Carotid Endarterectomy Should Be the Treatment of Choice for Most Forms of Carotid Bifurcation Disease: Are There New Adjuncts That Help?

NOTES

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Background
Clinical trials comparing carotid angioplasty and stenting (CAS) versus carotid endarterectomy (CEA) have shown equal or better results with endovascular therapy in several instances. This prompted us to review CEA in our practice with respect to clinical outcome and cost.

Method
Between January 1997 and December 2002, 226 patients, prospectively enrolled in a clinical pathway, underwent 254 CEAs performed by senior surgical residents under close supervision of an experienced vascular surgeon. General anesthesia with transesophageal pacing, appropriate monitoring, in-line shunt for cerebral perfusion, and patch angioplasty arteriotomy repair were standard. All patients were pretreated with 81 mg ASA, heparinized intraoperatively and received 500 cc of LMD-40 postoperatively followed by long-term antiplatelet therapy. Intraoperative duplex imaging was routine. Perioperative myocardial ischemia was assessed using either CPK isoenzyme fractions or troponin i which were obtained postoperatively and on POD1. Follow-up duplex imaging was done at 4 to 6 weeks postprocedure and semiannually thereafter.

Results
There were 128 males and 98 females whose age ranged from 44 to 88 years. Forty-six were ? 80 years old and 69 were ? 65 years old. One hundred thirty-three symptomatic patients had stenoses ? 70%; 93 asymptomatic patients had stenoses ? 75%. Ninety percent of patients had at least three of the following comorbidities-_coronary artery disease, hypertension, chronic obstructive pulmonary disease, hyperlipidemia, or diabetes. Length of stay was < 24 hours in 223 cases (87.8%), < 48 hours in 23 cases and, > 48 hours in 8 cases. Two hundred twenty-two patients were managed in the postanesthesia recovery unit then admitted to a monitored vascular surgery unit bed; 4 patients required care in the intensive care unit. No perioperative strokes or transient neurologic events occurred. There were 14 (5.5%) surgery-related cranial nerve pareses-8 involved the ipsilateral marginal mandibular nerve, 4 hypoglossal, and 2 vagus. All cranial nerve pareses resolved within 12 months. There were two perioperative deaths (0.8%). Two hundred eighteen cases (86%) had serial cardiac isoenzyme determinations. Thirty-three cases had only one determination usually on POD1. One non-Q wave MI was identified and underwent cardiac catheterization and subsequent coronary artery bypass. Follow-up ranged from 12 to 72 months with a mean time of 37.4 months. Thirty-day hospital readmission rate was 2.3% (6 of 254 cases). Cardiac events accounted for 66% (4 of 6 cases); cholecystitis accounted for the other 2 cases. Fifteen patients were lost to follow-up, 9 of whom were deceased, indicating a survival of 211 patients (93%). Follow-up duplex imaging identified 10 restenoses (4.1%). Two (0.7%) with stenoses ? 70% were treated with CAS and remain patent. There was one asymptomatic occlusion of the ICA. Direct CEA cost/case averaged $2,890.12 and total cost/case averaged $4,597.72. Medicare DRG reimbursement averaged $7,299.83 rendering CEA profitable for our institution. Our CAS total cost/case averages $10,133.00 and has, thus far, not been reimbursed.

Conclusion
This study shows that CEA can be performed safely and cost-effectively in an academic center producing durable clinical outcomes that exceed those currently reported for CAS. Incidence of non-Q wave MI was 0.3%, lower than the 7.3% incidence reported for SAPPHIRE and also lower than other carotid stent trials. We believe this is related to the use of transesophageal pacing rather than intraoperative pharmacologic manipulations for heart rate and blood pressure control.