Atypical Extreme Risk Carotid Endarterectomy for Asymptomatic Carotid Stenosis: Challenges to Traditional Dogma Facing Vascular Surgeons in Quaternary Referral Centers

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Piedmont Heart Institute
Piedmont Atlanta Hospital
Piedmont Healthcare

2015 Volume Indicators

- 455 beds
- 50,211 ED visits
- 1157 CV pump cases
- 1543 PCI cath cases
- 116 TAVR
- 43 VAD implants
- 77 ECMO cases
- 160 kidney transplants
- 90 liver transplants
- 12 heart transplants
- 24/7/365 MD critical care

Emory Gen Surg Residents
Mercer Transplant Surg Fellows
Mercer PA Students
PA and Nursing Residents
Objectives

1. Advanced Therapy for Heart Failure
   - an emerging problem where practice demands challenge well-established dogma
     - Presently relatively rare (< than 10% of practice)
     - Certain to grow (conceivable could reach 10% in certain practices)
2. Open a discussion about “risk-shifting” between programs
3. Briefly mention how this effects what our trainees observe
4. Proactively suggest that we begin to study this problem in the SE VSG
5. Proactively suggest that we call for a “carve out” to drop extreme risk patients from our routine practice databases but report them as a separate study
Asymptomatic Carotid Stenosis: What Do We Teach?

<table>
<thead>
<tr>
<th>SVS*</th>
<th>CEA in good risk patients with 60-99% stenosis</th>
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<tbody>
<tr>
<td></td>
<td>- 3 to 5 year life expectancy rate</td>
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<tr>
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<td>- &lt; than 3% complications</td>
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<tr>
<td>Selected CAS in properly selected patients</td>
<td>- established complication rates &lt; than 3%</td>
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How do we practice in 2016? CEA in reasonable risk patients with 80-99% stenosis
- may have lower threshold for higher-risk vulnerable lesions
- vulnerable lesions and noncompliance with BMT (e.g. statin intolerance)

VQI Report to Individual Surgeon: “If asymptomatic patients have a predicted one-year mortality of 5% or more, it is unlikely they will benefit from the stroke risk reduction vs. operative stroke risk conferred by CEA.”

Surgeons violating this principle might benefit from an OPI intervention
Asymptomatic Carotid Stenosis: The Problem with Heart Failure

More than 5.7 million people presently are living with heart failure in the United States
- 670,000 new cases per year

Prevalence of heart failure increases with aging population

Heart failure accounts for 34% of cardiovascular-related deaths
- 277,000 deaths per year

Overall mortality of heart failure patients following hospitalization is
- 10.4% at 30 days
- 22% at 1 year
- 42% at 5 years

“Heart Failure Surgical Programs” seek to improve survival
- ventricular-assist devices
  - bridge to heart transplantation (BTT)
  - destination therapy (DT)

Kirkland, JK, et. al
*JHLT* 2013; 32:141-156
INTERMACS SCORE
Interagency Registry for Mechanically Assisted Circulatory Support

**Long-Term LVAD**
Ideal candidates are INTERMACS classes 3-4

**Short-Term LVAD**
Candidates are INTERMACS classes 1-2

**Not a LVAD Candidate**
INTERMACS 1 or those with multisystem organ failure

Lietz and Miller
Curr Opin Cardiol
2009, 24:246–251
Dedicated to quality

Our team is focused on quality patient care, which has earned us

- Advanced Certification in Ventricular Assist Device from The Joint Commission
- Heart Failure Accreditation from the Society of Cardiovascular Patient Care
- Award for Excellence in Life Support as a designated Center of Excellence for ECMO from ELSO
- Approval from the United Network of Organ Sharing as a center for heart transplantation
- Approval from CMS for heart transplantation

“As a result, our heart failure patients can be confident that they are receiving the best possible care when they need it most.”
Southeast Centers performing Adult Heart Transplants & LVAD Implants
Case 1: DB 67 yo native American male
- referred from heart failure surgical program

HPI: Asymptomatic carotid stenosis with no previous CVA, TIA or AF
Evaluation for LVAD + carotid bruit
Direct CTA without duplex
- 80+% right ICA stenosis
- 50-60% left ICA stenosis
- Total occlusion of right vertebral artery
- Minimal left vertebral stenosis
Case 1: DB 67 yo native American male

Co-morbidity
Ischemic cardiomyopathy with EF 15%
INTERMACS 3
- PICC with continuous Milrinone therapy
Recurrent V-tach – AICD in place
Non-insulin dependent diabetes
Hypertension
Dyslipidemia
PAD with debilitating claudication and previous RICA stent
Previous Tobacco Use – 35 pk-years; stopped smoking 20 years ago

Medications
- 18 listed daily meds
- ASA 325 mg q day
- Clopidogrel 75 mg q d
- Pravastation
- Zestril
- Milranone continuous infusion
- Etc.
Case 1: DB 67 yo native American male

Cardiac Interventions (from EPIC)

- **Coronary artery bypass graft** 09/29/2011
  - **CV Surgery (Redo CABG x2 placing LIMA to LAD, SVG to diagonal branch of LAD.)** - 9/29/2011
  - **Cardiac catheterization** 11/18/2010
  - Status post 11/18/2010 successful percutaneous transluminal coronary angioplasty of first diagonal via the saphenous vein graft and unsuccessful recanalization of chronic total obstruction native left anterior descending.
  - **Cardiac catheterization** 10/27/2010
    - Coronary artery disease, status post left heart catheterization on 10/27/2010 showing total obstruction of the left anterior descending and total obstruction of the circumflex, total obstruction of
  - **Cardiac catheterization** 09/26/2011
    - Status post redo coronary artery bypass grafting x2 with grafts from the left internal mammary artery to the left anterior descending and saphenous vein graft to the diagonal branch of the left
    - Post-op ventricular tachycardia. The patient received multiple shocks from the ICD. The patient was started on IV amiodarone and electrolytes were repleted with no further reoccurrence. The patient requested to not be discharged on amiodarone as he does not want to take the drug secondary/
    - **Cardiac catheterization** 09/26/2011
      - Cath (Restenosis at previous diagonal artery PTCA site, probably culprit lesion. However, given angle of takeoff, not well suited for stenting and not stented in 2010. Moderate degeneration in a 29-year-old SVG which is providing most of circulation to heart. Severe LV dysfunction.) - 9/26/2011
    - **Coronary angioplasty**
      - **Pci** 7/26/2000
        - **Successfull balloon to the end stent re-stenosis at the RCA vein graft anastomosis. A 3.0x13 Velocity stent was used.)** - 7/26/2000
      - **Cardiac catheterization** 08/01/1994
        - **Cath (Saphenous vein graft to the LAD and diagonal patent, saphenous vein graft to PDA and PLOM patent.)** - 8/1/1994
      - **Coronary artery bypass graft** 6/1984
        - **CV Surgery (Saphenous vein graft to the LAD and diagonal, saphenous vein graft to PDA and PLOM.)** - 6/1984
Case 1: DB 67 yo native American male

12/17/2012 – same day admit

Right carotid endarterectomy with Xenosure patch 12/17/2012
Regional anesthesia

Postop ICU 1 night and telemetry 1 night
Discharged postop day # 3
No complications (could have safely gone home on POD #2)
Case 1: DB 67 yo native American male

8/25/2013 Procedure(s):
LEFT VENTRICULAR ASSIST DEVICE - HEARTMATE II
REDO STERNOTOMY
Repair of Right Fem Artery and Vein Primarily (Suture)
Repair of Right Axillary Artery with Patch Angioplasty
INTRAOPERATIVE TRANSESOPHAGEAL ECHOCARDIOGRAM

Surgeon(s):
David A. Dean, MD
Case 1: DB 67 yo (now 71) native American male

Course
- 46 month survival to date (asa/warfarin and statin)
- participates actively in North Georgia Cherokee Council Events

Last seen 5/30/2016
- widely patent right carotid
- asymptomatic left carotid disease
- severe PAD but no ulcers or rest pain
- + drive-line infection
Case 2: JB 66 yo male

HPI: Asymptomatic carotid occlusive disease
- no previous strokes, TIAs or AF
- progressive RICA stenosis (70-99%; 337/241 cm/sec; ratio 6.3)
  - > than 80% by CTA
- left ICA 50-69% (170/101 cm/sec)
  - < than 50% by CTA

LVAD 1/30/2013 Heartmate II as a Bridge to Transplant
- referred for RCE in preparation for OHT
Case 2: JB 66 yo male

Co-morbidity
- Redo CABG after N-STEMI in 8/2012
- Progressive failure requiring ICU admission and inotropic support ultimately requiring LVAD
- Cath – all grafts occluded; EF 15%
- Stabilized with LVAD
- Hypertension
- Dyslipidemia (intolerant to statins)
- PAD
- Previous DVT

Medications
- 25 daily meds
- Asa/persantine
- Insulin
- - etc.
Case 2: JB 66 yo male

9/17/2014
Right carotid endarterectomy with Xenosure patch
Regional anesthesia

(rom my op note: “very thin, friable carotid – more like a pulmonary artery than a carotid artery; completely nonpulsatile flow”)
Postop hematoma – not bad but taken back to be sure to prevent comps

Discharged: postop day 2
Case 2: JB 66 yo male

Course: Cleared for transplant 10/2014
- right carotid widely patent; left free of significant stenosis

Death: Cardiogenic shock and multiple organ failure 4/25/2015
- never made it to transplant
Piedmont : The Problem with Heart Failure System

Current Program Stats

530 evaluations per year
50-55 LVADS/yr (77 last year)
8 -10 OHTs/year
Challenges of Vascular Surgical Practice in “Destination Cardiac Centers”

1. Cardiac surgeons and their programs .......
   - intense quality and monetary pressure
   - must control as much risk as possible
   - risk shifting from cardiac to vascular programs, violating practice dogma, is an occasional consequence

2. Experiences of quaternary practices are not transferrable to most vascular surgical trainees’ future practices
   “Do as I say, not as you see me doing in this case”

3. The present VQI database does not have a tool that adequately recognizes extreme risk.

4. Would it not be unreasonable for those of us in the SEVSG who practice in Destination Cardiac Centers to combine our efforts to better study vascular surgical outcomes in HF patients?
   - perhaps stratify HF patients by documenting anything from NYHA-class, EF, to INTERMACS score
   - prophylactic operations to prevent vascular morbidity and death for DT and BTT patients
   - salvage operations for those patients with vascular issues with LVADs or periop transplants

5. Why not “carve out” cardiac DT and BTT and periop OHT patients from our routine practice database?