Carotid Endarterectomy by Eversion Technique
Its Safety and Durability

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Summary Background Data
The outcome of standard longitudinal carotid endarterectomy (CEA) can be measured by preservation of neurologic function with a low incidence of restenosis. Closure of the internal carotid arteriotomy with or without a patch may predispose to restenosis. Alternatively, transection of the internal carotid artery at the bulb with eversion endarterectomy allows expeditious removal of the plaque and direct visualization of the end-point. Because the proximal internal carotid artery is anastomosed to the common carotid artery, this obviates the need for patch closure. The authors report their results with this technique in more than 2200 procedures.

Methods
From May 1993 to March 1998, 1855 patients underwent 2249 CEAs using the eversion technique. During the same period, 410 patients had 474 CEAs by standard technique. Three hundred fifteen procedures in the eversion group and 65 procedures in the standard group were combined CEA and coronary artery bypass grafts. Most solo CEAs (97%) were performed in awake patients using regional anesthesia. Shunts were used on demand in 6% of CEAs.

Results
The operative mortality rate was 1.02% (16/1575) in the solo eversion group and 2.2% (9/410) in the standard group. There were 18 permanent neurologic deficits (0.8%) in the eversion group and 11 (2.3%) in the standard group. Transient neurologic deficits occurred in 20 patients (0.9%) in the eversion group and 13 patients (2.7%) in the standard group. Of the 1855 patients, 1786 (96%) presented for duplex ultrasound follow-up. There were seven (0.3%) stenoses greater than 60% in the eversion group versus five (1.1%) in the standard group.

Conclusions
Eversion CEA can be performed safely with a low rate of stroke and death and a minimal restenosis rate in short- and long-term follow-up.

The utility of carotid endarterectomy (CEA) for the treatment of hemodynamically significant atherosclerotic stenosis of the carotid bifurcation for the prevention of stroke has been well established.1-5 Most surgeons have performed this procedure by starting a longitudinal incision on the distal common carotid artery that is extended onto the internal carotid artery (ICA) across and beyond the stenosis opposite the orifice of the external carotid artery.6 After complete removal of the offending plaque and associated debris, the arteriotomy is closed. Using simple primary closure with fine sutures, it is often difficult to avoid stenosis, especially at the distal end of the ICA in patients with smaller arteries. Alternatively, to preserve the diameter of the ICA and minimize restenosis, this arteriotomy can be closed using a patch of autogenous vein or synthetic material.6-13 This may make closure of the bulk of the arteriotomy easier, but the distal arteriotomy may still be difficult to close without narrowing the artery. Obviously, meticulous closure is important in the prevention of early and late stenosis and occlusion in both of these techniques. However, symptomatic or asymptomatic restenosis rates after conventional CEA range from 2% to 30% in the literature.6-8,14-18

Another option, CEA by the eversion technique, completely avoids the need for suture lines in the distal ICA by displacing the suture line to the more proximal and much

larger junction of the distal common carotid and proximal internal carotid arteries. Thus, by avoiding the technical hazards of ICA closure, evasion CEA has been shown in numerous studies to minimize the role of closure in the occurrence of restenosis.19-30

Since 1993, we have used a simplified version of ICA evasion endarterectomy that involves complete oblique division of the ICA through the bulb with distal evasion of the adventitia over the atherosclerotic core, thereby completely removing all atheroma under direct vision.26 In this article, we report our results of more than 2200 evasion endarterectomies and compare them with our experience with conventional CEA during the same period.

METHODS AND MATERIALS

From May 1993 to March 1998, 2249 evasion endarterectomies were performed in 1855 patients; 1934 procedures were performed solely as CEAs and 315 in combination with coronary artery bypass grafts (CABG). All data were collected prospectively in a vascular registry; long-term follow-up was performed by clinical evaluation of patients and vascular laboratory studies. Patient demographics showed that 1039 (56%) were men, 451 (24%) were diabetic, and 606 (33%) were current smokers; the average age was 70 years (range 36 to 95). The presurgical workup consisted of a comprehensive history and physical examination and duplex ultrasound. In most cases, magnetic resonance or conventional biplanar angiography was performed to document the severity of stenosis. Indications are listed in Table 1.

Cervical block anesthesia was used in 1873 (97%) of the patients undergoing solo CEA. Fifty-seven patients (3%) required general anesthesia, and four patients (0.2%) were converted from cervical block to general anesthesia. Shunts were used in 73 (3.8%) solo procedures for neurologic deterioration after carotid cross-clamping. All patients undergoing CEA combined with CABG had general anesthesia without shunt. After surgery, all patients undergoing solo CEA remained in the recovery room for 2 to 4 hours until their blood pressure and neurologic status were considered acceptable. Eventually, they were transferred to a surgical floor. During this period, most patients were discharged from the hospital within 24 hours after their CEA. Patients with bilateral critical stenosis underwent their contralateral endarterectomy the day after the first procedure if there were no complications from the first.

After discharge, visiting nurses monitored the patients' blood pressure and neurologic status. Patients were followed or seen in the office 2 weeks after surgery for clinical evaluation and then at 3, 6, and 12 months thereafter, during which time they were also evaluated by duplex ultrasound for detection of occlusion, recurrent stenosis, or contralateral disease. Any recurrent stenosis of greater than 60% was recorded and evaluated by magnetic resonance angiography or conventional angiography. Follow-up occurred in 1786 of 1855 (96%) patients for an average of 18 months (1 to 52 months).

Table 1. INDICATIONS FOR SURGERY

<table>
<thead>
<tr>
<th>Indications</th>
<th>Eversion (%)</th>
<th>Noneversion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total procedures</td>
<td>2249</td>
<td>474</td>
</tr>
<tr>
<td>Transient ischemic attack</td>
<td>345 (15.34)</td>
<td>86 (18.14)</td>
</tr>
<tr>
<td>Amaurosis fugax</td>
<td>225 (10.00)</td>
<td>58 (12.24)</td>
</tr>
<tr>
<td>Stroke</td>
<td>204 (9.07)</td>
<td>63 (13.29)</td>
</tr>
<tr>
<td>Asymptomatic</td>
<td>1475 (65.69)</td>
<td>267 (56.33)</td>
</tr>
</tbody>
</table>

Technique

The technique of evasion CEA has been previously published.27-29 It involves the oblique transection of the ICA from the common carotid artery at the bulb. After division, the ICA may appear redundant; a cephalad incision from the heel of the transected ICA may be used to shorten the artery. The ICA is everted over its atheromatous core. It is important to remove the most external layers of the media when doing this to keep evertting the artery to the end of the atheroma. The endpoint is directly visualized and loose fragments are removed; tacking 7-0 or 8-0 monofilament sutures can be placed distally, if needed.

Because most of these cases were performed under cervical block anesthesia, shunts were used only if neurologic deterioration occurred after cross-clamping. The distal arm of the shunt is inserted into the internal carotid artery (ICA) in either of two principal ways. If the ICA appears redundant, the aforementioned extension of the ICA arteriotomy is carried above the disease before shunt insertion. Alternatively, the bulk of the plaque is removed (30 to 90 seconds) before the shunt is inserted. Once the shunt is placed, it can actually facilitate evasion of the ICA by serving as a mandrel. After completion of the ICA endarterectomy, the arteriotomy can be extended in the common carotid artery to facilitate removal of the common carotid and external carotid artery plaque. The ICA can then be tailored and shortened if needed for reanastomosis to the common carotid artery.

RESULTS

The 30-day mortality rate for all evasion CEAs was 1.4%; the rate for solo procedures was 1% (Table 2). There were 18 permanent neurologic deficits (0.8%) and 20 transient neurologic deficits (0.9%). Twenty-six of the 1855 patients (1.4%) died in the perioperative period, most secondary to cardiac disease, despite a vigorous cardiac workup before surgery. Nonfatal complications are listed in Table 2.

There were 13 occlusions after surgery; 7 of these occlusions occurred in early experience secondary to technical
failure, because the plaque was not entirely removed and a distal flap was left. These were treated by interposition bypass, four with vein and three with PTFE (polytetrafluoroethylene). Of the remaining occlusions, two patients were not reexplored, three patients had asymptomatic late occlusions, and one patient had a thrombectomy with revision of eversion. In an additional seven patients, eversion endarterectomy could not be completed because of long extended ICA plaque. In three of these patients, patch angioplasty was used; in four patients, a vein interposition graft was used. Distal tacking sutures were required in 17 patients (<1%).

During the same period, 474 traditional longitudinal CEAs were performed in 410 patients, 409 as solo procedures in 352 patients and 65 with CABG in 58 patients. These patients were demographically similar to those undergoing eversion endarterectomy: 70% were men, 23% were diabetic, and 35% were present smokers; the average age was 69 (range 45 to 89). The indications were also similar (see Table 1). The operative mortality rate was 2.2% (9/410), and transient and permanent neurologic deficits were seen in 24 patients (5%) (see Table 2). Most of the noneversion procedures were performed earlier during the transition to eversion endarterectomy. Otherwise, the traditional procedure was used selectively in patients whose plaque extended cephalad, based on evaluation before and during surgery, and for recurrent stenosis if the eversion could not be successfully completed. Seventy-three of the conventional endarterectomies (15.4%) were closed using a patch and 27 (5.7%) required the use of a shunt.

Only 7 of the 2249 procedures performed by eversion endarterectomy (0.3%) had long-term restenosis that required surgery; this figure was 5 (1%) in the noneversion group. Further stratified, there was no significant difference in outcome when a CEA was performed for symptomatic or asymptomatic disease in patients who had unilateral or bilateral CEA in the same hospitalization or in patients who underwent urgent CEA for neurologic deterioration (Table 3). Carotid artery cross-clamp time averaged 14.6 minutes (6 to 42 minutes) during eversion endarterectomy. Cumulative patency rates are shown in Table 4.

### Table 2. OUTCOME

<table>
<thead>
<tr>
<th>Complications</th>
<th>Eversion (%)</th>
<th>Noneversion (%)</th>
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<tbody>
<tr>
<td>Temporary neurologic deficit</td>
<td>20 (0.89)</td>
<td>13 (2.74)</td>
</tr>
<tr>
<td>Permanent neurologic deficit</td>
<td>18 (0.80)</td>
<td>11 (2.32)</td>
</tr>
<tr>
<td>Nonfatal cardiac</td>
<td>21 (0.93)</td>
<td>4 (0.84)</td>
</tr>
<tr>
<td>Occlusion</td>
<td>13 (0.58)</td>
<td>12 (2.53)</td>
</tr>
<tr>
<td>Nerve injury</td>
<td>6 (0.27)</td>
<td>5 (1.05)</td>
</tr>
<tr>
<td>Wound infection</td>
<td>2 (0.09)</td>
<td>1 (0.24)</td>
</tr>
<tr>
<td>Bleeding</td>
<td>28 (1.24)</td>
<td>5 (1.05)</td>
</tr>
<tr>
<td>Restenosis</td>
<td>7 (0.31)</td>
<td>5 (1.05)</td>
</tr>
<tr>
<td>Operative mortality</td>
<td>26/1855 (1.4)</td>
<td>9/410 (2.20)</td>
</tr>
</tbody>
</table>

### Table 3. COMPLICATIONS OF EVERSION ENDARTERECTOMY

<table>
<thead>
<tr>
<th>Patient Group</th>
<th>Stroke Rates (%)</th>
<th>Mortality Rates (%)</th>
<th>Complication Rates (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Symptomatic</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Asymptomatic</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Urgent</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Bilateral carotid occlusion</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Unilateral carotid occlusion</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td>1.29</td>
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<td>0.54</td>
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<td>4.26</td>
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<td></td>
<td></td>
<td></td>
<td>0.14</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>1.09</td>
</tr>
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* Complication rates include: Transient neurologic deficit, permanent neurologic deficit, wound bleeding, wound infection, occlusion, nerve injury, intracerebral bleeding, restenosis, cardiac, pulmonary.

### DISCUSSION

The efficacy of surgical treatment for carotid bifurcation disease in the prevention of stroke has been well documented by several prospective randomized studies.1-5 To prevent strokes, surgeons must avoid both acute problems such as thrombosis or embolization and more chronic problems such as restenosis. Careful reconstruction of the carotid artery after endarterectomy, whether by direct closure, patch closure, or the eversion technique, may play an important role in the prevention of symptomatic or asymptomatic restenosis.8-15

Eversion endarterectomy may be expected to produce lower rates of restenosis because it minimizes the technical demands of carotid closure.20,25,30-32 In addition, the configuration of the carotid artery after eversion may have hemodynamic advantages compared with other forms of carotid closure. Baan et al.33 evaluated the flow characteristics of arteries that had been treated by eversion endarterectomies and compared them with arteries closed with a Dacron patch angioplasty; they concluded that diameter, strain, and stiffness after eversion endarterectomy resembled the nonstenotic unoperated artery more closely than after Dacron patch angioplasty. Kieny et al.,31 in their evaluation of the evolution of carotid restenosis after endarterectomy, retrospectively compared the results of eversion and standard endarterectomy techniques and found restenosis rates of 1.9% in eversion and 13.5% in standard closures at a follow-up of close to 4 years. These results closely parallel the restenosis rate reported in this series.

### Table 4. CUMULATIVE PATENCY RATES

<table>
<thead>
<tr>
<th>Number</th>
<th>Eversion (%)</th>
<th>Standard (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1</td>
<td>99.4</td>
<td>97.0</td>
</tr>
<tr>
<td>2-12</td>
<td>99.2</td>
<td>95.4</td>
</tr>
<tr>
<td>13-24</td>
<td>98.0</td>
<td>93.1</td>
</tr>
<tr>
<td>25-36</td>
<td>98.0</td>
<td>93.1</td>
</tr>
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</table>
In addition to decreasing the rate of restenosis, eversion endarterectomy may have other advantages. Entz et al., in a series of articles, have shown that combined mortality and morbidity rates were significantly less in eversion endarterectomy than in standard endarterectomy. They also observed significant decreases in carotid artery clamp time and overall surgical time while performing eversion endarterectomy. Our experience with CEA supports these conclusions.

There are several possible reasons for the improved results with eversion endarterectomy. First, it is certainly easier to deal with the endpoint, because its entire circumference may be closely and directly visualized; also, the subsequent closure of the artery will not interfere with this area. Secondly, the reanastomosis of the ICA to the common carotid artery is a relatively macroscopic procedure that is much easier to perform than the exacting suture closure of the distal ICA, with or without a patch. Use of conventional patch angioplasty in these cases is certainly more time-consuming and often more difficult. Finally, eversion endarterectomy by complete transection of the ICA also allows shortening of redundant ICA and can more directly restore the streamlined anatomy of the carotid bifurcation; this, again, may offer a theoretical advantage of minimizing turbulence and the potential for restenosis.

Some authors have discouraged the use of this type of endarterectomy in patients who require intraluminal shunts. However, in this series and others, insertion of a shunt was found to be no more difficult when using eversion endarterectomy than it is during a conventional procedure. Reigner et al. demonstrated excellent results with eversion endarterectomy; even with the use of shunts, there were no neurologic complications in their series. As previously mentioned, two methods of shunting were used in this series. If the ICA was redundant, the ICA plaque was incised and the shunt placed distal to the stenosis. After restoration of cerebral blood flow through the shunt, the eversion was performed over the shunt. Conversely, if there was not much redundancy in the ICA, the bulk of the plaque could be removed in a matter of seconds and the shunt could be placed through the transected ICA beyond the endpoint. The shunt could then be used as a mandrel to evert the ICA fully and to evaluate the endpoint adequately. Thus, eversion endarterectomy with a shunt may at times actually facilitate the endarterectomy as opposed to being more of a hindrance, as it is in conventional longitudinal CEA.

Duplex ultrasound was used extensively for the follow-up of our patients. During the transition from traditional longitudinal CEA to eversion endarterectomy, these patients had to be followed closely to document that this procedure was as efficacious and safe as prior techniques. Patients were evaluated by duplex 3, 6, and 12 months after the procedure and then every 6 months thereafter. Carballo, Papanicolaou, and Golledge, with their colleagues, have demonstrated that follow-up using ultrasound is a precise technique that can detect restenosis of patients after endarterectomy. They also demonstrated the need for close, vigorous follow-up of patients to document the immediate adequacy of the procedure and long-term results.

In our series, 96% of patients had at least one follow-up ultrasound, and only 0.3% of patients undergoing endarterectomy needed follow-up revision of bypass because of hemodynamically significant (>70%) restenosis of their eversion endarterectomy. Early in this series, two patients underwent revision for inadequate common carotid endarterectomy with recurrence at the bifurcation but not extending into the ICA. As we became more familiar with this approach, a full endarterectomy of the common carotid artery has been performed in all patients. This can be performed by extending the arteriotomy onto the common carotid artery, which can be accomplished even with a small amount of redundancy of the ICA. The common carotid artery plaque can then be extruded, cut flush, and removed as well; a complete endarterectomy of the external carotid artery can be performed. The ICA is then sewn onto this area, and this closure allows widening of both lumens, the common and internal carotid arteries in essence patching each other. In doing so, however, the surgeon must be careful not to leave a large patent bulb; the surgeon should trim the ICA to create a more natural streamlined bifurcation. In our previous reports, we measured the external diameter of the ICA before and after endarterectomy and found that the distal ICA just above the bifurcation expanded by approximately 1 mm (external diameter) on average per procedure. Thus, instead of potentially narrowing the lumen with a primary closure or causing distal stenosis of the distal ICA suture line with a patch closure, this demonstrates that eversion endarterectomy actually increases the ICA diameter. This may be another reason why the restenosis rate was minimized in this series.

Although eversion endarterectomy in this series showed low complication and restenosis rates, this was not a prospective randomized series. Therefore, valid comparisons may not be made with the traditional longitudinal endarterectomy technique. The purpose of this study was to show the safety and durability of the eversion technique.

Unfortunately, eversion endarterectomy is not suited for every patient. Patients who have postradiation stenosis tend to have a less well-developed surgical endarterectomy plane and may better be served by an interposition graft or conventional endarterectomy with patch. Also, patients with extensive atherosclerotic plaque that extends beyond the cervical triangle are at high risk for distal dissection after eversion endarterectomy if the endpoint is not well visualized. Thus, the distal extent of the disease must be identified by visual inspection during surgery before committing to an eversion endarterectomy. The surgeon should have access to approximately 0.5 cm of normal ICA beyond the plaque to complete the eversion endarterectomy technique successfully. When evaluating the distal ICA, the transition between the yellow atherosclerotic plaque and the purplish-blue normal distal ICA can usually be identified. This definition of the end of the plaque and the beginning of the
normal artery signifies that an evasion endarterectomy should end without a problem. In cases of eccentric extension of plaque, the surgeon can either tack the distal endpoint with fine prolene suture or use an interposition graft by transecting the distal ICA. In our series, this had to be performed 10 times because of failed or incomplete evasion endarterectomy. All patients tolerated the procedure well without any neurologic sequelae. These results were paralleled by Entz et al., who found that 2.5% of patients needed carotid bypass after aborted evasion endarterectomy.

Despite the distal mobilization of the ICA, the incidence of cranial nerve injuries in this series was low (0.3%), and most were temporary. Much of the circumferential mobilization of the internal and common carotid arteries is best performed after division of the ICA, thereby allowing improved visualization of the posterior carotid sheath and its contents. After division of the ICA, the longitudinal fibers tethering the ICA cephalad can be divided along the artery and mobilization can be performed under direct vision. Once this is performed, the ICA can essentially be pulled from the wound, and in more than 80% of cases some of the redundant portion of the ICA can be excised. Complete division of the ICA in evasion endarterectomy facilitates uncoiling and unkinking of the ICA and also allows recreation of the carotid bifurcation in a hemodynamically acceptable fashion. At follow-up, the presence of distal restenosis was less than 0.5%, and the presence of occlusion secondary to distal loss or inadequately endarterectomized vessel again was less than 0.6%. These results compare favorably to prior reports of traditional CEA with or without patch closures in most modern series.7–14

**CONCLUSIONS**

CEA by the evasion technique allows for complete removal of the atherosclerotic plaque from the ICA as well as the common and external carotid arteries. It minimizes early occlusion and late restenosis. This technique can be safely performed in most patients; it is expedient, technically safe, and reliable and has produced durable results.

**References**

1. European Carotid Surgery Trialists Collaborative Group. MRC European carotid surgery trial, interim results for symptomatic patients with severe (70–90%) or mild (0–29%) carotid stenosis. Lancet 1991; 337:1235–1243.

Discussion

DR. MICHAEL E. DEBAKEY (Houston, Texas): We reported our experience with the evasion technique of endarterectomy about 40 years ago. We also found it useful and efficacious in well-localized atherosclerotic occlusive lesions in the iliac and femoral arteries. But with increasing experience with carotid endarterectomy following our first case in 1953, we changed our technical use of the procedure to the longitudinal approach for several reasons. For one thing, we became convinced of the usefulness of a temporary shunt and finally began to employ it in virtually every case. We found that it was simpler to employ the shunt in the longitudinal approach. For another, we found that in some patients in whom the carotid bifurcation was placed anatomically in the upper reaches of the neck, the evasion procedure was difficult to perform. I should like to ask the authors if they have encountered such cases and whether or not they employ the evasion technique in such cases. I should also like to ask how they determine when not to use a shunt.

DR. DHIRAJ M. SHAH (Albany, New York): As I mentioned in the presentation, the technique of evasion endarterectomy that we have used is a modification of your technique. Instead of dividing the common carotid artery we divide the internal carotid artery at its origin near the bulb obliquely so that it is the widest part of the artery and it is also easy to evert it completely up to the end point. Using this technique, the result has been better than the conventional technique in our hands, although that was not the purpose of this paper. When we started using the evasion technique, we had initially done a prospective randomized study showing the difference in the two techniques in terms of stroke, occlusion, and restenosis rates when all are combined. The explanation for this difference in result may be in the technique. In the evasion technique as I mentioned, there is no distal suture line on the internal carotid artery; therefore, there is no narrowing. Also, it allows complete removal of the plaque without decreasing the luminal area and so there is usually digitation of the artery distally. In our hands this is a more expedient technique compared to conventional because it takes less time to close or reanastomose the artery in the most accessible, proximal, and widest area of the carotid stent rather than meticulous closing of the distal arteriotomy whether with or without a patch. As I presented, the use of shunt was not difficult once the internal carotid was divided. We have used shunt on demand in awake patients for any neurological deterioration which may occur any time after cross-clamping the carotid artery. Use of shunt was not hindering; in fact, it could be facilitating to perform evasion endarterectomy.

DR. JONATHAN B. TOWNE (Milwaukee, Wisconsin): Basically, there are two points to this study that need evaluation. First, the perioperative results depend on the technical excellence of the operation. What is the perioperative morbidity, mortality, and stroke rate? The Achilles heel of this technique is the distal breakpoint in the internal carotid artery. What were the causes of stroke in these patients? With current duplex technology, the status of the repair can be evaluated.

We use intraoperative duplex as a means of assessing our repairs. Fortunately, we rarely find troubles with the distal breakpoint or reconstruction whether we patch or do primary closure. However, we have a small incidence of problems, even when we use a Fogarty mush clamp, where the intima of the common carotid cracks, creating an intimal flap proximal to the beginning of the endarterectomy. Without intraoperative assessment of the repair, you are going to miss this most of the time. Secondly, the effect on the external carotid artery, which rarely causes stroke, still needs to be evaluated.

DR. FRANK C. SPENCER (New York, New York): I have two questions: First, I believe you stated that a sonogram postoperatively found about a 6% fracture of the intima in the proximal carotid where the vascular clamp had been applied. This seems high so I’d would appreciate clarification. Second, as Dr. DeBakey mentioned, have these data been subjected to statistical analysis? The results seem similar so the question arises about chance association or statistical validity.

DR. JONATHAN B. TOWNE (Milwaukee, Wisconsin): We find in 6%, of the cases we revise the procedure intraoperatively. Two-thirds of those are problems with the external carotid which we do as a blind endarterectomy. In one-third of cases, there will be problems with the common carotid artery, usually proximal to the proximal breakpoint. These can be insidious and disastrous. We feel that to get the best technical result with carotid endarterectomy, one must do some sort of inoperative assessment.

The other key to this is the development of fibro-intimal hyperplasia. How many of your patients had studies for at least 2 years postoperatively and what were the findings? One note of caution I would like to raise, and it may answer Dr. DeBakey’s question, is that two-thirds of the patients in this series had asymptomatic