Gore® Hybrid Vascular Graft for bailout or rescue for intraoperative problems during CEA

INTRODUCTION

Standard CEA with or without patch-plasty and eversion remains the gold standard for significant carotid atherosclerotic disease.

IDEAL FLOW SURFACE AFTER CEA

- Embolic source
- Flow limiting
- Minimally thrombogenic
- Not too thin

“The optimal distal end point represents a compromise between continuing the endarterectomy until relatively normal intima is obtained, yet not continuing so high that the operation becomes needlessly or dangerously compromised.”

The cause of perioperative stroke after carotid endarterectomy

Theresa S. Riles, MD, Anthony M. Imperato, MD, Glenn R. Jakobowitz, MD, Patrick J. Lempertino, MD, Gary Giangola, MD, Mark A. Addis, MD, and Ronnie Landis, RN, New York, N.Y.

Conclusion: Although patient selection seems to play a role, most perioperative strokes were due to technical errors made during carotid endarterectomy or reconstruction and were preventable. O J Vasc Surg 33:1194, 2001)

CHALLENGING CEA

- Long plaque (post tongue)
- Fracture or disruption
- Transmural lesions
- Wall damage
- Intramural flap
- Cheese-wiring damage
- Excessive thinning
- False aneurysm
- Recurrent stenosis
- Radiation induced stenosis

With Permission All Naylor ISBN 2003
**CAROTID BYPASS**

Early and late outcome after carotid artery bypass grafting with saphenous vein

C. Lauder, HRCCh, A. Kelly, Wu, M. M. Thompson, MD, FRCS, N. J. M. London, MD, FRCS, P. F. Bell, MD, FRCS, and A. R. Naylor, MD, FRCS, Leicester, England

A prospective study was undertaken to determine outcome and morbidity of internal carotid artery bypass grafting with saphenous vein.

Revascularisation of 30 patients undergoing internal carotid and posterior communicating territory was collected, prospective, and unselected at 1 hospital.

Results: Bypass grafting was performed in 30 patients between 1992 and 2001, the common carotid being excised and the saphenous to the external carotid artery with an end-to-side anastomosis. The majority of patients were men (27/30). In total, 15 of 30 patients (11%) presented with prior stroke (7), cerebral haemorrhage (1), and peripheral vascular disease (7). The mean age was 66 (range 42–80) years. The mean follow-up was 32 months (range 12–48). The mean early complication rate was 12% (range 0–30%). One patient died within 30 days, and three had complications within the first 3 months (including one amputation). The mean hospital stay was 4 days (range 2–14). The mean operative time was 180 minutes (range 120–300). The mean follow-up was 32 months (range 12–48). The mean late complication rate was 10% (range 0–20%). One patient died at 1 year, and two had strokes at 3 years. Three patients required a revision of the graft at 1 year and 89% at 3 years. There were no late deaths. There were no late strokes. There were no late amputations. There were no late surgical complications. There were no late strokes. There was one late death. There was one late amputation. There were no late surgical complications. There were no late strokes.

**SUTURELESS VASCULAR ANASTOMOSIS**

1) Viabahn Open Revascularization TECHnique VORTEC

2) Viabahn Padova sutureless (VIPS)

**GORE® HYBRID VASCULAR GRAFT**

Heparin-bound expanded e-PTFE vascular prosthesis that has a section reinforced with Nitinol.

The Nitinol section is partially constrained to allow for easy insertion and deployment.

Sutureless outflow anastomosis

Reduces dissection and arterial manipulation

Reduction in organ ischaemic time

5-6-7 mm size

5-20% oversize

**Saphenous Vein Bypass: An Alternative to Internal Carotid Reconstruction**

A. Brancher, P. Pietri, P. E. Magnan, and E. Rossel

Service de Chirurgie Vasculaire, Hôpital Sainte-Marguerite, Marseille, France

Stroke/Death Rate @ 30 days

<table>
<thead>
<tr>
<th>CBP</th>
<th>Primary Patency @5 yr</th>
<th>Secondary Patency @10 yrs</th>
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</thead>
<tbody>
<tr>
<td>212</td>
<td>6.6 %</td>
<td>95.4 %</td>
</tr>
<tr>
<td></td>
<td></td>
<td>92.3 %</td>
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</table>

**Carotid bypass with polytetrafluoroethylene grafts: A study of 110 consecutive patients**

Choongwon, C., Canioni, M., Auer, M., Matsun, J., Basset, R., Heuts, M., Vanpee, J., Guillot, F., Valcnt, C., Marchand, M., and Jean-Philippe Nuss, M.

Primary Patency @3 yrs

<table>
<thead>
<tr>
<th>CBP</th>
<th>Stroke/Death Rate @ 30 days</th>
<th>Primary Patency @1 yr</th>
<th>Primary Patency @3 yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>110</td>
<td>0.9 %</td>
<td>97.4 %</td>
<td>95 %</td>
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</tbody>
</table>
CAROTID SURGERY at King’s 2007-2014

- Standard CEA
- Eversion
- Bypass

Total 590
Stroke/Death rate 1.1%

CAROTID BYPASS with GHVG IMPLANTATION TECHNIQUE

With the ICA clamped the nitinol reinforced end of the hybrid is introduced directly under vision for 1.5 cm with the deployment line facing upwards. Once in position the clamp is removed and the Stent graft is introduced for another cm. The deployment line is pulled, keeping parallel to the PTFE graft.

Anchoring suture / purse-string

Proximal anastomosis with CCA in an end to end fashion

Selective re-implantation of the ECA
CAROTID BYPASS with GHVG

<table>
<thead>
<tr>
<th>Case</th>
<th>Age</th>
<th>Gender</th>
<th>Stenosis %</th>
<th>Reason for Conversion</th>
<th>Peri-op Stroke</th>
<th>Patency at 6 months</th>
<th>Stroke at 6 months</th>
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<tbody>
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<td>1</td>
<td>58</td>
<td>M</td>
<td>90</td>
<td>Distal end point</td>
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<td>Patent</td>
<td>Nil</td>
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<tr>
<td>2</td>
<td>81</td>
<td>M</td>
<td>60</td>
<td>PAU</td>
<td>Nil</td>
<td>Patent</td>
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<tr>
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<td>F</td>
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<td>Patent</td>
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<tr>
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<td>71</td>
<td>M</td>
<td>80</td>
<td>PAU</td>
<td>Nil</td>
<td>Patent</td>
<td>Nil</td>
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<tr>
<td>5</td>
<td>63</td>
<td>M</td>
<td>80</td>
<td>Distal end point</td>
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<td>Patent</td>
<td>Nil</td>
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<tr>
<td>6</td>
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<td>M</td>
<td>80</td>
<td>Thin wall</td>
<td>Nil</td>
<td>Patent</td>
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</table>

CONCLUSION

- CEA is still the gold standard
- An easy CEA is an afterthought
- Carotid bypass is a durable alternative
- Gore Hybrid graft is a promising new technology
- Long term follow-up is necessary

Veith Symposium
Connecting the Vascular Community