Improving the provision of carotid endarterectomy in line with UK Government targets requires more than just motivated surgeons

CLAIRE BROWN, A ROSS NAYLOR

Department of Vascular Surgery, Leicester Royal Infirmary, Leicester, UK

ABSTRACT

INTRODUCTION Carotid endarterectomy confers maximum benefit in symptomatic patients provided it is performed within < 2 weeks of presentation, but few centres achieve this target. The objective of this study was to determine if a surgeon with an interest in carotid endarterectomy could make simple modifications to practice so that carotid endarterectomy was performed within 2 weeks of referral in the majority of patients.

PATIENTS AND METHODS Audit of 44 symptomatic patients undergoing carotid endarterectomy by one surgeon in 2007 after implementing simple changes in practice (e.g. *ad hoc* cancellation of non-urgent cases, *ad hoc* utilisation of cancelled theatre sessions). Outcomes were compared with 36 symptomatic patients undergoing carotid endarterectomy in 2006.

RESULTS There was only a modest reduction in delay to surgery. In 2006, 11% underwent carotid endarterectomy within 2 weeks of referral increasing to 20% in 2007. By 2007, 48% underwent surgery within 4 weeks compared with 33% in 2006.

CONCLUSIONS Notwithstanding the additional impact of delays from symptom onset to referral, achieving a 2-week target will require more than motivated surgeons making simple changes to practice. It seems inevitable that vascular units will have to identify 1–2 ‘ring fenced’ theatre sessions per week (but some could go unused) and surgeons will have to accept that they may not always operate on the patients they work-up.

KEYWORDS

Carotid endarterectomy – 2-week target – Practice

CORRESPONDENCE TO

A Ross Naylor, Professor of Vascular Surgery, Clinical Sciences Building, Leicester Royal Infirmary, Leicester LE1 5WW, UK

T: +44 (0)116 2523252; F: +44 (0)116 2523179; E: ross.naylor@uhl-tr.nhs.uk

Following publication of the European Carotid Surgery Trial (ECST)¹ and the North American Symptomatic Carotid Endarterectomy Trial (NASCET),² it has become customary to refer to the term ‘recently symptomatic’ as meaning that the patient presented within 6 months of suffering their index transient ischaemic attack or stroke. This 6-month threshold for intervention remains an important criterion in practice guidelines throughout the world.

However, evidence suggests that the highest risk of stroke after suffering a transient ischaemic attack/minor stroke is the first 7–14 days,³ during which time few patients are investigated and referred for surgery⁴ and that delays to surgery (even if they remain within the overall 6-month threshold) confer ever reducing benefit to the patient. For example, performing carotid endarterectomy within 2 weeks in symptomatic patients with a NASCET 50–99% stenosis (ECST 70–99%) will prevent 185 ipsilateral strokes at 5 years per 1000 carotid endarterectomies performed.^{4,5} The number of strokes prevented at 5 years falls to 98 if carotid endarterectomy is delayed by 2–4 weeks, while only

8 strokes will be prevented at 5 years if surgery is delayed by > 12 weeks. In effect, by 12 weeks, the patient still faces all of the risks of surgery with relatively little prospect of benefit.

Few (if any) centres in the UK have achieved a median 2-week delay to surgery in all symptomatic patients⁴ and the logistics of how this target might be achieved without wholesale changes in practice have rarely been explored. The aim of the current study was to see whether a surgeon with a professed interest in carotid disease could make relatively simple changes to practice in order to perform carotid endarterectomy on the majority of patients within 2 weeks of referral.

Patients and Methods

Pre-2007 practice

The Vascular Unit at Leicester Royal Infirmary has six consultants and provides elective and emergency vascular services to a population of about 1.2 million in

Leicestershire and South Staffordshire. All carotid referrals from these two health regions were distributed equally amongst the six consultants in order to optimise patient care. Secondary/tertiary referrals from outwith Leicestershire/South Staffordshire were allocated to the surgeon to whom the case had been referred. Prior to 2006, most referrals were made via the postal service.

Changes for 2007

The allocation mechanism for sharing referrals was unchanged. However, referral centres were now encouraged to telephone about individual cases or to fax referrals which were then allocated to the consultant on-call that day. Allocated referrals were seen (where possible) within 7 days in a single-visit clinic. This sometimes required the clinic co-ordinator to telephone the patient at home. However, if the 7-day deadline was not feasible (leave, *etc.*), no attempt was usually made to re-allocate the patient to another colleague.

Following counselling and provided there were no contra-indications, the aim was to perform surgery within 2 weeks. Where that was not possible (leave, already full lists), the waiting list co-ordinator would first establish whether a theatre session vacated by a vascular consultant was available. If that proved impossible, a vacated general surgery theatre was sought. If neither option was available, the next step was to move non-urgent cases from a scheduled theatre list. Finally, if that option failed, the patient was offered the first available ARN theatre list, accepting that it would now be beyond the 2-week target. As before, however, no attempt was generally made to see if a colleague could operate sooner. The only exception to this escalating protocol was the rare patient with crescendo transient ischaemic attacks who underwent urgent carotid endarterectomy in the emergency theatre.

Data

Most of the data was acquired prospectively as part of the on-going UK Carotid Endarterectomy Audit. Where data were missing or incomplete, case notes were reviewed to determine delays from onset of symptoms to referral to ARN and then from the date of referral to operation for the two calendar years 2006 and 2007. This audit does not include any patient undergoing endarterectomy for asymptomatic disease or when carotid endarterectomy was performed in combination with a cardiac procedure.

Results

Thirty-six symptomatic patients underwent carotid endarterectomy by ARN in 2006 and 44 in 2007. Figure 1 indicates changes in the delay from onset of symptoms to referral to the surgeon. The main findings were that there

Figure 1 Delays from onset of symptoms to referral to the surgeon.

was no change in the proportion of patients referred within 2 weeks of suffering their transient ischaemic attack or minor stroke (41% in both 2006 and 2007), nor within 4 weeks (56% in 2006 compared with only a slight increase to 65% in 2007). The most obvious (and welcome) change in referral practice, however, was the reduction in patients waiting > 8 weeks (39% in 2006, 14% in 2007). Of most practical importance, only 7% of patients in 2007 were referred after > 12 weeks had elapsed, compared with 22% in 2006.

Figure 2 details the cumulative delay from date of referral to surgery. Note that, although there was some improvement in 2007 following the various changes in practice, they did not really confer a major impact. In 2006, 11% of patients underwent carotid endarterectomy within 14 days of referral and 31% within 28 days. In 2007, the parallel figures were 21% and 48%, respectively. Overall, the median delay from referral to carotid endarterectomy in 2006 was 57 days, falling to 29 days in 2007. In both time periods, > 90% of patients underwent surgery within 12 weeks of referral.

Figure 2 Cumulative delay (days) from date of referral to undergoing carotid endarterectomy.

Discussion

By late 2006, the need for greater urgency in expediting carotid endarterectomy in symptomatic patients had become increasingly compelling and the aim of the current study was to see whether relatively simple changes in practice might significantly reduce the delay from referral to surgery. If proven, it would mean that most units could probably meet the '2-week' target for treatment without more fundamental reorganisation of service provision. However, this study has shown that motivation on behalf of the surgeon and a willingness to take on extra *ad hoc* theatre sessions is not enough and we now put forward our model of the service changes necessary to address this challenge.

There are a number of reasons (some cumulative) why these measures conferred relatively little impact. In retrospect, some should have been anticipated from the outset, some were unavoidable, some indicated a lack of awareness or education, but several highlighted outmoded and rigid practices that will have to be addressed.

Important reasons contributing to the cumulative delay included: (i) difficulties in bringing patients to clinic at short notice (this was occasionally due to problems contacting them, but we also found some patients surprisingly unwilling to attend clinic at short notice despite being offered an appointment within days of receiving the referral [*i.e.* a patient education/awareness problem]); (ii) the continued use of postal referrals in a significant minority of general practitioners, despite encouraging the use of fax (*i.e.* non-faxed referrals could use up to 5 days of the 14-day target time, as the clock 'starts' from the date of referral on the letter not when it arrives in the vascular office); (iii) 'out-of-area referrals' had to have managerial approval before an out-patient appointment could be sent (*i.e.* the relevant PCT had to confirm that treatment (*i.e.* payment) would be authorised); (iv) some patients were simply not ready for surgery (co-morbidity, need for cardiac work-up, *etc.*); (v) potential theatre space often clashed with other commitments (*e.g.* out-patients) so could not be taken up; (vi) there were difficulties in using other vacated general surgery theatre sessions or emergency theatres, due to lack of vascular experience of the theatre team and on-call junior surgery and anaesthetic staff; (vii) cancelling 'non-urgent' operations helped reduce carotid endarterectomy delays, but then created another problem as those patients had to be re-scheduled within 28 days in order to comply with UK Government targets; and (viii) it seemed that stroke did not carry the same political/financial 'clout' as heart disease and cancer so there was a lower priority for promoting systematic changes throughout the referral and treatment pathway.

These factors were responsible for many of the cumulative delays, but there was another more fundamental (and

sensitive) factor underlying some of the avoidable delays to surgery, namely the failure to consider that referring the patient to a colleague may facilitate more speedy treatment. Performing carotid endarterectomy (like aneurysm repair) is one of the 'index procedures' in the National Vascular Database and is one of the main reasons why surgeons chose vascular as their specialty. Accordingly, if you have worked hard to build up a burgeoning practice, why would you simply want to give it away? Similarly, most vascular surgeons enjoy developing a professional relationship with their patients (as do they in reverse) and most will reluctantly concede that they are averse to 'working someone up' and then hand them over to another colleague to perform the operation. This emotion is, of course, only human (and not restricted to vascular surgeons), but anyone reading the list of reasons why delay occurs will have observed that there were several situations when simply re-allocating the patient to a colleague could have greatly expedited investigation and treatment.

So what is the solution? The problem already looked challenging, but that was before the UK Government issued its latest guidelines,⁶ which now recommend that transient ischaemic attack/minor stroke be treated as an emergency and that patients should undergo carotid endarterectomy within 48 h! At present, this is impossible to achieve, but a 7-day threshold should be an attainable target. Accordingly, the way we investigate and manage patients has to radically change and that, inevitably, means dispensing with many cherished consultant practices. If the current study has shown nothing else, it has demonstrated that no matter how motivated the surgeon is, simply relying upon *ad hoc* utilisation of cancelled/emergency theatre space in order to meet the demand for expedited surgery is more akin to 're-arranging deckchairs on the *Titanic*'. Remember, there were only about 40 new symptomatic cases to deal with each year (*i.e.* about one per week allowing for leave, *etc.*) and still the 2-week target was not achievable despite everyone's best efforts.

To these authors, it is inevitable that all primary care trusts and hospitals will have to co-ordinate and plan adequately for the new era of treating transient ischaemic attack patients as emergencies (*i.e.* dedicated resources). With the recent change in political emphasis, our unit has now been able to implement some crucial changes in practice and we put forward our model to illustrate how this can work (Fig. 3). We now have a daily transient ischaemic attack clinic with single visit imaging (carotid artery duplex and head computed tomography). The clinic is accessed via the 'Choose and Book' referral system, thus reducing referral delays and problems with out-of-area referrals. The clinic is run every day including weekends. In addition to imaging, all patients are assessed clinically and given an ABCD score.⁷ Any patient seen in the clinic with ABCD score

of 4 or more and a significant stenosis (> 60% on carotid duplex) is transferred to the vascular unit for work-up for urgent carotid endarterectomy. There are two dedicated carotid endarterectomy theatre lists scheduled each week (Tuesday and Friday) with a consultant rota for cover. Patients are allocated to the next available list irrespective of whether it is the consultant who admitted him or her. The patient is operated on no more than 4 days later unless unfit for surgery.

This model is working well in our unit; however, its use could have important logistical implications upon other hospitals where carotid endarterectomies are performed. Some hospitals will not be able, or willing, to risk leaving such valuable theatre space unused, or have the capacity to meet other waiting list targets as well. Inevitably, this is going to raise the spectre of centralisation/regionalisation. The expedited carotid endarterectomy protocol is but one part of a much larger co-ordinated strategy to optimise the emergency care of patients with symptomatic cerebrovascular disease (e.g. immediate implementation of 'best medical therapy', anticoagulation for patients with arrhythmias, thrombolysis for acute ischaemic stroke, intracranial haematoma evacuation, carotid endarterectomy, angioplasty, etc.). Finally, and most importantly, surgeons in centres doing carotid endarterectomy

will have to change the way that they work and get used to the alien concept that they may have to admit and 'work-up' patients in order that another colleague operates upon them on the next allocated 'carotid endarterectomy' list.

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