

Table. Outcomes by degree of kidney disease

Complications	Moderate kidney disease, %			Severe kidney disease, %		
	OP (n = 2371)	EP (n = 1446)	P	OP (n = 311)	EP (n = 185)	P
Mortality	1.6	0.7	.01	4.5	0	.003
Worsening renal function	1.1	0.4	.01	4.2	1.1	.05
Cardiac events	2.9	1.2	.001	8.0	2.7	.01
Respiratory events	2.8	1.1	.0004	6.1	1.1	.007
Composite outcome	5.8	2.1	<.0001	14.8	3.8	.0001

EP, Endovascular procedure; OP, open procedure.

hypertension (89.9% vs 90.4%, $P = .61$). OPs were associated with higher mortality rates (1.9% vs 0.6%, $P = .0004$), postoperative worsening of renal function (1.4% vs 0.4%, $P = .002$), cardiac events (3.5% vs 1.4%, $P < .0001$), respiratory complications (3.2% vs 1.1%, $P < .0001$), and combined outcomes (6.8% vs 2.3%, $P < .0001$). The Table reports results for stratified analyses. Significantly worse outcomes with OP vs EP techniques persisted in multivariate logistic regression models adjusted for group differences.

Conclusions: In patients with moderate or severe kidney disease, endovascular revascularization is associated with lower mortality and reduced postoperative complications compared with open revascularization.

Disclosures: J. Benarroch-Gampel: Nothing to disclose; O. A. Nunez Lopez: Nothing to disclose; C. C. Cheng: Nothing to disclose; Z. F. Cheema: Nothing to disclose; M. B. Silva: Advisory Committee/Review Panel and/or Institutional Training Grants and Clinical Trial Support—Abbott Vascular, W. L. Gore, Boston Scientific

Aneurysmal Degeneration of Medically-Managed Acute Type B Aortic Dissections[†]

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Objectives: Patients with uncomplicated type B aortic dissections who are managed medically are at risk of aneurysmal degeneration over time. However, there is hope that improvement in antihypertensive medications and stricter blood pressure control will halt this process. The goal of this study was to determine the rate of aneurysmal degeneration in a contemporary cohort of patients with medically treated type B dissection.

Methods: All patients with acute uncomplicated type B aortic dissection who were initially managed medically between March 1999 and March 2011 and had at least two separate axial imaging studies were included. Maximum aortic growth was calculated by comparing the initial imaging study with the most current scan or imaging obtained just before any aortic-related intervention. Predictors of aortic aneurysmal degeneration were determined using Cox proportional hazards models.

Results: A total of 200 patients (61% male) with medically managed acute type B dissections receiving multiple imaging studies were identified. Average age was 63.4 years and 75.5% had a history of hypertension. Mean follow-up was 5.3 years (range, 0.1-14.7 years). Mean time between initial and final imaging studies was 3.2 years (range, 0.1-12.9 years). At 5 years, only 51% were free from aortic growth. Fifty-six patients (28%) required operative intervention (50 open, 6 endovascular repair) for aneurysmal degeneration, and the actuarial 5-year freedom from intervention was 76%. Mean rate of aneurysmal degeneration was 24.7 mm/y. Excluding early rapid degeneration requiring intervention within the first 2 weeks (5 patients [2.5%]), the mean rate of aneurysmal degeneration was 12.3 mm/y for the maximal lumen diameter, 3.8 mm/y for the true lumen diameter, and 8.6 mm/y for the false lumen diameter. Only presenting size >3.5 cm was predictive of future growth (odds ratio, 2.95; 95% confidence interval, 1.64-5.32; $P < .001$).

Conclusions: Although medical management of uncomplicated acute, type B aortic dissections remains the standard of care, a significant number of patients will require operative intervention for aneurysmal degeneration at 5 years. An initial aortic diameter >3.5 cm is predictive of future growth.

Disclosures: C. A. Durham: Nothing to disclose; N. J. Aranson: Nothing to disclose; E. A. Ergul: Nothing to disclose; L. J. Wang: Nothing to

disclose; V. I. Patel: Nothing to disclose; R. P. Cambria: Nothing to disclose; M. F. Conrad: Nothing to disclose

Fenestrated Endovascular Repair of Abdominal Aortic Aneurysms Is Associated With Comparable Early Morbidity and Mortality to Infrarenal EVAR[‡]

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Objectives: Previous studies have found an increase in complication rates after open repair of complex abdominal aortic aneurysms (AAAs) compared with infrarenal AAAs, with some reporting increased mortality as well. Little is known about the complication rates of complex fenestrated endovascular aneurysm repair (FEVAR) compared with standard infrarenal EVAR. The goal of this study was to compare complication rates of FEVAR vs EVAR of AAAs.

Methods: The American College of Surgeons National Surgical Quality Improvement Program database from 2005 to 2012 was queried for AAAs (International Classification of Diseases, 9th edition, 441.4). Patients were stratified according to procedure (FEVAR vs EVAR). A bivariate analysis was done to assess preoperative and intraoperative risk factors for postoperative 30-day outcomes. Multivariable logistic regression was conducted to identify independent associations.

Results: A total of 458 patients underwent FEVAR and 19,060 patients underwent EVAR for AAA. Patients undergoing FEVAR were older ($P = .02$) and less likely to have a bleeding disorder ($P = .046$). The groups were otherwise matched for comorbidities. FEVAR was associated with increased operative time (182 vs 153 minutes, $P < .001$) and postoperative length of stay (3.3 vs 2.8 days, $P = .03$). There was a statistically significant increase in postoperative transfusions (15.3% vs 6.1%, $P < .001$) and trends toward increased cardiac complications (2.2% vs 1.3%, $P = .09$) and the need for dialysis (1.5% vs 0.8%, $P = .08$) in the FEVAR group. Mortality (2.4% vs 1.5%, $P = .12$) and other complication rates were similar. On multivariable analysis, FEVAR remained independently associated with the need for postoperative transfusions (odds ratio, 2.48; 95% confidence interval, 1.87-3.28; $P < .001$).

Conclusions: Unlike open repair, FEVAR and EVAR for AAA have similar outcomes with no difference in mortality. Although FEVAR was associated with increased postoperative transfusions, this was not associated with an increased rate of return to the operating room or mortality. Thus, FEVAR can be performed safely outside of the clinical trial setting with minimal increased risks compared with infrarenal EVAR.

Disclosures: N. O. Glebova: Nothing to disclose; S. Selvarajah: Nothing to disclose; J. H. Black: Consulting fee, Cook Medical; M. B. Malas: Nothing to disclose; B. A. Perler: Nothing to disclose; C. J. Abularrage: Nothing to disclose

Impact of Gender on Outcomes of Peripheral Vascular Interventions[†]

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Objectives: This study evaluated the impact of gender on early and late outcomes of peripheral vascular interventions (PVI) for intermittent claudication (IC) and critical limb ischemia (CLI).

Methods: We reviewed 3338 patients (1316 [39%] women) undergoing PVI for IC (1892 [57%]) or CLI (1446 [43%]) in the Vascular Study

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Group of New England from January 2010 to June 2012. Kaplan-Meier analysis evaluated relationships between gender and primary outcomes of major amputation and overall survival at 1 year.

Results: Indications for PVI included IC in 719 (22%) vs 1173 (35%) and CLI in 597 (18%) vs 849 (25%), women and men, respectively. Women were older (69 vs 66 mean years, $P < .00001$) with less diabetes (43% vs 49%, $P = .01$), renal insufficiency (4.6% vs 7.3%, $P = .0029$), coronary artery disease (28% vs 35%, $P < .00001$), smoking (76% vs 86%, $P = .01$), and statin use (60% vs 64%, $P = .0058$). Women were more likely to present with CLI (45% vs 42%, $P = .0028$) and ambulate with assistance (16% vs 12%, $P = .0016$). Technical success (95% vs 94%, $P = .11$), vascular injury (1.3% vs 1.0%, $P = .82$), and embolization (1.6% vs 1.3%, $P = .46$) were similar, with higher rates of hematoma (7.1% vs 3.4%, $P < .0001$) and access-site occlusion (0.91% vs 0.24%, $P = .0085$) in women. There were no differences in 1-year major amputation rates between men and women for patients with IC or CLI. Survival at 1 year was similar between women and men with IC (95% vs 96%, $P = .19$) and CLI (77% vs 79%, $P = .35$). The model demonstrated moderate discriminative ability (receiver-operating characteristic curve, 0.81; Fig, Table).

Conclusions: Procedural morbidity was modestly greater in women, with higher rates of hematoma and access-site occlusion. We found no gender disparity in amputation rates or overall survival in patients undergoing PVIs for claudication or CLI. Further study is necessary to determine if gender should play a role in selection of therapy for patients harboring lower extremity occlusive disease.

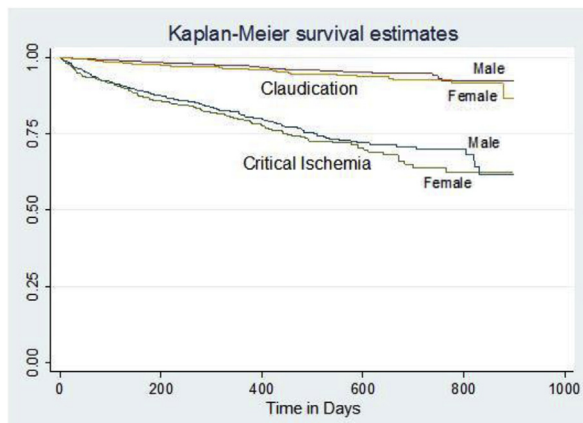


Fig. Kaplan-Meier survival estimates.

Table. Predictors of overall survival after peripheral vascular intervention

Variable	OR	95% CI	P
Age	1.04	1.02-1.06	.0001
Claudication	0.41	0.30-0.57	.0001
Congestive heart failure	2.32	1.70-3.18	.0001
COPD	1.57	1.15-2.13	.004
Nonambulatory pre-op	2.83	1.57-5.10	.001
β-Blocker use	1.42	1.03-1.96	.034

CI, Confidence interval; COPD, chronic obstructive pulmonary disease; OR, odds ratio.

Disclosures: K. Ferranti: Nothing to disclose; T. M. Osler: Nothing to disclose; R. Duffy: Nothing to disclose; A. C. Stanley: Nothing to disclose; D. J. Bertges: Nothing to disclose

Differential Effect of Atherosclerotic Risk Factors on Vascular Disease Phenotypes Between the Sexes

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Objectives: Most reported studies on atherosclerosis involve a predominance of men. There is a lack of information into the specific role of

atherosclerotic risk factors and their effects on the development of peripheral vascular diseases in women. The goal of this study was to analyze the association of known risk factors and the prevalence peripheral arterial disease (PAD), carotid stenosis (CS), and abdominal aortic aneurysm (AAA) in men and women.

Methods: Data of 3,696,778 individuals who underwent vascular screening examinations were used. PAD was defined as an ankle-brachial index of ≤ 0.9 , CS as stenosis of $\geq 50\%$ of the left or right internal carotid artery, and AAA as an aortic diameter of ≥ 3 cm. Multivariate analyses were used to determine odds ratios for the effect of each individual risk factor on each phenotype of vascular disease in men and women.

Results: Overall, AAA was noted in 1.8% of men ($n = 1,392,169$) and in 0.3% of women ($n = 2,304,609$). Respective rates of PAD and CS were 3.2% and 4.4% in men, and 3.8% and 3.5% in women. Odds ratios for the association of risk factors with vascular disease phenotypes in men and women are reported in the Table. Increased age and a positive smoking history were more significantly associated with AAA in men than in women, and diabetes was mildly protective against AAA in men but not in women. Increased age was more significantly associated with CS in men than in women, whereas hypertension, diabetes, and a positive smoking history were more significant risk factors in women. Increased age, a positive smoking history, and diabetes were more significant risk factors for PAD in men; obesity (body mass index > 30 kg/m²) conferred a mildly protective association with PAD in men but was a positive risk factor for the prevalence of PAD in women.

Conclusions: Our study suggests that atherosclerotic risk factors may not have the same effects on vascular diseases in men and women. Increased age appears to be a more significant risk factor in men. Notably, diabetes was inversely associated with AAA in men but not in women, and obesity was mildly protective against PAD in men but not in women. Our results suggest that atherosclerotic risk factor reduction strategies may need to be sex-specific.

Table. Odds ratios for the association of risk factors with phenotypes of vascular disease in men and women

Risk factor	Age > 70 years	Hyper-tension	Hyper-lipidemia	+Smoking history	Diabetes	Obesity (BMI >30 kg/m ²)
AAA						
Men	3.08	1.44	1.47	2.39	0.94	NS on univariate analysis
Women	1.95	1.28	1.27	1.65	1.19	NS on univariate analysis
CS						
Men	2.79	1.87	1.66	1.67	1.55	NS on univariate analysis
Women	2.30	1.99	1.60	1.79	1.64	NS on univariate analysis
PAD						
Men	2.61	1.75	1.16	1.95	1.73	0.84
Women	2.27	1.62	1.08	1.70	1.52	1.10

AAA, Abdominal aortic aneurysm; BMI, body mass index; CS, carotid stenosis; NS, not significant; PAD, peripheral arterial disease.

Disclosures: C. B. Rockman: Nothing to disclose; Y. Guo: Nothing to disclose; G. R. Jacobowitz: Nothing to disclose; T. Maldonado: Nothing to disclose; N. Cayne: Nothing to disclose; F. Mussa: Nothing to disclose; M. Adelman: Nothing to disclose; J. Berger: Nothing to disclose

Current Outcomes of Lower Extremity Bypass in High-Risk Patients

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Objectives: In 2009, the Society for Vascular Surgery established objective performance goals (OPG) for lower extremity bypass (LEB) in patients with critical limb ischemia (CLI) based on pooled data from previously performed prospective studies. Patients with a prosthetic conduit and end-stage renal disease (ESRD) were excluded. Patients within the

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