Abstracts

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Age and Outcomes After Carotid Stenting and Endarterectomy: The Carotid Revascularization Endarterectomy Versus Stenting Trial


Conclusion: Outcomes after carotid artery stenting (CAS) vs carotid endarterectomy (CEA) are related to patient age, with increased risk of stroke with increasing age in patients undergoing CAS.

Summary: The lead-in phase of Carotid Revascularization Endarterectomy Versus Stenting Trial (CREST) demonstrated a high risk of stroke events in older CAS-treated patients. Octogenarians were therefore excluded from the lead-in phase of CREST. They were, however, continued in the randomized phase to determine if equivalent risks were present for CEA-treated patients. A planned formal assessment of age on the relative efficacy of CEA vs CAS was agreed upon by the CREST investigators and is presented here. In this report, the authors examined the relative efficacy of the components of the primary end point, the treatment-specific effect of age, and contributors to risks for CAS-treated patients at older ages. Proportional hazard models were used to examine the effect of age on CAS to CEA relative efficacy and the effect of age on risk within CAS-treated and CEA-treated patients. Age was an effect modifier for the primary end point ($P = .02$ for interaction). Efficacy of CAS and CEA were approximately equal at age 70 years. For CAS, the risk of the primary end point increased with age ($P < .0001$) by 1.77 times (95% confidence interval, 1.38-2.28) per 10-year increment. There was no evidence of increased risk for CEA-treated patients ($P = .27$). The primary contributor to overall effect modification was stroke ($P = .033$ for interaction), with equal risk at approximately 64 years. Treatment by age interaction for CAS and CEA was not altered by was stroke ($P = .10$) and gender ($P = .27$).

Comment: This is another in a series of detailed analysis by the CREST investigators of variables of clinical interest affecting outcomes of CEA and CAS that were initially identified in the primary report of the CREST trial. The article here demonstrates a differential efficacy of CAS compared with CEA across the age spectrum, with the difference primarily attributed to stroke events. Lower relative risk in the CAS group at younger ages and higher relative risk at older ages is driven by increased risk of stroke in older patients treated by CAS. The risk of stroke for CEA was, however, constant across the age spectrum. The data indicated that patient age should be an important factor in selecting a treatment for carotid stenosis. The authors noted longer fluoroscopy times in older CAS patients, suggesting anatomic factors may be significantly contributing to the increased risk of stroke in older CAS-treated patients. It is, of course, also widely believed CAS may result in more postprocedural strokes in older patients because of anatomic factors affecting CAS, such as tortuosity of extracranial vessels, calcification of extracranial vessels, and higher prevalences of type II and type III arches in older patients.


Combined Proximal Endografting With Distal Bare-Metal Stenting for Management of Aortic Dissection


Conclusion: Staged total aortic and branch vessel endovascular reconstruction is a feasible endovascular technique to address the problems of distal true lumen collapse, incomplete aortic remodeling, and late aneurysm formation in aortic dissection.

Summary: Stent graft repair of acute aortic dissection was reported in 1999 (Dake MD et al, N Engl J Med 1999;340:1546-52). The idea is to encourage false lumen thrombosis and aortic remodeling, thereby stabilizing the dissection and aortic dimensions. However, endograft closure can result in incomplete repair and the aorta can fail to remodel in 50% to 80% of patients (Eggebrecht H et al, Eur Heart J 2006;27:489-90). To potentially avoid late complications of aneurysmal change, repeat dissections, and rupture, the authors augmented proximal endografting with distal deployment of bare-metal Z stents, a concept termed Staged Total Aortic and Branch Vessel Endovascular (STABLE) reconstruction. In this article, they describe use of the STABLE technique in the treatment of 31 patients with Stanford type A or type B aortic dissection between January 2003 and January 2010. Of the 31 patients, 13 had an acute type A dissection, 11 an acute type B dissection, and 7 a chronic type B dissection. Bare-metal Z stent implantation in the distal true lumen was combined with proximal endografting. Patients with type A dissection also underwent adjunctive surgical treatment of the thoracic procedures. At baseline, 1 year, and annually thereafter, a computed tomography angiogram was performed to assess aortic remodeling.

Conclusion: Primary technical success was 97%. The 30-day rates of death, stroke, and permanent paraplegia/paraparesis were 3% ($n = 1$), 0%, and 0%, respectively. Mean follow-up was 57.3 months (range, 5-100 months). At 100 months, survival was 60%. Aortic-specific survival was 93%. Four patients (13%) underwent device-related reintervention, and one patient had a late aortic-related death. Thoracic ($P = .64$) and abdominal ($P = .14$) aortic dimensions were stable. True lumen index was increased at follow-up.

Comment: The article presents a different approach to the STABLE technique. A different slant on the data is presented in an invited commentary by Dr Leonard Girardi of Cornell Medical College. Dr Girardi contends, “the data presented by Hofferberth et al have a similar message to my invited commentary” and calls for longer follow-up and prospective trials before widespread use of STABLE.


Doppler Criteria for Identifying Proximal Vertebral Artery Stenosis of 50% or More


Conclusion: A peak systolic velocity (PSV) ratio is the best Doppler parameter for identifying proximal vertebral artery stenosis.

Summary: About 20% of patients with posterior circulation ischemia have occlusive disease in the proximal vertebral artery (Caplan LR et al, Ann Neurol 2004;56:889-96). The V1 segment of the vertebral artery is that portion of the artery extending from its origin to entry into the transverse foramen of C6 and is a common site for atherosclerotic disease of the vertebral artery. Most carotid artery duplex scans include insonation of the vertebral artery, but very few studies have been performed to determine Doppler criteria for proximal vertebral artery stenosis. In this study through comparisons of duplex scanning with digital subtraction angiography, the authors sought to determine criteria for identification of proximal >50% vertebral artery stenosis. There were 48 patients with vertebral artery stenosis examined prospectively with color duplex scanning and digital subtraction angiography. Receiver operating characteristic curve analysis was used to determine PSV, PSV ratio, and end diastolic velocity (EDV) ratio criteria for proximal vertebral artery stenosis. The parameter with the highest accuracy for the detection of ≥50% proximal vertebral artery stenosis was the PSV ratio (area under the receiver operating characteristic curve, 0.967; 95% confidence interval, 0.899-0.994). A PSV ratio of >2.2 was the optimal criteria for identifying >50% proximal vertebral artery stenosis with a sensitivity of 96% and specificity of 89%. Optimal thresholds for other Doppler parameters to identify 50% proximal vertebral artery stenosis were PSVs >108 cm/s, EDV >36 cm/s, and EDV ratio >1.7.

Comment: It makes sense that PSV and EDV ratios may be more accurate in the evaluation of vertebral artery stenosis because they also look at vertebral artery asymmetry, which is common, with relatively high flow in a dominant vertebral artery. Also, vertebral arteries ending in a posterior inferior cerebellar artery may have low flow, and tandem lesions in vertebral or basilar arteries can also result in low flow. These particular conditions, which do not exist for the carotid circulation, are common in vertebral arteries. The result is improved accuracy of velocity ratios over other parameters for identifying vertebral artery stenosis.


Emergent Endovascular Recanalization for Cervical Internal Carotid Artery Occlusion in Patients With Presenting With Acute Stroke


Conclusion: Endovascular carotid recanalization should be encouraged for acute cervical internal carotid artery occlusion in younger patients with partial distal preservation of the internal carotid artery (ICA).
Summary: There has been a surge of interest in endovascular interventions for carotid artery occlusion (Zazdan KO et al, Neurosurgery 2004:55:1237-43; Dubois R et al, Cardiovasc Intervent Radiol 2007;30:34-41; and Miyamoto N, Neurol Med Chir (Tokyo) 2008;48:49-56). Recanalization rates of 70% or better were more than expected (50% to 65%), with improvement in neurologic status in some patients. In one study, mortality was 30% with recanalization of the ICA but was 73% in the non-recanalized patients (Flin AC, Stroke 2007;38:1274-80). In this current article, the authors’ results with emergency endovascular carotid recanalization, with acute proximal (cervical) ICA occlusion are presented, focusing on success rates, predictors of recanalization, and neurologic and functional outcomes. Inclusion criteria included a National Institutes of Health Stroke Scale (NIHSS) score ≤5, stroke onset within 8 hours of presentation, and computed tomography (CT) imaging, suggesting salvageable brain tissue. Patients with hemorrhage or evidence of a completed large ipsilateral stroke on a neuroimaging study were not included. If distal patency was present or could be restored, they attempted to advance a microcatheter and microwire, with subsequent advancement of a microcatheter into the petro cavernous segment of the carotid artery. If distal patency could not be demonstrated, the procedure was aborted. If distal patency could not be demonstrated, the procedure was aborted. If distal patency was confirmed by catheter-based angiography. The authors’ technique involved initially advancing a platform guide catheter into the common carotid artery just proximal to the bifurcation. They then explored the carotid artery bifurcation with a microcatheter and microwire, with subsequent advancement of a microcatheter into the petro cavernous segment of the carotid artery. If distal patency could not be demonstrated, the procedure was aborted. If distal patency could not be demonstrated, the procedure was aborted.

Comment: The results of this review are not “what dreams are made of,” but they may be better than the natural history of acute symptomatic cervical ICA occlusion. However, the review does not intend to suggest that the beneficial effects of early endovascular recanalization are independent or that other treatments do not have a role in the management of acute carotid artery occlusion. However, the review does not intend to suggest that the beneficial effects of early endovascular recanalization are independent or that other treatments do not have a role in the management of acute carotid artery occlusion.

Summary: Carotid artery stenting (CAS) and carotid endarterectomy (CEA) are associated with similar overall health-related quality of life (HRQOL) at 1 year. Stroke has a greater and more consistent sustained improvement in the primary composite end point of stroke, MI, or death for CAS compared with CEA. However, differences were brief and limited to highly sensitive, disease-specific outcomes and physical role limitation (Stolker JM, J Am Coll Cardiol 2011;58:1557-65). Conclusion: Carotid artery stenting (CAS) and carotid endarterectomy (CEA) are associated with similar overall health-related quality of life (HRQOL) at 1 year. Stroke has a greater and more consistent sustained improvement in the primary composite end point of stroke, MI, or death for CAS compared with CEA. However, differences were brief and limited to highly sensitive, disease-specific outcomes and physical role limitation (Stolker JM, J Am Coll Cardiol 2011;58:1557-65).