Carotid endarterectomy: applying trial results in clinical practice

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Editorial

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Résumé

DES ÉTUDES CONTRÔLÉES RANDOMISÉES MULTICENTRIQUES — NASCET ET ACAS en particulier — ont démontré que l'endartérectomie de la carotide est plus efficace que le traitement médical seulement pour réduire le risque d'attaque. Les avantages sont clairs pour les patients qui satisfont aux critères rigoureux de sélection et sont traités conformément aux protocoles d'étude. Le défi pour les cliniciens actifs consiste à appliquer les résultats d'études à leurs patients. L'établissement d'antécédents détaillés et la détermination exacte de l'ampleur de la sténose de la carotide permettent d'évaluer les risques et les avantages de la chirurgie. Il est peu probable que l'on dispose jamais de lignes directrices universelles, et un solide jugement clinique demeure donc essentiel.

Randomized prospective trials examining the efficacy of carotid endarterectomy — particularly the North American Symptomatic Carotid Endarterectomy Trial (NASCET)[1] and the Asymptomatic Carotid Atherosclerosis Study (ACAS)[2] — have given clear insights into the mechanisms and prevention of embolic stroke. These large multicentre trials have demonstrated the benefit of carotid endarterectomy for patients who meet the stringent selection criteria and are managed according to study protocols. The challenge facing practising clinicians is to apply these trial results to individual patients. In this issue (page XXX) the Canadian Neurosurgical Society attempts to provide guidelines for the use of carotid endarterectomy based on the results of NASCET and other trials.

The generalizability of trial results depends on the rigidity of entry criteria and management protocols. As a study population is narrowed, it becomes more likely that a definitive answer will be reached; at the same time, clinical decision-making for the whole spectrum of the disease process is made more difficult. In clinical practice, physicians must manage patients whose risk of stroke varies greatly. The large clinical trials have demonstrated that patients at relatively low risk are asymptomatic and have low-grade stenosis of the internal carotid artery, whereas patients at highest risk have high-grade stenosis and have had transient ischemic attacks in the area supplied by the carotid artery. Carotid endarterectomy is most strongly indicated for patients in this group.

For most patients, therefore, the risk of stroke can be determined through detailed history-taking aimed specifically at uncovering symptoms of transient ischemic attack, an episode of amaurosis fugax or nondisabling stroke. In NASCET, eligible patients were symptomatic in the 120 days before random assignment to a trial arm. Setting a limit of 120 days suggests that the risk of stroke may decrease as more time passes after the embolic episode. But at what point does the benefit of carotid endarterectomy cease to be significant? At 5 months or 6? After a year? Although this inclusion criterion makes the study population homogeneous, the generalizability of the study results becomes a critical issue. The results of clinical trials are clearly useful in the management of patients who are similar to the study participants. However, in this case the indications for surgical intervention may have to be broadened to include patients with slightly more remote symptoms, assuming that age, health status and surgical risk factors are favourable.

In NASCET, all patients underwent cerebral angiography in which clear views were obtained of the carotid bifurcation (in 2 planes) and the intracranial circula-

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tion. The degree of stenosis was determined using a prescribed formula and was measured at the patient's local facility and again at the study centre.[3] The agreement between these assessments was rather poor, particularly for stenoses around the critical level of 70%.

The difficulty of accurately determining the degree of carotid artery stenosis has an important impact on the application of trial results to individual patients. In NASCET, noninvasive investigations were documented in addition to angiography. In comparison with the angiographic assessment, Doppler ultrasonography showed much greater variability in technique and method of interpretation. It is not surprising that the NASCET investigators concluded that ultrasound alone was inadequate for preoperative evaluation. Originally comparisons were made between the degree of stenosis as evaluated by ultrasound and as measured by angiography, using a ratio of the diameter of the distal internal carotid artery and the estimated bulb diameter. In the formula used by the NASCET investigators, the maximum diameter of the luminal stenosis was compared with the diameter of the normal internal carotid artery *past* the bulb. Clearly, this would account for the presumed discrepancy between the ultrasound and angiography results. Prospective studies using duplex scanning have found that when the NASCET formula is employed with the appropriate adjustments, duplex scanning has a 91% sensitivity and 87% specificity for stenoses of 70% to 99%.[4] This improvement has stimulated the use of colour duplex alone to determine operability in symptomatic patients.[5] Given the cost and (admittedly small) risk of angiography, eliminating this diagnostic procedure may be considered an advance in the clinical application of the NASCET results.

The application of the NASCET results has also been shaped by the changing economic climate of clinical practice. A recent report examined the practice of carotid endarterectomy in a vascular surgery service between 1990 and 1994. The length of stay fell from 6.18 days to 2.0 days, the percentage of patients admitted to the intensive care unit fell from 95.0% to 7.3%, and the rate of angiography decreased from 93% to 33%. Throughout this period there were no significant changes in incidence rates of stroke or of death, which remained at less than 1% per year.[6]

The ACAS investigators showed a statistically significant decrease in the rate of stroke among asymptomatic patients with stenoses greater than 60% undergoing carotid endarterectomy in comparison with those treated medically. The ACAS findings are similar in many ways to the NASCET results, and earlier studies[7] involving asymptomatic patients have indicated that a greater degree of stenosis correlates with a higher risk of stroke. Although the absolute risk reduction shown in the ACAS findings is much less than that reported by the NASCET investigators, the ACAS results have been accepted by the sponsoring agents, the US National Institutes of Health and the American Heart Association in their consensus report of 1995.[8]

To be acceptable, a surgical procedure must have very low associated morbidity and mortality. This standard must also be applied to any new proposed interventions, such as angioplasty and stenting. Moreover, the application of therapeutic principles deriving from clinical trials requires a very careful scrutiny of the risk–benefit ratio for each patient. In the case of carotid endarterectomy, it is unlikely that guidelines will ever be able to address all potential clinical situations. Therefore, sound clinical judgement remains essential.

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