Outcome of Patients with Internal Carotid Artery Stenosis Approaching Occlusion

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Purpose
To review the clinical course of patients with symptomatic high grade internal carotid artery (ICA) stenosis in the subcategory of "approaching occlusion." To review the rate of perioperative ipsilateral central nervous system (CNS) complications in patients who underwent ICA intervention.

Materials & Methods
A review of all cerebral angiograms performed between July 1994 and October 2000 was performed to obtain a list of patients with subtotal occlusion of the ICA. This was defined as luminal narrowing greater than the ipsilateral internal maxillary artery (IMA) or delayed filling of the ICA relative to the external carotid artery (ECA) (Fig. 1)(1). Clinical charts were reviewed for subsequent therapy and clinical status of these patients.

Results
Of the 404 angiograms performed, there were 20 patients with 20 subtotal ICA occlusions. Two patients (10%) were deemed not to be candidates for intervention. One remains asymptomatic on medical therapy and one died from cardiac comorbidity. Two patients (10%) had technically unsuccessful intervention, both leading to ICA occlusion without resulting CNS symptoms. One surgically untreatable patient (recanalized long segment due to chronic dissection) had successful carotid angioplasty and stenting but died three months later from myocardial infarction. Nine patients (45%) had successful carotid endarterectomy (CEA) and are without further CNS symptoms. Six patients (30%) underwent CEA and had perioperative complications (within 10 days of surgery). Three patients (15%) had ipsilateral non-CNS complications (True vocal cord paralysis/swallowing difficulties, facial numbness/shoulder weakness and pain, and neck hematoma). Three patients (15%) had ipsilateral CNS complications. One had a large cerebral hemorrhage that required surgical evacuation with complications leading to death within 30 days. Two had large (greater than 1/3) middle cerebral artery (MCA) territory infarcts, both of whom are alive and without new symptoms. In summary, there were 18 symptomatic patients with subtotal ICA occlusion who were deemed candidates for ICA intervention. Among these patients, perioperative ipsilateral CNS complications were considerably higher (17%) than perioperative ipsilateral CNS complications reported for the population of patients having CEA for lesions 70–99% (2.1%) (2). Additionally, this patient population technically may be challenging as two patients in our series had attempted intervention that resulted in ICA occlusion/ligation without CNS symptoms and a third was referred for stenting.

Conclusion
Although it is recognized that symptomatic patients with ICA stenosis greater than 70% benefit from CEA (2, 3), the small subgroup of patients in whom the ICA is approaching occlusion require further study (4, 5). Surgery in this population may be associated with higher rates of perioperative ipsilateral CNS complications, and lower rates of technical success, thereby lowering the risk/benefit ratio.

References
1. Fox AJ. How to measure carotid stenosis. Radiology 1993;186:316–318