the presence and size of JBA predicts future ipsilateral ischemic stroke.

**Methods:** JBA was defined as an area of pixels with gray scale value <25 adjacent to the lumen without a visible echogenic cap, after image normalization. The size of a JBA was measured in the carotid plaque images of 1121 patients with asymptomatic carotid stenosis 50-99% in relation to the bulb (ACSRS study), followed-up for up to 8 years.

**Results:** JBA had a linear association with future stroke rate. The area under the ROC curve was 0.816. Using Kaplan Meier curves, the mean annual stroke rate was 0.4% in 706 patients with JBA <4 mm²; it was 1.4% in 171 patients with JBA 4-8 mm², 3.2% in 46 patients with JBA 8-10 mm² and 5% in 198 patients with JBA >10 mm² (P <.001). In a Cox model with ipsilateral ischemic events (AE, TIA or stroke) as the dependent variable, JBA (<4, 4-8, >8) was still significant after adjusting for other plaque features known to be associated with increased risk (stenosis, GSM, presence of discrete white areas without acoustic shadowing (DWA) indicating neovascularization, plaque area and history of contralateral TIA or stroke). Plaque area and gray scale median (GSM) were not significant. Using the significant variables (stenosis, DWA, JBA and history of contralateral TIA or stroke), this model predicted the annual risk of stroke (range 0.5-10.0%). The average annual stroke risk was <1% in 734 patients, 1-1.9% in 94, 2-3.9% in 134, 4-5.9% in 125 and 6-10% in 34.

**Conclusions:** The size of JBA is linearly related to the risk of stroke and can be used in risk stratification models. These findings need to be confirmed in future prospective studies or in the medical arm of randomized controlled studies in the presence of optimal medical therapy.

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**SS29. The Hemodynamic Impact of Balloon Angioplasty in Multiple Sclerosis Patients with Chronic Cerebrospinal Venous Insufficiency**

Manish Mehta, R. Clement Darling, Sean P. Roddy, Paul B. Kreienberg, John B. Taggart, Kathleen J. Oszvath, Jorge Rey, Dhiraj M. Shah. The Institute for Vascular Health and Disease, Albany Medical College/Albany Medical Center Hospital, Albany, NY

**Objectives:** Recently an association has been made between Multiple Sclerosis (MS) and Chronic Cerebrospinal Venous Insufficiency (CCSVI) characterized by stenosis and reflux of the principal extracranial venous drainage including the Internal Jugular veins (IJV) and the Azygous veins (AZV). This is the first angiographic study to quantitatively analyze the impact of percutaneous balloon angioplasty (PTA) on flow dynamics across these lesions.

**Methods:** 50 IJV form MS patients with CCSVI and 12 IJV from healthy volunteers underwent detailed angiographic evaluation. Technical components of all venograms were standardized. Quantitative analysis included the contrast time of flight (TOF) from the mid IJV to the superior vena cava, and the primary venous emptying time (PVET), quantified as >50% of venous emptying, from the IJV. The TOF and PVET were recorded in patients with CCSVI prior and subsequent to balloon angioplasty, as well in normal healthy subjects. All data was prospectively collected, and statistical analysis was performed using two-tailed Student’s t-test.

**Results:** Of the 50 CCSVI-MS patients with IJV stenosis >70% and reflux underwent balloon angioplasty, technical success defined as <20% residual IJV stenosis was achieved in 78% (44/50). The Table describes the pre and post angioplasty TOF and PVET in patients with CCSVI, as well as in healthy non-MS patients without any treatment. CCSVI patients were noted to have a significant improvement in both the TOF and PVET following balloon angioplasty that paralleled healthy non-MS subjects.

**Conclusions:** Results of this prospective pilot study suggest an association between MS and CCSVI, which results in abnormally elevated TOF and PVET through the IJV. Furthermore, balloon angioplasty these lesions improves the hemodynamic parameters that are comparable to healthy non-MS patients.

**Table.**

<table>
<thead>
<tr>
<th>MS patients with CCSVI</th>
<th>Healthy Non-MS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-angioplasty</td>
<td>Post-angioplasty</td>
</tr>
<tr>
<td>TOF</td>
<td>PVET</td>
</tr>
<tr>
<td>Mean time (sec.)</td>
<td>5.28</td>
</tr>
<tr>
<td>St. dev.</td>
<td>2.52</td>
</tr>
</tbody>
</table>

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**R1: Rapid Paced Paper Session I**

**RR1. Safety of Carotid Stenting (CAS) Is Based on the Center Experience More than on the Individual Performance**

Gianbattista Parlani1, Paola De Rango1, Fabio Verzini1, Enrico Cieri1, Gioele Simone1, Piergiorgio Cao2, 1Vascular and Endovascular Surgery; University of Perugia, Perugia, Italy; 2Vascular Surgery, Hospital S. Camillo Forlanini, Rome, Italy
Objectives: Relevance of training has been recognized as a key factor for safety of Carotid stenting (CAS).

The objective of this study was to evaluate whether the center learning curve could shortcut the training of new trainees with CAS.

Methods: Consecutive CAS procedures performed from 2001 to 2010 were reviewed. The learning curve phase (years 2001-2003) was performed by the “leader team” ("historical team") including vascular surgeons and interventional radiologists who first approached CAS. Learning curve included acquisition of handle skill with CAS procedural steps and best selection of patients and materials. Periprocedural complications after the learning curve in the “leader team phase” (the historical team continued to perform all procedures in 2004-2006) and in the “expanded team phase” (5 new trainees joined the historical team 2006-2010) were measured.

Results: A total of 1540 CAS were reviewed. The first 195 represented the learning curve. Of the remaining 1345 CAS, 431 were performed in the “leader phase” and 914 in the “expanded team phase”. Individual operator volume for the new trainees ranged from 20 to 188 CAS. Periprocedural complications were similarly low in the two phases: strokes (2.8% vs 2.2%; P = .56) major strokes (0.9% vs 0.8%, P = .75), death (0.2% vs 0%; P = .3) for the leader and expanded team phase respectively. Mean procedure time was longer (43 min vs 38 min) in the expanded team phase, while rates of immediate conversions (1.0% vs 3.5%, P = .03) and mean contrast use (69mL vs 92mL; \( P < .0001 \)) decreased.

Conclusions: The primary factor driving stroke reduction with CAS is the center experience. CAS complication rate is not based on individual rules but most likely on the center/team practice also defining how to select patients and materials best suited for the procedure. Appropriate learning curve of the center can reliably shortcut the training of new trainees preserving CAS safety and efficacy.

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RR2.

The Influence of Gender on Functional Outcomes of Lower Extremity Bypass

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Objectives: The purpose of this study was to evaluate the impact of gender on late functional outcomes of lower extremity bypass (LEB).

Methods: We reviewed 3,301 patients (1,060; 32% females) undergoing LEB in the Vascular Surgery Group of New England from January 2003 to June 2010 to assess procedural outcomes, independent living, and ambulatory status according to preoperative baseline. Logistic regression models adjusted for differences between genders and potential confounders (age, race, smoking, indication, preoperative ambulation, statin use, conduit, and length of follow up). Ambulation and living status were analyzed by life table analysis.

Results: On univariate analysis woman had less CAD (35% vs. 40 %, \( P < .001 \)), smoking (75% vs. 89%, \( P = .002 \)), and autogenous conduits (63% vs. 71%, \( P < .001 \)). Women had higher rates of reoperation for thrombosis (4% vs. 2%; OR 2.09, \( P < .001 \)) or infection (2% vs. 1%; OR 2.36, \( P = .02 \)) without differences in graft patency (94% vs. 95%; \( P = .25 \)) or mortality (2.1% vs. 2.1%; \( P = .84 \)) at discharge. Multivariate analysis showed fewer women were discharged home (63% vs. 73%; OR 0.72, \( P < .001 \)) and ambulating at discharge (90% vs. 93%; OR 0.65, \( P = .009 \)) regardless of preoperative ambulation. At long-term follow-up fewer women lived independently (HR 1.46, \( P = .06 \)) and significantly fewer were ambulatory (HR 1.65, \( P = .004 \)) (Fig).

Conclusions: Women have similar procedural-related complications but slightly inferior early and late functional outcomes after LEB. These findings may help define physician and patient expectations in women before revascularization.

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