MHIF FEATURED STUDY:
Heart EXPAND CAP

DESCRIPTION: a single-arm study evaluating the OCS™ Heart System and extended criteria donor hearts (those that are currently not transplanted or are seldom transplanted in the US)

CRITERIA LIST/ QUALIFICATIONS:

Donor Heart Inclusion
• Expected total cross-clamp time of ≥4 hours; OR expected total cross-clamp time of ≥2 hours PLUS one of the following risk factors:
  • Donor age 45-55 years, inclusive, with no coronary catheterization data
  • Donor age ≥55 years
  • Left ventricular septal or posterior wall thickness of >12 mm, but ≤16 mm
  • Reported down time of ≥20 min, with stable hemodynamics at time of final assessment
  • Left heart ejection fraction (EF) ≥40%, but ≤50% at time of acceptance of offer
  • Donor angiogram with luminal irregularities with no significant CAD (≤50%)
  • History of carbon monoxide poisoning with good cardiac function at time of donor assessment
  • Social history of alcoholism with good cardiac function at time of donor assessment
  • History of diabetes without significant CAD on angiogram (≤50%)

We are excited to announce the successful use of our first TransMedics Organ Care System (OCS™), aka “Heart in the Box”
Minneapolis Heart Institute Foundation® Cardiovascular Grand Rounds

**Title:** Synchronicity, opportunity and the evolution of carotid artery intervention  
**Speaker(s):** Timothy Sullivan, MD  
Chair, Vascular/Endovascular Surgery  
Minneapolis Heart Institute® at Abbott Northwestern Hospital  
**Date:** October 7, 2019  
**Time:** 7:00 – 8:00 AM  
**Location:** Minneapolis Heart Institute Building, Suite 100, Learning Center

**OBJECTIVES**  
At the completion of this activity, the participants should be able to:  
1. Understand how carotid surgery has evolved over the past 30 years.  
2. Describe the roles of carotid endarterectomy and carotid stenting in the treatment of patients with carotid occlusive disease.  
3. Utilize adjunctive medical therapy in patients having carotid intervention.  
4. Describe the results of carotid surgery at the Minneapolis Heart Institute.

**ACCREDITATION**  
**Physician** - Allina Health is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians. Allina Health designates this live activity for a maximum of 1.0 AMA PRA Category 1 Credit(s)™. Physicians should only claim credit commensurate with the extent of their participation in the activity.  

**Nurse** - This activity has been designed to meet the Minnesota Board of Nursing continuing education requirements for 1.0 hours of credit. However, the nurse is responsible for determining whether this activity meets the requirements for acceptable continuing education.

**DISCLOSURE POLICY & STATEMENTS**  
Allina Health, Learning & Development intends to provide balance, independence, objectivity and scientific rigor in all of its sponsored educational activities. All speakers and planning committee members participating in sponsored activities and their spouse/partner are required to disclose to the activity audience any real or apparent conflict(s) of interest related to the content of this conference.

The ACCME defines a commercial interest as “any entity” producing, marketing, re-selling, or distributing health care goods or services consumed by, or used on, patients. The ACCME does not consider providers of clinical service directly to patients to be commercial interests - unless the provider of clinical service is owned, or controlled by, an ACCME-defined commercial interest.

**Moderator(s)/Speaker(s)**  
Dr. Sullivan has declared the following relationships: 1) Speakers bureau/meeting organizer: WL Gore and Associates, 2) Principal Investigator, MIMICS2 Study: Veryan Medical, Ltd.
Planning Committee
Dr. Alex Campbell, Jake Cohen, Jane Fox, Dr. Kevin Harris, Dr. Kasia Hryniewicz, Rebecca Lindberg, Amy McMeans, Dr. Michael Miedema, Dr. JoEllyn Moore, Pamela Morley, Dr. Scott Sharkey, Maia Hendel and Jolene Bell Makowesky have disclosed that they DO NOT have any real or apparent conflicts with any commercial interest as it relates to the planning of this activity/course. Dr. Mario Gössl has disclosed the following relationships – Edwards Life Sciences: Grant/Research Support; Abbott Vascular, Caisson: Consultant; Speaker’s Bureau: Edwards Lifesciences. Dr. David Hurrell has disclosed the following relationship — Boston Scientific: Chair, Clinical Events Committee.

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We would like to thank the following company for their generous support of our activity.

W.L Gore & Associates, Inc.

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Bristol-Myers Squibb

Zoll LifeVest

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If audited by a licensing board or submitting for license renewal or certification renewal, boards will ask you not the entity providing the education for specific information on each activity you are using for credit. You will need to demonstrate that you attended the activity with a copy of your certificate/evidence of attendance, a brochure/flier and/or the conference handout.

Each attendee at an activity is responsible for determining whether an activity meets their requirements for acceptable continuing education and should only claim those credits that he/she actually spent in the activity.

Maintaining these details are the responsibility of the individual.

PLEASE SAVE A COPY OF THIS FLIER AS YOUR CERTIFICATE OF ATTENDANCE.

Signature: ____________________________________________________________________

My signature verifies that I have attended the above stated number of hours of the CME activity.

Allina Health - Learning & Development - 2925 Chicago Ave - MR 10701 - Minneapolis MN 55407
Synchronicity, opportunity and the evolution of carotid intervention

Timothy M Sullivan, MD
Minneapolis, MN

Disclosures

Consultant
Veryan Medical, Ltd

Meeting organizer
WL Gore and Assoc
MHIF CV Grand Rounds – October 7, 2019

MHI Vascular Surgery

“Alexander-esque”

Jay Scott Greenspan
Purpose

Changes in carotid artery intervention during the past 30 years

Identify individuals and opportunities during my career that shaped me as a person and physician

Acknowledge the importance of mentorship, opportunity, and focus in developing as a surgeon

What is Synchronicity?

5th and final studio album, released 1983
“Every breath you take”, “King of Pain”
Synchronicity

Carl Jung

Just as events may be connected by causality, they can also be connected by meaning

'Hinge Points' or 'Pivot Points' in life

Personal History

I never planned on becoming a physician
But my dad read an article in the Cleveland Plain Dealer...

Never wanted to become a Vascular Surgeon
But I had a mentor during GS Residency,
Dr Ken Rundell

Had no aspirations to become an academic surgeon
But I had a mentor who lit the flame,
Dr Norman Hertzer
Hinge Point #1

Applied to only one Vascular Surgery Fellowship

Cleveland Clinic

They accepted 3 fellows per year

I was #4 on the match list…
Cephalic vein grafts for lower extremity revascularization

Mark E. Sesto, MD, Timothy M. Sullivan, MD, Norman R. Hertzer, MD, Leonard P. Krajewski, MD, Patrick J. O’Hara, MD, and Edwin G. Beven, MD, Cleveland, Ohio, and Ft. Lauderdale, Fla.

From 1980 to 1989 infrainguinal revascularization was performed with cephalic vein grafts in a consecutive series of 34 patients (35 limbs) whose saphenous veins were either inadequate or already had been harvested for previous coronary (N = 16, 47%) or ipsilateral lower extremity bypass (N = 19, 56%). Surgical indications included ischemic rest pain or focal tissue necrosis in 25 limbs (71%), disabling claudication in six (17%), and popliteal aneurysms or prosthetic femoropopliteal graft infections each in two (6%). Preliminary arteriovenous fistulas were constructed in the arms of 23 patients (68%) to enhance the diameter of their cephalic veins, and 24 (69%) of the 35 infrainguinal procedures in this series were performed with use of cephalic vein alone. The distal popliteal artery was used for the outflow anastomosis in 10 limbs (29%), a tibial vessel was used in 12 (34%), and the peroneal artery was used in 13 (37%). Fourteen graft occlusions (40%) and six amputations (17%) have occurred during follow-up intervals of 1 to 107 months (mean, 28 months; median, 27 months). At 3 years the cumulative primary patency rate is 40%, the secondary patency rate is 46%, and the limb salvage rate is 82%. Despite their relative inconvenience, cephalic vein grafts appear to be preferable to prosthetic materials for infrainguinal revascularization below the knee. (J VASC SURG 1992;15:545-9.)
Hinge Point #2

A call from Dr Hertzer, January 1994
Attending the PVSS Winter meeting

“What do you know about Endovascular Surgery?”

“Well, I want you to come back to Cleveland and start our program…”
### 30-day Stroke and Death Rate for Carotid Endarterectomy
Clinical Trial Data

<table>
<thead>
<tr>
<th>Symptomatic Disease</th>
<th>Mortality (%)</th>
<th>Disabling Stroke (%)</th>
<th>Minor Stroke (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NASCET I(^1) (&gt;70% stenosis)</td>
<td>0.6</td>
<td>1.3</td>
<td>3.9</td>
</tr>
<tr>
<td>NASCET II(^2) (50-69% stenosis)</td>
<td>1.2</td>
<td>1.6</td>
<td>4.0</td>
</tr>
<tr>
<td>Asymptomatic Disease</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VA Asymptomatic(^3) (&gt;50% stenosis)</td>
<td>1.9</td>
<td>1.0</td>
<td>1.4</td>
</tr>
<tr>
<td>ACAS(^4) (&gt;60% stenosis)</td>
<td>0.4</td>
<td>0.2*</td>
<td>0.5*</td>
</tr>
</tbody>
</table>

*excludes 1.2% risk of stroke after angiography.

1. NEJM 1991; 325:445-453
2. NEJM 1998;339:1415-1425
3. NEJM 1993;328:221-227
INDICATIONS FOR CAROTID INTERVENTION

**Symptomatic patients**
* TIA, CVA, Amaurosis fugax
* >50% stenosis

**Asymptomatic patients**
* >70% stenosis

Cervical bruit
Pts with CAD, PAD, AAA

Duplex ultrasound

- High-grade stenosis
  - MRA / CTA
  - Standard risk
    - CEA
  - High-risk
    - CAS

- < 50% stenosis
  - Annual US

- 60-79% stenosis
  - US Q 6 mos
Early outcome assessment for 2228 consecutive carotid endarterectomy procedures: The Cleveland Clinic experience from 1989 to 1995

Norman R. Hertzer, MD, Patrick J. O’Hara, MD, Edward J. Mascha, MS, Leonard P. Krajewski, MD, Timothy M. Sullivan, MD, and Edwin G. Reves, MD, Cleveland, Ohio

Purpose: Several randomized trials have established guidelines regarding patient selection for carotid endarterectomy (CEA) that have been widely accepted but have little reference unless they are considered in the context of perioperative risk. The purpose of this study was to demonstrate the feasibility of early outcome assessment using a comprehensive database.

Methods: Since 1989, demographic information and in-hospital results for all surgical procedures performed by the members of our department have been entered into a prospective registry. For the purpose of this report, we have analyzed the stroke and mortality rates for 2228 consecutive CEAs (1046 patients), including 1924 that were performed as isolated operations and 304 that were combined with simultaneous coronary artery bypass grafting (CABG). This series incidentally contains a total of 113 reoperations for recurrent carotid stenosis.

Results: The perioperative stroke and mortality rates were 0.3% and 1.8% for all isolated CEAs, 4.5% and 3.5% for all CEA-CABG procedures, and 4.6% and 2.0% for carotid reoperations. According to a multivariable statistical model, the composite stroke and mortality rate for isolated CEAs was significantly influenced by female gender (p = 0.008), by the urgency of intervention (p = 0.026), and by carotid reoperations (p = 0.004). Gender (p = 0.008) and urgency (p = 0.006) also were associated with differences in the stroke rate alone; furthermore, the incidence of perioperative stroke was highest in conjunction with synthetic patching (odds ratio, 6.99; 95% confidence interval, 1.2 to 3.3) and was marginally higher with primary arteriotomy closure (odds ratio, 2.7; 95% confidence interval, 0.7 to 10.3). Technical variables were not associated with either stroke or mortality. In the current experience, the method used to repair the arteriotomy was the only independent factor that qualified for the multivariable composite stroke and mortality model, thus reflecting the relationship with the combined CEA-CABG procedures. But too few patients in this cohort had synthetic patching as primary closure to validate the procedural importance of vein patching.

Conclusion: Perspective outcome assessment is essential to reevaluate the indications for CEA with its actual results, and it may lead incidentally to important observations concerning patient care. (J Vasc Surg 1997;26:1-18.)
CAROTID ENDARTERECTOMY
Cleveland Clinic
2228 consecutive procedures

<table>
<thead>
<tr>
<th>Indication</th>
<th>Stroke</th>
<th>Death</th>
<th>CSM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isolated CEA</td>
<td>1.8%</td>
<td>0.5%</td>
<td>2.3%</td>
</tr>
<tr>
<td>Asymptomatic</td>
<td>1.3%</td>
<td></td>
<td>1.5%</td>
</tr>
<tr>
<td>TIA / amaurosis</td>
<td>2.5%</td>
<td></td>
<td>2.7%</td>
</tr>
<tr>
<td>Prior CVA</td>
<td>3.0%</td>
<td></td>
<td>3.8%</td>
</tr>
<tr>
<td>CEA + CABG</td>
<td>4.3%</td>
<td>5.3%</td>
<td>9.6%</td>
</tr>
<tr>
<td>Reoperations</td>
<td>4.6%</td>
<td>2.0%</td>
<td>6.6%</td>
</tr>
</tbody>
</table>


Risk Assessment for CEA

3061 pts prospectively registered CCF over 10 year period
High risk: n = 594 (19.4%)
- CHF
- CABG within 6 months
- CAD/CE
- COPD
- Creatinine >3.0

Overall stroke, death, or MI: 115 (3.8%)

<table>
<thead>
<tr>
<th></th>
<th>High risk</th>
<th>Low risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>7.4%</td>
<td>2.9%</td>
</tr>
<tr>
<td></td>
<td>(p&lt;0.001)</td>
<td></td>
</tr>
</tbody>
</table>

Ouriel, Hertzer; Circulation 1999; 100: I-673
76-yr male
Symptomatic LICA stenosis
Previous radical neck dissection + radiation
COPD CHF

First CAS at CCF
1995
Sullivan, Masaryk

Baseline TCD

Trans-cranial doppler (TCD):
High-intensity
Transient signals (HITS)

Pre-dilation (3.5mm balloon)
Palmaz P204 stent
Angioplasty and primary stenting of the subclavian, innominate, and common carotid arteries in 83 patients

Timothy M. Sullivan, MD, Bruce H. Gray, DO, J. Michael Bocchroth, MD, John Perl II, MD, Mary Beth Childs, RN, MSN, Linda Modalewski, LPN, and Edwin G. Beven, MD, Cleveland, Ohio

Purpose: The initial and long-term results of angioplasty and primary stenting for the treatment of occlusive lesions involving the supra-aortic trunks were studied.

Methods: All patients in whom angioplasty and stenting of the supra-aortic trunks was attempted were included in a prospective registry. Results are, therefore, reported on an intent-to-treat basis. The preprocedural and postprocedural clinical records, arteriograms, and noninvasive vascular laboratory examinations of 83 patients (41 men [49.4%] and 42 women [50.6%]; mean age at intervention, 63 years) in whom endovascular repair of the subclavian (66, 79.9%), left common carotid (14, 16.9%), and innominate (7, 8.4%) arteries was attempted were retrospectively reviewed.

Results: Initial technical success was achieved in 82 of 87 procedures (94.3%). The inability to cross 4 complete subclavian occlusions and the intotolated dissection of 1 common carotid artery lesion accounted for the 5 initial failures. Complications occurred in 17.8% of 73 subclavian and innominate procedures, including access-site bleeding in 6 and distal embolisation in 3. Ischemic strokes occurred in 3 of 14 common carotid lesions (21.4%), both of which were performed in conjunction with ipsilateral carotid bifurcation endarterectomy. The 30-day mortality rate was 4.8% for the entire group.

By means of life-table analysis, 84% of the subclavian and innominate interventions including initial failures, remain patent by objective means at 35 months. No patient required re血管ization or surgical conversion for recurrence of symptoms. Of 11 patients available for follow-up study who underwent common carotid interventions 10 remain stroke-free at a mean of 14.5 months.

Conclusion: Angioplasty and primary stenting of the subclavian and innominate arteries can be performed with relative safety and expectations of satisfactory midterm results. Endovascular repair of common carotid artery lesions can be performed with a high degree of technical success, but should be approached with caution when performed in conjunction with ipsilateral bifurcation endarterectomy (J Vasc Surg 1998;28:109-94).
SAPPHIRE TRIAL

CAS vs CEA in high-risk patients

Randomized arm + registry

Adjunctive medical Rx:
- CAS: ASA + clopidogrel
- CEA: ASA

SAPPHIRE

High-risk criteria
Medical

Cardiac disease:
- congestive heart failure (class III/IV) and/or known severe left ventricular dysfunction LVEF <30%
- open heart surgery needed within six weeks
- recent MI (>24 hrs. and <4 weeks)
- unstable angina (CCS class III/IV)

Severe pulmonary disease
SAPPHIRE
High-risk criteria
Surgical

- Contralateral ICA occlusion
- Contralateral laryngeal nerve palsy
- Radiation therapy to neck
- Previous CEA with recurrent stenosis
- High cervical ICA lesions or CCA lesions below the clavicle (ostial CCA excluded)
- Severe tandem lesions
- Age greater than 80 years

1 Year Data
Randomized Patients (Per Protocol)

<table>
<thead>
<tr>
<th>Events</th>
<th>Stent (159 pts)</th>
<th>CEA (151 pts)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death:</td>
<td>11 (7.0%)</td>
<td>19 (12.9%)</td>
<td>0.08</td>
</tr>
<tr>
<td>Stroke:</td>
<td>9 (5.8%)</td>
<td>11 (7.7%)</td>
<td>0.52</td>
</tr>
<tr>
<td>Major Ipsilateral:</td>
<td>0 (0.0%)</td>
<td>5 (3.5%)</td>
<td>0.02</td>
</tr>
<tr>
<td>Major Non-Ipsilateral:</td>
<td>&lt;1 (0.6%)</td>
<td>1 (0.7%)</td>
<td>0.97</td>
</tr>
<tr>
<td>Minor Ipsilateral:</td>
<td>6 (3.8%)</td>
<td>3 (2.2%)</td>
<td>0.37</td>
</tr>
<tr>
<td>Minor Non-Ipsilateral:</td>
<td>3 (2.0%)</td>
<td>3 (2.1%)</td>
<td>0.89</td>
</tr>
<tr>
<td>MI (Q or NQ):</td>
<td>4 (2.5%)</td>
<td>12 (8.1%)</td>
<td>0.05</td>
</tr>
<tr>
<td>Q-Wave MI:</td>
<td>0 (0.0%)</td>
<td>2 (1.3%)</td>
<td>0.15</td>
</tr>
<tr>
<td>Non-Q Wave MI:</td>
<td>4 (2.5%)</td>
<td>10 (6.6%)</td>
<td>0.08</td>
</tr>
<tr>
<td>MAE:</td>
<td>19 (12.0%)</td>
<td>30 (20.1%)</td>
<td>0.05</td>
</tr>
</tbody>
</table>
Hinge Point #3

Eversion Endarterectomy

Distal vertebral artery reconstruction

Introduction to *Annals of Vascular Surgery*

Nikolas Bourbaki

Society Digiti
Left Internal Carotid to Distal Vertebral Artery Transposition

Occipital artery to vertebral transposition
ADVANTAGES AND DISADVANTAGES OF EVERSION CEA

ADVANTAGES
- Faster operative time
- Reduced incidence of restenosis
- Does not require saphenous angioplasty
- No synthetic material is required
- Facilitates management of redundant ICA

DISADVANTAGES
- More extensive dissection of the carotid bulb and ICA is required
- More challenging to shunt
- May be more difficult to access high lesions for inexperienced surgeons
- Increased incidence of postoperative hypertension
Carotid endarterectomy in SAPPHIRE-eligible high-risk patients: Implications for selecting patients for carotid angioplasty and stenting

Gene Morea, MD, PhD,* Timothy M. Sullivan, MD,* Diego R. Torres-Ramos, MD,* Thomas C. Rowe, MD,* Torley L. Hovick, MD,* Jorgio M. Sampao, MD,* Peter Giovinski, MD,* Jean M. Fumetton, MD,* Andrea A. Neel, MD,* and Kenneth J. Cherry, Jr, MD,* Rochester, Minn

Objective: Carotid angioplasty and stenting (CAS) has been proposed as an alternative to carotid endarterectomy (CEA) in patients excluded from the North American Symptomatic Carotid Artery Stenosis Study and in those considered at high risk for CEA. In light of recently released CAS data in patients at high risk, we reviewed our experience with CEA.

Methods: The records for consecutive patients who underwent CEA between 1998 and 2002 were retrospectively reviewed, and risk was stratified according to inclusion and exclusion criteria from a "high-risk" or CAS-CEA trial. The benefit and Angioplasty with Excision in Patients at High Risk for Endarterectomy (SAPPHIRE) trial.

Results: Of 778 CEA performed, 325 (42%) were considered high risk, on the basis of criteria including positive recent test (n = 109, 14%), age older than 80 years (n = 85, 11%), contraindicated carotid occlusion (n = 64, 8%), pulmonary embolism (n = 44, 5%), high cervical lesion (n = 16, 2%), and repeat carotid operation (n = 27, 3%). Other high-risk criteria included recent myocardial infarction (MI), cardiac surgery, or class III or IV carotid stenosis left carotid stenosis fraction less than 50%, contralateral lapsed or another, and previous stroke or transient ischemic attack (15% vs 23%), and previous stroke (4% vs 5%). The overall perioperative stroke rate was 1.6% (symptomatic, 2.9%; asymptomatic, 0.6%). Comparison of high-risk and low-risk CEA demonstrated no statistical difference in the stroke rate. Factors associated with significantly increased stroke risk included cervical radiation therapy, class III or IV stenosis, symptomatic presentation, and age 60 years or younger. Overall mortality was 0.3% (symptomatic, 0.5%; asymptomatic, 0.2%), not significantly different between the high-risk and low-risk groups (0.4%). High-grade MIs were more frequent in the high-risk group (3.1% vs 0.9%, P < .05). A composite cluster of adverse clinical events (death, stroke, MI) was more frequent in the symptomatic high-risk group (9.9% vs 3.0%, P < .005), but not in the symptomatic cohort. There was a trend for more major cranial nerve injuries in patients with local risk factors, such as high carotid bifurcation, repeat operation, and cervical radiation therapy (4.6% vs 1.2%, P < .05). In 121 patients included on the basis of symptoms or untreated subsequent operations, who also would have been excluded from SAPPHIRE, the overall rates for stroke (3.4%, P = .09), death (2.6%, P = .19), and MI (0.8%, P = .75) were not significantly different from those in the study population.

Conclusions: CEA can be performed in patients at high risk, with stroke and death rates well within accepted standards. These data question the use of CAS as an alternative to CEA, even in patients at high risk. (J Vasc Surg 2004;40:958-66.)

42% considered 'high risk' by SAPPHIRE

Results

Stroke
n=776

Overall stroke risk = 1.4%

<table>
<thead>
<tr>
<th></th>
<th>High-risk</th>
<th>Low-risk</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>symptomatic</td>
<td>4.6%</td>
<td>1.6%</td>
<td>NS</td>
</tr>
<tr>
<td>asymptomatic</td>
<td>0.8%</td>
<td>0.9%</td>
<td>NS</td>
</tr>
</tbody>
</table>
Results

Mortality

<table>
<thead>
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<th></th>
<th>High-risk</th>
<th>Low-risk</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality</td>
<td>0.6 %</td>
<td>0.0 %</td>
<td>NS</td>
</tr>
</tbody>
</table>

All MI’s

Non-Q
Results

*Stroke + death + MI*

<table>
<thead>
<tr>
<th></th>
<th>High-risk</th>
<th>Low-risk</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>symptomatic</td>
<td>9.3 %</td>
<td>1.6 %</td>
<td>0.02</td>
</tr>
<tr>
<td>asymptomatic</td>
<td>3.4 %</td>
<td>2.1 %</td>
<td>NS</td>
</tr>
</tbody>
</table>

Hinge Point #5

Recruited to MHI by Kevin Graham, MD

Applied for a Vascular Surgery Fellowship 2008
Denied solely on the basis of lacking a GS Residency
Hinge Point #6

VS Independence
R Berguer
F Veith
J Stanley

Sullivan TM. Ann Vasc Surg 2015
ABVS History and Appendices

The American Board of Vascular Surgery and Independence of the Specialty

James C. Stanley, MD* and Frank J. Veith, MD† Ann Arbor, Michigan and New York

The American Board of Vascular Surgery (ABVS) was established in 1994 to better the care of patients with vascular diseases by improving the training and certification of vascular surgeons. During the ensuing decade, tumultuous times accompanied the ABVS efforts to become an independent board of the American Board of Medical Specialties (ABMS), formation of the Vascular Surgery Board (VSB) of the American Board of Surgery (ABS), and creation of the Primary Certificate in Vascular Surgery within the ABS structure. Many activities and controversies surrounding these events are likely to be forgotten. It is often stated that monumental memory does not exist if it isn't written down. This is the impetus for recording this history outside the discipline of vascular surgery. Development of a recognized specialty requires a defined body of knowledge and treatments different from other specialties, and has as its primary goal the improvement of patient care within that field. Those who established the ABVS believed that their specialty fulfilled those requirements and that medical care by non-vascular surgeons was unacceptable. Their deeply held convictions were countered by those who believed that specialists could not render comprehensive care and that many patients would be poorly served by such narrow specialists.

BACKGROUND

Largest randomized controlled trial
108 US centers, 9 Canadian centers

2502 patients followed over median 2.5 years in symptomatic and asymptomatic patients

Examined 4-year rates of primary end point between CAS and CEA

**Stroke**
**MI**
**Death**

**CREST Results Summary**

### Peri-procedural Period

<table>
<thead>
<tr>
<th>Event</th>
<th>CAS</th>
<th>CEA</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>0.7%</td>
<td>0.3%</td>
<td>0.18</td>
</tr>
<tr>
<td>Stroke</td>
<td>4.1%</td>
<td>2.3%</td>
<td>0.01</td>
</tr>
<tr>
<td>MI</td>
<td>1.1%</td>
<td>2.3%</td>
<td>0.03</td>
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<tr>
<td>Death/Stroke/MI</td>
<td>5.2%</td>
<td>4.5%</td>
<td>0.38</td>
</tr>
</tbody>
</table>

### 4-yr Study Period

<table>
<thead>
<tr>
<th>Event</th>
<th>CAS</th>
<th>CEA</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death</td>
<td>11.3%</td>
<td>12.6%</td>
<td>0.45</td>
</tr>
<tr>
<td>Stroke</td>
<td>10.2%</td>
<td>7.9%</td>
<td>0.03</td>
</tr>
<tr>
<td>Death/Stroke/MI</td>
<td>7.2%</td>
<td>6.8%</td>
<td>0.51</td>
</tr>
</tbody>
</table>
Primary Outcome – 4 Year

MHIF carotid practice:
- Age > 80: 35%
- Age > 75: 45%
- Age > 70: 64%

Clinical Research

Octogenarians are not at Increased Risk for Periprocedural Stroke following Carotid Artery Stenting

J. Michael Bresnahan,1,3 David P. Silvis,1,2 Joseph Kistler,1 and Timothy M. Sullivan,1 St Louis, St. Louis, Massachusetts, Rochester and Minneapolis, Minnesota

Background: We analyzed the risk of adverse events following carotid angioplasty and stenting (CAS) in patients >80 years (group I) compared with those <80 years of age (group II).

Methods: Prospective data from 235 patients who underwent 236 consecutive CAS procedures at three participating institutions were reviewed retrospectively. All subjects were enrolled in Food and Drug Administration-approved clinical trials of CAS in high-risk patients. The institutional protocol, procedural details, and angiographic morphology were reviewed in all cases. All patients underwent independent neurological evaluation at 30 days and 90 days following CAS.

Results: Mean age was 82.0 years in the younger cohort and 89.3 years in the older group. Embolic protection devices were used in 97.6% of cases in group I compared with 99.7% in group II (p = non-significant NS). Procedural success, defined as >90% residual stenosis after CAS, was achieved in all cases. Mean hospitalization was similar in the two groups. Transient ischemic attacks occurred in 1.9% in group I and 3.9% in group II (p = NS). Within 30 days of CAS, the risk of minor or major strokes (p = NS) as well as the composite risk of stroke (minor or major) and death was 22.1% in group I and 3.3% in group II (p = NS). Multivariate logistic regression analysis showed that absence of hypertension (odds ratio [OR] = 0.28, p = 0.001) and chronic renal insufficiency (OR = 2.42, p = 0.023) were significant predictors of the composite end point of stroke and death. Cox and Kaplan-Meier analyses revealed that survival and freedom from the combined end point of stroke and death were similar for patients in groups I and II.

Conclusions: Octogenarians are not at increased risk of periprocedural adverse events following CAS compared to younger patients. Exclusion of high-risk patients from CAS based on age alone is unjustified.

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How to improve on CEA?

**Stroke risk**

**MI risk**

The role of anticoagulants

Why isn’t ‘best medical therapy’ equivalent in CEA vs CAS trials?

**Surgical exposure / incision**

---

The most common cause of perioperative CVA: Thrombosis / Embolism

The cause of perioperative stroke after carotid endarterectomy

Thomas S. Riles, MD, Anthony M. Imparato, MD, Glenn R. Jacobowitz, MD, Patrick J. Lamparello, MD, Gary Giangola, MD, Mark A. Adelman, MD, and Ronnie Landis, RN, New York, N.Y.

**Purpose:** The purpose of this study was to examine the cause of perioperative stroke after carotid endarterectomy.

**Method:** The records of 2365 patients undergoing 3062 carotid endarterectomies from 1965 through 1991 were reviewed. Sixty-six (2.2%) operations were associated with a perioperative stroke. The mechanism of stroke was determined in 63 of 66 cases. Patient risk factors and surgeon-dependent factors were analyzed.

**Results:** More than 20 different mechanisms of perioperative stroke were identified, but most could be grouped into broad categories of ischemia during carotid artery clamping (n = 10), postoperative thrombosis and embolism (n = 25), intracerebral hemorrhage (n = 12), strokes from other mechanisms associated with the surgery (n = 8), and stroke unrelated to the reconstructed artery (n = 8). Dividing the operative experience approximately into thirds, during the years 1968 to 1979, 1980 to 1985, and 1986 to 1991 the perioperative stroke rates were 2.7%, 2.2%, and 1.8%, respectively. This, in part, is associated with a better selection of patients (more symptom free, fewer with neurologic deficits). There has been a notable decrease in perioperative stroke caused by ischemia during clamping and intracerebral hemorrhage, but postoperative thrombosis and embolism remain the major cause of neurologic complications.

**Conclusions:** 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. (J VASC SURG 1994;19:206-16.)
Background

Clopidogrel:
Superior to ASA alone in CAS

DAPT
Decreases recurrent cerebral events in symptomatic patients prior to CEA
Reduced stroke risk to due post-CEA ICA thrombosis

Increases bleeding risk following CEA
No difference in bleeding risk with CEA

CEA vs CAS trials:
Difference in adjunctive ‘best medical therapy’

1. Eur J Vasc Endovasc Surg 2005
2. Sem in Vasc Surg 2017
4. Eur J Vasc Endovasc Surg 2016

Uninterrupted warfarin compared with heparin bridging during implantation of cardiac rhythm devices

Meta-analysis: 8 studies, 2,321 patients

Maintenance of therapeutic warfarin associated with significantly lower postop bleeding (p< 0.01)
No difference in thromboembolic events
Decreased hospital LOS by avoiding heparin bridge
Outcomes Related to Antiplatelet or Anticoagulation Use in Patients Undergoing Carotid Endarterectomy

Andrew Kemphuis, Adam E. Ritten, Peter B. Alden, Alexander S. Turrentine, John N. Graber, and Timothy M. Sullivan, Minneapolis, Minnesota

Background: The number of cases involving patients undergoing vascular procedures who are prescribed clopidogrel or warfarin as treatment options continues to rise. Our aim was to examine outcomes related to antiplatelet or anticoagulation therapy in patients undergoing carotid endarterectomy (CEA).

Methods: A retrospective review of 260 consecutive patients undergoing CEA. Data including patient demographics, operative details, postoperative use of aspirin (ASA), clopidogrel, or warfarin, and early and/or late outcomes were collected. Endpoints included perioperative mortality and/or morbidity rates and bleeding complications.

Results: The study included 152 men and 108 women (mean age 68.9 years), with a mean follow-up of 466 days. In all, 46% of endarterectomies were for a symptomatic disease. The technique of saphenous endarterectomy was used in 126 (48.6%), Dacron patch in 112 (43.3%), and suture patch-back in 14 (5.3%) of the cases. Among the patients, 171 were taking ASA, 50 were taking clopidogrel ± ASA, and 18 were taking warfarin (mean INR = 1.82; range, 1.5–2.3); the remaining 22 were not on any antiplatelet therapy. All patients who were on warfarin therapy underwent an saphenous endarterectomy. Overall, there were 19 (7.3%) complications (12 major and seven minor). The 30-day stroke rate and stroke death rate was 0.7% and 0.4%, respectively. Patients taking clopidogrel developed more number of neck hematomas (16 vs. 1%, p = 0.001) compared with patients who were on ASA alone. For patients taking clopidogrel (Dacron patch) repair resulted in more hematomas than suture endarterectomy (5% vs. 4.2%, p = 0.12). There was no difference in the incidence of neck hematoma on the basis of endarterectomy technique in patients who were on ASA alone. The patients taking warfarin neither had a perioperative complication nor developed a neck hematoma.

Conclusions: In this study, clopidogrel use during CEA resulted in a significant risk for developing a neck hematoma, particularly when using a Dacron patch. The risk of a neck hematoma in patients who were on clopidogrel was much less when an saphenous endarterectomy was performed.

Annals of VS 2011

Methods

Retrospective review: June 2006 – April 2009

5 vascular surgeons, single institution

260 consecutive patients undergoing CEA

<table>
<thead>
<tr>
<th>Therapy</th>
<th>n</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspirin only</td>
<td>171</td>
<td>(66%)</td>
</tr>
<tr>
<td>Clopidogrel ± ASA</td>
<td>50</td>
<td>(19%)</td>
</tr>
<tr>
<td>- 44 on Clopidogrel and ASA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warfarin ± ASA</td>
<td>10</td>
<td>(4%)</td>
</tr>
<tr>
<td>- 8 on warfarin and ASA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No therapy</td>
<td>29</td>
<td>(11%)</td>
</tr>
</tbody>
</table>
### Complications by Antiplatelet or Anticoagulation

<table>
<thead>
<tr>
<th>Complications</th>
<th>Aspirin</th>
<th>Clopidogrel</th>
<th>Warfarin</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Major</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Myocardial Infarction</td>
<td>1 (0.6%)</td>
<td>1 (2%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Hematoma w/ Exploration</td>
<td>2 (1.1%)</td>
<td>6 (12%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Stroke</td>
<td>2 (1.1%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td><strong>Minor</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nerve Injury</td>
<td>2 (1.1%)</td>
<td>1 (2%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Surgical Wound</td>
<td>0 (0%)</td>
<td>1 (2%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Hematoma w/o Exploration</td>
<td>1 (0.6%)</td>
<td>2 (4%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

**Clopidogrel = 22% vs ASA = 4.6%  p = 0.0005**

#### Outcomes Related to Antiplatelet or Anticoagulation Use in Patients Undergoing Carotid Endarterectomy

Andrew Rosenbaum, Adnan Z. Ricci, Peter B. Alden, Alexander S. Tretiak, John N. Gruber, Jo Anne Goldman, and Timothy M. Sullivan, Minneapolis, Minnesota

Higher risk of complications in patients taking clopidogrel – related to neck hematoma

All in patients with dacron patch

No bleeding complications in patients taking warfarin – eversion CEA
Number of patients taking clopidogrel or ASA

Using a multivariate normal linear model to adjust for total annual volume

Purpose / Methods

To evaluate the use of clopidogrel at the time of CEA

N=1066

Retrospective, IRB-approved review of a prospective VS database Jan 2010- Jun 2017

All patients evaluated by a practitioner certified in NIH Stroke Scale

Associated complications @ 30 days
Preoperative anticoagulation regimen

N = 1066

- 509 on aspirin only
- 374 on ASA + clopidogrel
- 67 on clopidogrel only
- 33 on warfarin
- 83 on none

Total on clopidogrel w or w/o ASA = 441 (41%)

Indications for CEA

- 57% symptomatic
- 43% asymptomatic

Asymptomatic > 70%
N = 458, 43%

CVA
N = 314, 29%

TIA
N = 294, 28%
### Medical regimen and preoperative symptom status

**N = 950**

<table>
<thead>
<tr>
<th>Carotid Artery Disease (preop status)</th>
<th>ALL</th>
<th>ASA ONLY</th>
<th>ASA + CLOPIDOGREL</th>
<th>CLOPIDOGREL ONLY</th>
<th>&lt;0.001</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 0–1: asymptomatic with or w/o evidence</td>
<td>427 (45)</td>
<td>262 (51)</td>
<td>144 (39)</td>
<td>21 (31)</td>
<td></td>
</tr>
<tr>
<td>Grade 2: transient or temporary stroke</td>
<td>265 (28)</td>
<td>121 (24)</td>
<td>121 (32)</td>
<td>23 (34)</td>
<td></td>
</tr>
<tr>
<td>Grade 3: completed or acute stroke</td>
<td>258 (27)</td>
<td>126 (25)</td>
<td>109 (29)</td>
<td>23 (34)</td>
<td></td>
</tr>
</tbody>
</table>

ASA only: 48% were symptomatic (TIA/CVA)

Symptomatic:
- DAPT: 62%
- Clopidogrel only: 67%

### Preop cardiac status

ASA only: 48% of patients had moderate or severe cardiac disease

Clopidogrel (with or w/o ASA): 63% of patients had moderate or severe cardiac disease
Operative technique

Majority were with general anesthesia and EEG

Minority with local anesthesia / cervical block

62%: ‘Standard’ CEA with patch
38%: Eversion CEA

Results

Stroke: 15/1066 = 1.4%
   Minor stroke: 12/1066 = 1.1%
   Major stroke*: 3/1066 = 0.3%

<table>
<thead>
<tr>
<th></th>
<th>ALL</th>
<th>MAJOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASA + clopidogrel: 2/374</td>
<td>0.5%</td>
<td>0%</td>
</tr>
<tr>
<td>ASA alone*: 6/509</td>
<td>1.2%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Clopidogrel alone: 2/67</td>
<td>2.9%</td>
<td>0%</td>
</tr>
<tr>
<td>None*: 3/83</td>
<td>3.6%</td>
<td>1.2%</td>
</tr>
<tr>
<td>Warfarin* 2/33</td>
<td>6.1%</td>
<td>3.0%</td>
</tr>
</tbody>
</table>
Results

30-day mortality 3/1066 0.03%

MI: 9/1066 0.8%

**MACE**

Stroke / death / MI 25/1066 2.3%

Major stroke / death / MI 1.2%

Complications based on medication category

N = 950

<table>
<thead>
<tr>
<th>Outcome</th>
<th>ASA only</th>
<th>ASA + Clopidogrel, no warfarin</th>
<th>Clopidogrel only</th>
<th>p-value ASA only vs ASA+Clopidogrel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postop complications, all</td>
<td>152 (30)</td>
<td>102 (27)</td>
<td>15 (22)</td>
<td>0.38</td>
</tr>
<tr>
<td>Bilateral stroke</td>
<td>6 (2)</td>
<td>2 (1)</td>
<td>2 (3)</td>
<td>0.29</td>
</tr>
<tr>
<td>Hematoma</td>
<td>15 (3)</td>
<td>8 (2)</td>
<td>3 (4)</td>
<td>0.44</td>
</tr>
<tr>
<td>MI</td>
<td>4 (1)</td>
<td>5 (1)</td>
<td>0 (0)</td>
<td>0.74</td>
</tr>
<tr>
<td>MACE</td>
<td>15(3)</td>
<td>9(2)</td>
<td>3(4)</td>
<td>0.52</td>
</tr>
</tbody>
</table>

p-values highlighted
## Odds ratios of postoperative complications associated with clopidogrel use

**Multivariate regression model**

<table>
<thead>
<tr>
<th>Outcome</th>
<th>OR</th>
<th>Adjusted OR</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Postop complications, all</td>
<td>0.85</td>
<td>0.81 (0.60 - 1.08)</td>
<td>0.15</td>
</tr>
<tr>
<td>Ipsilateral stroke</td>
<td>0.62</td>
<td>0.54 (0.18-1.46)</td>
<td>0.24</td>
</tr>
<tr>
<td>Hematoma</td>
<td>0.84</td>
<td>0.80 (0.36 - 1.77)</td>
<td>0.59</td>
</tr>
<tr>
<td>MI</td>
<td>1.45</td>
<td>1.14 (0.30 - 4.69)</td>
<td>0.84</td>
</tr>
</tbody>
</table>

## Hematoma & CN Injury

**Table 8. Summary statistics for hematomas and cranial nerve injury outcomes**

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Total</th>
<th>ASA only</th>
<th>ASA + Clopidogrel, no warfarin</th>
<th>Clopidogrel only</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hematoma</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- observed</td>
<td>25</td>
<td>15</td>
<td>8</td>
<td>3</td>
<td>0.44</td>
</tr>
<tr>
<td>- returned to OR</td>
<td>14</td>
<td>9</td>
<td>4</td>
<td>1</td>
<td>0.85</td>
</tr>
<tr>
<td>Cranial nerve injury</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- permanent injury</td>
<td>10</td>
<td>9</td>
<td>0</td>
<td>1</td>
<td>0.02</td>
</tr>
<tr>
<td>- temporary injury</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

- 42 of 53
Conclusions

1. The use of clopidogrel in our CEA practice has increased over time

2. Higher % of patients with cardiac disease are on clopidogrel; equivalent risk of MI

3. Despite a higher percentage of symptomatic patients, those on DAPT had the lowest risk of postoperative stroke; no major strokes in patients taking clopidogrel (alone or with ASA)

4. No increase in complications, including postoperative bleeding, in those patients taking clopidogrel

5. DAPT with ASA and clopidogrel should be considered as part of ‘best medical therapy’ for patients having CEA

6. Future trials comparing CEA and CAS should utilize equivalent medical regimens
Conclusions

1. Clopidogrel may be protective of MI and major CVA

2. No increase in complications with DAPT

3. DAPT should be considered ‘best medical Rx’ in patients having CEA
Eversion endarterectomy with ICA shortening
Rationale:
Decreased tissue trauma
Cosmesis

2.5 cm

Pediatric Omni-trac
Mini-incision Carotid Endarterectomy: Technique and Results

Timothy M. Sullivan, MD and Daniele R. Lyon, BS

Introduction
Despite advances in the indications for and technique of carotid angioplasty and stenting (CAS), carotid endarterectomy remains the treatment of choice for long-term stroke prophylaxis in most patients, despite the potential advantages of CAS’s minimally-invasive nature, lack of a cervical incision and its ability to be performed under local anesthesia. Recent advances in the technique using TKAIR (trans-carotid stenting) have improved on the results of traditional trans-femoral stenting. Some controversy remains regarding the use of ‘optimal medical therapy’ with the two techniques, with those having CAS or TKAIR requiring the use of dual antiplatelet therapy with aspirin and clopidogrel and those patients having CEA requiring aspirin alone in most clinical trials.1

Rationale for the technique of CEA through a small incision include improved cosmesis and decreased tissue trauma (especially important in patients operated while on clopidogrel or warfarin) while maintaining the superior results of carotid intervention. The following chapter will discuss technique and results from a single center.

Mini-incision CEA

<table>
<thead>
<tr>
<th></th>
<th>Standard</th>
<th>Mini</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>N=941</td>
<td>N=124</td>
</tr>
<tr>
<td>Clopidogrel</td>
<td>39%</td>
<td>62%</td>
</tr>
<tr>
<td>30% Eversion</td>
<td></td>
<td>87%</td>
</tr>
<tr>
<td>CVA</td>
<td>2%</td>
<td>0%</td>
</tr>
<tr>
<td>CN</td>
<td>1%</td>
<td>1%</td>
</tr>
</tbody>
</table>
Results of the ROADSTER multicenter trial of transcarotid stenting with dynamic flow reversal

Christopher J. Kostek, MD,1 Michael B. Jaff, DO,2 Y. Ignacio Loel, MD,1 L. Nelson Hopyk, MD,3
Rachael M. Shaf, MD, Todd M. Hanneau, MD, Samantha Macdonald, MD,4 and Richard P. Cambria, MD,
Saint Vincent, Buffalo, NY, Greenville, SC, and Sunnyvale, Calif

Objective This report presents the 10-day results of the Safety and Benefit Study for Rescue Flow Leaflet During Carotid Artery Stenting Procedures (ROADSTER) multicenter trial and evaluates the safety and efficacy of ENROUTE Transcarotid (Endovascular Inc., Sunnyvale, Calif), a novel transcarotid transcatheter system that provides direct surgical common carotid access and cerebral embolic protection via high-flow reversed during carotid artery stenting (CAS).

Methods A prospective, single-arm, multicenter clinical trial was performed to evaluate the use of the ENROUTE Transcarotid (ETI) during CAS procedures performed in patients considered to be at high risk for complications from surgical access. Symptomatic patients with ≤50% stenosis and asymptomatic patients with ≤70% stenosis were eligible to be treated with ETI and Drug Administration-approved carotid artery stenting. The primary end point was the composite of all strokes, transient ischemic attack (TIA), and death at 30 days. Procedures were defined as the Food and Drug Administration-approved study protocol. Secondary end point included cranial nerve injury, 30-day stroke, death, stroke/death, and MI, acute device, technical, and procedural success, and rates of complications. All major adverse events were adjudicated by an independent clinical events committee.

Results Between November 2013 and July 2014, 131 patients were enrolled at 23 sites. Forty-two patients were enrolled in the covered group and 86 were enrolled in the pivotal phase. In the pivotal cohort, 68 were symptomatic and 77 were asymptomatic. Device failure and technical success was 99% (93 of 141). At 30 days, overall safety in the pivotal group was 1.4% (2 of 141), stroke and death was 2.1% (3 of 141), and stroke and death and MI was 3.5% (5 of 141).

Conclusions The results of the ROADSTER trial demonstrate that the use of the ENROUTE Transcarotid is safe and effective at preventing stroke during CAS. The overall stroke rate of 1.4% is the lowest reported to date for any prospective, multicenter clinical trial of CAS. (J Vasc Surg 2015;62:S127-39.)
Conclusions

Carotid endarterectomy remains the gold standard in the treatment of patients with carotid occlusive disease

Regardless of technique, attention to detail is paramount

Medical management for patients having CEA and CAS should be similar

Conclusions

My CEA technique has evolved over time:

ASA, clopidogrel and statin
Maintain warfarin
Small incision
Eversion CEA
The Greatest Generation

In 1998, Tom Brokaw published a book titled “The Greatest Generation,” a term he used to describe the generation of Americans who grew up during the Great Depression and went on to fight in World War II. He wrote, “It is a truth universally acknowledged that war is the right thing to do.” His father was a member of that generation, having dropped out of high school to serve in the US Navy during World War II.

Many of his classmates had the opportunity to learn under teachers in our own field of vascular surgery, surgeons, scholars, and educators who were at the forefront of their specialty during its formative years. These individuals, who dedicated their lives to patient care and the advancement of our specialty, are members of a group I refer to as “Vascular Surgery’s Greatest Generation.” They include such luminaries as Bogan, Yan, Stoney, Wray, Berger, Maier, Simmons, Yellin, Rink, Ferrell, Parodi, and countless others. It was my good fortune to have trained at the Cleveland Clinic Foundation (CCF) under a group of surgeons without equal, in my view. The education and training I received there is the reason I have ever had the privilege to work with them. I was, as one of my colleagues commented, “born to operate.” In my case, it was too big or complex for his superior skill. Dr. Streeter formed the next chair, Dr. Norman Berber; a spectacular surgeon, prolific author, and one of my heroes. He served as the 91st President of the Midwestern Vascular Society. Dr. Streeter, with his driven energy and infectious enthusiasm, encouraged me to write in a concise and precise style, and exemplified a work ethic that has been both inspirational and motivating. I continue to write and have an avid interest in the history of medicine. I was fortunate to be trained under Dr. Reaven and Berber, who, with their superb clinical skills, has been an inspiration and mentor. I have several of the techniques that I use in my practice today, including an interrupted technique for anastomotic repairs that has been a cornerstone of my surgical training.

The Department of Vascular Surgery, Cleveland Clinic Foundation, 1998. With kind permission to use this paragraph from the Cleveland Clinic Foundation.

On Mentoring

As I mature, I have come to view “mentorship” as important. I find that one of the most valuable and enjoyable parts of mentoring is providing opportunities for younger surgeons. It becomes a way of giving back to the generation that has provided me with so much. I have been fortunate to have mentoring opportunities during my training at the Cleveland Clinic. I was fortunate to be mentored by Dr. Norman Berber, who was my clinical mentor and later became my mentor. He was an excellent role model and mentor, and I have been fortunate to have him as a mentor throughout my career.

1. Having a mentor takes time and patience. An effective mentor must be willing to invest time in the mentorship. They must be willing to invest time and effort in the development of the mentee’s skills.
2. A mentor who is willing to share knowledge is essential. A mentor should be willing to share their knowledge with the mentee.
3. A mentor should be willing to take the time to develop the mentee’s skills. A mentor should be willing to provide guidance and support to the mentee.
4. A mentor should be willing to be contactable. A mentor should be available to answer the mentee’s questions and provide guidance.
5. A mentor should be willing to provide constructive feedback. A mentor should be willing to provide feedback that is both positive and negative, and constructive.

In conclusion, mentoring is an important aspect of professional development. A mentor can provide guidance and support to help the mentee achieve their goals. Mentoring is a rewarding experience for both the mentor and the mentee.
Conclusions

My surgical career has been influenced by mentors who took the time to nurture my interests and present me with incredible opportunities.

Life is replete with events which shape our in unexpected and wonderful ways.

Learn to recognize and embrace ‘hinge points’.

‘Ordinary’ people can achieve extraordinary things.
“The successful warrior is the average man, with laser-like focus”
Bruce Lee