Late-Breaking Science Abstract Posters I

Wednesday, January 24, 2018, 6:30pm – 7:00pm

LATE-BREAKING SCIENCE abstracts/studies presented at the INTERNATIONAL STROKE CONFERENCE 2018:

For late-breaking science being presented at ISC 2018, the embargo lifts when the first presentation begins in the scientific session in which the abstract is being presented: either 11:20 am PST on Wednesday, Jan. 24; 6:30 pm PST on Wednesday, Jan. 24; 11:00 am PST on Thursday, Jan. 25; 3:33 pm PST on Thursday, Jan. 25; or 11:53 am PST on Friday, Jan. 26. News media activities promoting late-breaking science are under embargo until the times noted above.

Presentation Number: LBP4

Presentation Title: Boston Criteria Version 2.0 for Cerebral Amyloid Angiopathy: An International Collaboration

Author Block: Andreas Charidimou, Marco Pasi, Susanne J. van Veluw, Massachusetts General Hosp, Boston, MA; Charlotte Cordonnier, Univ Lille, Inserm U1171, CHU Lille, Dept of Neurology, Lille, France; Rustam Al-Shahi Salman, Mark Rodrigues, Ctr for Clinical Brain Sciences, Univ of Edinburgh, Edinburgh, United Kingdom; Eric E. Smith, Hotchkiss Brain Inst, Dept of Clinical Neurosciences, Univ of Calgary, Calgary, AB, Canada; Julie A. Schneider, Depts of Pathology and Neurological Sciences, Rush Alzheimer's Disease Ctr, Rush Univ Medical Ctr, Chicago, IL; Jennifer Linn, Inst und Poliklinik für Neuroradiologie, Univsklinikum Carl Gustav Carus, Dresden, Germany; Nicolas Raposo, Neurology Dept, Hôpital Pierre-Paul Riquet, Ctr Hospier Univire de Toulouse, Toulouse, France; Gargi Banerjee, UCL, London, United Kingdom; Jean-Claude Baron, Dept of Neurology (J.-C.B.), Ctr Hospier Sainte Anne, Inserm U894, Paris, France; Mark A. van Buchem, Dept of Radiology, Leiden Univ Medical Ctr, Leiden, Netherlands; Frank A. Wollenweber, Klinikum der Univ München, Ludwigs-Maximilians-Univ LMU, Munich, Germany; Jonathan Rosand, M. Edip Gurol, Anand Viswanathan, Matthew P. Frosch, Massachusetts General Hosp, Boston, MA; David J. Werring, Univ Coll London (UCL), London, United Kingdom; Steven M. Greenberg, Massachusetts General Hosp, Boston, MA; For the International CAA Association

Abstract Body:

Objectives: The Boston Criteria are used worldwide for in vivo diagnosis of cerebral amyloid angiopathy (CAA) and have become the basis for clinical decisions and research. Given major advances in MRI biomarkers, we designed a multicenter study within the International CAA Association to update and validate a data-driven Boston Criteria “version 2.0”.

Methods: We analyzed patients age ≥50 with potential CAA-related clinical presentations (hemorrhagic stroke, cognitive impairment or transient neurological episodes), available MRI, and CAA histopathologic determination. MRIs were rated for hemorrhagic and non-hemorrhagic small vessel markers per STRIVE methods, blinded to clinical/histopathologic information. Brain tissue samples were rated for advanced CAA, defined as Vonsattel scale ≥2 for full brain autopsies and ≥1 for brain biopsies.

Results: We report MRI markers in an initial subset of 177 Massachusetts General Hospital patients (mean age: 72.5): 123 (69.5%) with pathologically verified CAA, 54 (30.5%) verified as non-CAA. MRI markers strongly associated with CAA were lobar ICH (OR 4.2, 95% CI 2-8.7; p<0.0001), cortical

superficial siderosis (cSS; 40, 5-300; p<0.0001), lobar cerebral microbleeds (CMBs; 3.4, 1.7-6.6; p<0.0001), severe centrum semiovale perivascular spaces (CSO-PVS; 6.3, 3-13.5; p<0.0001) and white matter hyperintensities in a multi-spot pattern (3.5, 1.6-7.6; p=0.002). cSS, multiple CMBs and severe CSO-PVS were independently associated with CAA in multivariable regression. For patients presenting with symptomatic ICH, provisional criteria defined by multiple strictly lobar ICH, cSS and CMBs yielded sensitivity, specificity, and area under the curve of 82.1% (95%CI: 70.8-90.4%), 88.2% (63.6-98.5), and 0.85. For those with non-ICH presentations, these values were 64.3% (50.4-76.6), 86.5% (71.2-95.5), and 0.75.

Conclusions: This preliminary analysis of an international collaboration to update the Boston Criteria suggests the combination of lobar ICH, cSS and CMBs gives high diagnostic accuracy, particularly for ICH patients. CSO-PVS and white matter hyperintensity spots might serve as additional supporting features to improve accuracy. External validation in the full international cohort is ongoing.

Author Disclosure Block: A. Charidimou: None. **M. Pasi:** None. **S.J. van Veluw:** None. **C. Cordonnier:** None. **R. Al-Shahi Salman:** None. **M. Rodrigues:** None. **E.E. Smith:** None. **J.A. Schneider:** None. **J. Linn:** None. **N. Raposo:**None. **G. Banerjee:** None. **J. Baron:** None. **M.A. van Buchem:** None. **F.A. Wollenweber:** None. **J. Rosand:** None. **M. Gurol:** None. **A. Viswanathan:** None. **M.P. Frosch:** None. **D.J. Werring:** None. **S.M. Greenberg:** None.

Presentation Number: LBP6

Presentation Title: Preventing Ischemic Cerebrovascular Events in High-risk Patients with Acute Non-disabling Cerebrovascular Events Using Remote Ischemic Conditioning: A Single-arm, Open-label, Multi-center Phase IIa Futility Study

Author Block: Shimeng Liu, Xuanwu Hosp, Beijing, China; Zongen Gao, Shengli Oilfield Ctr Hosp, Dongying, Shandong, China; Ran Meng, Haiqing Song, Xuanwu Hosp, Beijing, China; Tianping Tang, Shengli Oilfield Ctr Hosp, Dongying, Shandong, China; Ya Zhao, Taoyuan People's Hosp, Changde, Hunan, China; Rong Chen, The First Hosp, Hainan Medical Coll, Haikou, Hainan, China; Yanzhen Sheng, Taoyuan People's Hosp, Changde, Hunan, China; Qianqian Fan, The First Hosp, Hainan Medical Coll, Haikou, Hainan, China; Fang Jiang, Qian Zhang, Jianping Ding, Xiaoqin Huang, Qingfeng Ma, Kai Dong, Sufang Xue, Zhipeng Yu, Jiangang Duan, Changbiao Chu, Xuanwu Hosp, Beijing, China; Xiaohui Chen, Shengli Oilfield Ctr Hosp, Dongying, Shandong, China; Xingquan Huang, Taoyuan People's Hosp, Changde, Hunan, China; Sijie Li, Xuanwu Hosp, Beijing, China; Bruce Ovbiagele, Dept of Neurology, Medical Univ of South Carolina, Charleston, SC; Wenle Zhao, Dept of Public Health Sciences, Medical Univ of South Carolina, Charleston, SC; Wuwei Feng, Dept of Neurology, Medical Univ of South Carolina, Charleston, SC; Xunming Ji, Xuanwu Hosp, Beijing, China

Abstract Body:

Aims: Acute minor ischemic stroke (AMIS) or TIA is a common cerebrovascular event with a high recurrence despite the short-term use of dual antiplatelets. This study aimed to investigate the feasibility, safety and preliminary efficacy of twice daily remote ischemic conditioning (RIC) in preventing vacular events in patients with AMIS or high-risk TIA ($ABCD^2$score of ≥4).

Methods: This was a 4-center, single-arm, open-label phase IIa futility trial with 162 patients. Patients received RIC in additional to secondary stroke prevention regimen. RIC consisted of 5 cycles of 5-min inflation (200 mmHg) and 5-min deflation of cuffs (45 mins) on bilateral upper limbs twice-a-day for 90 days. The antiplatelet strategy was based on individual physician's practice. Recurrent Ischemic stroke/TIA within 3 months was the primary outcomes. Compliance rate (≥ 50% completion of 45-minute RIC sessions) was used to evalute feasibility. Safey was assessed by Adverse events or serious adverse events(SAE).

Results: 106/162 (65.4%) patients received dual antiplatlets**.** Ischemic Stroke/TIA occurred in 6 (3.7%) patients within 3 months. No hemorrhagic stroke occured. The top three adverse events are pain with upper limbs (27.2%); petechia (16.0%) and heart palpation (3.1%). No SAE was observed. 68 (42.2%) subjects completed ≥ 50% of 45-mins RIC sessions. 107 (74.8%) patients achieved favorble outcomes (mRS of 0 or 1) at 3 months.

Conclusions: RIC is a safe procedure with potential benefit in reduce cerebrovascular events, but compliance needs improvement. Our study provided critical prelimindary data to plan a phase II study. The study is registered at www.ClinicalTrials.gov(NCT03004820)

Table 1. Study Criteria

Inclusion Criteria	
1	≥18 years of any gender or race;
2	Diagnosed with a non-cardiogenic acute minor ischemic stroke/TIA; minor ischemic stroke is defined by NIHSS score ≤ 3 at the time of enrollment. TIA is defined as neurologic deficit attributed to focal brain ischemia; plus the moderate-to-high risk of stroke recurrence (defined as an $ABCD^2$ score of ≥4 at the time of enrollment);
3	Within 14 days of symptoms onset;
4	Stable vital signs, normal cardiac (class I-II in New York Heart Association Functional Classification), hepatic (normal range in blood liver function tests) and renal functions (normal range in blood renal function tests);
5	Able to consent by himself/herself or by a legally authorized representative;
6	Agree to conduct regular RIC by himself/herself or others.
Exclusion Criteria	
1	Diagnosis of hemorrhage or other pathologies, such as vascular malformation, tumor, abscess or other non-vascular diseases, based on brain CT or MRI;
2	Modified Rankin Scale (mRS) score > 2 before the indexed event;
3	Received intravenous thrombolytic therapy (alteplase or urokinase) or interventional treatment for the indexed event;
4	Contradiction for aspirin or clopidogrel (known allergy, severe asthma or heart failure, etc.);
5	Indication for anticoagulation therapy (cardiac source of embolus);
6	Hemorrhagic tendency of any reason (including but not limit to hemostatic disorder, platelet count <100 × 109/L, history of drug-induced hepatic dysfunction et al.);
7	Any hemorrhagic transformation on brain scan (MRI or CT);
8	Gastrointestinal bleed or major surgery within three months of the indexed event;
9	Stroke or TIA due to iatrogenic cause or procedure related;
10	Any upper extremity soft tissue disease, vascular injury or peripheral blood vessel disease which is contraindication for RIC;
11	Systolic blood pressure ≥200 mmHg despite medical treatment;
12	Planned revascularization (any angioplasty or vascular surgery) within the next three months;
13	Scheduled for surgery or intervention within next three months requiring RIC cessation;
14	Severe non-cardiovascular comorbidity with life expectancy ≤ 6 months;
15	Pregnancy;
16	Currently receiving an investigational drug or device by other studies.

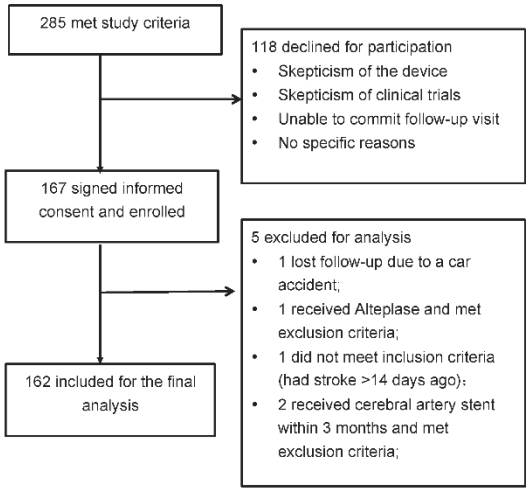


Figure 1. Study Patients Flow Chart

Table 2. Baseline Clinico-demographic Characteristics

Variables	All Patients (n=162)	Dual Antiplatelets (n=106)	Single Antiplatelet (n=56)
Baseline Characteristics			
Age, Median (IQR) (years)	58 (16)	59 (16)	56 (15)
Male, n (%)	121 (74.7%)	83 (78.3)	38 (67.9%)
Body Mass Index, Median (IQR)	25.0 (4.7)	25.6 (4.3)	24.1 (4.3)
Systolic Blood Pressure, Median (IQR) (mmHg)	148 (27)	150 (27)	146 (34)
Diastolic Blood Pressure, Median (IQR) (mmHg)	83 (19)	85 (15)	80 (20)
NIHSS, Median (IQR)	1 (1)	1 (2)	2 (1)
Hand Grip*, Median (IQR) (Kg)	22.5 (16.0)	23.6 (17.3)	20.0 (13.9)
Medical History, n (%)			
Hypertension	113 (69.8%)	81 (76.4%)	32 (57.1%)
Hyperlipidemia	81 (50.0%)	56 (52.8%)	25 (44.6%)
Diabetes	59 (36.4%)	38 (35.9%)	21 (37.5%)
Ischemic Stroke/TIA	37 (22.8%)	20 (18.9%)	17 (30.4%)
Coronary Heart Disease	21 (13.0%)	17 (16.0%)	4 (7.1%)
Intracerebral Hemorrhage	2 (1.2%)	1 (0.9%)	1 (1.8%)
Atrial Fibrillation/Flutter	0	0	0
Current or Previous Smoking, n (%)	83 (51.6%)	47 (44.8%)	36 (64.3%)
Family History of Stroke, n (%)	60 (37.0%)	45 (42.5%)	15 (26.8%)
Time to Receive Intervention, Median (IQR) (days)	7 (4)	7 (4)	7 (5)
Qualifying Event			
Acute Minor Ischemic Stroke, n (%)	153 (94.4%)	99 (93.4%)	54 (96.4%)
TOAST Classification			
Large artery atherosclerosis, n (%)	100 (65.4%)	64 (64.7%)	36 (66.7%)
Cardioembolism, n (%)	0	0	0
Small vessel occlusion, n (%)	50 (32.7%)	33 (33.3%)	17 (31.5%)
Stroke of other determined etiology, n (%)	0	0	0
Stroke of undetermined etiology, n (%)	3 (2.0%)	2 (2.0%)	1 (1.9%)
TIA, n (%)	9 (5.6%)	7 (6.6%)	2 (3.6%)
ABSCD^2 Score, Median (IQR)	5 (1)	5 (1)	5 (1)
Blood Test			
TChol, Median (IQR) (mg/dL)	164 (46)	166 (38)	162 (53)
HDL, Median (IQR) (mg/dL)	40 (15)	41 (15)	39 (16)
LDL, Median (IQR) (mg/dL)	103 (42)	106 (39)	100 (41)
GLU, Median (IQR) (mg/dL)	102 (54)	102 (50)	99 (60)
Hb A1C, Median (IQR) (%)	7.7 (2.4)	7.7 (2.4)	7.7 (2.4)
HCY, Median (IQR) (μmol/L)	11.6 (6.0)	11.4 (6.6)	11.9 (5.4)

IQR: interquartile range; NIHSS: NIH Stroke Scale; Tchol: total cholesterol; HDL: high-density lipoprotein; LDL: low-density lipoprotein; GLU: glucose; Hb A1C: Hemoglobin A1C; HCY: Homocysteine; *Hand Grip test were only done with those patients with upper limb weakness.

Table 3. Outcomes of the Study

Outcomes	All Patients (n=162)	Dual Antiplatelets (n=106)	Single Antiplatelet (n=56)
Primary Efficacy Outcome			
Ischemic Stroke/TIA within 3 months	6 (3.7%)	3 (2.8%)	3 (5.4%)
Secondary Efficacy Outcomes			
Ischemic Stroke/TIA within 1 Month, n (%)	2 (1.2%)	1 (0.9%)	1 (1.8%)
Stroke, Myocardial Infarct or Death from Cardiovascular Causes, n (%)	6 (3.7%)	3 (2.8%)	3 (5.4%)
Hemorrhagic Stroke	0	0	0
NIHSS Change from Baseline to 1 Month*, Mean⊥SD	-0.5⊥0.1	-0.5⊥0.1	-0.6⊥0.1
NIHSS Change from Baseline to 3 Month*, Mean⊥SD	-0.7⊥0.1	-0.8⊥0.1	-0.6⊥0.2
mRS ≤ 1 at 1 Month#, n (%)	108 (75.0%)	74 (78.7%)	34 (68.0%)
mRS ≤ 1 at 3 Month#, n (%)	107 (74.8%)	73 (78.5%)	34 (68.0%)
BI ≥ 95 at 1 Month#, n (%)	133 (89.3%)	89 (89.9%)	44 (88.0%)
BI ≥ 95 at 3 Month#, n (%)	132 (97.8%)	88 (98.9%)	44 (95.7%)
Hand Grip Strength Changes from Baseline to 1 Month*, Mean⊥SD (Kg)	4.2⊥0.7	4.3⊥0.8	4.2⊥1.1
Hand Grip Strength Changes from Baseline to 3 Month*, Mean⊥SD (Kg)	5.0+0.7	5.1+0.9	4.6+1.1
Safety Outcomes			
Pain (Upper limbs), n (%)	44 (27.2%)	27 (25.5%)	17 (30.4%)
Petechia (Upper limbs), n (%)	26 (16.1%)	20 (18.9%)	6 (10.7%)
Heart Palpation, n (%)	5 (3.1%)	4 (3.8%)	1 (1.8%)
Superficial Venous Thrombosis (Upper limbs), n (%)	1 (0.6%)	1 (0.9%)	0
Hand Cramps, n (%)	1 (0.6%)	0	1 (1.8%)
Any bleeding, n(%)	0	0	0
Compliance Rate			
≥50% Completion of 45-min RIC sessions, n (%)	68 (42.2%)	47 (44.8%)	21 (37.5%)

IQR: interquartile range; SD: standard deviation; NIHSS: NIH Stroke Scale; mRS: modified Rankin Scale; BI: Barthel Index; RIC: remote ischemic conditioning; #NIHSS, mRS and BI for the patients without stroke recurrence; *Hand Grip test were only done with those patients with upper limb weakness.

Author Disclosure Block: **S. Liu:** None. **Z. Gao:** None. **R. Meng:** None. **H. Song:** None. **T. Tang:** None. **Y. Zhao:** None. **R. Chen:** None. **Y. Sheng:** None. **Q. Fan:** None. **F. Jiang:** None. **Q. Zhang:** None. **J. Ding:** None. **X. Huang:** None. **Q. Ma:** None. **K. Dong:** None. **S. Xue:** None. **Z. Yu:** None. **J. Duan:** None. **C. Chu:**None. **X. Chen:** None. **X. Huang:** None. **S. Li:** None. **B. Ovbiagele:** None. **W. Zhao:** None. **W. Feng:**None. **X. Ji:** None.

Presentation Number: LBP7

Presentation Title: Emergent Angioplasty or Stenting After Thrombectomy in Patients with Underlying Intracranial Atherosclerotic Stenosis

Author Block: Chuanjie Wu, Xunming Ji, Xuanwu Hosp Captial Medical Uni, Beijing, China

Abstract Body:
Purpose: To investigate the clinical outcomes of emergent angioplasty or stenting after thrombectomy in acute intracranial occlusion with underlying severe intracranial atherosclerotic stenosis (ICAS).
Methods: In this multicenter, cohort study, we enrolled patients with acute proximal intracranial arterial occlusive stroke with underlying ICAS. Patients received emergent angioplasty, stenting, or neither at the interventionalists' discretion after mechanical thrombectomy. The primary outcome was recanalization rate at 24 h, which was defined as a modified thrombolysis in cerebral infarction score of 2b or 3.
Results: A total of 198 consecutive patients were enrolled in the study. Of these patients, 119 (60.1%) received emergent angioplasty or stenting after thrombectomy. The rate of recanalization at 24 h was higher in the emergent angioplasty or stenting group than in the control group (93.1% versus 80.8%, P=0.01). The early neurologic deterioration rate was lower in the emergent angioplasty or stenting group (13.4% versus 29.1%, P=0.007). The emergent angioplasty or stenting group was significantly more likely to have recanalization at 24 h (adjusted odd ratio [aOR], 3.62 [95% confidence interval (CI), 1.39 to 12.85]; P=0.011) and less likely to have early neurologic deterioration (aOR, 0.31 [95% CI, 0.35 to 0.91]; P=0.008). There were no significant differences between groups in the rate of death, symptomatic and asymptomatic intracranial hemorrhage, or functional independence.
Conclusions: Emergent angioplasty or stenting is possible in patients with ICAS and may reduce the risk of reocclusion and early neurologic deterioration, with no evidence of increased intracranial hemorrhage or death. Large randomized trials are warranted.

Author Disclosure Block: **C. Wu:** None. **X. Ji:** None.

Presentation Number: LBP8

Presentation Title: A Cluster Randomized Trial of a Multifaceted Intervention to Improve AcuteIschemic Stroke Care in China

Author Block: Yilong Wang, Zixiao Li, Xingquan Zhao, Chunjuan Wang, Xianwei Wang, Beijing Tiantan Hosp, Beijing, China; David Wang, INI Stroke Network, OSF Healthcare System, Univ of Illinois Coll of Med, Peoria, IL; Li Liang, Duke Univ Medical Ctr, Duke Clinical Res Inst, Durham, NC; Liping Li, Chunxue Wang, Hao Li, Beijing Tiantan Hosp, Beijing, China; Haipeng Shen, Faculty of Business and Economics, Univ of Hong Kong, Hong Kong, China; Janet Bettger, Duke Univ Medical Ctr, Duke Clinical Res Inst, Durham, NC; Yuesong Pan, Yong Jiang, Xiaomeng Yang, Changqin Zhang, Beijing Tiantan Hosp, Beijing, China; Gregg C Fonarow, Ahmanson-UCLA Cardiomyopathy Ctr Ronald Reagan-UCLA Medical Ctr, Los Angeles, CA; Eric D Peterson, Duke Univ Medical Ctr, Duke Clinical Res Inst, Durham, NC; Lee H Schwamm, Dept of Neurology, Massachusetts General Hosp, Harvard Medical Sch, Boston, MA; Ying Xian, Duke Univ Medical Ctr, Duke Clinical Res Inst, Durham, NC; Yongjun Wang, Beijing Tiantan Hosp, Beijing, China

Abstract Body:

Background There are considerable gaps in adherence to evidence-based stroke care in China. Our primary aim was to determine whether a multifaceted quality improvement (QI) intervention could improve adherence to the 9 evidence-based performance measures among Chinese patients with acute ischemic stroke (AIS).

Methods The Multifaceted Intervention to Improve AIS Care (GOLDEN BRIDGE-AIS) trial was a two-arm, multicenter, cluster-randomized, controlled trial. Patient hospitalized with AIS were included. Hospitals were randomized (1:1) to the intervention or a usual care control arm. The multifaceted QI intervention involved a clinical pathway, written care protocols, oversight by a quality coordinator, and a monitoring and feedback system of performance measures. The primary outcome was adherence to AIS evidence-based performance measures.

Results 4800 patients were enrolled from 40 hospitals, n=2400 intervention and n=2400 control with 12-month follow-up. Interventional hospital patients were more likely to receive acute and discharge treatments than those in the control hospitals (composite measure 88.2% vs 84.8%, adjusted OR, 1.38 [95% CI, 1.11-1.71], p value=0.003) (Table). Kaplan-Meier estimates showed a reduction in the secondary outcomes of 12-month new clinical vascular events in the intervention versus control group (HR 0.73, 95% CI, 0.61-0.87; p value<0.001) (Figure).

Conclusion Among patients with AIS treated in China, a multifaceted QI intervention improved the composite adherence to the evidence-based treatments as well as significantly reduced new vascular events. Trial Registration clinicaltrials.gov Identifier: NCT02212912.

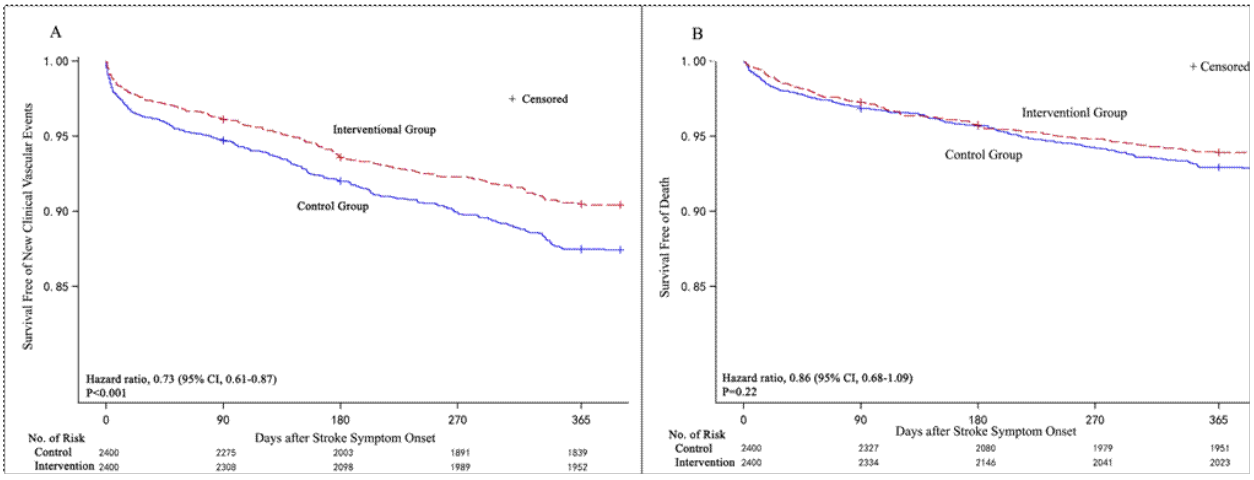
Table . Adherence to Evidence-based Performance Measures in Eligible Patients

Measures	Intervention	Control	Adjusted	Pvalue	ICC
	No. / Total (%)	No. / Total (%)	OR_{PA} (95% CI)*		
Composite measure, mean (SD)	88.2 (15.1)	84.8 (18.2)	1.38 (1.11-1.71)	0.003	0.02
All-or-none measure	1290/2400 (53.8)	1147/2400 (47.8)	1.21 (0.85-1.71)	0.29	0.06
Acute performance measures					
IV rt-PA 2 Hour	46/212 (21.7)	23/204 (11.3)	2.36 (0.66-8.46)	0.19	0.30
Early Antithrombotics	2307/2353 (98.0)	2253/2330 (96.7)	1.75 (0.79-3.86)	0.17	0.03
Dysphagia Screening	2255/2328 (96.9)	2040/2139 (95.4)	2.26 (0.82-6.24)	0.11	0.21
DVT Prophylaxis	178/645 (27.6)	66/592 (11.1)	2.28 (1.02-5.13)	0.05	0.39
Discharge performance measures					
Antithrombotics	2272/2324 (97.8)	2141/2305 (92.9)	2.29 (0.86-6.08)	0.10	0.23
Anticoagulation for Atrial Fibrillation	63/155 (40.6)	39/137 (28.5)	1.75 (0.64-4.74)	0.27	0.24
Lipid-lowering for LDL >100 mg/dL	1415/1481 (95.5)	1439/1547 (93.0)	1.35 (0.66-2.74)	0.41	0.15
Antihypertensive Medication	1510/1838 (82.2)	1372/1771 (77.5)	1.44 (0.94-2.22)	0.09	0.08
Antidiabetic Medication	653/728 (89.7)	557/663 (84.0)	1.58 (1.07-2.32)	0.02	0.02

IV, intravenous; DVT, deep vein thrombosis; ICC, intracluster correlation coefficient; LDL, low-density lipoprotein; and SD, standard deviation.

*Adjust for patient and hospital characteristics, including age, gender, history of ischemic stroke, hypertension disease, diabetes mellitus, hyperlipidemia, atrial fibrillation, coronary artery disease and previous myocardial infarction, ever smoking, NIHSS at admission, hospital grade, stroke unit, teaching hospital status, No. of neurological ward beds.

Figure . One-year new vascular events (A) and death (B)



Author Disclosure Block: Y. Wang: None. **Z. Li:** None. **X. Zhao:** None. **C. Wang:** None. **X. Wang:** None. **D. Wang:** None. **L. Liang:** None. **L. Li:** None. **C. Wang:** None. **H. Li:** None. **H. Shen:** None. **J. Bettger:** None. **Y. Pan:**None. **Y. Jiang:** None. **X. Yang:** None. **C. Zhang:** None. **G. Fonarow:** None. **E. Peterson:** None. **L. Schwamm:** None. **Y. Xian:** None. **Y. Wang:** None.

Presentation Number: LBP9

Presentation Title: Improving Transitions in Acute Stroke Patients After They Return Home: Interim Results of the Michigan Stroke Transitions Trial (MISTT)

Author Block: Mathew J Reeves, Michele C Fritz, Amanda T Woodward, Paul P Freddolino, Constantinos K Coursaris, Sarah J Swierenga, Mojdeh Nasiri, Anne K Hughes, Michigan State Univ, East Lansing, MI

Abstract Body:
BACKGROUND Navigating the transition after returning home following a stroke can be associated with substantial psychosocial and health-related challenges. The Michigan Stroke Transitions Trial (MISTT) tested the efficacy of a social work case management (SWCM) program, and access to an online information and support resource (MISTT website) to improve outcomes in acute stroke patients who returned home.
METHODS MISTT is a randomized, pragmatic, open, 3-group parallel designed trial conducted in 3 Michigan hospitals. Eligible subjects were acute stroke patients who returned home either directly or within 4 weeks of being discharged to a rehab facility. Subjects were randomized to one of 3 groups: 1) usual care, 2) SWCM only, or 3) SWCM plus MISTT website. Interventions concluded after 90-days. Primary patient-reported outcomes collected by telephone at 7 and 90 days included PROMIS Global10 QOL (physical health, mental health sub-scales), and Patient Activation Measure (PAM). Statistical analyses (ANOVA) compared the mean within-subject differences in outcomes (90d minus 7d) between the 3 groups.
RESULTS The mean age of the 221 randomized subjects was 66 years, 49% were female, 21% non-white, 13% had hemorrhagic stroke, 57% were first discharged to a rehab facility. One hundred and sixty three subjects (74%) had data available at both time points. There was a statistically significant difference in PROMIS Physical Health scores (F= 5.03, p= 0.008) between groups but no difference in PROMIS Mental Health (F= 0.81, p= 0.45). The mean change in Physical Health T score in the SWCM plus website group (3.9, 95%CI= 2.3, 5.4) was significantly higher than the mean change in the SWCM only group (1.1, 95%CI= -0.5, 2.6) and the usual care group (0.7, 95%CI= -0.8, 2.2). We also observed a statistically significant increase in PAM scores in the SWCM plus website group (p= 0.03).
CONCLUSION An intervention that combined social worker led case management with access to an online information and support website produced greater gains in patient-reported physical health and self-activation but not mental health. These results indicate that it is possible to make measurable improvements in patient well-being during the transition period. [ClinicalTrials.gov: NCT02653170].

Author Disclosure Block: M.J. Reeves: None. **M.C. Fritz:** None. **A.T. Woodward:** None. **P.P. Freddolino:** None. **C.K. Coursaris:** None. **S.J. Swierenga:** None. **M. Nasiri:** None. **A.K. Hughes:** None.

Presentation Number: LBP10

Presentation Title: Intima-Medial Thickness Sub-Study of the PreventIon of CArdiovascular Events in iSchemic Stroke Patients with High Risk of Cerebral hemOrrhage Study

Author Block: Woo-Keun Seo, Dept of Neurology and Stroke Ctr, Samsung Medical Ctr, Sungkyunkwon Univ Sch of Med, Seoul, Korea, Republic of; Yong Jae Kim, Stroke Ctr and Dept of Neurology, Coll of Med, Ewha Womans Univ, Seoul, Korea, Republic of; Juneyoung Lee, Dept of Biostatistics, Coll of Med, Korea Univ, Seoul, Korea, Republic of; Sun U. Kwon, Dept of Neurology, Asan Medical Ctr, Univ of Ulsan Coll of Med, Seoul, Korea, Republic of; PICASSO-IMT Investigators

Abstract Body:
Background and purpose - Cilostazol and probucol have been considered having anti-atherosclerotic effect. This study was designed to test the anti-atherosclerotic properties of cilostazol and probucol using intima-medial thickness (IMT) as a surrogate for atherosclerosis. Methods
Methods - This is a predefined sub-study of the PICASSO study. A total of 955 subjects with non-cardioembolic ischemic stroke or transient ischemic attack within 180 days and with prior intracerebral hemorrhage or multiple cerebral microbleeds were allocated into four groups (cilostazol and probucol combined, aspirin and probucol combined, cilostazol monotherapy, or aspirin monotherapy). For all subjects, IMTs were measured at baseline and annually thereafter. Mean and maximum common carotid artery IMTs had been scanned in both sides and all IMT measures were performed by using semi-automated edge-detection software. The primary outcome of this study was difference in averaged mean IMT changes up to 37 months between cilostazol and the aspirin groups. Differences in averaged mean IMT changes up to 37 months between probucol and the non-probucol groups were also investigated.
Results – The primary outcome, the mean changes in the averaged mean common carotid artery IMT from baseline to 37 months was -0.05±0.21mm for cilostazol group and 0.03±0.19mm for aspirin group ($p = 0.0014$). Mixed effect model repeated measure approach showed significant treatment-by-visit interaction between cilostazol and aspirin group ($p = 0.0007$). Between probucol group (-0.01±0.22 mm) and non-probucol group (-0.01±0.18 mm), no significant difference of IMT changes from baseline to 37 months was found ($p = 0.9950$). The patterns were similar for maximum IMT.
Conclusion – In ischemic stroke patients with high risk of intracerebral bleeding, cilostazol therapy resulted in a significant difference in changes of IMT as compared with aspirin. However, probucol therapy was not associated with IMT changes.

Author Disclosure Block: **W. Seo:** None. **Y. Kim:** None. **J. Lee:** None. **S. Kwon:** None.

Presentation Number: LBP11

Presentation Title: Preclinical Development of a Human Neural Stem Cell Extracellular Vesicle Therapy in Murine and Porcine Stroke Models

Author Block: Emily W Baker, Robin L. Webb, ArunA Biomedical, Inc., Athens, GA; Erin E. Kaiser, Samantha Spellicy, Brian J. Jurgielewicz, Univ of Georgia, Athens, GA; Shelley L. Scoville, Tyler A. Thompson, ArunA Biomedical, Inc., Athens, GA; Sumbul Fatima, Chirayukumar Pandya, Augusta Univ, Augusta, GA; Karishma Sriram, Univ of Georgia, Athens, GA; Raymond L. Swetenburg, ArunA Biomedical, Inc., Athens, GA; Ali S. Arbab, Babak Baban, Krishnan M. Dhandapani, David C. Hess, M. N. Hoda, Augusta Univ, Augusta, GA; Franklin D. West, Univ of Georgia, Athens, GA; Steven L. Stice, ArunA Biomedical, Inc., Athens, GA

Abstract Body: The litany of failed therapeutics in stroke clinical trials is thought to be partially attributed to limited preclinical testing in one animal model. Furthermore, many tested drugs mitigate only one secondary injury mechanism and possess no restorative potential. A promising therapy to address the need for an effective multifunctional stroke therapeutic are extracellular vesicles (EVs), which are nanometer sized cell-signaling particles. The objective of this study was to evaluate the therapeutic potential of human neural stem cell-derived and mesenchymal stem cell-derived EVs (NSC EVs and MSC EVs, respectively) in two translational stroke models. Stroke was induced in middle-aged mice (n=36) by thromboembolic middle cerebral artery (MCA) occlusion and in adult pigs (n=16) by permanent MCA occlusion. NSC EVs, MSC EVs, or vehicle was administered intravenously (IV) to mice at 2, 14, and 38 hours post-stroke while NSC EVs or vehicle was administered IV to pigs 2, 14, and 24 hours post-stroke. Magnetic resonance imaging was performed on pigs 1 and 84 days post-stroke. Functional recovery was measured in mice 96 hours post-stroke through the adhesive tape test and in pigs 1, 3, 7, 21, 28, and 84 days post-stroke through open field testing and quantitative gait analysis. Study results demonstrated that NSC EVs were more effective than MSC EVs in improving immune cell phenotype (M2 macrophage, Treg, and Th17, $p \leq 0.05$), reducing lesion size (42%, $p \leq 0.01$), and restoring somatosensory function (41%, $p \leq 0.001$) in stroked mice. Furthermore, NSC EVs significantly decreased lesion volume (54%, $p=0.01$) and improved white matter integrity (29%, $p=0.005$) in stroked pigs. These tissue-level changes correlated with functional recovery evident by increased exploratory behavior (42%, $p \leq 0.05$) and restored biomechanic gait parameters including velocity (32%, $p \leq 0.01$) and stride length (17%, $p \leq 0.01$). Not only is this the first report of EV therapy in a translational large animal model, this study validates NSC EV efficacy in two species, mouse and pig, as well as in two stroke models, thromboembolic and permanent, which strongly supports further testing of NSC EVs as a clinical stroke therapy.

Author Disclosure Block: **E.W. Baker:** Employment; Significant; ArunA Biomedical, Inc. **R.L. Webb:** Employment; Significant; ArunA Biomedical, Inc.. **E.E. Kaiser:** None. **S. Spellicy:** None. **B.J. Jurgielewicz:** None. **S.L. Scoville:**Employment; Significant; ArunA Biomedical, Inc. **T.A. Thompson:** Employment; Significant; ArunA Biomedical, Inc.. **S. Fatima:** None. **C. Pandya:** None. **K. Sriram:** None. **R.L. Swetenburg:**Employment; Significant; ArunA Biomedical, Inc.. **A.S. Arbab:** None. **B. Baban:** None. **K.M. Dhandapani:** None. **D.C. Hess:** None. **M.N. Hoda:** None. **F.D. West:** None. **S.L. Stice:** Ownership Interest; Significant; ArunA Biomedical, Inc..

Presentation Number: LBP13

Presentation Title: Reversal of Dabigatran Anticoagulation with Idarucizumab in Patients with Intracranial Hemorrhage: Subanalysis of RE-VERSE AD

Author Block: Thorsten Steiner, Klinikum Frankfurt Höchst, Frankfurt am Main and Heidelberg Univ Hosp, Heidelberg, Germany; Paul A Reilly, Boehringer Ingelheim, Ridgefield, CT; Joanne van Ryn, Boehringer Ingelheim, Biberach, Germany; Jeffrey I Weitz, McMaster Univ, Hamilton, ON, Canada; Charles V Pollack, Jr., Thomas Jefferson Univ, Emergency Med,, Philadelphia, PA; Richard A Bernstein, Northwestern Univ, Chicago, IL

Abstract Body:
Background: The rapid and complete reversal of dabigatran anticoagulation in patients presenting with severe bleeding or requiring urgent surgery was demonstrated in the RE-VERSE AD study. The impact of reversal of anticoagulation in a subpopulation of these patients, namely those with intracranial hemorrhage (ICH) was the focus of this sub-analysis.
Methods: ICH included parenchymal, subarachnoid or subdural hemorrhage. Patients received 5 grams of intravenous idarucizumab in RE-VERSE AD. The primary endpoint was maximum reversal of dabigatran anticoagulation in the first 4 hours. Secondary endpoints include mortality, modified Rankin score improvement, further thrombotic events and restart of anticoagulation. Where available, hematoma volume was measured upon enrollment and after idarucizumab injection.
Results: Patient baseline characteristics and reversal with idarucizumab are shown in the table. Baseline characteristics varied in the different ICH patient groups and falls accounted for the majority of trauma-related injuries. The mean modified Rankin score for all ICH patients was 3.4 at enrollment and 3.1 on day 7 post idarucizumab. Data regarding stroke severity and hematoma volume post idarucizumab are currently being evaluated and will also be presented.
Conclusions: Idarucizumab effectively and rapidly reverses dabigatran anticoagulation in patients with ICH. Its use may improve outcome in these patients.

	Intracranial Hemorrhage			All ICH patients
	Parenchymal	Subdural	Subarachnoid	
Number	53	39	26	98
Age* (years)	76.0	80.5	81.0	79.0
CrCl (mL/min)	74.4	59.4	56.1	66.1
Systolic BP (mmHg)	145.0	142.5	129.0	141.5
Trauma-related injury (%)	26.4%	75.0%	84.6%	50.0%
Time since last dose (h)	14.7	14.7	15.0	14.8
Dabigatran (ng/mL)	51.1	63.4	98.5	56.0
Reversal (%)	100	100	100	100
95% CI	100,100	100,100	100,100	100,100
Mortality n (%)	16 (30%)	6 (15.4%)	6 (23.1%)	24 (24.5%)

*data shown as median unless otherwise stated

Author Disclosure Block: T. Steiner: Research Grant; Significant; Octapharma. Speakers' Bureau; Significant; Boehringer Ingelheim, Octapharma, Bayer, BMS-Pfizer, Daiichi Sankyo. Consultant/Advisory

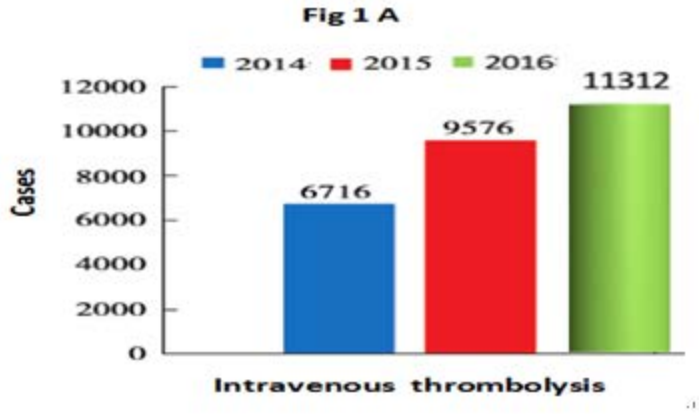
Board; Significant; Boehringer Ingelheim, Octapharma, Bayer, BMS-Pfizer, Daiichi Sankyo. Other; Significant; Novo Nordisk. **P.A. Reilly:** Employment; Significant; Boehringer Ingelheim. **J. van Ryn:** Employment; Significant; Boehringer Ingelheim. **J.I. Weitz:** Honoraria; Significant; Bayer, Boehringer Ingelheim, BMS, Daiichi-Sankyo, Ionis Pharmaceuticals, Janssen, Merck, Novartis, Pfizer, and Portola. Consultant/Advisory Board; Significant; Bayer, Boehringer Ingelheim, BMS, Daiichi-Sankyo, Ionis Pharmaceuticals, Janssen, Merck, Novartis, Pfizer, and Portola. **C.V. Pollack, Jr.:** Research Grant; Significant; Boehringer Ingelheim, Daiichi Sankyo, Portola, CSL Behring, Janssen Pharma, AstraZeneca. Consultant/Advisory Board; Significant; Boehringer Ingelheim, Portola, BMS/Pfizer, Janssen Pharma, AstraZeneca. **R.A. Bernstein:** Research Grant; Significant; Boehringer Ingelheim. Other Research Support; Significant; Boehringer Ingelheim. Consultant/Advisory Board; Significant; Boehringer Ingelheim. Other; Significant; Boehringer Ingelheim.

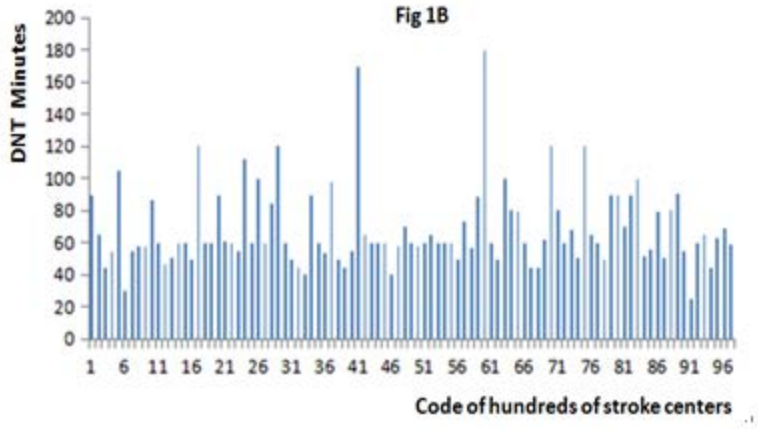
Presentation Number: LBP14

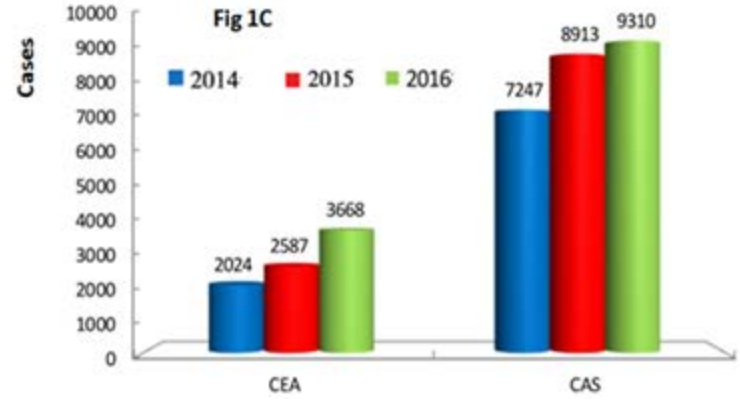
Presentation Title: Effect of a Nationwide Stroke Centers Network on Key Processes of Evidence-based Acute Stroke Care in China

Author Block: Feng Yan, Dept of Neurosurgery, Xuanwu Hosp, Capital Medical Univ, Beijing, China; Longde Wang, The Natl Health and Family Commission, Beijing, China; Xuming Ji, Dept of Neurosurgery, Xuanwu Hosp, Capital Medical Univ, Beijing, China; Yang Hua, Xuanwu Hosp, Capital Medical Univ, Beijing, China; Liqun Jiao, Hongqi Zhang, Feng Ling, Dept of Neurosurgery, Xuanwu Hosp, Capital Medical Univ, Beijing, China

Abstract Body:
Background: Stroke bring huge burdens in China. To address this core issue, the China Stroke Centers (CSC) construction was initiated in 2015 by the China National Stroke Prevention Project (CNSPP) of Chinese Government (Ministries of Health) as a goal to improve the emergency dispose and prevention level of stroke.
Objective: To confirm whether CSC was associated with improvements in key processes of evidence-based stroke care for treatment and prevention management.
Methods: CSC construction is an ongoing nationwide project, include 3 ranks: 1) Stroke Control Center (primary); 2) Advanced Stroke Center (comprehensive); 3) National Model Advanced Stroke Center (regional demonstration). The CSC network is a prospective quality improvement program within 5 years(2015 to 2020). To optimize the curative effect through the treatment process reform and standardizing. The core date online collecting system has already operated.
Results: Among the hundreds of advanced stroke centers' uploading database, we could found that the CSC construction has given initial progress between 2014 (before CSC construct) and 2015 year(after). The number of patients who received intravenous thrombolysis from 6716 in 2014 to 11312 in 2016 ($p<0.001$)**(Fig1A)** and the median door-to-needle time among the advanced stroke centers was 54.67 minutes in 2016 **(Fig1B)**, 14.23 minutes faster than in 2014 ($p<0.001$). Acute ischemic stroke / TIA standard antiplatelet use rate, 1 week blood vessel assessment completion rate, early swallowing function assessment rate, early bedside rehabilitation rate in 2016 were higher than in 2014.Carotid endarterectomy(CEA) and stenting(CAS) respectively performed 3668 and 9310 cases in 2016 and compared with 2014 increased considerably ($p<0.001$)**(Fig1C)**.**Conclusion:** These data show that a government-driven nationwide CSC network improved the whole stroke care capabilities and offer a model for Chinese hierarchical medical system reform.







Author Disclosure Block: F. Yan: None. **L. Wang:** None. **X. Ji:** None. **Y. Hua:** None. **L. Jiao:** None. **H. Zhang:** None. **F. Ling:**None.

Presentation Number: LBP15

Presentation Title: ADAPT Reperfusion with ACE64 and ACE68 is Safe and Effectivein Large Vessel Occlusions of the Anterior Circulation. The PROMISE RegistryResults

Author Block: Peter Schramm, Univsklinikum Schleswig-Holstein, Lübeck, Germany; Pedro Navia, 2Hosp Univrio Donostia, San Sebastian, Guipúzcoa, Spain; Rosario Papa, A.O.U. Policlinico, Messina, Italy; PROMISE Trial Investigators

Abstract Body:

Purpose

The aim of PROMISE registry is to evaluate the safety and effectiveness of the aspiration-based Penumbra System with the latest generation of ACE Reperfusion Catheters ACE 64 and ACE 68 in a real world population with acute ischemic stroke from anterior circulation LVO, treated with the ADAPT technique in routine practice.

Methods

It is a prospective, single-arm, multicenter registry evaluating the Penumbra System with ACE64 and ACE68 Reperfusion catheters across 20 European centers. Inclusion criteria were anterior circulation LVO within 6 hours of ictus, NIHSS ≥ 2, CT-ASPECTS ≥ 6 or MR DWI ASPECTS ≥ 5 and wherein intervention was proceeded with ADAPT as frontline. Primary endpoints included success in angiographic revascularization (TICI 2b-3), and clinical independence (mRS 0-2) at 90 days. Secondary endpoints included safety events, functional improvement at 7-10 days, procedural metrics and quality of life.

Results

A total of 203 patients were enrolled. The median age was 74 [IQR 65-80]. The median baseline NIHSS scores of 16 [IQR 11-20]. The median baseline CT ASPECT score was 9 [IQR 8-10]. Prior to endovascular procedure, IV rtPA was administered in 61.6% (125/203) of patients. Final revascularization mTICI 2b-3 was achieved in 91.5% (184/201) per Core Lab assessment. Of these, mTICI 3 was achieved in 38.8% (78/201). Day 90 Modified Rankin Score of 0-2 was achieved in 61.3% (122/199) of the patients. All cause-mortality was observed in 7.5% (15/199) patients with completed follow-up. None of the deaths was related to the device or procedure.

Conclusion

Interim analysis of the PROMISE registry demonstrated safety and effectiveness of aspiration-based Penumbra System with the novel ACE64 and ACE68 Reperfusion Catheters using ADAPT as frontline treatment. Final results will be presented at ISC 2018 conference.

Author Disclosure Block: P. Schramm: None. **P. Navia:** None. **R. Papa:** None.

Presentation Number: LBP16

Presentation Title: S100A1, a Calcium Binding Protein and Novel Regulator of Endothelial Nitric Oxide Synthase (eNOS or NOS3), in Ischemic Stroke

Author Block: Sumbul Fatima, Chirayukumar Pandya, Kumar Vaibhav, Noor Ul H Rao, Mohammad B Khan, Rafay Chaudhary, Krishnan M Dhandapani, Babak Baban, David C Hess, Md Nasrul Hoda, Augusta Univ, Augusta, GA

Abstract Body:
Background: Nitric oxide (NO) from eNOS improves cerebral blood flow (CBF) during ischemic brain injury. S100A1 regulates eNOS activity to promote vasodilation and angiogenesis.
Hypothesis: Loss of S100A1 from brain endothelium exacerbates eNOS dysfunction and post-stroke pathophysiology.
Methods: Plasma levels of S100A1 and NO within 6h after stroke in human subjects and mice were tested. Using brain endothelium-specific adeno-associated virus 2 carrying S100A1 transgene (AAV2-S100A1), S100A1 knock out ($S100A1^{-/-}$; SKO) mice were intravenously injected with, and re-constituted to express S100A1 specifically in the brain endothelium, followed by thromboembolic (TE)-stroke 3-wks after the transfection. Moreover, aged (18 ±2-mo old) wild type (WT) and SKO male mice were also subjected to TE-stroke and evaluated for CBF, lesion size by MRI and neurological outcomes. Statistical significance was determined at $P<0.05$.
Results: When compared to control, stroke in both human subjects (N=25) and mice (N=10) resulted into increased plasma level of S100A1 which paralleled with decrease in NO. Immunoprecipitation assay at 3h post-stroke confirmed reduced S100A1-eNOS interaction in the injured side of the brain, supporting our notion that the loss of S100A1 may cause eNOS dysfunction after stroke. Moreover, in the injured side of brain in SKO mice transfected with AAV2-S100A1, S100A1 expression was also decreased significantly compared to their contralateral side, within 6h of stroke. SKO mice when compared to WT-control were also significantly hypertensive, and showed frequent hemorrhagic transformations after stroke which was rescued in the AAV2-S100A1 transfected group. Genetic deletion of S100A1 resulted into poor CBF and neurological outcomes, and increased stroke injury in SKO mice as compared to WT-control.
Conclusion: Our results encourage further studies into the molecular regulation of eNOS signalosome by S100A1 after stroke. Moreover, brain endothelial S100A1 may provide long term neurovascular protection against the post-stroke vascular cognitive impairment and dementia in survivors.

Author Disclosure Block: S. Fatima: None. **C. Pandya:** None. **K. Vaibhav:** None. **N.H. Rao:** None. **M.B. Khan:** None. **R. Chaudhary:** None. **K.M. Dhandapani:** None. **B. Baban:** None. **D.C. Hess:** None. **M. Hoda:** None.

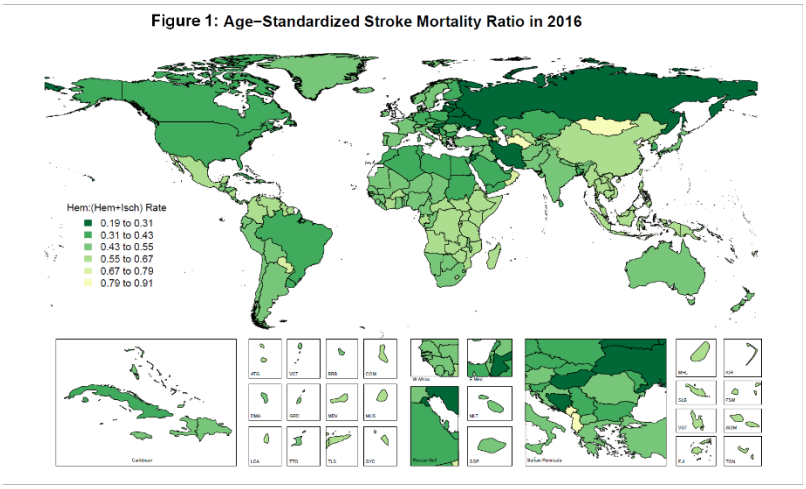
Presentation Number: LBP17

Publishing Title: Global Variation and Burden of Hemorrhagic Stroke

Author Block: **Steven O'Donnell**, Rizwan Kalani, David Tirschwell, Univ of Washington, Harborview Medical Ctr, Seattle, WA; Gregory Roth, Catherine Johnson, Valery Reigin, Univ of Washington, Seattle, WA

Abstract Body:
Introduction: Stroke is the second leading cause of death worldwide, and prior reports have demonstrated that wide variation exists between countries in the proportion of hemorrhagic stroke.
Objective: We aim to present the global variation in hemorrhagic stroke (defined as intracerebral hemorrhage, subarachnoid hemorrhage, and other non-ischemic stroke) burden from the Global Burden of Disease (GBD) 2016 study.
Methods: The GBD study is a comprehensive observational epidemiological study that aims to quantify morbidity and mortality from major diseases, including stroke, worldwide. We present temporal trends and the proportional burden of hemorrhagic stroke (defined as the ratio of hemorrhagic stroke : total stroke) from the GBD 2016 study. All measures are age-standardized.
Results: Global deaths, incidence and disability-adjusted life years (DALYs) lost for hemorrhagic stroke decreased by 37.8%, 37.9%, and 14.0%, respectively, in 2016 compared to 1990. The proportion of global stroke deaths due to hemorrhagic causes varied widely between nations, from 18% to 90% at both time periods (Figure 1). Global proportional incidence of hemorrhagic stroke was 32.0% in 1990 and 30.0% in 2016. In both 1990 and 2016, the greatest proportional burden of hemorrhagic stroke was seen in Sub-Saharan Africa as well as in parts of Central and Eastern Asia where hemorrhagic stroke continued to account for >30% of the incidence, >55% of the deaths and >65% of DALYs lost.
Conclusions: Despite reduction in global incidence, deaths, and DALYs lost from 1990 to 2016, hemorrhagic stroke disease burden remained high in parts of Asia and Sub-Saharan Africa. Future work should explore key drivers of this global variation in the burden of hemorrhagic stroke. These findings may inform strategies that aim to reduce this burden of disease.

Figure 1: Age–Standardized Stroke Mortality Ratio in 2016



Author Disclosure Block: S. O'Donnell: None. **R. Kalani**: None. **D. Tirschwell**: None. **G. Roth**: None. **C. Johnson**: None. **V. Reigin**: None.

Presentation Number: LBP18

Publishing Title: Effectiveness of the Stroke Riskometer App for Primary Stroke Prevention: A Pilot RCT

Author Block: Rita V Krishnamurthi, Rohit Bhattacharjee, Priya Parmar, Ann George, Alice Theadom, Denise Wilson, AUT Univ, Auckland, New Zealand; Lynette Tippett, Alan Barber, Suzanne Barker-Collo, The Univ of Auckland, Auckland, New Zealand; Kevin Sheth, Yale Sch of Med & Yale New Haven Hosp, Connecticut, NJ; Yogini Rathnasabapathy, Waitemata District Health Board, Auckland, New Zealand; **Valery Lvovitch Feigin**, AUT Univ, Auckland, New Zealand

Abstract Body:
Background: Reducing stroke risk behaviors is associated with reduced stroke incidence. The Stroke RiskometerTM mobile phone App ("App") is a tool for primary stroke prevention. The App is designed to help people to reduce their risk by providing their absolute and relative risk of stroke, individualized risk management information, goal-setting and monitoring.
Methods: The feasibility, acceptability and preliminary efficacy of the App for reducing stroke risk behaviors was tested in a pragmatic pilot, open-label, 2-arm prospective randomized controlled trial (RCT; n=50). Consented participants were randomly assigned to the intervention arm (App; n=26) or usual care (UC; n=24) using online minimization randomization. Usual care participants were not actively informed about the App. Changes in lifestyle behavior were measured at baseline, 3- and 6-months and assessed using Life's Simple 7 (LS7) questionnaire as recommended by the American Heart Association.
Results: Recruitment was feasible with a recruitment rate of 70% (39% male; age range 20-81 years). The intervention was well accepted and comprehensive data was collected across a range of socioeconomic and education levels. The proportion of withdrawals was low (4%), and those randomized to the App group accessed the App up to 6 times over 6 months. In those who completed the 6-month follow-up, we observed an improvement of 0.29 points in the LS7 score for the App group since baseline vs. the UC. This positive trend in the LS7 score ((RR = 1.14 (95% CI = 0.48, 2.70) represented the improvements predominately in total cholesterol and diet domains of the LS7. No contamination issues were observed. Positive feedback was received from study participants for the App as a tool to know more about stroke and take action for better health, thus highlighting the motivational value of the App.
Conclusions: The Stroke Riskometer App is a feasible intervention for stroke prevention. These findings along with positive trend in improving lifestyle risk factors warrant a full scale RCT to test the effectiveness of the Stroke Riskometer app in reducing the risk of stroke.

Author Disclosure Block: R.V. Krishnamurthi: None**. R. Bhattacharjee:** None**. P. Parmar:** None. **A. George:** None**. A. Theadom: None. D. Wilson:** None**. L. Tippett:** None**. A. Barber:** None. **S. Barker-Collo:** None**. K. Sheth: None. Y. Rathnasabapathy:** None**. V.L. Feigin:** None.

Presentation Number: LBP19

Publishing Title: THRIVES: Randomized Controlled Trial of a Multipronged Intervention to Improve Blood Pressure Control Among Stroke Survivors

Author Block: Bruce Ovbiagele, Medical Univ of South Carolina, Charleston, SC; Rufus Akinyemi, Univ of Ibadan, Ibadan, Nigeria; Mulugeta Gebregziabher, Medical Univ of South Carolina, Charleston, SC; Oyedunni Arulogun, Ezinne Uvere, Univ of Ibadan, Ibadan, Nigeria; Raelle Saulson, Kevin Armstrong, Medical Univ of South Carolina, Charleston, SC; Babatunde Salako, Olanrewaju Olaniyan, Univ of Ibadan, Ibadan, Nigeria; Samantha Hurst, Univ of California, San Diego, San Diego, CA; Mayowa Owolabi, Univ of Ibadan, Ibadan, Nigeria

Abstract Body:
Background: Stroke exacts a huge toll in sub-Saharan Africa (SSA), where there are few resources, and stroke research is extremely limited. Mitigating this burden will require improved control of conventional stroke risk factors, especially hypertension. We conceived a first-of-its-kind NIH-funded study in the region designed to enhance the implementation and sustainability of secondary stroke-preventive services following hospital discharge.
Objective: To test whether a Chronic Care Model-based initiative entitled the Tailored Hospital-based Risk reduction to Impede Vascular Events after Stroke (THRIVES) significantly improves blood pressure (BP) control after stroke in SSA.
Methods: From October 2014 to October 2017, we conducted a randomized controlled trial comprising a cohort of 400 patients with a stroke discharged from four medical care facilities in Nigeria. Prior to initiation of the trial (May 2012 to April 2014), we used mixed methods approaches to culturally and contextually develop a multipronged intervention consisting of a patient report card, an in-clinic educational video, and phone text messaging (for care coordination and education). Primary outcome was significant improvement in BP control at one year. Secondary endpoints included control of other risk factors, medication adherence, functional status, and quality of life.
Results: In the overall cohort, at baseline, 60% were aged 45-65 years, 36% were female, hemorrhagic stroke comprised 28%, mean NIHSS score was 4, 39% had a pre-enrollment systolic BP > 140, and 26% had a pre-enrollment diastolic BP >90. The analyses of the primary and major secondary outcomes will commence shortly and will be available for presentation at the conference.
Conclusions: A successful intervention could serve as a scalable model of effective post-discharge chronic BP management for stroke in SSA. However, if the intervention is not successful, we will assess why it didn't work; and moreover we would have shown that it is possible to rigorously conduct a multi-site large randomized trial among stroke patients in SSA, which will have implications for enhancing future stroke research and capacity building in the region.
Author Disclosure Block: B. Ovbiagele: Research Grant; Significant; U01NS079179. **R. Akinyemi**: Research Grant; Significant; U01NS079179. **M. Gebregziabher**: Research Grant; Significant; U01NS079179. **O. Arulogun**: None. **E. Uvere**: Research Grant; Significant; U01NS079179. **R. Saulson**: Research Grant; Significant; U01NS079179. **K. Armstrong**: Research Grant; Modest; U01NS079179. **B. Salako**: None. **O. Olaniyan**: None. **S. Hurst:** None. **M. Owolabi**: Research Grant; Significant; U01NS079179.

Presentation Number: LBP20

Publishing Title: Outcome Impact of Day-1 Extracranial ICA Patency in Stroke Patients with Tandem Occlusions

Author Block: Thomas Personnic, Hilde Henon, Laurent Estrade, Labreuche Julien, Marc Ferrigno, Nicolas Bricout, Lille Univ Hosp, Lille, France

Abstract Body:
Background: Mechanical thrombectomy for acute stroke with tandem occlusion seems efficient, but management of the extracranial occlusion remains controversial. We aimed to determine the outcome impact of the extracranial ICA patency at Day-1 follow-up MR-Angiography in patients treated for tandem occlusion.
Methods: Consecutive stroke patients with tandem occlusion were identified from a hospital-based prospective registry from 2011 to 2017. Baseline characteristics (initial NIHSS and DWI-ASPECT scores), angiographic outcome (mTICI score), Day-1 follow-up imaging characteristics (extracranial ICA patency and parenchymal hemorrhage), and Day-90 outcome (mRS) were recorded.
Results: We included 83 stroke patients (69.9% male, age 62.3 ± 12.3) with tandem occlusion. Mean NIHSS was 17.9±4.8 and median ASPECTS was 7. Successful reperfusion (mTICI 2b/3) was achieved in 61.5%. Patency of extracranial ICA was evidenced in 44.6% of patients at Day-1 follow-up MR-Angiography. It was significantly associated with a favorable functional outcome at Day-90 (64.9% vs 21.7%, $p<0.0001$) independently of the successful reperfusion. It was also associated with prior IV thrombolysis ($p=0.035$) and with a cervical revascularization procedure (balloon angioplasty or stenting, $p=0.034$). There was no significant difference between the groups in terms of sICH (13.5% vs 10.9%, $p=0.75$) or mortality rate (8.1% vs 17.4%, $p=0.33$).
Conclusion: This study highlights the outcome impact of extracranial ICA patency in stroke patients with tandem occlusions. Management of the extracranial ICA might be seriously considered.

Author Disclosure Block: T. Personnic: None. **H. Henon**: None. **L. Estrade**: None**. L. Julien**: None. **M. Ferrigno**: None. **N. Bricout**: None.

Presentation Number: LBP21

Publishing Title: TrkB Receptor Activation and Improvements in Recognition and Spatial Memory in Neonatal Mice Following Perinatal HI in an Estrogen Receptor Dependent Way

Author Block: Dila Zafer, Vishal Chanana, Waisman Ctr, Univ of Wisconsin, Madison, WI; Damla Hanalioglu, Hacettepe Univ, Sch of Med, Ankara, Turkey; Letisya Melengic, Acibadem Univ, Istanbul, Turkey; Molly Serebin, Kaylyn Freeman, Peter Ferrazzano, Waisman Ctr, Univ of Wisconsin, Madison, WI; Jon E Levine, Dept of Neuroscience, Univ of Wisconsin, Madison, WI; **Pelin Cengiz**, Waisman Ctr, Univ of Wisconsin, Madison, WI

Abstract Body:
Introduction: Hypoxia ischemia (HI) related brain injury due to perinatal asphyxia is one of the major causes of mortality and morbidities in developing brains. Male brains are two times more vulnerable to the effects of HI, a phenomenon that is poorly understood. We recently reported that increased hippocampal ERα expression post-HI confers neuroprotection only in the female neonate hippocampi through crosstalk with the neurotrophin receptor, tyrosine kinase B (TrkB). Activation of the TrkB via its agonist, 7,8-dihydroxyflavone (7,8-DHF) decreases apoptosis only in female mice hippocampus in an ERα dependent way. We hypothesize that absence of ERα will ablate the sex differences seen in long-term neurological outcome following 7,8-DHF therapy in neonatal mice following perinatal HI.
Methods: HI was induced by unilateral common carotid artery ligation and exposure to 10% O2 for 50 min using Vannucci-Rice's HI model in P9 B6/C57 mice. Recognition and spatial memory were assessed at P60+ by novel object recognition (NOR) and location (NOL) tests, respectively. Total exploration time (novel+familiar exploration=30 sec) was recorded. Percent time spent with novel object/location were calculated as discrimination ratio. ANOVA was used to compare the discrimination ratios (mean ± SEM) between the groups.
Results: HI decreased the discrimination ratios for both NOR and NOL tests in ERα wild type (WT) male (% 28 ± 2 and %23 ± 3) and female (% 28 ± 9 and % 28 ± 4) mice compared to sham male (% 72 ± 5 and % 55 ± 6) and female (% 68 ± 4 and % 71 ± 12) mice ($p < 0.001$), respectively. HI induced decline in cognition and memory were recovered by 7,8-DHF therapy only in ERα WT females for both NOR and NOL tests, respectively [% 64 ± 6 and % 67 ± 4, ($p < 0.001$)]. 7,8-DHF therapy failed to improve the discrimination ratios for both NOR and NOL tests in ERα knockout female and male mice ($p < 0.001$). n=3-9
Conclusion: Neurotrophin receptor activation improves the long-term cognitive and memory function only in female WT mice in an ERα dependent way following global brain injury. Sex differences seen in 7,8-DHF therapy-mediated improvements in recognition and spatial memory are ablated in ERα KO mice.

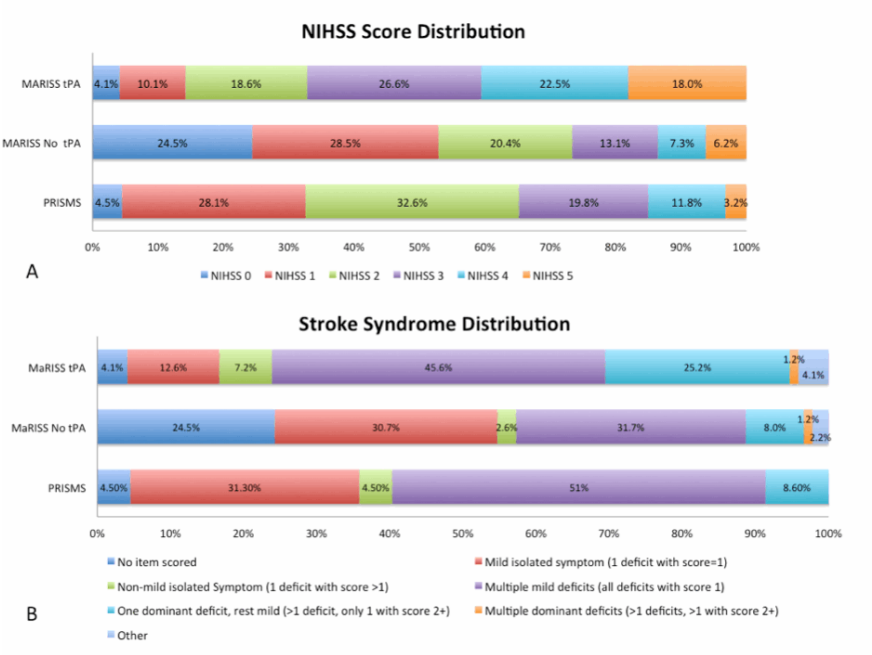
Author Disclosure Block: D. Zafer: None. **V. Chanana**: None. **D. Hanalioglu**: None. **L. Melengic**: None. **M. Serebin**: None. **K. Freeman**: None. **P. Ferrazzano**: None. **J.E. Levine**: None. **P. Cengiz**: None.

Presentation Number: LBP22

Publishing Title: Severity Distributions in Patients with Low NIHSS Ischemic Stroke: A Comparative Analysis of PRISMS and MaRISS

Author Block: **Negar Asdaghi**, Hannah Gardener, Univ of Miami Miller Sch of Med, Miami, FL; Jenny Davenport, Genentech Inc., San Francisco, CA; Iszet Campo-Bustillo, Univ of Miami Miller Sch of Med, Miami, FL; Edna Kavuma, The American Heart Association, Dallas, TX; Barbara Purdon, Genentech Inc., San Francisco, CA; Joseph P Broderick, Univ of Cincinnati Coll of Med, Cincinnati, OH; Lee Schwamm, Massachusetts General Hosp, Boston, MA; Eric E Smith, Hotchkiss Brain Inst, Univ of Calgary, Calgary, AB, Canada; Ralph L Sacco, Univ of Miami Miller Sch of Med, Miami, FL; Jeffrey L Saver, Univ of California Los Angeles, Los Angeles, CA; Jose G Romano, Univ of Miami Miller Sch of Med, Miami, FL; Pooja Khatri, Univ of Cincinnati Coll of Med, Cincinnati, OH; On behalf of MaRISS and PRISMS Investigators

Abstract Body:
Background: Mild ischemic stroke patients were largely excluded from prior major thrombolysis trials. The PRISMS randomized trial evaluated alteplase in patients with NIHSS≤ 5 and without clearly disabling deficits at presentation. We sought to compare the distribution of symptoms among patients enrolled in PRISMS versus the ongoing prospective Get With The Guidelines - Stroke MaRISS registry. MaRISS captures current treatment practice by characterizing all patients with NIHSS≤ 5 regardless of degree of disabling deficit or alteplase treatment status.
Methods: We compared the distribution of NIHSS scores and stroke syndromes of differing severity, defined by prespecified NIHSS item score clusters, using chi-square analyses among PRISMS and MaRISS patients.
Results: Among 612 patients in MaRISS, 338 (55.2%) were treated with alteplase and 274 (44.8%) not treated with alteplase. These patients were compared with 313 randomized in PRISMS. NIHSS scores were median 2 (IQR 1-3) in PRISMS, 1 (1-3) in MaRISS non-alteplase treated, and 3 (2-4) in MaRISS alteplase-treated participants. The Figure shows the distributions of total NIHSS scores and of stroke syndromes of varied severity in the three groups. Total NIHSS 0-2 was seen in 65.2% of PRISMS, 73.4% of MaRISS non-alteplase treated and 32.8% of MaRISS alteplase-treated groups ($p < 0.0001$). The proportion of patients with ≥1 NIHSS item ≥2 (dominant syndrome) was higher in MaRISS alteplase-treated (26.4%) compared to PRISMS (8.6%) and MaRISS non-alteplase treated (9.2%, $p<0.0001$).
Conclusion: Patients randomized in PRISMS had comparable NIHSS scores and syndromic severity to patients not treated with alteplase in routine practice in MaRISS, and much less severity than patients treated with alteplase in routine practice in MaRISS. The PRISMS trial cohort, as intended, appears fairly representative of mild deficit patients who do not receive alteplase in current broad clinical practice.



Author Disclosure Block: N. Asdaghi: None. **H. Gardener**: None. **J. Davenport**: None. **I. Campo-Bustillo**: None. **E. Kavuma**: None. **B. Purdon**: None. **J.P. Broderick**: None. **L. Schwamm**: Research Grant; Significant; principal investigator of an investigator-initiated study of extended-window intravenous thrombolysis funded by the National Institutes of Neurological Disorders and Stroke. Other Research Support; Significant; Genentech provided alteplase free of charge to Massachusetts General Hospital as well as supplemental per-patient payments to participating sites in an investigator-initiated trial of extended-window. Other; Modest; hair of the AHA/ASA GWTG stroke clinical work group [unpaid]. **E.E. Smith:** None. **R.L. Sacco**: Research Grant; Significant; Research support from NIH, AHA Bugher Center, Evelyn McKnight Foundation, and Boehringer Ingelheim**. J.L. Saver**: Consultant/Advisory Board; Modest; unpaid site investigator in PRISMS, unpaid consultant to Genentech advising on the design and conduct of the PRISMS trial. Consultant/Advisory Board; Significant; received funding for services as a scientific consultant regarding trial design and conduct to Boehringer Ingelheim (prevention trials only). Other; Significant; UC Regents received payments as a performance site for PRISMS on the basis of clinical trial contracts for the number of subjects enrolled**. J.G. Romano**: Research Grant; Significant; Research salary support to Department of Neurology at the University of Miami from: a. Genentech for role as PI of the Mild and Rapidly Improving Stroke Study (MaRISS). b. NIH for role as PI (MPI) of. Consultant/Advisory Board; Significant; Genentech for Steering Committee role of the Potential for rtPA to Improve Stroke with Mild Symptoms (PRISMS) Study; Vycor/NovaVision for role as Scientific Advisor. **P. Khatri**: Research Grant; Significant; NIH/NINDS. Other Research Support; Modest; Biogen (DSMB), neurospring (payment to department for research effort). Other Research Support; Significant; Genentech (payment to department for research effort on PRISMS trial), Lumosa (payment to my department for therapy development/DSMB). Expert Witness; Modest; Medicolegal case. Other; Modest; Neuravi (domestic travel for academic mtg), EmstopA (doemstic travel for mtg).

Presentation Number: LBP23

Publishing Title: Targeting PI3-Kinase Gamma for Thrombolytic Therapy in a Rat Model of Embolic Stroke

Author Block: Rong Jin, Penn State Coll of Med, Hershey, PA; **Adam Y Xiao**, LSUHSC-Shreveport, Shreveport, LA; Jarvis Li, Hershey High Sch, Hershey, PA; Min Wang, Shan Liu, Guohong Li, Penn State Coll of Med, Hershey, PA

Abstract Body:
Background: Intravenous tissue plasminogen activator (tPA) is the only FDA-approved treatment for acute ischemic stroke, but its use is limited by narrow therapeutic window (within 4.5h) and increased risks of intracerebral hemorrhage. Phosphoinositide 3-kinase gamma (PI3Kγ) is a key modulator of inflammation. We have previously reported that genetic deficiency of PI3Kγ protects against acute ischemic brain injury in mice by reducing inflammation and oxidative stress. Here, we tested the hypothesis that pharmacological inhibition of PI3Kγ with a PI3Kγ-selective inhibitor (AS605240) in a clinically relevant setting reduces acute brain injury and increases the therapeutic window of tPA for treatment of embolic stroke.
Methods and Results: Spontaneously hypertensive rats (8-10 weeks old) were subjected to embolic middle cerebral artery occlusion (MCAO) and randomly divided into the following treatment and control groups: saline injected at 4h; AS605240 (30 mg/kg/day, orally) initiated at 2h or 4h and repeated at 24h and 48h, tPA (10 mg/kg, I.V.) at 2h or 6h, and a combination therapy with AS605240 initiated at 4h plus tPA at 6h after the onset of ischemia. As monotherapy, administration of AS605240 initiated at 2 h significantly reduced infarct volume and neurological deficits (neurological score, foot-fault) 72h after stroke, but the protective effects were much less significant when the treatment was initiated at 4h after the onset of ischemia. Delayed 6-hour tPA did not decrease infarction but instead worsened brain hemorrhage and mortality. Impressively, the delayed tPA-induced hemorrhage was blocked almost completely by the combination treatment with AS605240, accompanied by increased survival rates and improved neurological function. Inhibition of MMP-9 via inactivation of NF-kB signaling in the ischemic brain microvessels and prevention of secondary microvascular thrombosis may underlie the protective mechanisms of the PI3Kγ inhibition with AS605240.
Conclusion: Therapeutic inhibition of PI3Kγ reduces acute ischemic brain injury and extends the therapeutic time window for tPA therapy in a clinically relevant embolic stroke model. This combination therapy could be a new promising strategy for treating stroke in humans.

Author Disclosure Block: R. Jin: None. **A. Xiao**: None. **J. Li**: None. **M. Wang**: None. **S. Liu**: None. **G. Li**: None.

Presentation Number: LBP24

Publishing Title: Intracerebral hemorrhage produces differential expression of genes in peripheral blood

Author Block: Boryana Stamova, Bradley P. Ander, Glen Jickling, Farah Hamade, Marc Durocher, Xinhua Zhan, Da Zhi Liu, Xiyuan Cheng, Heather Hull, Natasha Shroff, **Frank Sharp**, UC Davis Sch of Med, Sacramento, CA

Abstract Body:
Background: Intracerebral Hemorrhage (ICH) is a devastating type of stroke. Treatments for ICH are limited, creating urgent need for identification of novel treatment targets. Since vasculogenesis and angiogenesis hold promise to improve outcome of ICH patients, we focused on identifying differentially expressed genes in whole blood between ICH patients and matched vascular risk factor controls (CTRL) that are implicated in angiogenesis and vasculogenesis to provide potential novel ICH treatment targets.
Methods: We examined RNA from 66 human peripheral whole-blood samples (33 ICH, 33 CTRL) using GeneChip® HTA 2.0 arrays. We used a Mixed Regression Model for transcript-level analyses. Transcripts with $p<0.005$ and $|\text{Fold Change}|>1.2$ were considered significant.
Results: We identified differentially expressed transcripts from 36 genes that have been implicated in angiogenesis/vasculogenesis (Ingenuity Pathway Analysis, p-value of overlap = 3.67E-05 and p=3.24E-05, respectively): 20 up-regulated and 16 down-regulated transcripts, with overall positive Z-score for activation of the angiogenesis and vasculogenesis pathways. The upregulated transcripts included one miRNA – mir-21, and the mRNAs ADAM9, CALCRL, CYP1B1, FOS, IL4R, ITGAM, JAK2, MAP2K6, MAPK14, PFKFB3, POR, RBPJ, S100A9, SLC8A1, SOCS3, TGFA, TIPARP, TLR2, and VIM. The down-regulated genes were BCL2, BECN1, CD28, CD3E, CNTRL, ETS1, ITGA4, KMT2A, LEF1, PLCG1, RNF213, RORA, SRPK1, STAT1, WNK1, and ZC3H13,
Conclusion: We found significant enrichment of vasculogenesis/angiogenesis-associated genes in ICH. Evidence suggests that following ICH there is upregulation of angiogenesis, leading to remodeling that can at least in part compensate for loss of function. Neuroprotective approaches in ICH, acting primarily through angiogenesis and vasculogenesis, have been showing promise in animal models. The differentially expressed genes provided here may represent potential specific therapeutic targets.

Author Disclosure Block: B. Stamova: None. **B.P. Ander**: None. **G. Jickling**: None. **F. Hamade**: None. **M. Durocher**: None. **X. Zhan**: None. **D. Liu:** None. **X. Cheng**: None. **H. Hull**: None. **N. Shroff**: None. **F. Sharp**: None.

Presentation Number: LBP26

Publishing Title: Development and Validation of Clinical Prediction Rules to Classify Type of Stroke at Prehospital

Author Block: Uchida Kazutaka, Hyogo Coll of Med, Nishinomiya, Japan

Abstract Body:
Introduction: The effectiveness of endovascular thrombectomy for acute cerebral large vessel occlusion (LVO) was proved, but many patients did not received such interventions because capable operators were not placed at all hospitals. If the type of stroke [large vessel occlusion, subarachnoid hemorrhage (SAH), intracranial hemorrhage (ICH), other cerebral infarction (CI)] was predicted at prehospital, better access to appropriate interventions were capable. We, thus, developed the clinical prediction rules to classify the type of stroke who were suspected to suffer acute stroke at prehospital, and validated them.
Methods: We analyzed consecutive 1,229 patients who were suspected to suffer acute stroke from June, 2015 to March 2016. We obtained the history and physical signs at prehospital from paramedics and final diagnosis from hospital transferred. We constructed multivariate logistic regression models for 1) LVO, 2) SAH, 3) ICH, 4) CI, and developed the clinical prediction rules for each type. We prospectively validated the rules with another consecutive patients from August 2016 to July 2017 using mobile application.
Results: In the derivation cohort, 104 LVO, 57 SAH, 169 ICH, and 183 CI were observed. The area under the receiver operating curve (AUC) of the rules were 0.90 for LVO, 0.90 for SAH, 0.85 for ICH, and 0.65 for CI. The validation cohort of 932 patients showed the sensitivity and specificity of the rules were 0.53 and 0.95 for LVO, 0.73 and 0.96 for SAH, 0.52 and 0.85 for ICH, 0.63 and 0.70 for CI. The AUCs of LVO, SAH, ICH, and CI were 0.85, 0.96, 0.77, and 0.67, respectively.
Conclusions: The clinical prediction rule calculated by paramedics at prehospital can easily classify the patients who suspected to have stroke into LVO, SAH, ICH, and CI with excellent performance. By applying the rules, more patients would receive appropriate interventions without unnecessary delay.

Author Disclosure Block: U. Kazutaka: None.

Presentation Number: LBP27

Publishing Title: Fully Automated Insonation of the MCA Using a Robotically Controlled Transcranial Doppler Ultrasound Probe

Author Block: Robert Hamilton, Shankar Radhakrishnan, Michael O'Brien, Mina Ranjbaran, Ilyas Patanam, Mateo Scheidt, Danielle Seth-Hunter, Samuel Thorpe, Seth J. Wilk, Corey M. Thibeault, Neural Analytics, Los Angeles, CA

Abstract Body:
Introduction: Transcranial Doppler Ultrasound (TCD) has been shown to have the potential as a significant diagnostic aid for Acute Ischemic Stroke (AIS), in particular for large vessel occlusion. Overall less than 10% of eligible patients receive endovascular surgical intervention. There are a number of reasons for the low treatment rate, but simpler tools for diagnosis of treatable AIS is critical for routing these patients to interventional centers earlier. Although TCD is a rapid and non-invasive tool it traditionally requires a trained sonographer to find and insonate the arterioles of the circle of Willis. This has limited the use of TCD in many emergency departments and smaller hospitals. In this work we present a pilot study using a novel, fully automated, TCD system that removes the need for an expert sonographer. The automated TCD (A-TCD) system is a robotically controlled device that locates and optimizes a cerebral blood flow velocity signal insonated through the subject's temporal window. It automates the entire process of probe placement, force control, signal identification and optimization. This pilot study illustrates the effectiveness of fully automated TCD independent of a trained sonographer.
Methods: TCD measurements of the middle cerebral arteries of eighteen subjects were collected bilaterally by an expert sonographer (ES). The subjects were then scanned using the A-TCD system. The resulting 30 second scans were compared using the average velocity and a quantitative assessment of quality.
Results: Of the 36 signals (18 subjects bilaterally) collected by both the ES and the A-TCD an average velocity of 59.0 cm/s and 54.1 cm/s were found respectively. On average the velocity signals found by the A-TCD were 8% lower than the ES. However, when comparing the quality of the signal - the metric most important for morphological analysis - the A-TCD and ES had average scores of 0.8 on a 0-1.0 scale. In addition, the A-TCD system took an average of 5.5 minutes to setup and 4.5 minutes to find a signal.
Conclusions: Comparison of bilateral TCD waveforms collected by the A-TCD system and an expert sonographer illustrates the potential of this system in areas where sonography is not readily available.

Author Disclosure Block: R. Hamilton: Employment; Significant; Neural Analytics. S. Radhakrishnan: Employment; Significant; Neural Analytics. **M. O'Brien**: Employment; Significant; Neural Analytics. **M. Ranjbaran:** Employment; Significant; Neural Analytics. **I. Patanam**: Employment; Significant; Neural Analytics. **M. Scheidt**: Employment; Significant; Neural Analytics. **D. Seth-Hunter**: Employment; Significant; Neural Analytics. **S. Thorpe**: Employment; Significant; Neural Analytics. **S.J. Wilk**: Employment; Significant; Neural Analytics. **C.M. Thibeault**: Employment; Significant; Neural Analytics.

Presentation Number: LBP28

Publishing Title: Electronic Decision Support for Improvement of Contemporary Therapy for Stroke prevention (EDICTS)

Author Block: Seemant Chaturvedi, Univ of Miami Miller Sch of Med, Miami, FL; Adam Kelly, Univ of Rochester Sch of Med, Rochester, NY; Shyam Prabhakaran, Northwestern Univ Feinberg Sch of Med, Chicago, IL; Gustavo Saposnik, Univ of Toronto Sch of Med, Toronto, ON, Canada; Lilly Lee, Jackson Memorial Hosp, Miami, FL; Amer Malik, Univ of Miami Miller Sch of Med, Miami, FL; Christine Boerman, Univ of Rochester Sch of Med, Rochester, NY; Gayle Serlin, Univ of Miami Miller Sch of Med, Miami, FL

Abstract Body:
Background: Despite two decades of clinical trial data demonstrating that oral anticoagulation (OAC) treatment is highly effective in reducing stroke for patients with atrial fibrillation (AF), OAC treatment remains underutilized in the community. Targeting emergency medicine (EM) and hospitalist physicians with electronic decision support in AF patients represents a potential opportunity to improve the use of OAC medication.
Methods: We conducted a three-center study in which two sites utilized an alert embedded in the electronic health record (EHR) and one site was randomly selected to provide usual care. The electronic alert (EA) calculated the CHADS-VASC score for clinicians and provided feedback on whether OAC therapy was appropriate. Patients were tracked following discharge from either the emergency department or hospital. The study hypothesis was to demonstrate that the EA increased the rate of OAC use by 15% compared to usual care, with a study sample size of 360 patients. Study exclusions included severe heart valve disease, advanced renal disease, and severe dementia. The primary endpoint was OAC use at the time of hospital discharge or 30 days after hospital discharge (last observation recorded).
Results: As of October 20, 265 patient records were evaluated. The mean age of the patients at the three study centers was 69.9 years (42% women) and the frequency of hypertension and diabetes was 74% and 28%. The median CHADS-VASC score was 3. The frequency of OAC use at the usual care hospital was 56.2% (95% confidence interval 47.8-64.6). At the two EA sites, the rate of OAC use at the last observation point was 40.3% (CI 31.1-50.0). Aspirin use was similar at the usual care site and the EA sites (53.4% vs. 54.6%). The rate of OAC use in patients >75 years was 60.0% (CI 46.1-73.9) in the usual care site and 41.5% (CI 25.2-57.8) at the EA sites.
Conclusions: The study demonstrates the feasibility of including an electronic alert within the EHR for patients with AF. With close to ¾ of the target sample size recruited, there is not a trend for increased OAC use at hospitals that incorporated an alert with direct clinician feedback in the EMR. Final study results will be presented at the conference.

Author Disclosure Block: S. Chaturvedi: Research Grant; Significant; Boehringer-Ingelheim. **A. Kelly**: None. **S. Prabhakaran**: None. **G. Saposnik**: None**. L. Lee**: None. **A. Malik**: None. **C. Boerman**: None. **G. Serlin**: None.

Presentation Number: LBP29

Publishing Title: Effect of Penetrating Arteries Atherosclerosis Detected by 7T MRI in Patients with Deep Isolated Ischemic Stroke

Author Block: Haiqiang Qin, Dept of Neurology, Beijing Tiantan Hosp, Capital Medical Univ, Beijing, China; Zihao Zhang, State Key Lab of Brain and Cognitive Science, Beijing MR Ctr for Brain Res, Inst of Biophysics, Chinese Acad of Sciences, Beijing, China; Lina Jing, Radiology Dept, Beijing Neurosurgical Inst, Beijing Tiantan Hosp, Capital Medical Univ, Beijing, China; Qingle Kong, Univ of Chinese Acad of Sciences, Beijing, China; Yan Zhuo, State Key Lab of Brain and Cognitive Science, Beijing MR Ctr for Brain Res, Inst of Biophysics, Chinese Acad of Sciences, Beijing, China; Yilong Wang, Liping Liu, Xingquan Zhao, Yongjun Wang, Dept of Neurology, Beijing Tiantan Hosp, Capital Medical Univ, Beijing, China

Abstract Body:
Introduction: Atherosclerosis at the proximal segment of penetrating arteries is one of etiologies of acute isolated infarct. However, evidence in vivo is scarce as the vessel wall of penetrating artery could not be investigated from 3T MRI or DSA. We aim to investigate atherosclerosis signs within penetrating arteries in vivo by 7T MRI in patients with deep isolated ischemic strokes.
Methods: Patients with acute isolated infarct in the territory of anterior Choroidal Artery (AChA) within 1 month after onset and normal 3T magnetic resonance angiography(MRA) were enrolled from January 2016 to October 2017. These patients were given 7T MRI within 1 week after 3T MRI to compare the difference between AChA imaging by 3T and 7T MRI, especially investigating arterial arteriosclerosis in internal carotid artery and AChA walls. The resolution of TOF-MRA was 0.7×0.6×0.9 mm3 at 3T and 0.23×0.23×0.36mm3 at 7T. The vessel wall imaging at 7T was implemented by a 3D turbo spin-echo sequence with the isotropic spatial resolution of 0.40mm.
Results: In the 7 patients with acute infarct in the territory of AchA (Figure A), AChA was absent in 3T MRI (Figure B), but could be clearly demonstrated 4-5 cm from their parent arteries by 7T MRI (Figure C). We found no obvious atherosclerotic lesions in the both ipsilateral and contralateral internal carotid arteries where AChA derives from. No atherosclerotic lesions were found at the proximal segment of AChAs in the contralateral sides (Figure D), while wall thickening and discontinuous flow signal in the ipsilateral sides (Figure E), along with eccentric plaques were detected in the transection of stenosis in 2 patients (Figure F).
Conclusion: The proximal segment of penetrating arteries plays an important role in the ischemic stroke in the territory of the penetrating artery, but to be further confirmed by a larger study.

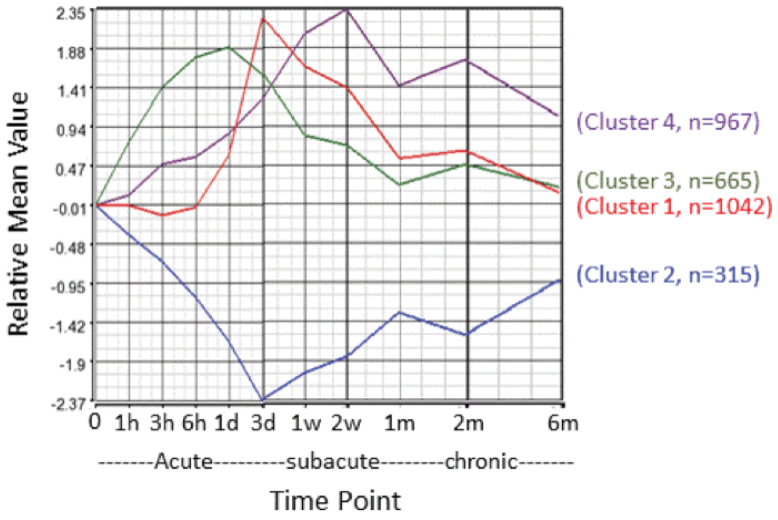
Author Disclosure Block: H. Qin: None. **Z. Zhang**: None. **L. Jing**: None. **Q. Kong**: None. **Y. Zhuo**: None. **Y. Wang**: None**. L. Liu:** None. **X. Zhao**: None. **Y. Wang**: None.

Presentation Number: LBP30

Publishing Title: Longitudinal Gene Expression Profiling Identifies Immune Components as a Predominant Molecular Signature Across Post-stroke Stages in Mouse

Author Block: Wen Fury, Regeneron Pharmaceuticals, Inc., Tarrytown, NY; Eunhee Kim, Burke-Cornell Medical Res Inst, White Plains, NY; Yu Bai, Lynn E Macdonald, Susan D Croll, Regeneron Pharmaceuticals, Inc., Tarrytown, NY; Sunghee Cho, Burke-Cornell Medical Res Inst, White Plains, NY

Abstract Body:
Objective: Recurring translational failures of stroke neuroprotection strategies suggest a better understanding of stroke pathophysiology is needed beyond the acute stage. The current study investigates the molecular signature of the mouse brain at acute, sub-acute, and chronic stages after stroke using gene expression profiling.
Method: Adult male C57Bl/6 mice were subjected to sham surgery or transient Middle Cerebral Artery Occlusion (MCAO) for 30 min. Whole genome RNA sequencing of brain tissue was performed at 0 hour (sham), and at acute (1, 3, 6, 24, 72 hours), sub-acute (1, 2 weeks) and recovery (1, 2, 6 months) phases (n=4/time point). Genes with a mean fold change >1.5 and a negative binomial test $p < 0.05$ for MCAO vs. sham were considered significantly perturbed. The significant genes were clustered by temporal pattern across time using the k-means method. Clusters were then analyzed for pathway enrichment using NextBio.
Results: MCAO perturbed 2989 ipsilateral and 822 contralateral genes at least once, and 721 ipsilateral and 98 contralateral genes at 4 or more time points, suggesting robustness of the identified gene signatures. The perturbations occurred at 3d, 1w, and 2w after stroke. There were 4 distinct cluster patterns: clusters 1, 3 and 4 were up-regulated and cluster 2 was down-regulated during the acute/subacute phase after stroke with all clusters returning towards baseline at 6 m (Figure, n = # genes/cluster). Immune system and cytokine signaling genes were the significant shared components of clusters 1, 3 and 4. Cluster 1 was also strongly involved in cell cycle/DNA repair, while cluster 2 was associated with genes of neural system, cell death, and signal transduction.
Conclusion: The comprehensive profiling study demonstrated that stroke induces persisting gene perturbation for months after MCAO, and identified that immune components are the predominant molecular signatures from acute injury through chronic recovery.



Author Disclosure Block: W. Fury: Employment; Modest; Regeneron Pharmaceuticals. **E. Kim**: None. **Y. Bai**: Employment; Modest; Regeneron Pharmaceuticals. **L.E. Macdonald**: Employment; Modest; Regeneron Pharmaceuticals. **S.D. Croll**: Employment; Modest; Regeneron Pharmaceuticals. **S. Cho**: None.

Presentation Number: LBP31

Publishing Title: Preventing Cognitive Decline and Dementia from Cerebral Small Vessel Disease: The LACI-1 Trial

Author Block: Joanna M Wardlaw, Gordon W Blair, Univ of Edinburgh, Edinburgh, United Kingdom; Jason P Appleton, Katie Flaherty, Nikola Sprigg, Univ of Nottingham, Nottingham, United Kingdom; Fergus Doubal, Julia Boyd, Univ of Edinburgh, Edinburgh, United Kingdom; Richard Dooley, Carla Richardson, Univ of Nottingham, Nottingham, United Kingdom; Iona Hamilton, Univ of Edinburgh, Edinburgh, United Kingdom; Zhe-Kang Law, Univ of Nottingham, Nottingham, United Kingdom; Yulu Shi, Univ of Edinburgh, Edinburgh, United Kingdom; Michael Stringer, Univ of Nottingham, Nottingham, United Kingdom; Michael J Thrippleton, Univ of Edinburgh, Edinburgh, United Kingdom; Philip M Bath, Univ of Nottingham, Nottingham, United Kingdom

Abstract Body:
Introduction: Lacunar stroke, a form of small vessel disease (SVD), differs pathologically from atherothrombo- or cardioembolic stroke. There is no specific secondary prevention. Licenced drugs, isosorbide mononitrate (ISMN) and cilostazol, have actions which might prevent SVD progression.
Methods: LACI-1 is a phase IIa partial factorial, dose-escalation, prospective, randomised, open-label, blinded-endpoint trial testing tolerability, safety and efficacy of ISMN and cilostazol in patients with lacunar ischaemic stroke from Edinburgh and Nottingham. Randomisation is to ISMN, cilostazol, ISMN and cilostazol, or delayed ISMN and cilostazol. Dose is escalated, as tolerated, to target dose over 11 weeks. Tolerability, safety, blood pressure, arterial stiffness, platelet function, and cerebrovascular reactivity MRI (in subgroup) are assessed before and on-treatment. The primary outcome is the proportion of patients achieving target dose. LACI-1 is powered to detect 35% (90% versus 55%) difference between those reaching target dose on one versus both drugs (80% power, significance 0.05). ISRCTN12580546.
Results: Of a planned 60 patients, 57 were enrolled (03/16-08/17): 18 (32%) female, age 66 (11), onset-randomisation 203 (range 6-920) days. Most were fully adherent (81.5%) with treatment. Headache was common with either drug initially, declined during treatment, and was not more common with the drugs taken together. There were no safety issues. Follow-up is ongoing and the main results will be available in quarter 1 2018.
Conclusion: Cilostazol and ISMN given short-term appear to be well tolerated and safe following dose escalation in patients with lacunar stroke.

Author Disclosure Block: J.M. Wardlaw: None. **G.W. Blair**: None. **J.P. Appleton**: None. **K. Flaherty**: None. **N. Sprigg**: None**. F. Doubal**: None. **J. Boyd**: None. **R. Dooley**: None. **C. Richardson**: None. **I. Hamilton**: None. **Z. Law**: None. **Y. Shi**: None. **M. Stringer**: None. **M.J. Thrippleton**: None. **P.M. Bath**: None.

Presentation Number: LBP32

Publishing Title: A Common Data Language forClinical Research Studies: Review and Updates to the National Institute of Neurological Disorders and Stroke and National Library of Medicine Unruptured Cerebral Aneurysms and Subarachnoid Hemorrhage Common Data Elements Version 1.0 Recommendations

Author Block: Muniza Sheikh, Sherita Ala'i, Joy Esterlitz, The Emmes Corp, Rockville, MD; R. Loch Macdonald, Univ of Toronto, Toronto, ON, Canada; Jose I. Suarez, Johns Hopkins Univ Sch of Med, Baltimore, MD

Abstract Body:
Introduction: In 2017, the National Institute of Neurological Disorders and Stroke (NINDS) and the National Library of Medicine (NLM) jointly developed common data elements (CDEs) for unruptured cerebral aneurysms and subarachnoid hemorrhage (SAH) research. These data standards for funded neuroscience clinical studies are available on the NINDS CDE website and are an evolving resource for investigators, requiring updates as research advancements indicate. NINDS encourages review and user feedback to continue to improve the CDEs as needed.
Methods: Once the CDEs were released to the public, the SAH Working Group (WG) began drafting manuscripts outlining their process in the development of the SAH CDEs. Revisions were also made to the domains and documents originally recommended by the WG to better align the recommendations with current SAH research. To continue this ongoing analysis, a SAH Oversight Committee will be formed, which will review the existing recommendations and provide input and updates to the SAH CDEs. Feedback from the research community is also essential and encouraged on the NINDS CDE website.
Results: The Version 1.0 SAH CDEs were made available on the NINDS CDE website in April 2017. The SAH CDEs and recommendations include those developed for acute therapies and outcomes. The website provides uniform names and structures for each data element, as well as guidance documents and template case report forms using the CDEs. The recommendations are continually being reviewed and revised as needed and will be reviewed by an Oversight Committee periodically.
Conclusion: With these data standards, the NINDS and NLM SAH joint CDE initiative strives to improve SAH data collection by increasing efficiency, improving data quality, reducing study start-up time, facilitating data sharing/meta-analyses and helping educate new clinical investigators. The NINDS encourages the use of CDEs by the clinical research community to standardize the collection of research data across studies. These newly developed SAH CDEs will serve to be a valuable starting point for researchers and facilitate streamlining and sharing data and will be updated as necessary.

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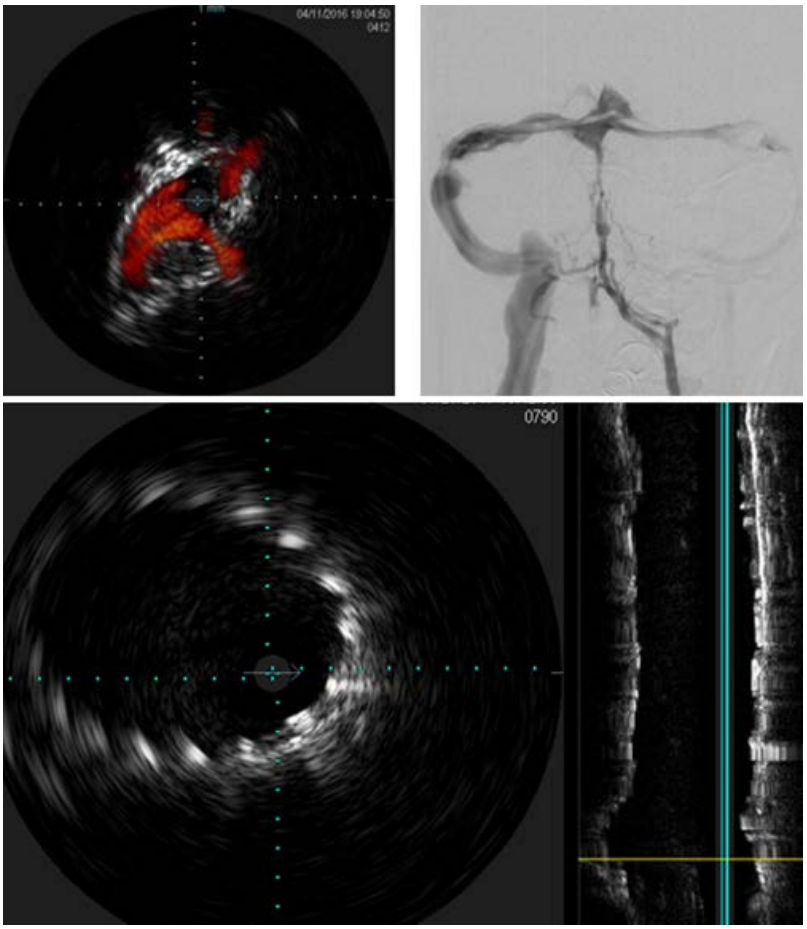
Presentation Number: LBP33

Publishing Title: Accuracy and Validity of Intravascular Ultrasound as a Clinical Adjunct for Cerebral Venous Sinus Stenosis

Author Block: **Feng Yan**, Xuming Ji, Yang Hua, Liqun Jiao, Hongqi Zhang, Feng Ling, Xuanwu Hosp , Capital Medical Univ, Beijing, China

Abstract Body:
Background: Intravascular ultrasound (IVUS) could generate high-resolution cross-sectional images and reconstruct 3D sagittal images of the vessel wall and lumen. We used IVUS as an adjunct to venous angiography for cerebral venous sinus stenosis (CVSS) which can also caused stroke. To our knowledge, it's the largest series cases of IVUS assisted in CVSS neurointervention.
Methods: During 12 patients ' venoplasty, IVUS was used before and after stenting. The IVUS catheter was performed in cerebral venous sinus and from dixmoal to proximal part of stenosis segment for comparison. Under IVUS' help, the most narrow cross-sectional area and length of the lesion lumen can be clearly defined. Information obtained on the patients included at admission, during operation, and at 3 and 6 monthes follow-up after treatment.
Results:The IVUS' imaging can accurate measure the degree of vessel stenosis, confirmed the ostium of the drainage venous branches, identified the intra- or extraluminal lesions caused stenosis, analysis of etiologic mechanism, thrombus complication and direct intravascular therapy, etc. Different stenosis types clearly visualized with IVUS such as: intraluminal thrombus (3 of 12, 25%), arachnoidal granulations (1 of 12, 8.3%), intravenous compartments (2 of 12, 16.7%) and pure vessel wall thickening (6 of 12, 50%). Intraluminal thrombus was more frequently observed in symptomatic stenosis than in asymptomatic cases ($P < 0.001$). Moreover, by the guidance of IVUS, the precise stenting implantation can be done and avoided to cover the opening of drainage vein or stray in the compartments of cerebral venous sinus in case of severe syndrom (Fig1). No technical or neurologic complications were encountered during our research.
Conclusions: IVUS is a promising tool that has potential to improve diagnostic accuracy and to guide the intervention of cerebral venous system diseases.IVUS adjunct venous precise stenting is an effective treatment for CVSS patients.



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Publishing Title: Time and Severity Dependent EMS Stroke Triage in King County, Washington: A Population Based Study

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Abstract Body:
Objective: To assess an emergency medical services (EMS) triage algorithm, whereby possible stroke patients < 6 hours from last known well (LKW) and with Los Angeles Motor Scale (LAMS) >=4 are taken directly to an endovascular stroke center.
Methods: All cases meeting triage criteria per on scene EMS providers had prospective data collection to assess final diagnosis, stroke type, presence of large vessel occlusion (LVO), key times, administration of tPA, and performance of thrombectomy. Cases not triaged that met EMS triage criteria by medical record review were actively sought (false negatives). Data collection is ongoing, all results are based on currently available data.
Results: From 1/2017 thru 9/2017, 131 cases met criteria and were triaged to endovascular stroke centers. In 30%, the endovascular stroke center was the closest hospital. Mean age was 69 years, 50% were women. The median LKW to 911 call was 23 min, 911 to hospital arrival 52 min, and depart scene to hospital 11.3 min if local vs. 22.8 min if redirected. Median door to CT was 8 min, door to tPA 36 min, and door to puncture 71 min. The positive predictive value of this triage algorithm for identification of LVO was 47% (62/131); there were 19 false negative triage LVO cases for a sensitivity of 76% (62/81). Median NIHSS was 18 in those with LVO, 11 in those without ($p < 0.0005$); 77% of LVOs included M1 occlusion and 53% received tPA. Of the 62 with LVO, 65% went for thrombectomy. The most common reasons for no thrombectomy in 22 LVO cases were: 7 outside time window, 6 rapidly improving and 5 poor ASPECTS. Of the 69 patients triaged without LVO, final diagnoses included 45% ischemic stroke (48% of these received tPA), 32% hemorrhagic stroke, 6% TIA/other stroke and 17% not a stroke. No patients were excluded from the tPA time window due to triage to a more distant stroke center.
Conclusions: In King County, WA, EMS stroke triage based on time < 6 hours and LAMS >= 4 identified a cohort where 88% had a final stroke diagnosis, 47% had a LVO, 31% went for thrombectomy and 37% were given IV tPA. For the 70% of cases diverted to a more distant endovascular stroke center, there was a median increase of 11.5 min travel time.

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