

Objectives: The impact of severe (>70%) contralateral carotid stenosis or occlusion (SCSO) on outcomes following carotid endarterectomy (CEA) is controversial. This study evaluated the effect of SCSO on outcomes following CEA.

Methods: All patients undergoing carotid endarterectomy at a single institution were retrospectively stratified according to the presence of SCSO. The peri-operative outcomes of CEA in the presence of SCSO were analyzed using univariate and multivariable methods.

Results: There were 2945 CEA performed from 1/89 to 1/06, including 736 (25%) patients with SCSO. Patients identified with SCSO had a higher rate of prior contralateral CEA (44% vs 21%; $P < .01$), positive intra-operative EEG changes (31% vs 17%; $P < .01$), and use of an intra-operative shunt (40% vs 28%; $P < .01$). Univariate analysis identified SCSO as a risk factor for any stroke (2.8% vs 1.5%; $P = .02$), death (2.2% vs 1.1%; $P = .03$), and any stroke/death (4.3% vs 2.4%; $P < .01$), but not ipsilateral stroke (1.6% vs 1.2%; $P = .4$). Multivariable regression demonstrated SCSO as an independent predictor of any stroke (OR1.8 [95% CI: 1-3.3]; $P = .05$) and any stroke/death (OR1.7[95% CI: 1.1-2.7]; $P = .02$), without increasing risk of ipsilateral stroke (OR1.3[95% CI: 0.6-2.7]; $P = .2$). The presence of SCSO was also associated with a higher risk of late mortality (HR1.3 [95% CI: 1.1-1.4]; $P < .01$).

Conclusions: Although the presence of SCSO is a risk factor for any stroke/death with CEA, it does not increase the risk of ipsilateral stroke. These data suggest that increased attention to peri-operative medical and hemodynamic management should be especially considered in this patient cohort as the observed strokes do not occur in the territory at risk from the surgical procedure.

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PVSS8.

A Longitudinal Analysis of the Impact of Cumulative Intravenous Contrast Exposure on Renal Function in Patients With Occlusive and Aneurysmal Vascular Disease

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Objectives: Patients with occlusive or aneurysmal vascular disease are repeatedly exposed to intravenous (IV) contrast for diagnostic or therapeutic purposes. We sought to determine the long-term impact of cumulative iodinated IV contrast exposure (CIVCE) on renal function, the later defined with National Kidney Foundation (NKF) criteria.

Methods: We conducted a longitudinal analysis on consecutive patients without renal insufficiency at baseline (NFK stage I or II) who underwent interventions for

arterial occlusive or aneurysmal disease. We collected detailed data on any IV iodinated contrast exposure (including diagnostic or therapeutic angiography, cardiac catheterization, IV pyelography, computed tomography (CT) with IV contrast, and CT angiography); medication exposure throughout the observation period; comorbidities; and demographics. Primary end point was the development of renal failure (RF) (defined as NFK stage 4 or 5). Analysis was performed using a Cox Regression frailty model with clustering at the patient level.

Results: Patients (n = 1298) had a mean follow-up of 5.8 (range, 2.2-14) years. In the multivariate model with RF as dependent variable and after adjusting for the statistically significant covariates of baseline renal function (HR, 0.94; $P < .001$), age (HR, 0.42; $P < .001$), diabetes (HR, 2.2; $P = .013$), and congestive heart failure (HR, 3.2; $P < .001$), CIVCE remained an independent predictor of RF development (HR, 1.15; $P < .001$). In the multivariate survival analysis model and after adjusting for the statistically significant covariates of the newly developed RF (HR, 5.1; $P < .001$), perioperative myocardial infarction (HR, 5.2; $P = .004$), age (HR, 1.5; $P = .01$), total number of open operations (HR, 2.1; $P < .001$) and serum albumin (HR, 0.4; $P < .001$), CIVCE was an independent predictor of mortality (HR, 1.14; $P < .001$).

Conclusions: Cumulative IV iodinated contrast exposure is an independent predictor of renal failure and mortality in patients with occlusive and aneurysmal vascular disease.

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PVSS9.

Endothelial Function and Geometric Remodeling of Arterialized Vein Grafts Are Asynchronous

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Objectives: Lower extremity vein bypass grafts (LEVBG) undergo geometric remodeling within the first month of surgery which directly correlates with subsequent patency. Veins are less vasoreactive than arteries and the extent of biochemical adaptation by vein grafts in the arterial environment is unknown. Flow-mediated vasodilation (FMD) measures endothelial-dependent vasodilation in response to hyperemia. We hypothesized that geometric remodeling of venous conduits would be correlated with endothelial function after LEVBG.

Methods: Patients undergoing LEVBG were prospectively enrolled. Brachial artery FMD was performed at baseline and vein graft FMD studies were performed at intervals following LEVBG.

Results: A total of 57 patients, median age 64 years (IQR, 61-71) with median follow-up 17 months (IQR, 10-32), were included. Most patients (91%) were male, 75% were white, 49% had diabetes, 81% were on a statin and the

median baseline hsCRP was 6.2 mg/L (IQR, 2.4-10). Most vein grafts (68%) were single-segment great saphenous vein and 63% were femoral-popliteal bypasses. Mean baseline brachial artery FMD was $7.6 \pm 4.5\%$. Mean graft lumen diameter increased from 4.3 ± 0.8 mm at surgery to 4.7 ± 0.8 mm at 3 months. There was a significant correlation between initial lumen diameter and 0-3 months remodeling ($r = -.48$; $P = .02$). No correlation was seen between brachial FMD and vein graft FMD. Mature (≥ 12 months) grafts had significantly higher FMD than early (3 months) grafts ($4.5 \pm 2.7\%$ vs $0.6 \pm 1.9\%$; $P < .0005$) and there was a significant positive correlation between early and late graft FMD ($r = .64$; $P = .01$). We did not observe a significant correlation between early graft remodeling and either brachial or vein graft FMD.

Conclusions: LEVVG patients have endothelial dysfunction demonstrated by impaired brachial artery FMD. Veins grafts exhibit recovery of endothelial function over the first year of implantation. However, early geometric remodeling appears asynchronous from physiologic endothelial recovery in the arterialized vein.

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PVSS10.

The Society for Vascular Surgery's Objective Performance Goals for Critical Limb Ischemia Are Attainable With Contemporary Endovascular Therapy
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Objectives: The Society for Vascular Surgery's Objective Performance Goals (SVS OPGs) for critical limb ischemia (CLI) are derived from bypass surgery outcomes in a pooled cohort from 3 randomized trials. We examine the effectiveness of endovascular therapy (ET) for CLI in using OPG efficacy benchmarks.

Methods: CLI patients undergoing ET (2006-2012), were identified in a prospectively maintained database. Unadjusted outcomes were used for comparisons to the

overall OPG cohort, as well as between anatomic and clinical high-risk subgroups. ET-specific regression models for each OPG end point identified risk factors for poor outcome.

Results: 283 CLI patients underwent ET for tissue loss (77%) or rest pain. Compared to the OPG cohort ($n = 838$), patients undergoing ET were more likely to be >80 years old (32% vs 19%; $P < .0001$), female (51% vs 34%; $P < .0001$), have end stage renal disease (ESRD) (15% vs 0%; $P < .0001$), or anatomic high-risk features (73% vs 60%; $P = .002$). The mean reintervention rate after ET was 0.67 per limb-year. The overall effectiveness of ET, with subgroup analysis, is summarized in the Table.

Conclusions: Although survival-based benchmarks may be difficult to achieve in "real world" practice that includes poor surgical candidates and those with ESRD, most SVS OPGs are attainable with contemporary endovascular therapy. These findings not only support the role of ET in the management of CLI, but underscore the utility of SVS OPGs for comparative effectiveness and outcomes research.

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V2: Peripheral Vascular Surgery Society Paper Session II

PVSS11.

Intervention, Failure Mechanism, Patency, Wound Complications, and Limb Salvage in Open Versus Endoscopic Greater Saphenous Vein Harvest for Lower Extremity Revascularization

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Objectives: Determine intervention rates, failure mechanisms, patency, wound complications and limb salvage after lower extremity revascularization using open (OVH) vs endoscopic vein harvest (EVH).

Methods: Single institution review of consecutive patients between 2005 and 2012, who underwent infringuinal bypass with reversed greater saphenous vein (GSV).

Table. One year results with endovascular therapy compared to suggested OPGs

Outcome metric	Overall		Clinical high risk		Anatomic high risk	
	OPG (n = 838)	Endo (n = 283)	OPG (n = 136)	Endo (n = 56)	OPG (n = 505)	Endo (n = 206)
Major adverse limb event or post-op death (MALE + POD)	71%	73 ± 3%	61%	69 ± 8%	67%	73 ± 5%
Amputation-free survival (AFS)	71%	66 ± 3%	53%	60 ± 7%	68%	66 ± 4%
Reintervention, amputation, or stenosis (RAS)	39%	43 ± 4%	29%	47 ± 8%	36%	56 ± 5%
Reintervention or amputation (RAO)	55%	60 ± 4%	54%	53 ± 8%	51%	59 ± 5%
Limb salvage	84%	85 ± 3%	80%	82 ± 7%	81%	83 ± 4%
Survival	80%	74 ± 3%	63%	69 ± 7%	80%	77 ± 4%

Rates reported as freedom from adverse events.