## Platform Session II

**Saturday, October 17, 2015 • 9:00 – 10:00 am**

*Moderators: Jawad F. Kirmani, MD, FSVIN and Muhammad Asif Taqi, MD, FAHA*

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Presenting Author First Name</th>
<th>Presenting Author Last Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>9:00 - 9:10 am</td>
<td>Drivers of Differential Outcomes in Thrombectomy Procedures Performed Under General Anesthesia versus Non-General Anesthesia.</td>
<td>Anit K.</td>
<td>Behera</td>
</tr>
<tr>
<td>9:10 - 9:20 am</td>
<td>Acute Stroke Therapy: A Multicenter Experience of the ACE64 Reperfusion Catheter in Endovascular Thrombectomy</td>
<td>Annika</td>
<td>Kowoll</td>
</tr>
<tr>
<td>9:20 - 9:30 am</td>
<td>Balloon guide catheter improved clinical outcomes, revascularization and decreased mortality in Trevo thrombectomy. Analysis of the TREVO Stent Retriever Acute Stroke (TRACK) Registry.</td>
<td>Thanh</td>
<td>Nguyen</td>
</tr>
<tr>
<td>9:30 - 9:40 am</td>
<td>Proprietary Software Enhancement of Digital Subtraction Angiography for Perfusion Mapping of Posterior Circulation</td>
<td>Siddhart</td>
<td>Mehta</td>
</tr>
<tr>
<td>9:40 - 9:50 am</td>
<td>Spinal dural arteriovenous fistula: Long term clinical and radiographic outcomes with endovascular therapy alone in a single academic center</td>
<td>Christopher J.</td>
<td>Southwood</td>
</tr>
<tr>
<td>9:50 - 10:00 am</td>
<td>Admission Neutrophil–Lymphocyte Ratio Predicts Delayed Cerebral Ischemia Following Aneurysmal Subarachnoid Hemorrhage</td>
<td>Fawaz</td>
<td>Al-Mufti</td>
</tr>
</tbody>
</table>

**ABSTRACT DISCLAIMER:** All Abstract information is published as submitted.

Anit K. Behera1, Eric S. Armbrecht1, Amer Al Shekhlee2, Randall C. Edgell3

1St. Louis University Center for Outcomes Research, St. Louis, MO, USA, 2SSM Neurosciences Institute at DePaul Health Center, St. Louis, MO, USA, 3St. Louis University Department of Neurology and Psychiatry, St. Louis, MO, USA

Introduction:
The optimal form of anesthetic during mechanical thrombectomy (MT) for ischemic stroke remains controversial. Available evidence has supported the avoidance of general anesthesia (GA) but gives little insight into modifiable factors associated with this difference in outcome. This retrospective observational study investigates the association between anesthesia method and factors expected to adversely affect outcomes.

Methods:
Using a registry extracted from the electronic health record of a university-affiliated medical group, all subjects undergoing MT between January 2012 and June 2015 were identified. Subjects were divided into two groups: GA and non-general anesthesia (NGA). Demographic data, medical comorbidities, and procedural details were collected. In addition, data on intra-procedural hypoxia, intra-procedural hypotension, total procedure time, post-procedure intracranial hemorrhage, number of days of intubation, selection of hospice care, and in-hospital mortality were collected.

Results:
A total of 55 patients (28 males & 27 females) were identified with an average age of 63.4. The Charleston Comorbidity index and total procedure time will be calculated for each patient. Patient characteristics will be compared between anesthetic management groups with standard statistical tests. The standardized beta coefficients for the GA and NGA groups will be calculated using risk-adjusted regression models that measure association with: intra-procedural hypoxia, intra-procedural hypotension, total procedure time, post-procedure intracranial hemorrhage, number of days of intubation, selection of hospice care, and in-hospital mortality. Demographic data, medical comorbidities, and procedural details will be included as potential covariates.

Conclusions:
The difference in clinical outcomes between subjects undergoing MT under GA versus NGA may be driven by modifiable variables. Identification of these variables would allow for the creation of a mechanical thrombectomy optimized general anesthesia protocol.

Keywords: Anesthesia, Mechanical thrombectomy, Ischemic stroke, General Anesthesia,

Financial Disclosures: The authors had no disclosures.

Grant Support: None.
Saturday, October 17, 9:10 - 9:20 am

Acute Stroke Therapy: A Multicenter Experience of the ACE64 Reperfusion Catheter in Endovascular Thrombectomy

Annika Kowoll1, T.H. Lo1, Werner Weber1, Christian Loehr3, Ansgar Berlis4, Gyula Gal5, Antonio Moreno6, Johannes Weber7, Javier Masso8, Simone Peschillo9

1Universitätsklinikum Knappschaftskrankenhaus Bochum, Bochum, Germany, 2University Medical Center Utrecht, Utrecht, Netherlands, 3Knappschaftskrankenhaus Recklinghausen, Recklinghausen, Germany, 4Klinikum Augsburg, Augsburg, Germany, 5Odense Universitets Hospital, Odense, Denmark, 6Hospital Universitario Virgen de la Arrixaca, Murcia, Spain, 7Kantonsspital St Gallen, St. Gallen, Switzerland, 8Hospital Universitario Donostia, Gipuzkoa, Spain, 9Hospital Policlínico Umberto I, Roma, Italy

Introduction:
Rapid and complete revascularization has been documented to improve neurological outcome in acute stroke patients with large vessel occlusions. ACE64, a new large bore aspiration thrombectomy device, is a novel tool designed to aid in the rapid revascularization of acute ischemic stroke patients. The aim of this retrospective study is to assess the safety and efficacy of the ACE64 as a frontline thrombectomy tool.

Methods:
A total of 117 consecutive patients across 9 European centers were treated with the ACE64 device between December 2014 and March 2015. A direct first pass aspiration (ADAPT) technique using the ACE64 was performed as the primary reperfusion technique in all cases.

Results:
Mean age of cohort was 70±12.8 years with an average baseline NIHSS score of 14 (range: 1-28). Prior to aspiration thrombectomy, IVT was administered in 65.8% (77/117) of cases. Target vessels included: M1 (49%), M2 (12%), basilar artery (9%), ICA (11%), and carotid T (19%). Rate of successful revascularization to TICI 2b/3 was 95.7%, with 61.5% achieving a TICI score of 3, at a median procedure time of 35 minutes and 2 passes (range 1-8). In 22 cases (18.8%), stent retrievers were used adjunctively as an anchoring tool to deliver the ACE64 (14.5%) or to remove remaining clot (4.3%). Rate of complications regarding vasospasm and vessel dissection were both 2.8% and involved the use of adjunctive devices; emboli into new territories occurred in 1.9% of cases.

Conclusions:
The ACE64 offers a safe, effective profile with a high rate of revascularization and low rates of complications. Results from this multicenter study demonstrate the efficacy of ACE64 to treat large vessel occlusions, supporting its use as the frontline aspiration thrombectomy tool in acute stroke therapy.

Keywords: Access catheters, Acute Ischemic Stroke Intervention, Penumbra, Endovascular therapy, Intra-arterial therapy

Financial Disclosures: The authors had no disclosures.

Grant Support: None.
Balloon guide catheter improved clinical outcomes, revascularization and decreased mortality in Trevo thrombectomy. Analysis of the TREVO Stent Retriever Acute Stroke (TRACK) Registry.

Nguyen Thanh¹, Castonguay AC², Nogueira RN³, English J⁴, Farid H⁵, Veznedaroglu E⁶, Puri AS⁷, Janardhan V⁸, Vora N⁹, Alshekhlee A¹⁰, Abraham MG¹¹, Khoury R¹², Mehta S¹³, Majiho OA¹⁴, Froehler MT¹⁵, Zaidat OO¹⁶

¹BMC, Boston, MA, USA, ²MCW, Milwaukee, WI, USA, ³Emory, Atlanta, GA, USA, ⁴CPI, SF, CA, USA, ⁵St Jude Radiology, Chicago, IL, USA, ⁶Capital Health, Pennington, NJ, USA, ⁷U Mass, Boston, MA, USA, ⁸Texas Stroke I, Dallas, TX, USA, ⁹CRI, Columbus, OH, USA, ¹⁰St Paul, St Louis, MO, USA, ¹¹KU, Kansas, KS, USA, ¹²Tulane, NO, LA, USA, ¹³SL, SL, MO, USA, ¹⁴Wayne, Detroit, MI, USA, ¹⁵Vanderbilt, Nashville, TN, USA, ¹⁶MCW, Milwaukee, WI, USA

Introduction:
The Solitaire stent-retriever registry showed improved revascularization, faster procedure times, and better outcome in stroke patients treated with balloon guide catheter (BGC) and Solitaire stent-retriever. The goal of this study was to validate these findings with stroke patients treated with the Trevo stent-retriever.

Methods:
The investigator-initiated TRACK registry recruited 24 clinical sites to submit demographic, clinical, site-adjudicated angiographic, and clinical outcome data on consecutive patients treated with the Trevo stent-retriever device. BGC use was at the discretion of the treating physicians.

Results:
624 patients were enrolled in the TRACK registry. After exclusion of the posterior circulation strokes and 1 patient with unknown BGC status, 534 anterior circulation patients (of which 279 (52.3%) had BGC placement) were included in this analysis. Baseline characteristics were notable for younger patients in the BGC group (64.8±15.9 vs 67.6±14.1, p=0.03) and higher rate of atrial fibrillation (45.3% vs 37.3%, p=0.06), but lower rate of hypertension (70.6% vs 77.7%, p=0.06). The mean time from symptom onset to groin puncture was slightly longer in the BGC group (266 minutes vs 249 minutes, p=0.06). TICI-2b or more scores were higher in BGC cohort (84.6% vs 74.9%, p=0.005), with trend for shorter revascularization time (76.4 vs 82.3, p=0.09) and less likely use of rescue therapy (19% vs 25%, p=0.1), however, no difference in the number of passes. Good clinical outcome at 3 months was superior in patients with BGC compared with patients without (58% vs 40%; p< 0.0001) with lower mortality rate (13.1% vs 22.4%, p=0.01). Multivariate analysis demonstrated that BGC use was an independent predictor of good clinical outcome (OR 2.0;95%CI:1.3-3.1, p=0.002), with strong trend for less mortality (OR 0.59;95%CI:0.33-1.04, p=0.07).

Conclusions:
In ischemic stroke patients presenting with anterior circulation large vessel occlusion, use of a BGC with the Trevo stent-retriever device resulted in improved clinical outcome, shorter revascularization time, improved revascularization and reduced mortality.

Keywords: Acute Ischemic Stroke Intervention, Balloon guide catheter,

Financial Disclosures: Zaidat and Nogueira Consultant for Stryker, Penumbra, Medtronic, and Neuravi This investigator initiated study is funded in part by Stryker, the data is housed and analyzed at MCW.

Grant Support: None.
Proprietary Software Enhancement of Digital Subtraction Angiography for Perfusion Mapping of Posterior Circulation

Siddhart Mehta¹, Gregoire Avignon, Daniel Korya, Audrey Arango, Jaskiran Brar, Mohammad Moussavi, Jawad Kirmani

JFK Medical Center, Edison, NJ, USA

Introduction:
Perfusion Imaging has a growing role in evaluating and treating Intra and extracranial flow limiting symptomatic stenosis or in acute ischemic strokes. However, differentiation of salvageable ischemic penumbra is still not applicable or possible for posterior circulation with CTP or more established MR techniques. We describe a proprietary software application for perfusion altering stenoocclusion of posterior circulation (PC).

Methods:
Proprietary Software Developed by GE (AngioViz) was applied for patients with posterior circulation strokes from an IRB approved registry in collaboration of engineering team of GE and physicians at University Affiliated Community Teaching Hospital. Data from 5 years (2010-2015) was reviewed. AngioViz software optimization performed to obtain best automated protocols.

Results:
A total of 51 PC Angiograms were reviewed. Acute PC interventions were performed in 33,(Male, n=18); Stenting in 17, (Male, n=9). Following Correlates to CTP were developed: Peak opacification (PO) mapped the peak intensity reached by each pixel over time, CBV on CTP; Time to peak (TOP) displayed the time at which each pixel reaches its peak intensity, MTT on CTP. Peak Fusion Time (PFT) Combined time to peak and peak opacification parameters, CBF on CTP. Color bars indicate time to peak; intensity indicates peak opacification. Goals of AngioViz software enhancement were achieved with this fusion demonstrating both vascular flow and opacification level in a single image. Figure illustrates cerebral flow data in a 76 y/o female with right vertebral craniocervical junction intervention.

Conclusions:
AngioViz DSA enhancement technique may reliably identify patients with intraprocedural neurovascular perfusion deficits for posterior circulation when none exists. Further larger retrospective analysis and prospective validation studies for reproducibility and reliability of this software application are needed.

Keywords: Acute stroke, CT perfusion, Diagnostic neuroradiology, New innovation,

Financial Disclosures: The authors had no disclosures.

Grant Support: None.
Spinal dural arteriovenous fistula: Long term clinical and radiographic outcomes with endovascular therapy alone in a single academic center

Christopher J Southwood, Mazen Noufal, Ahsan Sattar, Wally Wazni, Sallowm Yamin, Marc Lazzaro, John R Lynch, Osama Zaidat, Brian-Fred Fitzsimmons

Department of Neurology, Medical College of Wisconsin, Milwaukee, WI, USA

Introduction:
Spinal dural arteriovenous fistula (SDAVF) is a rare disease with heterogeneous presentation that often delays diagnosis. Limited data is available about long term outcomes with endovascular therapy.

Methods:
Retrospective database review in one institution with 4 neurointerventional neurologists. Clinical outcome was assessed using Aminoff-Logue scale (ALS) through chart review and telephone interviews. Spine catheter angiogram and MRI were used for radiographic outcome.

Results:
Over 10 years, 18 patients (7 females and 11 males) underwent endovascular therapy for SDAVF, with mean age of 56 years (range 47 to 83). The SDAVF was located in the cervical spine in 2 patients (11%), thoracic spine in 12 (67%), and lumbar spine in 4 (22%). Mean duration of symptoms was 26 months. At baseline, 10 patients (55%) had significant gait disability (ALS gait score 4 or 5) with a mean score of 3.8, and 13 (72%) had significant bladder dysfunction (ALS micturition score 2 or 3) with a mean score of 2. First embolization achieved immediate occlusion in 17 patients (94%). Two patients (11%) had fistula recurrence between 2 weeks and 7 years, and second embolization achieved persistent occlusion in both. One patient had persistent SDAVF. Clinical follow up data was available for all patients with a mean duration of 40 months, and radiographic follow up data was available for 14 patients. While most patients reported subjective improvement of symptoms, 7 (38%) had an improvement on ALS scale by 1 or more points, 10 (55%) had stabilization of deficits. Mean post-treatment ALS score was 2.8 for gait and 1.4 for micturition. All 4 patients with no radiographic follow up had stable clinical conditions, suggesting persistent occlusion after one embolization.

Conclusions:
Our data shows that endovascular therapy is an effective and durable treatment for SDAVF, with comparable clinical outcome to other reports using open surgical and endovascular therapy.

Keywords: Spinal malformation therapy, Endovascular therapy

Financial Disclosures: The authors had no disclosures.

Grant Support: None.
Admission Neutrophil–Lymphocyte Ratio Predicts Delayed Cerebral Ischemia Following Aneurysmal Subarachnoid Hemorrhage

Fawaz Al-Mufti1, David Roh1, Philip Meyers 2, E. Sander Connolly2, Jan Claassen1, 2, Michael J. Schmidt1

1Department of Neurology, Columbia University Medical Center, New York, NY, USA, 2Departments of Neurosurgery, Columbia University Medical Center, New York, NY, USA

Introduction:
Immune dysregulation has long been implicated in the development of delayed cerebral ischemia (DCI) following aneurysmal subarachnoid hemorrhage (aSAH). The neutrophil–lymphocyte ratio (NLR) is an established prognostic marker in patients with cancer, cardiac disease, or sepsis. This study sought to determine whether there is a relationship between NLR and DCI in SAH patients.

Methods:
We evaluated 1045 aneurysmal SAH patients between 2006 and 2015 enrolled into a single center, prospective, observational cohort study. Admission WBC differentials (NLR) were analyzed using a ≥5.9 cutoff. DCI from cerebral vasospasm was defined as (1) clinical deterioration (i.e., a new focal deficit, decrease in level of consciousness, or both), and/or (2) a new infarct on CT that was not visible on the admission or immediate postoperative scan, when the cause was thought by the research team to be vasospasm. Logistic regression models were generated.

Results:
We found that 749 (72%) patients had an admission NLR ≥5.9. In a multivariable model elevated NLR was associated with poor admission Hunt Hess grade (OR:1.6, 95%-CI:1.2-2.6, p= 0.005), Caucasian ethnicity (OR:2.6, 95%-CI:1.9-3.7, p< 0.001), anterior aneurysm location (OR:1.7, 95%-CI:1.2- 2.4, p= 0.004), loss of consciousness at ictus (OR:1.4, 95%-CI:1.0-2.0, p=0.055), and thick SAH (modified Fisher ≥3)(OR:1.8, 95%-CI:1.3-2.4, p< 0.001). Admission NLR predicted development of DCI (OR: 1.7; 95% CI: 1.1- 2.5, p=0.008) after controlling known predictors including age, poor admission clinical grade, thick SAH blood, and elevated admission MAP.

Conclusions:
This study shows that the admission NLR provides further evidence to the association between inflammation and DCI. Admission NLR is a readily available biomarker that may be a clinically useful tool for prognostication when evaluating SAH.

Keywords: Subarachnoid hemorrhage, Vasospasm, Decision analysis, Medical management, Inflammation

Financial Disclosures: The authors had no disclosures.

Grant Support: None.