.

Methods:

We did retrospective analysis of patients who underwent acute endovascular intervention for posterior circulation LVOs at a community based, university affiliated comprehensive stroke center during five year period (2010-2015). Patients with SES were included. Complications were noted and categorized in major versus minor. Initial NIHSS, discharge NIHSS and discharge mRS were abstracted. A severity matched comparison of discharge mRS to composite 90 day mRS of recent multi-centered prospective randomized control trials (MPRCT) for acute endovascular treatment of acute ischemic stroke involving LVOs was made.

Results:

There were 2,980 patients who presented with acute ischemic stroke during the pre-specified time period. Of those 310 were posterior circulation strokes; of which, 6 underwent endovascular treatment using SES. These were compared with 1,386 patients with proximal anterior circulation strokes included in the recent MPRCTs. The mean age was 54 (SD 10.66). Mean initial NIHSS was 25.2 (SD 11.23). Mean change in NIHSS was 8.7 (SD 10.30). Mean discharge NIHSS was 16.5 (SD 17.41). Mean discharge mRS was 3.3 (SD 2.34). There were no major or minor complications. Comparative group analysis revealed no statistically significant difference when outcomes were compared to MPRCTs (n.s.)

Conclusions:

The safety and early efficacy of SES for posterior circulation LVO compares well with those recently achieved by the trials evaluating the treatment for anterior circulation strokes. A prospective randomized trial should be attempted to better elucidate the results.

Keywords: Acute Stroke, Endovascular Therapy

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 28

Impact of Detecting Symptomatic Extracranial Carotid Artery Disease Using Noninvasive Imaging Compared to Cerebral Angiography

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Introduction:

Digital subtraction angiography (DSA) remains the gold standard tool of visualizing carotid and cerebrovascular anatomy. However, due to wide availability of other diagnostic and less invasive tools, it is being utilized less often to precisely determine the degree of carotid disease. This resulting in growing population of patients who is getting unnecessary treatments of overestimated carotid artery disease detected using carotid doppler ultrasound (CDUS), computed tomography angiography (CTA), or magnetic resonance angiography (MRA).

Methods:

Retrospective review of 359 patients who underwent both radiographic diagnostic modalities using CDUS, CTA or MRI followed by DSA to assess different spectrum of cerebrovascular diseases. Patient population was mixed between regional health care referrals and admissions to our institution from July 2013 to July 2015. 158 out of 359 met our primary inclusion criterion of symptomatic extracranial carotid artery disease. We analyzed radiographic date of 158 symptomatic vessels, 80 right carotid arteries (50.6%) and 78 left carotid arteries (49.4%). Agreement between noninvasive imaging and DSA was assessed by Cohen's kappa coefficient.

Results:

Agreement over moderate and severe symptomatic carotid stenosis between the two modalities was fair with a kappa coefficient of 0.370 ($p < 0.001$); 74 out of 158 cases (46.8%) demonstrated non compatible assessment of stenosis. Sensitivity and specificity of non-invasive imaging to detect significant stenosis that warrant revascularization was 0.637 and 0.417 respectively. If moderate to severe stenosis findings reported by noninvasive radiographic tools used as a criterion for revascularization, 34 out of 158 cases (21%) of our cohort would have received unnecessary treatment of mild carotid artery stenosis.

Conclusions:

Given only fair agreement between noninvasive diagnostic imaging and cerebral angiography, verifying the degree of carotid stenosis in symptomatic patients with DSA is highly recommended prior to pursue carotid revascularization. This would minimize unnecessary exposure to endovascular and surgical treatments along with their potential associated complications.

Keywords: Angiogram, Carotid, Ultrasound, Angiographic Ct, MRA

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Utilizing NCCT with MIP Bypassing CTA Improves Time to Groin Puncture in Stroke Thrombectomy

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Introduction:

Thrombectomy in proximal anterior circulation occlusions has shown improvement in outcome over tPA alone. Recent trials have utilized CT angiography(CTA) for vascular imaging immediately following non-contrast CT(NCCT). Thin section NCCT with Maximum Intensity Projection(MIP) reconstructions has high accuracy in showing occluding thrombus. Multiple imaging modalities may delay time to groin puncture(GP). We hypothesized that performing thin section NCCT alone before thrombectomy improves time to GP compared to performing CTA after NCCT.

Methods:

This is a retrospective cohort study of prospectively collected database of patients receiving thrombectomy for anterior circulation occlusions at our tertiary-care academic medical center. All stroke NCCTs are thin section (0.625mm) with software automated maximal intensity projection (MIP) reconstructions available within 2 minutes of CT images. When a "hyperdense sign" was seen on thin section MIPs in the anterior circulation, the treating physician had a choice to forgo CTA and bring the patient directly to the angiography suite. We excluded all transfer patients, in-hospital stroke, and receiving stroke imaging other than NCCT or CTA prior to thrombectomy. NCCT + CTA and NCCT groups were compared for duration from initiation of NCCT to GP and total stroke imaging duration prior to GP.

Results:

From March 2008-August 2015, 289 patients underwent thrombectomy with 34 patients meeting criteria, 14 in NCCT and 20 in NCCT+CTA group. Total stroke imaging duration was lower in the NCCT group compared to NCCT+CTA group, 3.6±2.2 vs 42.7±13.5min(p<0.001). NCCT group has lower time from NCCT to GP, 76.7±21 vs 104.8±17.6min(p=0.02).

Conclusions:

Performing only thin section NCCT with MIP reconstruction prior to thrombectomy for large vessel occlusion detection does significantly improve time to groin puncture. Selecting LVO patients with thin section NCCT with MIPs showing a hyperdense sign may significantly save time and therefore brain and further improve outcomes.

Keywords: Angiographic Ct, Acute Ischemic Stroke Intervention, Diagnostic Neuroradiology, Stroke

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 30

Thin-sliced reformatted CT used to Assess Clot Size and Vessel Diameter in Large Vessel Occlusions.

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Introduction:

Thin-sliced reformatted non-contrast CT are not widely used to detect thrombus. We investigated whether thin-sliced reformatted non-contrast CT scans could be reliably used to detect and measure size of the thrombus in patients with large vessel occlusion and therefore serve as a potential substitute of CT Angiogram (CTA), saving time and contrast.

Methods:

Comprehensive prospective analysis of patients who underwent acute endovascular intervention for LVOs at a community based, university affiliated comprehensive stroke center during one year period (Jan 2015-Dec 2015) was done. The raw data of non-enhanced CT scans and CTAs were collected. All raw data were reconstructed with thin slices of 0.625 mm using standard GE software. Two observers independently evaluated the 5-mm maximum intensity projections of the thin slices and CTA in coronal and axial projections for best assessment of vessel diameter and thrombus length. Inter-observer agreement was measured using Cohen κ .

Results:

There were 749 patients who presented with acute ischemic stroke during the specified time period. Of those 67 were large vessel circulation strokes; of which, 22 had both CT and CTA done. Mean clot length measured was 14.75 (SD 4.95) on thin slices CT and 15.02 (SD 5.47) on CTA. Vessel diameter measured was 2.77 (SD 0.47) on thin sliced reformatted CT and 2.41 (SD 0.49) on CTA. There were no instances where clot size or vessel diameter could not be measured on thin slice reformatted CT. Inter-observer agreement was higher for both CTA (κ , 0.83) versus thin-slice nonenhanced CT reconstructions (κ , 0.80).

Conclusions:

Thin-sliced reconstructions of standard cranial nonenhanced CT raw data can be reliably used to detect and measure the thrombus size in LVOs. It also reliably measures the vessel diameter, making intervention planning possible. Larger multicenter trials are needed to validate our data.

Keywords: Imaging

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 31

MCA sphenoidal segment (M1) :Incidence of bifurcation within horizontal segment and relevance in mechanical thrombectomy

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Introduction:

The middle cerebral artery (MCA) occlusion is the most commonly treated vessel with mechanical thrombectomy. M1 segment occlusion typically leads to more severe deficits than M2 segments. Definition of M1 and M2 segments is variable and operators find it quite confusing. Purpose of the study was to determine, the incidence of bifurcation into major divisions of MCA within the sphenoidal (M1) segment, and to emphasize on the importance of a descriptive site of occlusion for research purposes.

Methods:

Consecutive patients undergoing cerebral angiograms between January 2011 and March 2014 were selected. The anatomy of the MCA was classified as classic, when the bifurcation occurred at the M1-2 junction and non-classic when the bifurcation occurred within the M1 segment, having the M1 segment a pre-bifurcation (main trunk) and a post-bifurcation (division) segment.

Results:

A total of 348 consecutive patients who underwent cerebral angiogram were studied. 273 patients had bilateral Internal carotid artery injections and 75 had unilateral internal carotid artery injection. A total of 621 MCA angiograms were studied. The classic pattern was found in 252 MCAs (40.5%) cases. Remaining 369 MCAs (59.5%,) had non classic bifurcation. Early bifurcation occurred 23.6% among patients with non classic bifurcation. Mirror pattern of bifurcation was seen in 61.5% of angiograms. There were no differences between the classical and non-classical anatomical pattern when demographics factors like race and gender were compared.

Conclusions:

In majority of the patients bifurcation of M1 segment occurs within the sphenoidal (M1) segment. In the endovascular treatment of acute ischemic stroke, it is more pertinent to further describe the site of occlusion in sphenoidal (M1) segment as pre-bifurcation (main trunk) versus post-bifurcation (division) with comment on lenticulostriate branches involvement whenever possible. This will provide a better imaging criteria for outcome comparison.

Keywords: Angiogram, Endovascular, Vascular Imaging, Acute Ischemic Stroke Intervention, Cerebrovascular Disease

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Grant Support: None.

Poster 32

Mechanical Thrombectomy in Large Vessel Occlusion Stroke Patients with Low CT ASPECT score

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Introduction:

Recent evidence has established the safety and efficacy of Endovascular Thrombectomy (ET) in patients with acute large vessel occlusion (LVO). Alberta Stroke Program Early CT Score (ASPECTS) has been shown to be a reliable marker of early ischemia. A high ASPECTS (8-10) is associated with better outcomes in ischemic stroke. However, there is very little information available on the patients with low ASPECTS (0-7) undergoing ET. We aim to evaluate ET safety and predictors of outcome in patients with low ASPECTS.

Methods:

We retrospectively evaluated consecutive patients who underwent ET for acute anterior circulation LVO at a tertiary academic hospital. Vascular neurologists blinded to all clinical data reviewed the initial CT scans of these patients. Patients with low ASPECTS (0-7) were identified. Primary outcomes were favorable mRS at 90 days (0-2), successful recanalization (TICI 2b-3), and symptomatic ICH (sICH).

Results:

From January 2008 to June 2016, 57 patients were identified. Stent retrievers were used in 50% of patients. Median initial NIHSS and ASPECT were 17 (14-21) and 7 (6-7), respectively. Successful recanalization, favorable mRS, and sICH were seen in 64.3%, 20.4%, and 19.3%, respectively. ASPECTS 0-5 was associated with significantly higher rate of sICH when compared with ASPECTS 6-7 (46.2% vs 11.4%, $p=0.005$) with trend to lower rate of favorable mRS-90days (9.1 vs 23.7, $p=0.29$). When compared with other methods of ET, the use of Stent retrievers was associated with higher rate of successful recanalization (82.1% vs 48.1%, $p=0.008$) and with higher rate favorable mRS-90days (34.8% vs 8%, $p=0.022$).

Conclusions:

ET in LVO patients with low ASPECTS results in high rate of sICH, especially in ASPECTS 0-5 compared to 6-7. Utilizing stent-retriever results in a significantly better rate of recanalization and favorable mRS-90days with trend to lower sICH rate.

Keywords: Aspects, Endovascular Therapy, Stentretriever, TICI, Acute Ischemic Stroke Intervention

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 33

Active Extravasation Seen During CT Perfusion Scanning For A Stroke Patient-A Novel Imaging Finding

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Introduction:

Rapid cerebrovascular imaging plays a critical role in acute management of ischemic stroke patients in order to select those that will benefit from directed intra-arterial therapies. CT perfusion is often used to help distinguish between salvageable ischemic penumbra and the unsalvageable core but there is also a lot of data the dynamic portion before post processing. We present the unique case of 63 year old male who was noted to have active extravasation noted on the dynamic CTA portion of the CT perfusion.

Methods:

A 63 year old male with hypertension, diabetes and hyperlipidemia who had a left PCA stroke a month prior to his new stroke. He was placed on dual antiplatelet therapy for stroke prevention as the etiology was thought to be due to severe intracranial atherosclerosis. The patient presented with new onset aphasia with NIHSS of 15. CT perfusion demonstrated an area of decreased cerebral blood flow, decreased cerebral blood volume and increased mean transit time in the left middle cerebral artery territory consistent with his symptoms and without a notable penumbra. On the dynamic CTA portion of the CT perfusion there was a clear area of active contrast extravasation in the area of the left temporal lobe hemorrhage 18 x 25 mm. The patient then had clinical worsening 2 hours later and repeat CT demonstrated expansion of the hemorrhage to 30 x 49 mm.

Results:

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Conclusions:

CT perfusion is an important tool when trying to measure the penumbra of tissue for consideration of intra-arterial therapies. We present the first novel instance of active extravasation in a hemorrhagic conversion of an ischemic stroke using the often neglected dynamic portion of the CT perfusion. Adding a careful review of the dynamic CT perfusion images as a cine loop adds value for the detection of active extravasation which can have important clinical consequences for management.

Keywords: Acute Stroke, Angiographic Ct Perfusion, CBF, Ct Perfusion, ICH

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 34

Treatment with Pipeline Embolization Device and Heparin in Vertebral Artery Pseudoaneurysm with Basilar Artery Occlusion

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Introduction:

Vertebral Artery (VA) pseudoaneurysms have a wide range of treatment options. Covered stents, stent grafts, coil embolization, and onyx embolization have all been used in iatrogenic pseudoaneurysms. Flow-diverting stents have been gaining more interest in the treatment of traumatic pseudoaneurysms. We present a patient with basilar artery (BA) thrombo-embolism and a spontaneous vertebral pseudoaneurysm who received both medical management with heparin and endovascular treatment using a Pipeline Embolization Device (PED).

Methods:

The patient is a 39 year-old male with no medical history who acutely reported gait unsteadiness and left sided weakness. He denied any neck injuries or recent chiropractic manipulation. He does work for a lumber company and reported carrying a log on his shoulder that day.

Results:

MRI showed an acute left superior cerebellar and right ponto-medullary infarction. CTA of the head neck suggested a pseudoaneurysm as well as basilar thrombosis, findings confirmed on catheter angiography. The patient was started on heparin drip for the subocclusive basilar thrombus. A repeat CTA showed complete resolution of the basilar thrombus and he clinically continued to improve with rehabilitation. He was discharged on dual anti-platelet therapy in anticipation of elective endovascular treatment with PED. He was readmitted about 2 weeks later with worsening symptoms and found to have a new cerebellar infarct with reocclusion of the BA. He was again placed on a heparin drip, with resolution of the thrombus on further imaging. He was then treated with telescoping PEDs. He tolerated the procedure well and continued to improve with rehab.

Conclusions:

The case demonstrates the clinical utility of PEDs in pseudoaneurysms as well as a possible indication for using heparin, even in the setting of an acute infarct.

Keywords: Pipeline, Aneurysm Embolization, Flow Diverter, Medical Management, Vertebral

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 35

Endovascular treatment of cerebral blister aneurysms using flow diverter stent – a single center experience.

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Introduction:

Blister aneurysms are small, friable and broad based aneurysms representing 0.3 to 1% of all intracranial aneurysms. They account for around 0.9 - 6.5% of ruptured aneurysms, and represent high risk for rerupture. Treatment of blister aneurysms is challenging, and may include surgical wrapping, clipping, multiple overlapping stents and/or coiling. Flow diversion is a rapidly evolving treatment strategy for intracranial aneurysms, but the evidence for its use in cases of blister aneurysms is scarce.

Methods:

We performed a retrospective review of flow diverter-treated blister aneurysm cases at our tertiary care institution. Clinical, imaging, procedural and follow up data on the patient were collected.

Results:

We identified 9 patients with blister aneurysms treated with flow diverter stents. Mean age at time of treatment was 52 ±14 years with 6 females (66.7%). In 8/9 cases (88.8%), the aneurysm had ruptured with mean size of 2.4±0.8 mm and most common location being the supraclinoid segment of the internal carotid artery (88.9%). All cases were treated using the pipeline flow diverter stent with a mean of 1.8 stents/patient, and without any adjunctive coiling. Complete occlusion of the aneurysm was seen in 6/7 patients (85.7%) with available imaging follow-up (mean duration 8.6 months). None of the patients had rerupture, or required retreatment. Patients were maintained on dual antiplatelet therapy for 3-6 months. At time of follow up, good outcomes (modified rankin score 0-2) were seen in 7/9 patients (77.8%).

Conclusions:

Flow diverter stents may be a feasible treatment option for blister aneurysms. They offer high occlusion and low retreatment rates with good outcomes. However, dual antiplatelet therapy in the acute ruptured setting can be challenging.

Keywords: Aneurysm Embolization, Flow Diverter, Subarachnoid Hemorrhage

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 36

Trends and Predictors of Utilization of Endovascular Coiling vs Microsurgical Clipping of Ruptured Intracranial Aneurysms

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Introduction:

Endovascular coiling treatment of ruptured aneurysm has emerged as a safe alternative since 2002. Aim is to evaluate the trend of utilization, cost and the predictors of utilization of coiling vs clipping for ruptured intracranial aneurysms (RIA).

Methods:

Data of 1004736 patient discharges with a diagnosis of RIA spanning from 2003 to 2013 was obtained from the Nationwide Inpatient Sample (NIS). Acute hemorrhagic stroke (subarachnoid hemorrhage 430.0 and intracerebral hemorrhage 431.0) was identified using ICD 9-CM codes. The cost and trend of utilization were calculated using Cochran-Armitage trend test and t-test. Multivariate survey logistic regression with weighted analysis was done to find out predictors of utilization.

Results:

Cohort of 1004736 patients with RIA treated with 47999 (4.7%) coiling and 55900 (5.6%) clipping was identified. A constant decline in utilization of clipping (7.9% in 2003 to 3.9% in 2013, $p < 0.001$) and increase in utilization of coiling (3.1% in 2003 to 4.1% in 2013, $p < 0.001$) was seen. Though utilization cost of coiling was higher, it was associated with lower length of stay (Cost: \$242,819 vs. \$231,460; LOS: 18 days vs. 20 days: $p < 0.001$). On discharge, patients who had died (OR:2.73; CI:2.47-3.02), severe or extreme loss of function (OR:1.24; CI:1.16-1.34) and poor discharge to intermediate care/skilled nursing facility were associated with higher utilization of clipping (OR:1.45; CI:1.35-1.56). Clipping utilization was higher in Elderly 65- 80 years (OR:2.02; CI:1.73-2.37) and > 80 years (OR:5.15; CI:4.25-6.23), Male (OR:2.02; CI:1.89-2.15), Emergency admissions (OR:1.73; CI:1.52-1.97), Preexisting co-morbidities like Renal failure (OR:3.07; CI:2.48-3.80), Tumor (OR:2.78; CI:1.80-4.32), Hypertension (OR:1.27; CI:1.19-1.36) and Diabetes (OR:1.77; CI:1.60-1.96). Coiling utilization was higher in Young 35-50 years (OR:1.20; CI:1.04-1.38), Large hospitals (>100 beds) (OR:4.53; CI:3.54-5.81), Urban teaching hospitals (OR:4.66; CI:3.63-5.97).

Conclusions:

Study highlights significant increase in utilization rates of coiling over the past eleven years for RIA in USA.

Keywords: Neurointerventional Training, Acute Stroke, Intracerebral Aneurysm, Carotid Stenting And Angioplasty, Avm Embolization

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 37

Effect of Hypothyroidism on Unruptured Cerebral Aneurysm Dimensions and Endovascular Coiling Outcome

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Introduction:

In a previous case-control study, we found significant association of history of hypothyroidism with occurrence of unruptured cerebral aneurysm in women within our patient cohort. Hypothyroidism has been shown to cause mucopolysaccharide deposition with association to blood vessel wall weakening and aneurysm formation in some case reports. We hypothesized that women with hypothyroidism may also have larger aneurysm size.

Methods:

We performed a retrospective cohort study of consecutive female patients with cerebral aneurysm receiving 3-vessel cerebral angiography at our tertiary-care academic medical center. Exclusion criteria included any ruptured aneurysm. We compared aneurysm dimensions measured from digital subtraction angiography between the group with hypothyroidism and without. multivariate analysis between the groups to control for age, hypertension, diabetes, hyperlipidemia, smoking, alcohol or drug abuse, and family history of aneurysm. Endovascular coiling outcome was recorded as Raymond-Roy Occlusion Classification (RROC) and recanalization on follow-up angiography

Results:

From 2008 through 2013, 178 female patients with cerebral aneurysms were identified. 34 patients had hypothyroidism. Aneurysms dimension in the hypothyroidism group and control group shows significant different in neck sizes 5.4 ± 0.5 vs 4.2 ± 0.2 mm ($p=0.01$). The mean of other dimensions were, height 10.4 ± 1.2 vs 8.3 ± 0.4 mm ($p=0.059$), maximal dimension 10.6 ± 1.1 vs 9.3 ± 0.5 mm ($p=0.2$), and aspect ratio 2 ± 0.1 vs 2 ± 0.2 . No significant difference was noted in RROC and subsequent recanalization.

Conclusions:

Hypothyroidism has a significant association with cerebral aneurysm neck size in women and trend to higher aneurysm height and maximal dimension which may link to higher risk of rupture. There was no significant difference in endovascular coiling outcome.

Keywords: Aneurysm, Aneurysm Embolization

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 38

Hypothyroidism is Associated with Unruptured Cerebral Aneurysms: A case-control study.

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Introduction:

Thyroid disorder has been known to affect vascular function and has been associated with aortic aneurysm formation in some case reports. However, the connection has not been well studied. We hypothesized that hypothyroidism maybe associated with the formation of cerebral aneurysms.

Methods:

We performed a retrospective case-control study of consecutive patients receiving cerebral angiography at our tertiary-care academic medical center. Patients with unruptured aneurysms were identified from consecutive patients undergoing 3-vessel catheter angiography. Age matched controls without cerebral aneurysms on angiography were also identified from the same database. We excluded patients with subarachnoid hemorrhage or previous intracranial hemorrhage. History of hypothyroidism and other risk factors were recorded.

Results:

From 2004 through 2014, 243 cases with aneurysms were identified and were age-matched with 243 controls. Average aneurysm size was 9.6 ± 0.8 mm. Hypothyroidism was present in 40 (16.5%) of the cases with unruptured cerebral aneurysms and 9 (3.7%) of controls: adjusted odds ratio (OR) 3.2(1.3-7.8), $p=0.01$. Subgroup analysis showed men with hypothyroidism had a higher odds of unruptured cerebral aneurysm diagnosis compared to women with hypothyroidism, with adjusted OR 12.7(1.3-121.9) versus OR 2.5(1.0-6.4), respectively.

Conclusions:

Hypothyroidism appears to be independently associated with unruptured cerebral aneurysms, with a higher effect seen in men. Given the known pathophysiological associations between hypothyroidism and vascular dysfunction, this warrants further exploration.

Keywords: Aneurysm, Subarachnoid Hemorrhage, Interventional Neuroradiology

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 39

Safety and Efficacy of the Pipeline Embolization in the Treatment of Anterior Communicating Artery Aneurysms.

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Introduction:

The Pipeline Embolization Device (PED) is increasingly used in the endovascular management of cerebral aneurysms. Longitudinal data regarding safety and benefit of PED in Anterior Communicating (ACOM) artery aneurysms is limited and particularly lacking in residual ACOM artery aneurysms. We report the use of PED in three patients with ACOM artery aneurysms who were previously coiled.

Methods:

Recurrence of three previously treated aneurysms arising from the ACOM artery via transarterial coil embolization were retreated with a PED. All obtained follow up diagnostic cerebral angiograms at either 3 or 6 months.

Results:

Mean age of patients was 59. All patients received cerebral angiograms at a minimum of 3 months following treatment the PED. All cases demonstrated complete aneurysm occlusion at a mean of 5 months, without any stenosis in the parent artery on follow up angiography.

Conclusions:

The Pipeline Embolization Device can be safely used for the treatment of ACOM artery aneurysms. Complete aneurysm obliteration can be achieved in cases refractory to endovascular coiling. These findings warrant replication in a larger dataset.

Keywords: Aneurysm Embolization, Pipeline, Intracerebral Aneurysm, New Innovation, Coiling

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 40

Endovascular repair of the middle cerebral artery aneurysm including those with complex in morphology

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Introduction:

Surgical clipping of the middle cerebral artery aneurysm (MCAA) may be superior to endovascular coiling when modified Rankin Scale (mRS) 2 or less is considered a good outcome. There are minimal data on the outcome of the repair of the MCAA when mRS 0-1 is considered good outcomes including those are complex in nature. Our objective is to determine the percentage of good outcome (mRS 0-2) patients who may return to the functional status (mRS 0-1).

Methods:

Analysis of patients from a prospectively maintained database with consecutive patient with MCAA who underwent endovascular treatment from 2011 to 2015.

Results:

13 patients with median age 60 years (38-76), 83% women underwent endovascular repair of the 14 MCAA. Of 14 aneurysms (right 9) including 2 ruptured cases (11 were wide neck and 6 had complex anatomy), 11 required stent-assisted coiling representing one ruptured case. Stent was deployed all but one case due to the extreme tortuosity, which underwent primary coiling, who developed intraoperative thrombosis of superior division of MCA which was recanalized using intra-arterial eptifibatid resulted in no stroke. Immediate complete and near complete obliteration was observed in 10 and subtotal in 4 cases. Of 4 subtotal cases; two achieved complete and 2 remain subtotal with improvement. Recurrence of aneurysm was observed in two cases that required subsequent coiling and achieved aneurysm obliteration. 90 days mRS 0-2 was observed in all 13 patients including 2 ruptured cases. Long-term mRS 0-1 was observed in 11/12, except one ruptured patient remained in mRS 2.

Conclusions:

Endovascular repair of the MCAA including those with wide neck and complex are not only safe and feasible, but associated with high long-term functional outcome. Therefore, endovascular options must be presented to patients prior to surgical clipping of a MCAA

Keywords: Aneurysm, Interventional Neuroradiology, Stent Assisted, Coiling, MCA

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 41

Endovascular strategies for anterior cerebral artery fusiform aneurysm presenting with distal aneurysms and subarachnoid hemorrhage.

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Introduction:

Treatment of aneurysmal subarachnoid hemorrhage (SAH) with the presence of multiple aneurysms in the same SAH distributions is neither clear nor straight forward, especially if the parent artery is diseased and harboring a proximal fusiform aneurysm. Objectives: To present an exceptional endovascular strategies and outcome in aneurysmal SAH

Methods:

A case report

Results:

A 40 years old man presented with SAH, Hunt & Hess II and Fisher 2. Angiogram demonstrated a proximal right ACA fusiform aneurysm (ACAFA) 8X8 mm with a daughter lobe, and presence of an 8x5x2 mm AComA and a 7x4x3 mm pericollousal artery aneurysm (PAA). The entire right ACA including PA appeared abnormal. AComA aneurysm was repaired. Catheterization of PAA resulted in occlusion of the PA and obliteration of the PAA with late ipsilateral filling. No perfusion deficit was observed and achieved NIHSS 0. Follow up angiogram demonstrated obliteration of both aneurysms with predominant collateral from ipsilateral MCA to ACA. Patient was sent home with NIHSS 0 and mRS of 2. Patient was rescheduled to repair ACAFA aneurysm and diseased ACA distal to ACAFA. Use of a pipeline flow diverter was also entertained but considered not feasible due to the anatomy. Angiogram revealed no contralateral contributions and right ACA solely dependent on MCA peal collateral. Therefore, no right balloon test occlusion was performed. Strategies were to place an enterprise stent in the right ICA and MCA, and coil diseased ACA distal to ACAFA followed by coiling of ACA fusiform. Patient underwent repair of the aneurysm with above strategies with the achievement of complete obliteration and good functional outcome. Patient return work in 90 days and follow-up angiogram demonstrated persistent obliteration.

Conclusions:

When multiple aneurysms are arising from a defective parent artery, repair of the aneurysms with the sacrifice of the parent artery may results in permanent obliteration and prevent recurrence.

Keywords: Aneurysm Embolization, Endovascular Therapy, Stent Assisted, Coiling, Embolization

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 42

The Evaluation of the Treatment of Ruptured Intracranial Aneurysms with Pipeline Embolization Device.

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Introduction:

There is minimal medical literature about the use of pipeline embolization device (PED) in ruptured aneurysms. Our goal was to evaluate the efficacy and safety of the PED in ruptured intracranial aneurysms.

Methods:

We obtained institutional review board approval to search our prospectively updated data of twenty patients with ruptured aneurysms who were treated with PED at our institution. Patients were loaded with aspirin and clopidogrel or received an infusion of tirofiban intraoperatively.

Results:

The Hunt and Hess grades were I in 7 patients (35%), II in 9 (45%), and III in 4 (20%). The mean duration from hemorrhage to PED placement was 7.0 days. A single device was used in all but 1 patient (95%). The procedure was staged in 20%. There was only 1 complication (5%); this was a fatal intraoperative aneurysm dome rupture that occurred during adjunctive coil deployment. Adjunctive coiling was used in 30%. There was no patient that required an invasive procedure after PED placement. Follow-up angiography (mean, 5.3 6 4.2 months; range, 2-12 months) showed 100% occlusion in 12 (80%) and incomplete occlusion in 3 patients (20%). 19 patients achieved a favorable outcome (modified rankin scale 0-2) at the most recent follow-up.

Conclusions:

In the Jefferson experience, treatment of ruptured aneurysms with the PED was associated with high occlusion rates, low complication rates, and favorable outcomes. Therefore PED may be considered as a safe and effective alternative for patients with favorable Hunt and Hess grades and aneurysms that are difficult to treat with conventional endovascular procedures.

Keywords: Aneurysm

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 43

Comparison of Pipeline Embolization Device With Conventional Endovascular Procedures For Treatment Of Carotid Cavernous Aneurysms

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Introduction:

There are many endovascular treatment options that are available for cavernous carotid aneurysms. At our institution, we compared pipeline embolization device (PED) versus conventional endovascular treatment with regards to evolution of mass effect, complications, recurrence, and retreatment rate.

Methods:

We evaluated one hundred fifty-seven patients harboring 167 cavernous carotid aneurysms who were treated using PED placement, coiling, stent-assisted coiling, and carotid vessel destruction. We compared and analyzed procedural complications, angiographic results, and clinical outcomes.

Results:

There were no difference in age, sex, and mean aneurysm size between those treated with PED and those treated with conventional endovascular procedures. Multivariate analysis revealed treatment other than PED (PED: odds ratio [OR], 0.03; P=0.002) and size >15 mm (OR, 4.27; P=0.003) to be predictors of no improvement in symptoms. The rate of complete occlusion was 81.36% (48 of 59) for PED, 42.25% (39 of 71) for stent-assisted coiling, 27.27% (6 of 22) for coiling, and 73.33% (11 of 15) for carotid vessel destruction. Retreatment was needed in patients with aneurysm size >15 mm (OR, 2.67; P=0.037) and those who were not treated with PED (PED: OR, 0.16; P=0.006). The rate of major complications was 6.6% (11 of 167). Patients who were treated with PED or stent-assisted coiling had 3.84 lower odds to develop complications (OR, 0.26; P<0.05).

Conclusions:

We should encourage the use of PED, especially in symptomatic patients. We found PED to be associated with less need for future treatment, higher improvement in symptoms rate, and lower rate of complications.

Keywords: Aneurysm Embolization

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 44

Dual Energy CT: Crucial Role in acute management of Neurovascular Conditions

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Introduction:

Tissue characterization became feasible with Dual-energy CT(DECT). DECT provides the opportunity to differentiate 3 different materials (iodine, calcium and hemorrhage). Recently, the use of DECT in neuroradiology is increasing but still broad usage, clear indications and the dedicated algorithm are lacking. We intended to investigate the clinical utility of DECT in guiding the prompt treatment of neurovascular conditions in acute situation.

Methods:

We reviewed the DECT images in twelve patients at our comprehensive stroke center with different neurovascular conditions. In our cases, advanced dual energy post-processing has been performed.

Results:

DECT differentiated contrast vs hemorrhage in five acute stroke patients in immediate post-endovascular period and avoided significant delay in therapy. DECT also reliably identified spot sign in four acute ICH patients, provided better characterization of aneurysm and dissection by subtracting bone and excluded hemorrhage for further treatment in one of our critical patient who had just received contrast during cardiac catheterization.

Conclusions:

The spectral information (blood vs contrast) provided by DECT aids in appropriate timely management in many acute neurovascular pathologies and could potentially reduce associated morbidity and mortality. We propose routine use of DECT to differentiate blood vs iodinated contrast in order to prevent any significant delay in management of acute neurovascular conditions including post intra-arterial therapy for acute stroke, ICH with unclear etiology and characterization of aneurysm or dissection mainly at skull base.

Keywords: Diagnostic Neuroradiology, Angiographic Technology, Imaging

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 45

Intracranial stenting in the anterior and posterior circulations in a Tertiary Centre- Reiterating the SAMMPRIS.

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Introduction:

Endovascular intervention for intracranial stenosis using Wingspan-stent with inflatable gateway balloon angioplasty has taken a major back stand after SAMMPRIS. We looked at retrospective results of all intracranial stents at our institution to compare our safety outcomes versus success rates.

Methods:

Retrospective chart review of patients with angiographic intervention for intracranial stenosis in anterior and posterior circulation from 2007-15 performed and follow up data from subsequent clinic visits.

Results:

48 patients were subjected to Wingspan stents and percutaneous-transluminal angioplasty with gateway balloon. 30 of these interventions were in anterior circulation and 18 were posterior circulation. In anterior circulation; M:F of 0.8:1, mean age: 58 years. 50% (15/30) were stents in the intracranial portion of the ICA, 14 in the MCA and 1 in the ACA. 2 procedures were unsuccessful, instant restenosis was seen in 13% (4/30) and fatal hemorrhage was seen in 13%. Rate of preoperative strokes was 46% and peri/post intervention strokes were 20%. Cardiovascular complications were seen in 16% (4NSTEMI and 1STEMI) and mortality was 13%. In the posterior circulation; N=18; M:F of 1.25:1, Mean age-58 years. 22% were distal basilar, 27% vertebro-basilar junction and rest were intracranial vertebral stents. All arteries had >70% stenosis, instant restenosis was seen in 11%, dissection in 11% (2/18). Rate of preoperative strokes was 61% and peri/post intervention strokes were 44%.

Conclusions:

There is a significant risk of poor outcome including peri/post operative stroke and myocardial infarction associated with intracranial stenting in both anterior and posterior circulations. Rates of strokes and NSTEMIs are three times higher in posterior than anterior circulation, probably because of more perforator injury, given the anatomy of the vertebro-basilar system. Hence, Wingspan stent should be reserved for those with >2 TIA/strokes who fail maximum medical-management as per the FDA as a Humanitarian Use Device for patients with refractory intracranial stenosis.

Keywords: Endovascular Therapy, Stenting

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 46

Clinical Outcome of Isolated Symptomatic Basilar Artery Stenosis

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Introduction:

The clinical and vascular outcome of isolated symptomatic basilar artery stenosis has not been characterized well.

Methods:

Retrospective analysis of a prospectively acquired database. Patients were included in the analysis if they had symptomatic isolated basilar stenosis of at least 50% by NASCET criteria. The aim of the study was to characterize the clinical outcome of patients with disease burden affecting mainly the basilar artery. Favorable outcome was defined as a modified Rankin score of 0-2 on follow-up.

Results:

70 patients were identified between 2001 and 2015 with a mean follow up of 26 months. Nine patients lost follow-up. 49 (70%) patients were men and the most common risk factors were: hypertension (81%), intracranial atherosclerosis (61%), hyperlipidemia (58%) and diabetes (35%). 56 (80%) patients presented with stroke. The mid-basilar segment was most commonly involved (57%). All patients were treated with maximal medical therapy: dual antiplatelets, permissive hypertension and a statin. However, 43 patients required endovascular intervention after failing medical therapy: 33 (47%) underwent stenting and 10 (14%) angioplasty only. Patients who had a mid-basilar stenosis had worse outcome (mRS > 2) than proximal and distal stenosis: 40%, 10% and 0%. However, due to the small number of the sample this was not statistical significant. Kaplan-Meier curves demonstrated more events (strokes and death) in the mid-basilar group than other locations. Overall, patients in the interventional group appeared to have a worse outcome than the medically managed patients (HR 0.6 95% CI 0.2 – 1.5). However, 11/43 endovascular patients had a complete basilar occlusion.

Conclusions:

In this sample of 70 patients, mid-basilar stenosis patients appeared to have a worse outcome than patients with proximal and distal stenosis. Overall, the group in the interventional arm had a worse outcome than the medical arm.

Keywords: Acute Stroke, Intracranial Stenosis Stenting And Angioplasty, Basilar, Stenting, Cerebrovascular Disease

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 47

Causes, Cost, and Rate of Readmission in Moyamoya Disease

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Introduction:

Moya Moya disease is a rare form of vasculopathy affecting cerebral perfusion. Although the condition is rare, affected patients have recurrent hospitalization due to variety of complications. There is limited data on causes and patterns of recurrent hospitalization although it is not an uncommon phenomenon in this patient group.

Methods:

We used the National Readmission Dataset (NRD), which is designed to generate national estimates for readmission analysis published by Healthcare Cost and Utilization Project (HCUP), accounting for 49.3 percent of the total U.S. resident population and 49.1 percent of all U.S. hospitalizations. Moya Moya disease/ Syndrome patients were identified by ICD-9 code 437.5. A cross-sectional study was conducted using the observational data on unplanned 30-day readmission rates exploring all causes, excluding elective readmissions. Cost of readmission was calculated by multiplying total charges with cost to charge ratio provided by HCUP. Top causes were estimated by frequency analysis and discharge weights were used to generate national estimates.

Results:

The NRD contained 317 (weighted N = 711) Moya Moya patients in year 2013. After excluding readmission, the all cause 30-day readmission rate was 11.46%. Total cost of unplanned 30-day readmission in \$4.2 million (accounting for about 49.1% of all US hospitalizations). Top five causes of readmission included cerebrovascular accident (39.5%), post surgical complication (17.6%), headaches (5.3%), Seizure (5.2%), transient cerebral ischemia (4.0%).

Conclusions:

Even the incidence of Moya Moya disease is 0.086/ 100,000 population, a sample of NRD accounting for 49.3 percent of the total U.S. resident population and 49.1 percent of all U.S. hospitalizations showed annual readmission rate of 11.46% costing \$4.2 million. Cerebrovascular accidents still remains number one cause of readmission followed by post surgical complications. This suggest that further research is needed for post discharge monitoring in Moya Moya population for better outcomes and cost effective care.

Keywords: Intra Caranial Stenosis, Cerebrovascular Disease

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 48

Endovascular Treatment Rates among AIS Patients Admitted to Hospitals on Weekends as Compared with Weekdays.

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Introduction:

A stroke “weekend effect” has been described where acute ischemic stroke (AIS) patients admitted to hospitals on weekends are less likely to receive intravenous thrombolysis (IV-tPA). It however remains unclear if endovascular treatment (EVT) rates differ between patients admitted on weekend versus weekdays.

Methods:

All adults admitted to US hospitals from 2007-2012 with primary diagnosis of AIS (n=2,649,431) were identified from the Nationwide Inpatient Sample. We computed weighted frequency of EVT and IV-tPA use in patients admitted on weekend and weekdays. Generalized Estimation Equations models were used to compare odds of EVT, IV-tPA use, mortality and home disposition between weekend and weekday patients.

Results:

Weekend admissions comprised 25.6% of all AIS admissions from 2007-2012. N=4,249 (0.63%) of all weekend patients received EVT compared to n=13,276 (0.67%) of all weekday patients. N=91,203 (4.6%) of all weekday patients received IV-tPA compared to n=34,070 (5.0%) of all weekend patients. After multivariate adjustment, weekend patients had lower odds of EVT (OR 0.88, 95%CI=0.80-0.97) but higher odds of receiving IV-tPA (OR 1.08, 95%CI=1.04-1.11) compared to weekday patients. There was no difference in mortality between weekend and weekdays patients (OR 1.02, 95%CI=0.99-1.05). However, weekend patients who survived AIS were less likely to be discharged home (OR 0.93, 95%CI=0.91-0.94).

Conclusions:

Our Study demonstrates stroke weekend effect for patient-undergoing EVT, however previously described weekend effect for IV-tPA use no is no longer evident. Mortality was similar among patient undergoing EVT on weekday vs weekend but the patients who underwent EVT on weekend were less likely to discharge home. Our study suggests weekend admission face unique challenges for AIS patient undergoing EVT and additional efforts are still needed to lessen this disparity.

Keywords: Acute Ischemic Stroke Intervention, Epidemiology

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 49

Hemorrhage Risk with tPA for Ischemic Stroke in the Oldest Old: A Propensity-Matched Medicare Analysis

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Introduction:

Although meta-analytic findings suggest the risk of intracranial hemorrhage (ICH) with tissue plasminogen activator (tPA) may be greater among acute ischemic stroke (AIS) patients 80 years and older,(1) consensus guidance underscores a net health benefit.(2) Our objective was to measure the association of tPA administration with ICH and inpatient mortality in a national cohort of AIS patients.

Methods:

A patient's first AIS hospitalization from 04/01/11 to 12/31/2012 was selected from Medicare Part A claims. The baseline period was 3 months preceding the index admission, during which time included patients were not hospitalized, had >1 nursing home Minimum Data Set assessment, and were continuously enrolled in Medicare Parts A and D. Propensity scores were calculated using multivariable logistic regression with tPA as the outcome. The model incorporated potential confounders including demographics, comorbidities, cognitive and functional status, and medication use. Logistic regression estimated odds ratios (ORs) and 95% confidence intervals (CI) for ICH and inpatient mortality in the matched cohort.

Results:

Among 10,052 patients hospitalized for AIS, 502 (5.0%) received tPA. The propensity-score matched cohort comprised 502 tPA treated patients (median age (IQR): 86.0 (80.0-90.0); 25.1% male) and 502 untreated patients (median age (IQR): 86.0 (80.0-91.0); 24.7% male). Functional limitations (mean (SD) Barthel Index: 46.5 (24.2)) and cognitive impairments (43.5% moderate-to-severe) were common. Incidence of ICH was 10.8% and 1.8% among the tPA exposed and unexposed groups, respectively. Inpatient mortality was similar (9.0% treated versus 9.1% untreated). The OR for ICH was 6.6 (95%CI: 3.2-13.5) and the OR for mortality was 1.02 (95%CI: 0.7-1.6) for tPA treated patients.

Conclusions:

Despite substantial baseline impairment, the observed rate of tPA use was comparable to estimates in less burdened populations.(3) Further characterization of post-discharge trajectories will be important to determine if the elevated risk of ICH with tPA is outweighed by longer term benefits in this challenging population.

Keywords: TPA, Ischemic Stroke, Hemorrhage

Financial Disclosures: The authors had no disclosures.

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Poster 50

Internal Carotid Web (Atypical Fibromuscular Dysplasia): High Stroke Recurrence and Amenability to Stenting.

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Introduction:

Carotid web (intimal/atypical fibromuscular dysplasia-FMD) is an uncommon cause of stroke and transient ischemic attack (TIA). We report a cohort of patients with carotid web and the first series of stenting for this condition.

Methods:

A retrospective review of consecutive patients identified to have a carotid web (evaluated with CTA or MRA) and prospectively followed from September 2014-September 2016 at a tertiary medical center.

Results:

Sixteen patients were identified. Mean age was 48±3years, 56% were female and 56% blacks. Vascular risk factors were infrequent: hypertension(50%), hyperlipidemia(12%), atrial fibrillation(0%), diabetes(12%), and smoking(12%). All patients were symptomatic at time of presentation (88% stroke vs. 12% TIA). One individual was receiving antiplatelet treatment at baseline. Mean NIHSS was 9.4±8.4 and ASPECTS 8.1±1.3. Forty-four percent received intravenous thrombolysis and 37% thrombectomy. There were no parenchymal hemorrhages and 100% achieved mRS0-2 in 90 days. Only one patient had associated classic FMD changes. Six (37%) patients had contralateral web lesions (all less prominent than symptomatic side). A recurrent stroke/TIA involving the territory of the symptomatic web was noted in 5(31%; 4 strokes/1 TIA) patients over a median follow-up time of 11[6-17] months. Two recurrent events happened within 7 days of index event, two within 9 months, and one within 10 years. Two recurrent events happened in patients receiving therapeutic dual antiplatelet therapy, one within 24-hour of thrombolysis, and one in a patient off antithrombotics. Nine patients were stented (5 closed-cell/4 open-cell) at a mean 15±17days after presentation. No pre-stent angioplasty and one post-stent angioplasty were performed. There was any residual stenoses and peri-procedural complications. Follow-up imaging included ultrasound in 8/9 patients at 3 months and abnormalities were not observed. No recurrent stroke/TIA occurred in stented patients (median follow-up 12[4-17] months).

Conclusions:

Carotid web is associated with high recurrent stroke/TIA risk despite antithrombotic use and is amenable to stenting.

Keywords: Carotid, Stenting, Ischemic Stroke

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 51

Cardiac Stents usage in Stroke patients with Extensive Atherosclerosis that Precludes the Use of Stentriever.

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Introduction:

Stent design technology for cerebrovascular disease has not evolved as rapidly or effectively as it has for cardiovascular disease. Cardiac stents are balloon-mounted stents that can be safely maneuvered through tight stenosis. Cardiac stents do not require over-the-wire exchange and they rarely require pre or post-stenting angioplasty, which allows shorter procedure times. Cardiac stents can be used for intra- and extra-cranial, posterior and anterior circulation diseases. We reviewed our experience to determine our complication rates and outcomes.

Methods:

We reviewed the IRB approved stroke registry of patients who presented to our community based, university affiliated comprehensive stroke center with ischemic strokes during a 2-year period (August 2013-July 2015). Pre-procedure NIHSS, discharge NIHSS, discharge mRS and complications were abstracted to determine effects of treatment. SPSS v22 was used for statistical analysis.

Results:

Total 864 patients were evaluated for ischemic stroke. Of those, 14 patients had cardiac stents (Integrity (n=14) and Multi-Link (n=2)) used for neurointervention after other options were felt to be unfeasible. Patients were mostly male (78%, n=11), with mean age of 67 years (SD +/-10.9). 71.4% (n=10) patients had posterior circulation stroke. Median duration of procedure was 48 minutes (range 32-125 mins). Mean pre-intervention NIHSS was 7.4 (SD +/- 12.3). Mean NIHSS at discharge was 5.9 (SD +/-10.6). Mean change in NIHSS at discharge was 1.6 (SD +/-2.2). Mean discharge mRS was 1.5 (SD +/- 2.2). 57 % (n=8) patients had good outcomes (mRS 0-2) on discharge. There were no major intracranial bleeding or acute ischemic complications during the procedure.

Conclusions:

Cardiac stents are rapidly deployed and associated with fewer complications. They may be a safe alternate to stentriever in select cases. A larger prospective trial is needed to evaluate and compare cardiac stents with the currently used stents for cerebrovascular ischemic disease.

Keywords: Acute Stroke, Stenting

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 52

Safety and Outcomes of Mechanical Thrombectomy in Large Vessel Occlusion Stroke with Low NIHSS

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Introduction:

Recent randomized trials support tremendous efficacy and safety of mechanical thrombectomy (MT) with IV tPA in the treatment of acute large vessel occlusion (LVO) with median National Institute of Health Stroke Scale (NIHSS) of 17. Outcomes of MT with or without IV tPA in patients with LVO & low NIHSS are not well-studied.

Methods:

We retrospectively analyzed consecutive patients who underwent mechanical thrombectomy of LVO in tertiary care University center. Patients with NIHSS 0-7 were included. Primary outcomes were recorded, including 90-days mRS, successful recanalization (TICI 2b-3), and symptomatic intracerebral hemorrhage (sICH). Comparison of outcome was evaluated between patients that were treated with stent retriever vs non-stent retriever devices.

Results:

From June 2009 to August 2016, a total of 21 patients (16 anterior circulation LVO and 5 basilar occlusion) were included in our report. Median NIHSS was 6 (3.5-6). Median 90-days mRS was 1 (0-4.5). Rate of favorable mRS, successful recanalization, and sICH were reported in 71.4%, 85.7%, and 4.8%, respectively. Stent-retriever was utilized in 76.2%. There was a strong trend to higher successful recanalization rate utilizing stent-retriever versus other device, 93.8% vs 60% (p=0.06). There was no significant different in favorable mRS, 75% vs 60% (p=0.5). Subgroup analysis of stent retriever usage in NIHSS 0-5 vs 6-7 shows no different in rate of favorable mRS (71.4% vs 77.8%, p=0.77) and successful recanalization (85.7% vs 100%, p=0.24). There was no different in treatment outcomes in anterior circulation LVO and basilar occlusion.

Conclusions:

Our small single-center study suggests that Mechanical thrombectomy with stent-retriever in LVO patients with low NIHSS is also likely to be safe and effective. Larger studies and subsequent randomized control trial of this approach are indicated.

Keywords: Acute Ischemic Stroke Intervention, Acute Stroke, Access Catheters, TICI, Endovascular

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 53

Implanting Longterm Cardiac Monitors by Stroke Interventionalists in a Collaborative Cryptogenic Stroke Program

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Introduction:

Cryptogenic strokes account for 25-40% of ischemic strokes globally. Identification of Atrial Fibrillation for cryptogenic stroke patients is critical for secondary stroke prevention. We sought to evaluate the feasibility of incorporating the long term implantable cardiac monitoring into a seamless treatment algorithm as a collaborative cryptogenic stroke program within a Comprehensive Stroke System.

Methods:

Via retrospective chart review, all implantable cardiac monitors (ICM) placed from August 2014 through July 2016 were identified and separated into subgroups according to fiscal quarters. The ICMs were also subdivided according to indication of placement and specialty of the proceduralist. P values were calculated using t-tests and fisher's exact test.

Results:

A total of n=111 LINQ monitors were implanted at our Comprehensive Stroke Network between August 2014 and July 2016. Since the launch of the Collaborative Cryptogenic Stroke Program, there has been 136% (n=26 vs n=11) increase in the total number of ICMs implanted per quarter, and increase in mean number of monitors implanted per quarter from 8 to 16.25 (p<0.0001). There has been 444% increase in ICMs implanted for the indication of Cryptogenic stroke (n=3 of 32 vs n=32 of 65; p<0.0001). The mean number of ICMs placed by cardiology have slightly increased from 8 to 10.25 (p=0.0151) per quarter since the collaboration. When compared by specialty of proceduralist, 36% (n=24/65) of the ICMs were placed by Interventional neurologists.

Conclusions:

Paroxysmal atrial fibrillation remains an elusive cornerstone in the secondary prevention of stroke. An algorithmic approach demonstrates an increased on-label utilization of ICMs, with higher overall volume of devices placed system-wide, with no deleterious effects on existing cardiology procedural volume. Building a multidisciplinary collaborative cryptogenic stroke program is feasible and ideal in detecting paroxysmal Atrial fibrillation in cryptogenic stroke patients.

Keywords: Ischemic Stroke, Treatment, Imaging

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 54

Evaluation of Reperfusion Therapies within a U.S. County System for Acute Comprehensive Stroke Care

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Introduction:

In an effort to maximize provision of acute stroke therapies, the Emergency Medical Services (EMS) in Orange County, CA established a system of care whereby patients with suspected acute stroke are taken to hub sites with endovascular treatment (EVT) capability or to spoke hospitals. Here we examined the performance of this system

Methods:

All patients during 2013-2015 for whom 911 was called within 7 hours of onset, and EMS personnel declared "acute stroke" at end of initial evaluation were included.

Results:

A total of 6,188 patients (mean age 72) had suspected stroke, 54.9% ischemic and 19.4% hemorrhagic. Across all patients, transfer rates increased over time (OR 1.12 per 3-months, $p < 0.0001$) and differed by diagnosis ($p < 0.0001$), occurring in 12.0% of hemorrhages but only 3.5% of ischemic strokes. Among all AIS, transfer rates into a hub site also increased over time (OR 1.08, $p < 0.0001$), spiking mid-2015. Acute reperfusion therapy was given to 28.2% (20.9% IV tPA only, 7.3% any IA therapy), but its usage was unrelated to transfer status, and only 11% of all transferred AIS patients received EVT. Among all hemorrhagic strokes, transfer rates into a hub site again increased over time (OR 1.1, $p = 0.002$). Across all patients, mortality during acute hospitalization was 8.2% and did not differ by transfer status, but did differ by diagnosis ($p < 0.0001$): 23.6% of hemorrhages vs. 5.4% of ischemic strokes. Over time, mortality decreased only among patients with ischemic stroke (OR 0.95, $p = 0.03$).

Conclusions:

There were several favorable features of this acute stroke care system, including that 28.2% of AIS patients received reperfusion therapy and mortality decreased over time. However, while transfer to EVT-ready sites increased, rates of EVT were low. Continued efforts to optimize acute stroke systems of care should be tailored toward increasing EVT by early recognition of LVO and timely triage to hub facilities.

Keywords: Acute Ischemic Stroke Intervention, Revascularization, Ischemic And Hemorrhagic Stroke, Endovascular Therapy, Health Economic

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 55

Rate of Endovascular Therapy in Octogenarian/Nonagenarian Acute Ischemic Stroke Patients Compared to Younger Patients.

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Introduction:

Data on the usage of endovascular therapy (EVT) in elderly acute ischemic stroke (AIS) patients is sparse.

Methods:

Our study aims to assess temporal trends in the rate of EVT and IV-thrombolysis (IV-TPA) in AIS patients ≥ 80 years compared to younger patients. We secondarily evaluated predictors of EVT during AIS hospitalization in elderly ≥ 80 years and trends in intracerebral hemorrhage (ICH) and mortality following ET in this age group.

Results:

From 2007-2012, EVT and IV-tPA usage increased by 804% and 122% respectively in elderly patients ≥ 80 years (EVT: 0.08%-0.76%, p-trend ≥ 80 years). Blacks had lower odds of receiving EVT compared to whites (OR 0.53, 95%CI=0.37-0.75). Weekday admission, large hospital bed number, high stroke volume and teaching hospital designation were also positively associated with EVT. There was no significant change in mortality (p-trend=0.07) or ICH (p-trend=0.38) over time in patients that received EVT.

Conclusions:

Frequency of EVT and IV-TPA use in AIS patients ≥ 80 years are increasing but rates remain significantly lower compared with younger patients. Disparity in EVT use in octogenarian/nonagenarian also exists by race and hospital factors. Targeted efforts are needed by clinicians and policy makers to lessen this disparity.

Keywords: Acute Ischemic Stroke Intervention

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 56

Evolve of practice to reduce door-to-needle time in a new stroke center

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Introduction:

“Time is gold” for every stroke interventionist. Every 30 min delay in treatment could increase the risk of poor clinical outcome by approximately 10%. In present study, we compare door to needle time in patients (1) with and without groin shaving, and who underwent (2) 3-phase CT angiogram and CT perfusion for evaluation of a suspected stroke. The difference in complication, if any, is also noted.

Methods:

Institutional review board permission was taken for present study. A total of 25 patients were included in the study. Ten patients underwent groin shaving and rest did not undergo any shaving. Three-phase-CT angiogram was performed for fifteen patients. Rest of the patients undergo single-phase angiography and CT perfusion.

Results:

Avoiding groin shaving significantly reduced the door to needle time ($p=0.021$). There was no incidence of infection in either group. Three-phase-angiogram reduced the imaging time significantly ($p<0.05$), when compared with CT perfusion. The reduction of NIHSS score at 24 hours in both methods are comparable. Study of a larger cohort will improve significance.

Conclusions:

In quest to improve the door to needle time, multiple modifications in practice have been advised. The safety and accuracy can't be compromised while trying to achieve a faster intervention. Avoiding groin shaving can save time without worsening the infection rate. Multiphase CT angiography is a novel tool for imaging in patients with acute ischemic stroke, which can be used reliably over standard single-phase CT angiogram and perfusion.

Keywords: Acute Ischemic Stroke Intervention, Door To Groin Puncture, Angiographic Ct, Ct Perfusion

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 57

Assessment of large vessel posterior circulation thrombus with MRI and noncontrast CT.

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Introduction:

Thrombi retrieved from patients with acute ischemic stroke with anterior circulation Large Vessel Occlusion (LVO) and correlation with hyperdense MCA sign seen on non contrast CT and blooming artifact seen on gradient-echo (GRE) MRI have given relevant insights into the pathophysiology of thrombotic lesions (RBC-dominant vs Fibrin-dominant). This may facilitate the development of safer noninvasive reperfusion treatment approaches. Our goal was to evaluate the benefit of anticoagulation for posterior circulation strokes based on imaging characteristics in patients where endovascular therapy was not justified.

Methods:

Prospective evaluation of patients who presented with posterior circulation LVOs at community based, university affiliated comprehensive stroke center during one year period was done. The clot characteristics on thin-sliced reformatted CT, CT Angiogram and GRE MRI were noted. The clot size and characteristics were followed by sequential imaging while the patients were on anticoagulation for presumed embolic thrombus.

Results:

Total 749 patients were evaluated. Of those 78 were posterior circulation strokes; of which, 7 had LVO and 4 underwent endovascular treatment. Endovascular therapy was not justified in 3 patients due to clinically stable exam. These patients were thought to have embolic etiology of stroke and therefore were started on anticoagulation. Group A (RBC-dominant thrombus; n=2) mean clot length was 15.5mm, measured on CT, CTA, MRI. GRE MRI showed blooming artifact around the area of thrombus. Thrombus resolved on repeat CTA at 48-72 hours. Group B (Fibrin-dominant; n=1) 5.5mm clot was visualized only on CTA (nothing on CT head and MRI) and it persisted on repeat CTA at 48-72 hours. Mean initial NIHSS was 2 (SD=1). Mean discharge NIHSS was 0.33 (SD 0.577). Mean discharge mRS was 0.67 (SD 0.57).

Conclusions:

Hyperdense sign on reformatted thin-sliced CT head and blooming artifact on GRE MRI brain in patients with LVO can be used to characterize the composition of thrombus, which could be helpful in deciding medical therapy.

Keywords: Acute Ischemic Stroke Intervention

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 58

Does “Hyperdense MCA Sign” Predict the Outcome of Thrombectomy Plus IV tPA for Acute Stroke?

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Introduction:

Objective: To evaluate significance of pretreatment hyperdense MCA sign (HMCAS) for predicting outcomes after intravenous tPA (IVT) plus Intra-arterial mechanical thrombectomy (IAMT) in acute ischemic stroke. Background: IAMT plus IVT has shown to have excellent recanalization rate and better clinical outcome in acute ischemic stroke (AIS) patients who have occlusion in the proximal large vessels in the anterior circulation, but there are still a group of patients who do not have good functional outcome. We evaluate whether presence of HMCAS on pretreatment non-contrast head CT (NCHC) predicts outcome in patients who receive this treatment.

Methods:

We retrospectively reviewed the medical records and cerebrovascular images of the patients treated with IVT plus IAMT for AIS in our center. Those with occlusion in terminal internal carotid artery (TICA) or MCA on pretreatment CT angiogram of the head were included.

Results:

Out of 46 patients who underwent IVT plus IAMT, 22 (48%) had HMCAS on the pretreatment NCHC. Both groups had comparable baseline stroke severity and age ($p>0.05$). After adjusting for age and NIHSS using multivariate logistic regression analysis, there was no significant difference in terms of favorable outcome (mRS: 0-2) between the two groups.

Conclusions:

In AIS due to proximal large vessel occlusion, the presence of HMCAS sign on pretreatment NCHC does not predict the functional outcome after treatment with IVT plus IAMT.

Keywords: Acute Ischemic Stroke Intervention, Acute Stroke, Thrombolytics

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 59

Outcomes of EVT with vs. without thrombolysis for MCA (M2) Lesions in Patients with ELVO

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Introduction:

EVT is standard of care for ELVO for most proximal lesions. Recently some studies found that M2-MCA lesions may do better compared to medical management alone. However, the impact of thrombolysis on successful procedural and clinical outcome in such cases has not been well established. We present our experience with thrombectomy of distal lesions in the MCA.

Methods:

A retrospective review of our stroke database was conducted between Sept 2015 to Aug 2016 identify all patients EVT in the setting of ELVO involving the MCA/M2 territory & beyond. We reviewed clinical imaging procedural and outcome data of 13 such patients identified.

Results:

In total, 13 patients were identified, 8 men and 5 women. 5 patients received TPA prior to thrombectomy, while 8 were treated only by EVT. The TPA group had an average NIHSS of 18. Median time from onset to arrival was 232 minutes. 80% of the lesions were located on the left. Of the patients that received TPA, 40% had a high level of recanalization (TICI 2c/3), and only 1 had a good clinical outcome (discharge-mRS of 0-2). Only 2 patients were discharged to home/acute rehab. For EVT-alone group the average NIHSS was 18. Median time from onset to arrival was 233.5. 75% of the lesions were located on the left. Of those that had EVT alone, 50% achieved high level of recanalization (TICI 2c/3) or greater, and 4 of 8 had discharge-mRS of 0-2. 50% of patients were discharged to home/acute rehab. Both groups had 1 mortality each. No symptomatic ICH or reperfusion edema were reported. 90-day MRS will be available at the time of the meeting.

Conclusions:

Our data suggests that EVT may be successful when used in isolation for distal MCA lesions as compared to when used adjunctive to thrombolysis in the setting of ELVO.

Keywords: Mechanical Thrombectomy, Acute Stroke

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 60

Effectiveness of ARTS as Rescue Therapy for ELVO

Sahil Kazmi, Research Associate¹, Mark Hilmy, Clin. Research Coord¹, Ambooj Tiwari, Assistant Professor NYU¹, Jeffrey Farkas, Clinical Supervisor¹, Karthikeyan Arcot, Assistant Professor NYU¹, David Turkel-Parrella, Assistant Professor NYU¹, Jeremy Liff, Assistant Professor NYU¹

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Introduction:

Multiple modalities of EVT have been attempted in the setting of ELVO. Recently Aspiration Retriever technique in Stroke (ARTS) was proposed by a single center. We report our single center experience with ARTS as rescue therapy.

Methods:

A retrospective review of our stroke database was conducted between Sept 2015 to Aug 2016 identify all patients who underwent ARTS-based therapy for ELVO.

Results:

Of the total 110 patients identified in our database, a total of 51 patients (46%) received ARTS. 26 were men and 25 women. Mean/Median NIHSS score was 20. Median time from onset to arrival was 236.5 minutes. 19 (37%) patients received TPA prior to thrombectomy, and the others were outside the systemic thrombolysis window. Lesions included basilar (3, 5.8%), MCA (27, 53%), ICA (16, 31.4%), CCA (1, 2%), vertebral (2, 4%) and PCA (2, 4%). 41 (80.4%) patients had successful recanalization defined as TICl grade 2b or greater. Median time from access to reperfusion was 33 min in the combination therapy group. There were 10 (19.6%) mortalities. No symptomatic ICH or reperfusion edema was reported. Discharge mRS was < 3 in 31.4% of the patients. Of the total 110 patients, 48% patient were male in the total group. Mean/Median NIHSS was 19. Median time from onset to arrival was 268 minutes. A similar percentage (31%) received tPA. Lesion distribution was more in favor of MCA in the entire group but all other lesions had comparable distribution: Basilar (6.3%) & ICA-T (28.2%). 95 (86.4%) patients had successful recanalization. Median time from access to reperfusion was 34 min in the complete group. There were 19 mortalities (17.4%). No symptomatic ICH or reperfusion edema was reported.

Conclusions:

In spite of use as rescue therapy for recalcitrant lesions, ARTS-based therapy was found to be equally effective and safe as compared to standard unimodal approach.

Keywords: Acute Stroke, Interventional Neuroradiology

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 61

Outcomes of EVT in Young Patients with ELVO

Sahil Kazmi, Research Associate¹, Mark Hilmy, Clin. Research Coord.¹, Ambooj Tiwari, Assistant Professor NYU¹, Jeffrey Farkas, Clinical Supervisor¹, David Turkel-Parrella, Assistant Professor NYU¹, Karthikeyan Arcot, Assistant Professor NYU¹, Jeremy Liff, Assistant Professor NYU¹

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Introduction:

The efficacy of EVT is well established in the age group of 80 and above. Young patients with ELVO are, however, at higher risk of requiring decompressive hemicraniectomy and higher cause-specific DALYs. EVT may be a modality to reduce the incidence of both in this population, even for those patients outside the TPA window. We report our experience of performing EVT in patients <50 with ELVO.

Methods:

A retrospective review of our stroke database was conducted between Sept 2015 to Aug 2016 to identify all patients under the age of 50 who underwent EVT in the setting of ELVO. We reviewed clinical imaging procedural and outcome data of 11 such patients identified.

Results:

In total, 11 patients were identified, 6 men and 5 women. The average NIHSS score at intake was 17 and the median was 14. Median time from onset to arrival was 303 minutes. ASECTS of < 7 were recorded in 4 patients. 3 patients received TPA prior to thrombectomy, and the others were outside the systemic thrombolysis window. Lesions included MCA (7), ICA (2), Basilar (1), and vertebral (1). 8 patients had successful recanalization defined as TICl grade 2b or greater. Of the patients with TICl <2b, one patient died; this was the only mortality. No symptomatic ICH or reperfusion edema was reported. 4 patients had discharge MRS of 0-3, 3 were not reported at the time of this evaluation, and 4 were 4 and above. 8 patients had acute rehab, 2 had subacute rehab, and 1 did not have rehab. 90-day MRS was not available for all patients (90-day MRS will be available at the time of the meeting).

Conclusions:

Our data demonstrate that EVT is useful and effective with or without thrombolysis in young patients with ELVO.

Keywords: Endovascular Therapy, Mechanical Thrombectomy

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 62

Endovascular Acute Ischemic Stroke Treatment with Flowagte Balloon Guide catheter.

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Introduction:

Acute ischemic stroke thrombectomy has become the standard for care after recent publications. The degree of recanalization is still very important in overall outcomes. We seek to review the utility of a new balloon guide catheter in degree of recanalization.

Methods:

Medical records of prospectively collected endovascular ischemic stroke database were reviewed. All consecutive strokes when flowgate balloon guide catheter was used with a Trevo thrombectomy stentriever were identified. Use of flowgate balloon guide catheter, number of passes, final TICl score, trackability, adjunct devices used were all collected and analyzed.

Results:

Use of flowgate balloon guide resulted in 64% (33/52) first pass effect of TICl 2b/3. Of first pass, 73% (24/33) were TICl 3. Adjunct device of aspiration catheter was used in 12% (6/52) of cases. Overall success with flowgate balloon guide with one or more passes of TICl 2b/3 was 94% (49/52). Trackability was achieved in 92% (57/62) of cases. The 10 extra cases either had melted clots, distal A2, M3 clots where balloon guide not used. Safety profile had no carotid dissections or any other complications.

Conclusions:

Use of flowgate balloon guide catheter was associated with good first pass effect and overall recanalization of TICl 2b/3 of 94%. It's high success rate can be due to better trackability and easy of use. No carotid dissections or complications occurred.

Keywords: Acute Stroke, Acute Ischemic Stroke Intervention, Balloon Guide Catheter, Stentriever

Financial Disclosures: Author received grant for investigator-initiated research from Stryker Corporation.

Grant Support: None.

Poster 63

Embolic Stroke of Undetermined Source: The Role of the Nonstenotic Carotid Plaque

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Introduction:

Cryptogenic stroke, or stroke of undetermined cause, presents a remarkably challenging dilemma for the treating physician as there are limited therapeutic options to prevent recurrence. Roughly one third of transient ischemic attacks (TIAs) and ischemic strokes are classified as cryptogenic, with an even greater proportion in young patients. While classification systems have been successfully used to refine therapeutic approaches specific to subtype, there has been little progress made in secondary prevention of cryptogenic stroke. The Cryptogenic Stroke/ESUS International Working Group recently proposed a new entity under the realm of cryptogenic stroke called embolic strokes of undetermined source (ESUS). This clinical construct emerged from data establishing thromboembolism as the primary etiology of cryptogenic strokes. Three ongoing trials are evaluating the use of novel oral anticoagulants in the prevention of recurrent ESUS, while others are defining the burden of covert atrial fibrillation in this population. While current trials are addressing covert atrial fibrillation as a significant source of embolism, more recent population data has illustrated a role of the nonstenotic, and potentially vulnerable, carotid plaque in ESUS. As part of the required diagnostic workup to define ESUS, carotid imaging, and advances therein, provides a unique opportunity to prospectively determine a subset of patients who may benefit from endovascular interventions in the prevention of recurrent ESUS. Here we review advances in carotid plaque imaging and discuss the potential role for the neurointerventionalist in embolic strokes of undetermined source.

Keywords: Ischemic Stroke, Carotid

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 64

DISTAL ARTERIAL OCCLUSIONS MECHANICAL THROMBECTOMY: could represent an option despite current guidelines SINGLE CENTER EXPERIENCE

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Introduction:

Mechanical thrombectomy is indicated for acute ischemic stroke due to large artery occlusion. according the current guidelines ;AIS due to distal arterial occlusion is still an indication for IV rTPA . we present our results of group of patients with distal occlusion treated by MT, data concerning the frequency and location of distal cerebral artery occlusions, recanalization rates, periprocedural complications, and clinical outcome.

Methods:

We performed a retrospective analysis of prospectively collected data of patients with AIS undergoing MT in the Distal occlusions between June 2011 and April 2015.

Results:

Of 201 patients included in this analysis, we identified 18 (9%) with either primary (n = 10, 5%) or secondary (n = 8, 4%) embolic occlusion of the distal cerebral artery. Distal ACA in n=6:(33.3%) MCA in n=9 (50%) and PCA in n = 2 (11.1%).The recanalization rate after placement of a stent retriever was 90%. Periprocedural complications were rare and included vasospasms (n = 2, 11%) and dissection (n = 1, 5.5%). However, 8 (44.4%) patients sustained an infarction of the distal artery territory. Ninety days after the ictus, clinical outcome according to the mRS was the following: 0–2, n = 8 (44.4%); 3–4, n = 5 (27.8%); 5–6, n = 5 (27.8%).

Conclusions:

Occlusions of the distal cerebral artery affect approximately 9% of patients with AIS who are receiving MT. Despite a high recanalization rate and a low complication rate, subsequent (partial) infarction in the distal artery territory occurs in about half of patients.

Keywords: Stroke, Stent retriever, Mechanical Thrombectomy, Acute Ischemic Stroke Intervention, Clinical Trial Methodology

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 65

Cervical Carotid Pseudo-Occlusions and False Dissections: Intracranial Occlusions Masquerading as Extracranial Occlusions

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Introduction:

Pseudo-occlusion of the cervical internal carotid artery (ICA) refers to an isolated occlusion of the intracranial ICA that appears as an extracranial ICA occlusion on computed-tomography angiography (CTA) or digital subtraction angiography (DSA), due to blockage of distal contrast penetration by a stagnant column of unopacified blood. We aim to better characterize this poorly recognized entity.

Methods:

Retrospective review of an endovascular database (2010-2015, n=898). Only patients with isolated intracranial ICA occlusions as confirmed by angiography or microcatheter exploration were included. CTA and DSA images were categorized according to their apparent site of occlusion as (1) extracranial ICA pseudo-occlusion or (2) discernible intracranial ICA occlusion.

Results:

Cervical ICA pseudo-occlusion occurred in 21/46 (46%) patients on CTA (17 proximal cervical; 4 mid-cervical). Fifteen (71%) of these patients also had pseudo-occlusion on DSA. A "flame-shaped" pseudo-occlusion mimicking a carotid dissection was seen in seven (33%) patients on CTA and in six (29%) patients on DSA. Patients with and without CTA pseudo-occlusion had similar age (64.8 ± 17.1 vs. 60.2 ± 15.7 years; $p=0.35$), sex (male, 47% vs. 52%; $p=1.00$), and intravenous tPA use (38% vs. 40%; $p=1.00$). The rates of mTICI 2b-3 reperfusion were 71.4% in the pseudo-occlusion versus 100% in the non-pseudo-occlusion cohorts ($p<0.01$). The rates of parenchymal hematoma, 90-day mRS0-2, and 90-day mortality were 4.8% vs. 8% ($p=0.66$), 40% vs. 66.7% ($p=0.12$), and 25% vs. 21% ($p=0.77$) in pseudo-occlusion versus non-pseudo-occlusion patients, respectively. Multivariate analysis indicated that pseudo-occlusion patients had lower chances of mTICI3 reperfusion (OR 0.14; 95% CI [0.02-0.70]; $p=0.01$).

Conclusions:

Cervical ICA pseudo-occlusion is a relatively common entity and may be associated with decreased reperfusion rates.

Keywords: Carotid, Imaging, Acute Stroke

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 66

Risk stratification of antiplatelet regimes in emergency extracranial carotid artery stenting

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Introduction:

In acute stroke, a small subgroup of patients have an underlying extracranial stenosis or occlusion of the carotid artery in addition to an intracranial large vessel occlusion. Increasingly acute carotid stenting has been undertaken to open the extracranial carotid to allow reperfusion and to allow access to the intracranial large vessel thrombus. One concern about this practice is need for antiplatelet therapy after stent placement. This study is a review of the literature to examine the hemorrhagic and thromboembolic (TE) risk of commonly used antiplatelet regimes in extracranial acute carotid stenting.

Methods:

A meta-analysis of the literature was undertaken to identify reported cases of extracranial acute carotid stenting in the setting of acute ischemic stroke to examine the various antiplatelet regimes.

Results:

30 studies were identified that included patients with acute stroke who underwent extracranial acute carotid stenting and had information about the use of antiplatelets. These studies combined to include 821 patients. The average rate of symptomatic intracranial hemorrhage (SICH) was 9.7%. The average rate of thromboembolic complication was 2.8%. 13 studies had a SICH less than 7% and of these, 2 used dual antiplatelets. 11 studies had a SICH greater than 12%, of these 7 used dual antiplatelets. 2 studies had a thromboembolic rate greater than 16%. Both of these studies used a GPIIb/IIIa inhibitor as the antiplatelet regime. Only 2 TE events occurred in any study that did not use a IIb/IIIa inhibitor.

Conclusions:

There is an increased risk of SICH in acute stroke patients who are placed on dual antiplatelet therapy when compared to monotherapy. The intra-procedural risk of a TE may be greater in patients who receive a GPIIb/IIIa inhibitor rather than by platelet inhibition through other mechanisms.

Keywords: Acute Ischemic Stroke Intervention, Carotid Stenting And Angioplasty

Financial Disclosures: The authors had no disclosures.

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Poster 67

New Generation Endovascular Devices Associated with Higher Rates of Functional Independence in Posterior Circulation Stroke

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Introduction:

There is robust evidence of the importance of patient selection and stent retriever (SR) / suction technology (ST) in endovascular treatment (EVT) of anterior circulation acute ischemic stroke (AIS) treatment. However, data on applicability of SR/ST- EVT of posterior circulation acute ischemic stroke (PCAIS) remains limited. The goal was to assess differences in functional outcome in PCAIS patients undergoing first generation (1G) (MERCIA, IA thrombolysis) versus second generation (2G) (SR and or ST) EVT.

Methods:

A total of 26 patients were identified retrospectively from 2007 to 2015 presenting with PCAIS. Patients were subdivided into 2 groups: 1) 1G (n=8); 2G (n=18). Outcome variable were assessed with Barthel Indices (BI) at 3 months of discharge. BI ≥ 12 was identified as good functional outcome. Univariate and multivariate analyses were used to identify statistical significant difference in outcomes. For multivariate regression admission NIHSS, age, gender, race, hypertension, hyperlipidemia, diabetes, atherosclerosis, ischemic heart disease, smoking, alcohol, lipid lowering treatment, antiplatelets and anticoagulation were controlled.

Results:

In univariate analysis at 3 months, patients with 2G EVT exhibited higher BI than 1G group (p=0.05). Multivariate model did not reach statistical significance due to low sample size.

Conclusions:

Individuals treated with latest 2G EVT exhibited better outcomes at 3 months compared to 1 G devices. Availability of further data would contribute in reinforcing our findings and help augment a better care model for PCAIS.

Keywords: Endovascular Therapy, Acute Stroke, Stroke, Stent retriever

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 68

Aspiration Thrombectomy for Distal Middle Cerebral Artery Ischemic Strokes

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Introduction:

Early revascularization of large vessel occlusions has been shown to correlate with improved outcomes in selected patients with acute ischemic stroke. Techniques for removing clot includes stent retrievers, intra-arterial tPA and aspiration thrombectomy. The ADAPT trial showed the benefit of aspiration thrombectomy in large vessel occlusion with TICI2B or 3 revascularization in 78% of the case. We present two cases where aspiration thrombectomy was used for more distal M2 occlusions.

Methods:

Patient 1: A 32 year old gentleman presented with aphasia and an NIHSS of 6. He was given iv tPA at the referring facility without significant improvement. CT head demonstrated posterior left MCA infarction, increasing areas of loss of gray-white distinction, consistent with evolving areas of infarction. CTA head revealed mid left M2 vascular occlusion. CT perfusion was notable for perfusion mismatch in the left temporal and parietal lobes, consistent with posterior left MCA core infarction with significant surrounding tissue at risk. He was taken to the IR suite and was found to have a left M2 posterior division occlusion for aspiration thrombectomy using a Penumbra 3Max catheter with a TICI 2B re canalization. Patient 2: A 53 year old gentleman presented with left hemiparesis and an NIHSS 16 on admission. Initially there was a concern for large vessel occlusion. Patient was taken emergently to the Neuro IR suite where a right M2 branch occlusion was identified. TICI 2B re canalization was achieved with the ADAPT technique using the Penumbra 3Max catheter.

Results:

TICI2B re canalization was achieved in both patients.

Conclusions:

Aspiration thrombectomy with a Penumbra 3Max catheter is a safe and effective technique in middle and distal segment MCA occlusions with good revascularization results.

Keywords: Acute Ischemic Stroke Intervention, Endovascular Therapy, Endovascular, Neurointerventional Education

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 69

Thrombolytic therapy in Acute Ischemic Stroke Patients with Pending Coagulation panel

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Introduction:

Background: Early initiation of tPA is associated with better AIS outcome. Waiting for coagulation profile may delay tPA door-to-infusion time, on the other hand giving tPA without coagulation panel increases risk of ICH .We compared rates of ICH in patients with pending coagulation profile (no-INR) vs those with known coagulation panel using a single center retrospective database

Methods:

Methods: We systematically reviewed the charts of all consecutive adult AIS with no known history of coagulopathy(n=169) who received IV-tPA from 2010 to 2014 . All patients were treated per standardized protocol but the coagulation panel of some patients were known before tPA infusion(INR group) while that of others were unknown at the time(no-INR). Primary endpoint was symptomatic ICH. Secondary endpoint was tPA door-to-infusion time. Propensity scores modeled using age, sex, race, hypertension, diabetes mellitus and NIH stroke scale score (NIHSS) was used to control for confounding. Conditional logistic regression models matched on quartiles of propensity score were used to compare odds of ICH between the INR and no-INR groups

Results:

Results: the INR (n=152) and no-INR (n=17) groups did not differ with respect to age, sex, race, hypertension, diabetes and NIHSS. There was significant difference in the TPA door-to-infusion times in the no-INR (median 53minutes, interquartile range (IQR) 43.0-60.0) when compared to the INR group (median 62.5 minutes, IQR 50.5-75.0), p=0.023.. After matching on quartile of propensity scores, there was no difference in the odds of ICH between the no-INR patients compared to INR patients (OR 1.07, 95%CI 0.32 to 3.56, p= 0.98}

Conclusions:

Conclusion: our preliminary data suggests that there was a significantly lower tPA door-to-infusion times between patient who received tPA without coagulation panel when compared to patients who received tPA with coagulation panel. Overall ICH rates did not differ between both groups of patients.

Keywords: Acute Stroke, TPA, Coagulation, Thrombolytics

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 70

Safety of Eptifibatide in Subarachnoid Hemorrhage Patients Requiring Antiplatelet Agents.

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Introduction:

The International Subarachnoid Aneurysm Trial (ISAT) showed a greater likelihood of independent survival at 1 year in patients who underwent endovascular coiling of ruptured aneurysm and were started on antiplatelet agents compared to neurosurgical clipping. However, data on safety of acute parental antiplatelet agents after aneurysmal coiling is lacking. Objective of this study is to assess the safety of IV eptifibatide in patients presenting with acute subarachnoid hemorrhage who undergo endovascular coiling for aneurysmal embolization.

Methods:

All the patients who presented to our community based, university affiliated comprehensive stroke center with aneurysmal subarachnoid hemorrhage from 2010-2015 and underwent endovascular coiling were evaluated. Eptifibatide was administered as a one-time bolus of 135- μ g/kg intra-arterially during the procedure, and then continued as intravenous infusion of 0.5- μ g/kg/min post-procedure. Charts were reviewed to assess for all major and minor complications including symptomatic and asymptomatic intra- and extra-cranial hemorrhages, groin hematomas, epistaxis and gross hematuria.

Results:

Of a total of 101 patients treated with coil embolization during this period, 12 patients (mean age 55 years; SD +/- 12), received acute intra-procedural Eptifibatide followed by IV infusion for a mean duration of 71 hours (range 15.5-316 hours). Various reasons for use of Eptifibatide included: stent assisted coiling [n=3], multiple stents for flow diversion [n=2], partial coil prolapse [n=2], angioplasty for vasospasm (n=1) and vascular lumen flow compromise [n=4]. None of the patients demonstrated symptomatic/asymptomatic hemorrhage, groin hematoma, epistaxis or gross hematuria.

Conclusions:

Our results indicate that administering IV Eptifibatide to prevent thrombotic complications after endovascular coil embolization in selected patients with aneurysmal subarachnoid hemorrhage is safe. Multicenter prospective trials are warranted to corroborate our findings.

Keywords: Subarachnoid Hemorrhage

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 71

Imaging and Disposition Differences in Diabetics Versus Non-diabetics Presenting With Non-aneurysmal Subarachnoid Hemorrhage

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Introduction:

Diabetic patients have been reported to be at increased risk for non-aneurysmal subarachnoid hemorrhage (naSAH). Also, patients with naSAH often undergo multiple digital subtraction angiograms to identify occult or thrombosed cerebrovascular abnormality. This study investigates differences between diabetics and non-diabetics presenting with naSAH with regards to initial CT imaging features, number of angiographic evaluations for diagnostic and/or treatment purposes such as for vasospasm, and disposition.

Methods:

Hypothesis: We assessed the hypothesis that certain features, when found on admission imaging in naSAH patients, are more prevalent in those with DM than those without. Methods: Patients admitted at our center with a diagnosis of naSAH between January 2011 and December 2015 were studied. Baseline characteristics, including clinical and radiological presentation, were noted. Fisher's exact tests was used to compare the prevalence of radiological characteristics, including Claassen classification between naSAH patients.

Results:

Total 52 patients with non-aneurysmal subarachnoid hemorrhage were identified during the study period. Mean age was 53 years and 47% were women. A total 15 patients were identified to have diabetes either based on history or based on HgbA1c obtained upon admission. Bleeding in the third ventricle was more prevalent among diabetics with HbA1c $\geq 6.5\%$ as compared to non-diabetics and diabetics with HbA1c < 6.5 [4/9 (44.4%) vs. 6/42 (14.3%), $p=0.06$]. No difference was found between number of DSAs performed in the two groups. With regards to disposition, 42 were discharged home, 4 to long term acute hospital and 6 to inpatient rehabilitation center. Patients without DM were more likely to be discharged home (88.9% vs 62.5%; $p=0.02$).

Conclusions:

Increased prevalence of third ventricular blood was observed amongst diabetic patients with HbA1c $\geq 6.5\%$ presenting with naSAH. Non diabetics were more likely to go home at discharge.

Keywords: Subarachnoid Hemorrhage, Angiogram

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 72

Trip-and-treat vs. Drip-and-ship: Mobile Neurointerventional Teams lead to improved treatment times for endovascular stroke therapy

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Introduction:

Endovascular recanalization treatment for acute ischemic stroke is a complex, time-sensitive intervention. 'Trip-and-treat' is an interhospital service delivery model that has not previously been evaluated in the literature, and consists of a mobile neurointerventional team (MNT) shared between a Comprehensive Stroke Center (CSC) and several primary stroke centers with interventional capacity (PSCI). The MNT travels to and provides endovascular treatment at PSCIs in the event of a stroke. In contrast, 'drip-and-ship' is a commonly used model that involves transferring patients from a peripheral hospital to a CSC. Our aim is to compare treatment times between trip-and-treat and drip-and-ship stroke models.

Methods:

We performed a retrospective analysis on 94 stroke patients who received endovascular treatment for acute stroke at four hospitals in Manhattan. Procedure times for 39 (41%) patients treated by the MNT at a PSCI were compared with 55 (59%) patients transferred to and treated at a CSC. The primary outcome measure was initial hospital door-to-puncture time, defined as the time between arrival at any hospital and arterial puncture. We recorded and analyzed times of hospital arrival, intravenous tissue plasminogen activator (IV-tPA) administration, transfer, and arterial puncture.

Results:

Mean initial hospital door-to-puncture time was 146 minutes for trip-and-treat and 253 minutes for drip-and-ship ($P < 0.0001$). There was no difference in initial hospital door-to-tPA time between the two groups ($P = 0.8998$). There was a trend in change in NIHSS from admission to discharge with -9.2 for trip-and-treat compared to -2.1 for drip-and-ship ($P = 0.0603$).

Conclusions:

Trip-and-treat compared to drip-and-ship had superior treatment times for neurointervention without delaying IV-tPA treatment. By decreasing time to treatment, trip-and-treat may improve clinical outcomes and offers a promising alternative to current interhospital stroke models. These results, however, should be verified in a larger prospective study.

Keywords: Acute Ischemic Stroke Intervention, Mechanical Thrombectomy, Door To Groin Puncture, Door To Needle, Neurointerventional Program

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 73

Observational Study of ER to ER Transfer Times in a Large Hub-and-Spoke Comprehensive Stroke Network.

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Introduction:

The importance of rapid triage, door-to-needle times, and door-to-reperfusion times are established hallmarks of quality interventional care of large vessel occlusions (LVO). Often overlooked is the non-clinical time in transferring patients from a stroke ready or primary stroke center to a comprehensive site where evaluation and treatment of LVOs are possible. This study describes our experience with inter-facility transfer times in a prospective registry at a large hub-and-spoke stroke network in north Texas.

Methods:

Inter-facility transfer times for ischemic strokes, head bleeds, and other neurological/ neurosurgical emergencies were analyzed for 500 consecutive transfers in a prospective tele-stroke registry.

Results:

For ischemic strokes, time between presentation at primary facility and tele-stroke consult (D1) was avg 106.6 minutes; time between tele-stroke consult and presentation at comprehensive facility (D2) was 134.8±62.7 minutes, and total time between presentation at primary facility to presentation at comprehensive facility (D3) was 238.2±148.6 minutes. There was no significant difference in transfer times for ischemic strokes, head bleeds, and other neurological/neurosurgical emergencies. [D1, p=0.1; D2, p=0.3; D3, p=0.8] There was no difference in D2 times when land versus air were used for transport. [144.3±75.7 versus 116.4±46.2 minutes, p=0.1] Again, there was no difference in transfer time (D2) during day versus night. [140.3±6.9 versus 133.6±67.0 minutes, p=0.8] However, a non-significant trend towards shorter interfacility transfer time (D3) was seen in “network” compared to “out of network” hospitals. [231.7±145.7 versus 258.0±157.2 minutes, p=0.06]

Conclusions:

Transfer time comprises an average of 50% of the time window available from onset of symptoms to the guideline suggestions of intervention for LVO within 8 hours. Further optimization of transfer mechanisms could play a massive role in the volume of cases appropriate for intervention at comprehensive stroke centers, thereby improving outcomes in the overall stroke treatment infrastructure.

Keywords: Acute Ischemic Stroke Intervention

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 74

Institution of Code Neurointervention Improves treatment times

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Introduction:

Various strategies have been implemented to reduce acute stroke treatment times. A unique code process pathway was designed at our hospital specifically to be activated by the stroke team for the purpose of rapidly assembling the Neurointerventional team.

Methods:

Code Neurointervention (NI), was designed and tested from 1/2014 to 4/2014 for ischemic stroke patients that presented to our community based, university affiliated comprehensive stroke center. We retrospectively analyzed patients who had Code NI called from 5/1/2014 to 4/30/2015 and compared them to patients who underwent acute endovascular treatment the prior year (Non Code NI). Decision to recanalization and door to recanalization times were compared. Patients presenting during work hours (M-F 8am-5pm) and off hours were further analyzed using GraphPad QuickCalcs Web site.

Results:

There were 28 Code NI (14 during work hours; 14 during off hours) The previous year 25 patients underwent acute endovascular intervention; (12 during work hours; 13 during off hours). Mean decision to recanalization time was 106 (Code NI) vs 115 minutes (Non Code NI) ($p < 0.06$) during work hours and 154 (Code NI) vs 139 minutes (Non Code NI) ($p < 0.37$) during off hours. Mean door to recanalization time was 169 (Code NI) vs 173 minutes (Non Code NI) ($p < 0.85$) during work hours and 252 (Code NI) vs 243 minutes (Non Code NI) ($p < 0.75$) during off hours. Subset analysis of time parameters for patients in Code NI group showed mean decision to recanalization times of 106 minutes during work hours vs 154 minutes off work hours ($p < 0.004$). Mean door to recanalization times were 169 minutes vs 251 minutes ($p < 0.0003$), respectively.

Conclusions:

Institution of Code NI significantly improved intervention time parameters during work hours as compared to off hours. Further initiatives, such as improving neurointervention staff availability during off hours or cross training other staff can further improve acute intervention time parameters

Keywords: Acute Stroke

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 75

Stroke Unit with Dedicated Bedside Monitoring Improves Blood Pressure Control

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Introduction:

Patients with ischemic or hemorrhagic stroke require strict BP control to prevent hemorrhagic transformation or hematoma expansion. Acute elevations in BP are often treated with IV labetalol. Dedicated stroke units often have automated bedside monitoring of vital signs. Standard automated BP monitoring would allow physicians to accurately trend patient's BP leading to more steady control of BP rather than frequent acute interventions.

Methods:

Patients were evaluated over a 12-month period after the incorporation of bedside automated BP monitoring in a dedicated stroke unit at a university affiliated, comprehensive stroke center. The number of times each patient during this time frame received IV labetalol for acute elevations in BP was compared with a time period spanning 12-months prior; there was no automated BP monitoring performed. The average interventions were compared with a T-test by using SPSS Version 22. Comparisons of patient population and type of pathology were also made to match the patients appropriately.

Results:

Of the 1,326 patients who presented for ischemic or hemorrhagic stroke during the 24-month period evaluated, 25 of them required multiple injections of IV labetalol for acute BP control. Of these, 12 patients were on automated vital signs and BP monitoring, and 13 were not. The mean number of IV labetalol interventions implemented in the group being monitored was 2.8, while the mean number of treatments given to patients not being monitored was 5.9 (p=.016).

Conclusions:

Patients monitored on dedicated stroke units can obtain control of their blood pressure with adequate adjustment of oral medications and require fewer acute IV labetalol treatments than patients who are not being continuously monitored. Prevention of sudden elevations in BP may translate into lower rates of hemorrhagic transformation or hematoma expansion in stroke patients and confer to a better clinical outcome.

Keywords: Blood Pressure Management In Acute Stroke

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 76

Staffing for Success in the Neuro Interventional Suite

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Introduction:

Optimal care after acute ischemic stroke in the setting of a large vessel occlusive disease requires specialized interdisciplinary team. Traditional models have relied on a separate off-site on-call team to manage care in the neuro-angi suite and an in-house neuro-critical care team caring for the patient after the procedure, but alternative models may be indicated to address the increasing and complex needs of neuro-endovascular therapy. We analyzed the effect of optimization steps to improve care.

Methods:

Consecutive patients with ischemic stroke treated with endovascular therapy were prospectively analyzed. We divided the patients into traditional pre-optimization model (August 2014 to March 2015) and hybrid post-optimization model (August 2015 to March 2016) periods. The main interventions included: (1) cross-training a combined pool of nurses in the care of both neuro-critical care and neuro-interventional procedures (2) continuous in-house availability of neuro-interventional nursing (3) reduced nursing hand-offs (4) increased familiarity of nursing staff with interventional procedures. The main metric used to measure improvement was door to groin puncture time (D2P), clinical outcomes, peri-procedural complications, and usage of call time.

Results:

We included a total of 200 patients (95 pre-optimization, 105 post-optimization). Median D2P improved from 59.5 min pre-optimization to 45.5 min post-optimization. Rates of good clinical outcomes (modified Rankin Scale 0–2 at 3 months) were 39% vs 41%. The amount of nursing staff on-call time was reduced by 6,138 hours and call in time was reduced by 1,866 hours. The complication rates were comparable between the two groups.

Conclusions:

Restructuring a traditional neuro-endovascular staffing model with a hybrid model utilizing a combined pool of nurses trained in both neuro-critical care and neuro-interventional procedures led to faster treatment times, improved clinical outcomes and decreased usage of call time.

Keywords: Neurointerventional Program, New Innovation, Care, Door To Groin Puncture, Acute Stroke

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 77

Lytic therapy and mechanical thrombectomy over tele-stroke, a comprehensive stroke center experience.

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Introduction:

At the Medical University of South Carolina (MUSC) a web-based tele stroke program that allows patients with acute ischemic stroke at a rural hospital to receive expert stroke consultation within minutes was implemented. We provide an update on how our tele stroke program has developed since inception.

Methods:

Data for all patients evaluated with the MUSC Tele Stroke consultation network from 5 /2008 through 4/2016 was reviewed. Data included NIHSS, number of IV tPA administrations, mechanical thrombectomy, symptomatic intracerebral hemorrhage (sICH) rate, and functional outcome.

Results:

7694 stroke consults were performed during the study period. 3795 (49.2%) of patients were diagnosed with acute ischemic stroke (AIS) and of these 1324 (34.8%) received IV tPA. Among the patients with AIS, 1282 (33.8%) were transferred to MUSC, of those 717 received tPA (54%). Symptomatic ICH (sICH) occurred in 33/717 (4.6%) patients who received IV tPA only and in 5 % of patients receiving a combination of intravenous and intra-arterial (IA) therapy. Data on intra-arterial therapy were collected from 11/2014 through 4/2016 following the publication of the first positive thrombectomy trial. A total of 27 patients received intravenous thrombolysis and thrombectomy and 29 patients had thrombectomy only. Of these 21 (34%) patients were discharged home and 28 (46 %) were discharged to rehab. Overall, 49 (80%) of these patients had good outcomes.

Conclusions:

The MUSC tele stroke program has evolved into a robust, statewide partnership between MUSC Comprehensive Stroke Program and many partner hospitals. Overall most patients achieved good functional outcome and had an acceptable rate of complications.

Keywords: Mechanical Thrombectomy, Ischemic Stroke

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 78

Impact of Time Metric System on Door-to-Puncture Time for Acute Stroke Intervention: Single Center Experience

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Introduction:

Reducing the Door-to-Reperfusion time has been identified as an essential factor to improve clinical outcome in the treatment of large vessel anterior circulation stroke patients. As a quality improvement (QI) project, we implemented the time metric system, and we examined the Door-to-Reperfusion time and system improvement by the multidisciplinary team as well as clinical outcome.

Methods:

Retrospective cohort analysis was performed over a three-year-period for all anterior-circulation stroke patients who underwent endovascular thrombectomy. We collected Door-to-Reperfusion time, and subdivided into various interval time, such as Door-to Imaging, Imaging-to-Puncture, Door-to-Interventionalist notification, and Puncture-to-Recanalization. Time metric system was implemented to detect and improve the delay of each interval. The impact of time metric system was examined by comparing the pre- and post-QI cohort of each interval time. The angiographic outcome and clinical outcome were also compared.

Results:

Data of a total 39 patients pre-QI, and 42 patients post-QI cohort were analyzed. In the Pre-QI, the greatest delay was observed in the Imaging-to-Puncture with median 109 minutes (interquartile (IQR) 68-144 minutes). QI significantly shortened the interval time of (pre-QI vs Post-QI) Imaging-to-Puncture (109 vs 72 minutes) and Door-to-Puncture (144 vs 102 minutes) time. There was no change in the Puncture-to-Reperfusion time or good angiographic outcome of TIC1 IIB and III between Pre- vs Post -QI. The proportions of better clinical outcome in modified Rankin Scale 0 ,1, 2 were higher in post-QI in trend (27% vs 38%).

Conclusions:

The QI project of time metric implementation in our institution substantially reduce in various interval time of Door-to-Reperfusion time, especially in the Imaging-to-Puncture time, which potentially improves clinical outcome.

Keywords: Acute Stroke, Acute Ischemic Stroke Intervention, Door To Needle, Endovascular Therapy, Door To Groin Puncture

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Grant Support: None.

Poster 79

Failed magnetic resonance imaging in patients admitted to the neurological intensive care unit

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Introduction:

Neuro-critically ill patients often need to undergo magnetic resonance imaging (MRI) of the brain. However, they frequently fail to cooperate for the examination despite sedative agents. Such failure may delay prompt diagnosis and be related to medical complications due to inappropriate usage of sedative agents. We investigated the incidence and factors related to failed MRI examinations in patients admitted to the neurological intensive care unit (NICU).

Methods:

: In this retrospective analysis, we included 122 patients who attempted to undergo MRI of the brain during admission to the NICU. Their initial diagnosis, vital signs, the acute physiology and chronic health evaluation (APACHE) II scores, the Glasgow Coma Scale (GCS) scores, and the Richmond Agitation-Sedation Scale (RASS) scores were reviewed. The failed MRI examination was defined as 1) premature termination of MRI due to poor cooperation of the patients, 2) decrease in oxygen saturation below 90% by pulse oximetry, 3) endotracheal intubation or cardiac arrests, 4) decrease in blood pressure of 40 mmHg or more or requirements of inotropics, or 5) requirement of MRI sedation, during transportation to the MRI room or soon after coming back to the NICU

Results:

Results: Of 122 patients, 45 (36.9%) developed failed MRI. 42 (93.3%) patients among patients who failed in MRI examination required sedative agents, and midazolam was prescribed to 36 (80%) of them. 3 patients had events of desaturation, but none of them developed cardiac arrest. 4 patients developed hypotension, and 5 patients required inotropics. Patients with a higher APACHE II score ($p = 0.045$) and low GCS scores ($p = 0.018$) experienced more events of failed MRI examination. RASS scores after failed MRI examination were non-significantly lower than those after successful MRI examinations ($p = 0.12$).

Conclusions:

The severity of illness and lower level of consciousness were related to failed MRI examination.

Keywords: Care, MRI, Sedation

Financial Disclosures: The authors had no disclosures.

Grant Support: None.

Poster 80

Neuroendovascular Procedures In Anticipation Of Photoimmunotherapy For Recurrent Head and Neck Cancer

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Introduction:

Photoimmunotherapy (PIT) is a novel therapeutic being investigated for the treatment of recurrent head and neck cancers that are deemed inoperable and not amenable to chemoradiation. PIT therapy is known to cause rapid shrinkage of the tumor, which can result in carotid dissection or blow out if carotid is involved or encased within the tumor. Therefore, when the carotid artery is at risk, the eligibility criteria for the PIT trial requires that the involved carotid be safeguarded by performing either stenting, or carotid balloon test occlusion and sacrifice, or surgical ligation, prior to PIT initiation. This creates a novel indication for neuroendovascular procedures.

Methods:

We report a case of carotid artery stenting in anticipation of PIT and review the literature for prior reports of similar cases.

Results:

A 60-year-old woman with history of malignant squamous cell carcinoma of tongue, previously treated with chemo-radiation, was admitted for syncope. Examination was significant only for light-headedness on turning the head towards left. Workup revealed extensive recurrence of her tumor. Carotid ultrasound demonstrated 50% decrease in velocity at the left carotid upon turning the neck to the left. After extensive discussions, it was decided to perform left carotid stenting to strengthen the carotid wall in anticipation of PIT. DSA demonstrated focal 57% narrowing of the left internal carotid. Two overlapping stents (Protégé stent 6x60mm and XACT stent 9-7mm x 40mm) were placed across the lesion and extending from mid common carotid artery to mid-cervical left internal carotid. Our review of literature did not reveal any prior reports of similar cases. The study investigators did not find similar case at any other enrolling sites

Conclusions:

We report a novel use of carotid stenting and potentially balloon test occlusion and endovascular carotid sacrifice in conjunction with photoimmunotherapy for recurrent and inoperable head and neck cancers with carotid involvement.

Keywords: Carotid, Tumors, Endovascular Therapy

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Poster 81

Embolization of the meningeal branches of the ophthalmic artery for skull-based tumors: –a technical report.

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Introduction:

Preoperative embolization may help complete resection of Skull-based large vascular meningioma (SBLVM) and reduce the length of surgery. Embolization of the meningeal branches (MB) of the ophthalmic artery (OA) supplying the SBLVM is not described. Objective: To present two patients with SBLVM who underwent embolization of the MB of the OA prior to the tumor resection.

Methods:

Methods: Case report

Results:

First patient is a 73 Y/O woman with progressive visual impairment and headaches, diagnosed with a right SBLVM causing significant mass effect requiring craniotomy. Both neurosurgeon and enuro-endovascular surgeon planned for pre-operative embolization. Patient was prepared with 10 mg of decadron every 8 hours, keppra 1500 mg intravenously and 3% NaCl with target Na of 145 to 155 mom/l. Cerebral angiogram demonstrated large tumor blush feeding by middle meningeal artery (MMA) and MA of the OA. The MMA was embolized using embosphers particles. Due to the fear of retrograde particle embolization to the retinal artery, coil embolization was decided for OA. A SL 10 micro-catheter was placed in the MB of OA and completely embolized using two coils without event. Patient underwent complete resection of the SBLVM required 3 hours and remained neurologically intact. The second case is a 76 Y/O man with a SBLVM and mass-effect. Primary feeder is from the MB of the right OA and small contribution from the inferior petrosal artery (IPA). An Echelon 10 micro-catheter was place in the MB of the OA followed by IPA. Complete embolization was performed using 5 coils resulted in significant reduction of tumor blush with no event. Patient underwent complete resection of tumor required 4 hours with no deficit

Conclusions:

Our two cases demonstrate that trans-OP embolization of the SBLVM is technically feasible which may facilities complete resection of tumor with the reduction of operative time. Further studies are required.

Keywords: Coiling, Embolization, Endovascular, Interventional Neuroradiology, Endovascular Therapy

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