

## JVS ABSTRACTS

## Selected Abstracts from the April 2022 Issues of the *Journal of Vascular Surgery* and the *Journal of Vascular Surgery: Venous and Lymphatic Disorders* ☆

Editors: Peter Gloviczki and Peter F. Lawrence

### From the Society for Clinical Vascular Surgery

#### Predictors of mortality in nonagenarians undergoing abdominal aortic aneurysm repair: analysis of the National Surgical Quality Improvement Program dataset

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**Background** The present study used the American College of Surgeons National Surgical Quality Improvement Program dataset to identify the predictors of 30-day mortality for nonagenarians undergoing endovascular aortic aneurysm repair (EVAR) or open surgical repair (OSR).

**Methods** Patients aged >90 years who had undergone abdominal aortic aneurysm repair from 2005 to 2017 were identified using procedure codes. Those with operative times <15 minutes were excluded. The demographics, preoperative comorbidities, and postoperative complications of those who had died by 30 days were compared with those of the patients alive at 30 days.

**Results** A total of 1356 nonagenarians met the criteria: 1229 (90.6%) had undergone EVAR and 127 (9.4%) had undergone OSR. The overall 30-day mortality was 10.4%. The patients who had died within 30 days were significantly more likely to have undergone OSR than EVAR (40.9% vs 7.2%;  $P < .001$ ). They also had a greater incidence of dependent functional status (22.0% for those who had died vs 8.1% for those alive at 30 days;  $P < .001$ ), American Society of Anesthesiology (ASA) classification of  $\geq 4$  (81.2% vs 18.8%;  $P < .001$ ), perioperative blood transfusion (59.6% vs 20.3%;  $P < .001$ ), postoperative pneumonia (12.1% vs 2.9%;  $P = .001$ ), mechanical ventilation >48 hours (22.7% vs 2.6%;  $P < .001$ ), and acute renal failure (12.1% vs 0.5%;  $P < .001$ ). The EVAR group had a 30-day mortality rate of 2.6% in 1008 elective cases and 28.6% in 221 emergent cases. The OSR group had a 30-day mortality rate of 19.1% in 47 elective cases and 53.7% in 80 emergent cases. In the EVAR cohort, the 30-day mortality group had had a significantly greater incidence of dependent functional status (17% for those who had died vs 8% for those alive at 30 days;  $P = .004$ ), ASA classification of  $\geq 4$  (76.4% vs 40.3%;  $P < .001$ ), perioperative blood

transfusion (57% vs 19%;  $P < .001$ ), emergency surgery (71% vs 14%;  $P < .001$ ), and longer operative times (150 vs 128 minutes;  $P = .001$ ).

**Conclusions** Nonagenarians had an incrementally increased, but acceptable, risk of 30-day mortality with EVAR in elective and emergent cases compared with that reported for octogenarians and cohorts of patients not selected for age. We found greater mortality for patients with dependent status, a higher ASA classification, emergent repair, and OSR. These preoperative risk factors could help identify the best surgical candidates. Given these results, consideration for EVAR or OSR might be reasonable for highly selected patients, especially for elective patients with a larger abdominal aortic aneurysm diameter for whom the risk of rupture is higher.

### Treatment of carotid stenosis in asymptomatic, non-octogenarian, standard risk patients with stenting versus endarterectomy trials

*Presented at the International Stroke Conference, Honolulu, HI, February 6-8, 2019.*

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**Objective** Asymptomatic carotid stenosis is the most frequent indication for carotid endarterectomy (CEA) in the United States. Published trials and guidelines support CEA indications in selected patients with longer projected survival and when periprocedural complications are low. Transfemoral carotid artery stenting with embolic protection (CAS) is a newer treatment option. The objective of this study was to compare outcomes in asymptomatic, nonoctogenarian patients treated with CAS vs CEA.

**Methods** Patient-level data was analyzed from 2544 subjects with  $\geq 70\%$  asymptomatic carotid stenosis who were randomized to CAS or CEA in addition to standard medical therapy. One trial enrolled 1091 (548 CAS, 543 CEA) and another enrolled 1453 (1089 CAS, 364 CEA) asymptomatic patients less than 80 years old (upper age eligibility). Independent neurologic assessment and routine cardiac enzyme screening were performed. The prespecified, primary composite endpoint was any stroke, myocardial infarction, or

death during the periprocedural period or ipsilateral stroke within 4 years after randomization.

**Results** There was no significant difference in the primary endpoint between CAS and CEA (5.3% vs 5.1%; hazard ratio, 1.02; 95% confidence interval, 0.7-1.5;  $P = .91$ ). Periprocedural rates for the components are (CAS vs CEA): any stroke (2.7% vs 1.5%;  $P = .07$ ), myocardial infarction (0.6% vs 1.7%;  $P = .01$ ), death (0.1% vs 0.2%;  $P = .62$ ), and any stroke or death (2.7% vs 1.6%;  $P = .07$ ). After this period, the rates of ipsilateral stroke were similar (2.3% vs 2.2%;  $P = .97$ ).

**Conclusions** In a pooled analysis of two large randomized trials of CAS and CEA in asymptomatic, nonoctogenarian patients, CAS achieves comparable short- and long-term results to CEA.

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## From the Society for Clinical Vascular Surgery

### Outcomes of carotid artery stenting in patients with radiation arteritis compared with those with atherosclerotic disease

*Presented at the Carotid Scientific Session at the Society for Clinical Vascular Surgery 48th Annual Symposium, Miami, Fla, March 13-17, 2021.*

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**Objective** Head and neck malignancies are often treated with radiotherapy (RT). Nearly 80% of patients who have undergone RT will develop carotid radiation arteritis to some degree and 29% will develop stenosis >50%. Surgery in a radiated neck has higher rates of complications, and carotid artery stenting (CAS) has become the primary therapy. The outcomes for CAS in patients with radiation arteritis have not been rigorously evaluated. The objective of the present study was to evaluate the differences in perioperative outcomes, restenosis rates, the need for reintervention, and freedom from mortality between RT patients and patients with atherosclerotic disease who had undergone CAS.

**Methods** The national Vascular Quality Initiative CAS dataset from 2016 to 2019 comprised the sample for analyses ( $n = 7343$ ). The primary independent variable was previous head and/or neck RT. The primary endpoint was the interval to mortality. The secondary endpoints were the cumulative incidence of restenosis (>50% and >70% by duplex ultrasound) and reintervention. We also examined the following secondary perioperative endpoints: myocardial infarction, in-hospital mortality (death before discharge), neurologic events, ipsilateral stroke, and contralateral stroke. Kaplan-Meier and multivariable Cox proportional hazard models were used to assess for mortality, and cumulative incidence function estimates were used for the nonfatal endpoints.

**Results** Of the 7218 patients, 1199 (17%) had undergone prior RT. We found a significant difference in the 3-year estimates of mortality for those with and without prior RT (9.4% and 7.5%, respectively;  $P = .03$ ). Furthermore, on adjusted analysis, we observed a 58% increase in the risk of mortality for those with prior RT (adjusted hazard ratio, 1.58; 95% confidence interval, 1.13-2.21). We did not observe any differences in the risk of perioperative complications (myocardial infarction, in-hospital mortality, ipsilateral or contralateral stroke), restenosis (>50% or

>70%), or reintervention for the prior RT group compared with those without RT.

**Conclusions** The CAS patients with RT had significantly greater mortality at all time points compared with those without RT, even after adjusting for other covariates. No significant difference was found in the incidence of perioperative complications, reintervention, or restenosis between the two groups. The present study is unique because of the large sample size and length of follow-up. The results suggest that for this high-risk group, CAS provides the same patency as it does for atherosclerotic carotid stenosis and avoids potentially morbid cranial nerve injury and wound healing complications.

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## From the Society for Clinical Vascular Surgery

### Hospital-based delays to revascularization increase risk of postoperative mortality and short bowel syndrome in acute mesenteric ischemia

*Presented at the Forty-eighth Annual Symposium of the Society for Clinical Vascular Surgery, Miami, Fla, March 13-17, 2021.*

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**Objective** Acute mesenteric ischemia (AMI) is a surgical emergency for which delays in treatment have been closely associated with high morbidity and mortality. Although the duration of ischemia as a determinant of outcomes for AMI is well known, the objective of this study was to identify hospital-based determinants of delayed revascularization and their effects on postoperative morbidity and mortality in AMI.

**Methods** All patients who underwent any surgery for AMI from a multi-center hospital system between 2010 and 2020 were divided into two groups based on timeliness of mesenteric revascularization after presentation. Early revascularization (ER) was defined as having both vascular consultation ≤12 hours of presentation and vascular surgery performed at the patient's initial operation. Delayed revascularization (DR) was defined as having either delays to vascular consultation or vascular surgery. A retrospective review of demographic and postoperative data was performed. The effect of DR on major postoperative outcomes, including 30-day and 2-year mortality, total length of bowel resection, and development of short bowel syndrome, were analyzed. Effects of delayed vascular consultation alone, delayed vascular surgery alone, no revascularization during admission, and admitting service on outcomes were also examined on subgroup analyses.

**Results** A total of 212 patients were analyzed. Ninety-nine patients received ER, whereas the remaining 113 patients experienced a DR after hospital presentation. Among the DR group, 55 patients (25.9%) had delayed vascular consultation, whereas vascular surgery was deferred until after the initial operation in 37 patients (17.4%). Fifty-one patients (24.0%) were never revascularized during admission. DR was a significant predictor of 30-day (odds ratio [OR], 2.09; 95% confidence interval [CI], 1.4-4.9;  $P = .03$ ) and 2-year mortality (hazard ratio, 1.55, 95% CI, 1.0-2.3;  $P = .04$ ). DR