

CAROTID ENDARTERECTOMY : SURGICAL PROPHYLAXIS FOR STROKE

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ABSTRACT : An experience of 28 carotid endarterectomy patients is being presented. Of these 18 were males and 10 females. Their ages ranged from 43-85 years, the mean age being 68.5 years. Twenty four patients presented with transient ischemic attacks, two had transient monocular blindness while the remaining two had partial stroke. All patients had colour duplex ultrasonography of their internal carotid arteries done pre-operatively which revealed 70-90% stenosis in their proximal part. Twenty seven patients had unilateral disease for which carotid endarterectomy was performed. The remaining one patient had bilateral carotid stenosis alongwith coronary artery disease. He underwent bilateral carotid endarterectomy and coronary artery bypass graft, all at the same time. Two patients developed venous bleeds postoperatively and one a partial stroke with complete recovery. There was no major stroke or death in this series.

KEY WORDS : Stroke, Carotid Endarterectomy, Transient Ischaemic Attack, Transient Monocular Blindness.

INTRODUCTION

Cerebrovascular disease constitutes the third leading cause of death in USA¹. More than 150,000 deaths each year are attributed to stroke. Despite the epidemiological evidence of 50% reduction in mortality rate from stroke, it is still a major cause of disability among elderly Americans. About 75% of new strokes each year are due to thromboembolic disease and carotid artery occlusive disease is probably the single most common causal factor in the development of cerebrovascular ischaemia. Although transient ischemic attack (TIA) and amaurosis fugax or transient monocular blindness (TMB) are important warning signs of impending stroke, many patients do not report or sustain them. A variety of risk factors contribute to an increased likelihood of stroke² viz. age, high systolic blood pressure, smoking, diabetes mellitus and history of cardiovascular disease.

The first carotid endarterectomy (CEA) was performed by Eastcott et al at St. Mary's Hospital, London on 19th May 1954³. At present it is the commonest vascular procedure performed in USA. In Great Britain and Ireland the number of carotid endarterectomies are increasing gradually. TIA's or minor strokes, TMB and angiographic atherosclerotic stenosis of greater than 70% are common indications of carotid endarterectomy⁴. The benefits of carotid endarterectomy for patients with symptomatic cerebrovascular

disease have been recently published⁵. The results of North American symptomatic carotid endarterectomy trial (NASCET)⁵ and the European carotid surgery trial (ECST) have documented a significant reduction in cerebrovascular events following CEA as compared with patients managed medically⁶. Since then carotid endarterectomy is becoming popular as a prophylaxis for the prevention of major stroke.

PATIENTS & METHODS

This is a prospective study of 28 patients who underwent carotid endarterectomy. Their data regarding age, sex, symptoms, examination findings, operations, complications, etc. was recorded on a proforma. All patients had colour duplex ultrasonography of their carotid arteries besides other relevant investigations to determine the degree of stenosis. All patients underwent carotid endarterectomy under general anaesthesia. Only 6 patients needed shunt at the time of operation. In 25 patients the arterial incision was closed with double velor dacron patch while in 3 no patch was used. Soon after the operation all patients were prescribed acetyl salicylic acid (aspirin) 300mg once daily for the rest of their lives.

RESULTS

Out of the 28 patients who comprised this study, 18 were males and 10 females. The age of the youngest

patient was 43 years and the oldest 85 years. Twenty two cases were in the 6th and 7th decades of life, the mean age being 68.5 years. Twenty four patients presented with TIA, 2 had TMB and the remaining 2 had partial stroke which resolved completely over the next 2-3 months.

Colour duplex ultrasonography revealed 70-90% stenosis of the proximal internal carotid artery which was unilateral in 27 patients. All of them underwent carotid endarterectomy. The remaining single patient had bilateral carotid stenosis with concomitant coronary artery disease. He had bilateral carotid endarterectomy and coronary artery bypass graft done, all at the same time. Twenty seven patients were operated upon on elective lists while one patient needed emergency surgery as he had been having crescendo TIA's. Twenty five patients were managed postoperatively in the ward. The remaining three patients were kept in ICU for 24-72 hours. Two patients had post-operative bleeding from the wound which were re-explored under general anaesthesia within 8 hours of surgery. In both these patients it was venous bleeding while the arteriotomy site was intact. Only one patient had partial stroke next day, however, he made complete recovery within 6 weeks. There was no major stroke, death or wound infection in any of our patients. Average hospital stay after the operation was 3-5 days.

DISCUSSION

According to the results of NASCET⁵ and ECST the presence of significant stenosis (>70%) in symptomatic patients increases the stroke risk by 10% every six months. Those patients who were treated medically with acetyl salicylic acid (aspirin) had a 7% risk of developing major stroke every six months. On the other hand patients with similar degree of the disease pattern treated with CEA had <2.5% risk of having major stroke every six months (Table 1).

Table 1. Comparison of Results for Severe Symptomatic Carotid Stenosis

Mode of Treatment	2 years stroke risk
None	40%*
Medical (acetyl salicylic acid)	26%**
Surgical (carotid endarterectomy)	9%**

* From meta-analysis of studies in literature

** From NASCET⁵

In our study colour duplex ultrasonography alone was used to determine the degree of internal carotid artery stenosis. There is evidence from several studies^{7,8} that ultrasonography when paired with careful clinical evaluation is a reliable and cost effective method for evaluating surgical carotid disease.

Although pre-operative angiography is still the gold standard, however, it carries a 1.2% risk of causing stroke⁴. Therefore, very few surgeons now submit potential candidates for operation directly to angiography and its attendant risks^{9,10}. Significant carotid stenosis may be associated with a higher frequency of abnormal CT scans. Therefore, routine pre-operative CT scanning is unnecessary before elective carotid endarterectomy¹¹.

Stroke and death are the gravest complications of carotid endarterectomy. Stroke risk after carotid endarterectomy has ranged from 0.5% to 1% per year. Mortalities are frequently associated with post-operative myocardial infarction. Fortunately in our series there was no major stroke or death. The upper limits of combined stroke and death after carotid endarterectomy are shown in Table 2.

Table 2. Recommended upper limits of Combined Stroke morbidity & mortality For Carotid Endarterectomy*

Indication	Percentage
Asymptomatic carotid stenosis	<3%
Transient ischaemic attack	<5%
Stroke with fixed neurological deficit	<7%
Restenosis	<10%
Mortality	≤2%

*From Callow AD, et al¹²

The incidence of symptomatic carotid restenosis following carotid endarterectomy is 5%¹³. We have not seen restenosis in any of our cases, so far.

CONCLUSION

For the prevention of stroke in patients with symptomatic carotid artery stenosis, carotid endarterectomy is the treatment of choice. Colour duplex ultrasonography is recommended for initial screening of suspected patients with carotid artery occlusive disease.

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