Preoperative Duplex on Admission Prevents Unnecessary Carotid Surgery

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Objectives. Our unit policy is to duplex on admission all patients undergoing carotid endarterectomy to confirm patency. The aim of this study was to evaluate whether this had led to avoidance of unnecessary carotid surgery in a significant number of patients.

Methods. Over a 7-year period from January 1997 to December 2003, a total of 475 patients were scheduled for carotid endarterectomy. Of these, 439 patients subsequently underwent carotid endarterectomy. These data were obtained from prospectively collected vascular departmental records and we also hand searched notes of the 36 cancelled patients.

Results. There were a total of 36 cancellations for various reasons. Of these, 8 were clearly occluded on duplex. A further 16 were highly suspicious of occlusion on duplex and thus surgery was deferred and selective angiography was undertaken. Of these 9 were confirmed to be occluded on angiogram and a further 4 had severe stenoses or virtual occlusion, 3 patients had a distal internal carotid artery occlusion.

Thus a total of 24 patients had an occlusion either diagnosed directly on duplex or because of suspicion on duplex. Unnecessary carotid surgery was avoided in 24 of 475 (5%) of patients.

Conclusion. This study shows that a preoperative duplex on admission for surgery results in 1 of 20 patients avoiding unnecessary carotid surgery.

Keywords: Carotid endarterectomy; Internal carotid artery occlusion.

Introduction

There is significant evidence to suggest that carotid endarterectomy is beneficial in patients with 70–99% stenosis.1 The role of duplex is also well established as the best non invasive test to assess the degree of stenosis accurately. Angiography is reserved for patients with equivocal or suboptimal duplex or if there is doubt of occlusion.2

Our unit policy is to duplex on admission all patients undergoing carotid endarterectomy to confirm patency. The initial decision to operate is based on duplex criteria alone. Our criteria for assessment of ICA stenosis are based on duplex velocity criteria alone.3 There is often a delay between the time of first duplex and the patient coming for surgery during which period progression to occlusion could occur. All our patients are operated on an average of 4 weeks from their clinic appointment with a range of 2–8 weeks. The role of surgery for internal carotid artery occlusion is controversial.4–7

The aim of this study was to evaluate the policy of preoperative duplex on admission and to assess whether this has led to avoidance of unnecessary carotid surgery in a significant number of patients.

Methods

We undertook a 7-year review of the weekly prospectively collected mortality and morbidity (M&M) data of the Nuffield Department of Surgery, University of Oxford for the period 1st of January 1997 to 31st December 2003. The number of patients scheduled for carotid endarterectomy, number who underwent surgery and the number of patients cancelled were reviewed. The notes of all the cancelled patients were handsearched.
Results

A total of 475 patients were scheduled for carotid endarterectomy during the 7-year period of which 439 (92.42%) underwent surgery. There were 36 (7.58%) cancellations for the reasons shown in Table 1.

All these patients had a preoperative duplex on admission. Eight of these patients had carotid occlusion and hence were cancelled. A further 17 had duplex suspicious of occlusion of which one was difficult to interpret due to heavy calcification. All of these 17 patients underwent selective angiography. Nine were occluded on angiography, 4 others had severe stenoses/virtual occlusion and a further 3 had distal occlusion of the internal carotid artery. These 7 patients were deemed to be in operable due to extensive internal carotid artery disease. The patient with calcified carotid on duplex had a normal angiogram.

Assessment by a neurologist on admission resulted in a further 4 of 36 patients being considered high risk to benefit ratio and hence surgery was cancelled. Five patients were cancelled due to evidence of misdiagnosis on preoperative assessment by a neurologist. Of these one had symptoms related to vertebral-basilar insufficiency, one had bilateral symptoms and angiogram done suggested only 50% stenosis bilaterally. One patient had amaurosis fugax on the side of the normal carotid and 2 others had atypical symptoms and angiogram suggested less than 70% stenosis. One patient had a major stroke on admission and surgery was cancelled. Surgery was deferred in 1 patient as he was on a combination of aspirin and clopidogrel.

Thus a total of 24 (66.66%) of all cancelled patients had an occlusion either diagnosed directly on duplex or because of suspicion on duplex with subsequent angiography. Unnecessary carotid surgery was avoided in 24 of 475 (5%) patients.

Table 1. Reasons for cancellation of carotid surgery

<table>
<thead>
<tr>
<th>Reason</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occluded on duplex</td>
<td>8</td>
<td>22%</td>
</tr>
<tr>
<td>Duplex suspicious-angiogram requested</td>
<td>17</td>
<td>47%</td>
</tr>
<tr>
<td>Occluded on angiogram</td>
<td>9</td>
<td>25%</td>
</tr>
<tr>
<td>Severe stenosis or virtual occlusion</td>
<td>4</td>
<td>11%</td>
</tr>
<tr>
<td>Distal occlusion or disease</td>
<td>3</td>
<td>8%</td>
</tr>
<tr>
<td>No significant disease</td>
<td>1</td>
<td>3%</td>
</tr>
<tr>
<td>Misassessment</td>
<td>4</td>
<td>11%</td>
</tr>
<tr>
<td>Misdagnosis</td>
<td>5</td>
<td>14%</td>
</tr>
<tr>
<td>On aspirin + clopidogrel</td>
<td>1</td>
<td>3%</td>
</tr>
<tr>
<td>Preoperative event</td>
<td>1</td>
<td>3%</td>
</tr>
<tr>
<td>Total number</td>
<td>36</td>
<td>100%</td>
</tr>
</tbody>
</table>

Discussion

There is anecdotal evidence that the investigation and referral of patients for carotid endarterectomy is taking too long.1 All our patients are operated on an average of 4 weeks from their vascular review in clinic. The delay from the time of first duplex to surgery could result in carotid stenosis progressing to occlusion. This is the rationale for our unit policy of preoperative duplex on admission. This is the first such study to our knowledge.

The role of surgical intervention for internal carotid artery occlusion is ill-defined. Earlier results of carotid revascularisation in the setting of acute and subacute occlusion showed dismal outcomes.4,5 Although there are isolated reports favouring surgery in the case of symptomatic carotid occlusion, a randomized prospective trial is needed to define the potential benefits of carotid revascularisation.6,7 The ECST and NASCET studies have shown that the ubiquitous string sign is not associated with a high risk of stroke and emergency endarterectomy is unnecessary.1 All our patients detected to have occlusion were asymptomatic.

The policy of preoperative duplex on admission in this study detected occlusion in 5% of patients and thus avoided unnecessary carotid surgery. The issues of misassessment and misdiagnosis were eliminated by introducing joint neurovascular clinics.

The outstanding challenges still to be met are minimising delay with early referral, rapid assessment and prompt surgery. The role of surgery for carotid occlusion remains unclear.

References


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