Impact of Female Gender on AAA Presentation, Treatment, and Outcomes: A Prospective Analysis

Handel Robinson, Manish Mehta, Sean P. Roddy, R. Clement Darling III, Philip S.K. Paty, Yaron Sternbach, W. John Byrne, John B. Taggert, Paul B. Kreienberg, Kathleen J. Ozsvath, Benjamin B. Chang, Dhiraj M. Shah, Albany Medical College, Albany, NY

Introduction and objectives: Although female gender has been implicated as a risk factor for AAA repair, the etiologies for this gender difference remains ill defined. We prospectively analyzed variables that might impact the aneurysm-related morbidity and mortality in women.

Methods: From 2002 to 2009, 2631 consecutive AAA patients undergoing open surgical and endovascular aneurysm repair (EVAR) were entered into a registry based on female (n = 636, 24%) vs male (n = 1995, 76%) gender. Data were prospectively collected and all variables analyzed.

Results: Of the 2631 AAA patients, both genders were comparable with respect to demographics with one exception: women had a higher incidence of COPD (24% vs 15%, $P < .05$). A higher percentage of women presented with AAA rupture (14% vs 8%, $P < .05$). Compared with men, women undergoing EVAR had a significant higher mortality (elective EVAR: 3.2% vs 0.9%; emergent EVAR: 27.3% vs 17.2%; all EVAR: 5.3% vs 1.9%, $P < .05$), arterial rupture (4.1% vs 1.2%, $P < .05$), postoperative bleeding (4.9% vs 2.9%, $P < .05$), lower extremity ischemic complications (3.5% vs 0.6%, $P < .05$), ischemic colitis (4.1% vs 1.2%, $P < .05$), Palmaz stent placement for type I endoleak (16.3% vs 7.2%, $P < .05$), and mean hospital length of stay (4.1 vs 1.8 days, $P < .05$). These gender differences were not significant in the elective and emergent open surgical groups. At a mean follow-up of 26 months, there were no gender differences in survival, secondary interventions, or freedom from aneurysm rupture.

Conclusions: A higher percentage of women present with aneurysm rupture. When treated by endovascular means, in comparison with men, women have higher procedurally related morbidity of intraoperative arterial rupture, postoperative bleeding, lower extremity ischemic complications, ischemic colitis, and type I endoleaks requiring adjunctive procedures. These findings suggest the need for improvements in stent graft design and EVAR procedures that are better suited for women.

Intensive Statin Therapy Is Associated With a Decrease in Adverse Events and Death Following Carotid Revascularization

Catherine K. Chang[1], Chetan P. Huded[2], Philip P. Goodney[1], Brian W. Nolan[1], Daniel B. Walsh[1], Richard J. Powell[1] [1]Dartmouth Hitchcock Medical Center, Lebanon, NH; [2]Dartmouth Medical School, Lebanon, NH

Introduction and objectives: This study determined whether high-dose statin therapy is associated with a reduction in major adverse events compared with low-dose or moderate-dose, or no statin therapy, after carotid revascularization.

Methods: A retrospective review was performed of 872 consecutive carotid endarterectomy (CEA) and carotid artery stenting (CAS) procedures in 804 patients between January 2003 and March 2009. Patient demographics, comorbidities, and clinical outcomes were collected. High-dose statin therapy was defined as atorvastatin, simvastatin, pravastatin, lovastatin, or fluvastatin at 80 mg/d or rosuvastatin at 20 mg/d starting before or at the time of the procedure. The composite primary outcome measure was all-cause mortality, stroke, any reintervention, and recurrent stenosis >70% at 5 years. A multivariate logistic regression model was used for statistical analysis.

Results: At the time of carotid revascularization, 216 patients were taking no statin, 548 were taking a low or moderate dose, and 108 were taking a high dose of statins. Hypertension, diabetes, coronary artery disease, peripheral arterial disease, and congestive heart failure were all significantly more prevalent in the high-dose group. High-dose statins were associated with a decrease in the incidence of the composite end point from 19% to 11% ($P = .05$) compared with no/low-dose statins. Multivariate analysis showed high-dose statin therapy was protective of death, stroke, reintervention, or restenosis (OR, 0.41; 95% CI, 0.21-0.81; $P = .01$) and was also associated with a 64% reduction in the odds of death after CEA or CAS (OR, 0.36; 95% CI, 0.15-0.86; $P = .02$). In contrast, lower-dose statin therapy was not associated with a reduction in the odds of any or all of these adverse events.

Conclusions: High-dose statin therapy initiated before carotid revascularization may have a protective effect in reducing the incidence of death, stroke, reintervention, or recurrent stenosis after CEA and CAS. Further studies will be needed to confirm these findings.

The Impact of Completion Imaging During Carotid Endarterectomy

Jessica B. Wallaert[1], Philip P. Goodney[1], Yaunyaun Zhao[1], David H. Stone[1], Brian W. Nolan[1], Daniel Bertges[2], Jens Eldrup-Jorgensen[3], Andres Schanzer[4], Robert A. Cambria[5], Daniel B. Walsh[1], Jack L. Cronenwett[1] [1]Dartmouth Hitchcock Medical Center, Lebanon, NH; [2]Dartmouth Hitchcock Medical Center, Lebanon, NH; [3]Dartmouth Hitchcock Medical Center, Lebanon, NH; [4]Fletcher Allen Health Care, Burlington, Vt; [5]Maine Medical Center, Portland, Me; [6]UMass Memorial Medical Center, Worcester, Mass; [7]Eastern Maine Medical Center, Bangor, Me

Objectives: Completion imaging by duplex or arteriogram after carotid endarterectomy (CEA) is performed to confirm technical adequacy and reduce perioperative complications. We examined the utilization of completion imaging and associated outcomes.

Methods: A retrospective analysis was done of 6261 CEAs performed in 5749 patients in the multicenter Vascular Study Group of New England. We categorized surgeons' use of completion imaging as routine (>90% of CEAs), selective (5%-90%), or rarely (0%-5%). We examined crude and risk-adjusted 30-day stroke/death and 1-year restenosis rates across these groups.

Results: Although 91% (5708 of 6261) of CEAs involved a completion study, 58% were Doppler insonation (3702 of 6261). Completion imaging was used in 32% of CEAs, consisting of 31% duplex (1981 of 6261) and 1% arteriography (22 of 6261; Table), and resulted in 185 (2.9%) arterial re-explorations. Crude and adjusted 30-day stroke/death rates were not significantly different across categories of completion imaging use, but 70% restenosis at 1 year was lower in patients undergoing routine completion imaging (OR, 0.5; 95% CI, 0.27-0.92). Although crude 30-day stroke/death rates were higher in patients undergoing re-exploration based on completion imaging (3.8 vs 1.8%, $P = .049$), differences were attenuated when we adjusted for patient characteristics predictive of stroke/death (adjusted OR, 2.2; 95% CI, 0.9-5.5). A review of 68 patients who underwent arterial re-exploration demonstrated that technical problems amenable to surgical correction are often identified, such as intimal flaps (82%), dissection (6%), or flow velocity abnormalities (6%; Fig). These findings led to intraoperative repair in 96% of re-explorations.

Conclusions: Although completion imaging did not significantly change 30-day stroke/death rates, these studies identify correctible technical lesions and reduce restenosis at 1 year.

Table. Surgeon practice pattern for use of completion imaging

Variable	*Rarely (0%-5% of CEAs)*	*Selective (5%-90% of CEAs)*	*Routine (>90% of CEAs)*	P
Surgeons, No. (%)	35 (49)	16 (22)	20 (28)	n/a
Number of CEAs, No. (%)	3412 (54)	1045 (17)	1804 (29)	n/a
30-day stroke/death (unadjusted), No. (%)	56/3412 (1.6)	15/1045 (1.4)	45/1804 (2.5)	.052
Restenosis >70% at long-term follow-up (unadjusted), No. (%)	81/1881 (4.1)	13/595 (2.2)	41/1058 (3.9)	.062
Adjusted OR (95% CI)				
For 30-day stroke/death (JVS 2008 model)	Referent	0.8 (0.4-1.4)	1.4 (0.9-2.2)	.106
For restenosis at 1 year (JVS 2010 model)	Referent	0.6 (0.3-1.1)	0.5 (0.3-0.9)	.025