Preoperative Frailty Risk Analysis Index to Stratify Patients Undergoing Carotid Endarterectomy

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Introduction

• No disclosures
Medicare wasted at least $1.9 billion a year on unnecessary treatments, study finds
# Original Investigation | LESS IS MORE

## Measuring Low-Value Care in Medicare

Aaron L. Schwartz, BA; Bruce E. Landon, MD, MBA; Adam G. Elshaug, PhD, MPH; Michael E. Chernew, PhD; J. Michael McWilliams, MD, PhD

<table>
<thead>
<tr>
<th>Measure</th>
<th>Source and Supporting Literature</th>
<th>More Sensitive, Less Specific (Base Definition)</th>
<th>Operational Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cardiovascular Testing and Procedures</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stress testing for stable coronary disease</td>
<td>CW(^3)^, literature(^3)(^5)</td>
<td>Stress testing for patients with an established diagnosis of ischemic heart disease or angina (≥6 mo before the stress test) and thus not done for screening purposes</td>
<td>Test not associated with inpatient or emergency care, which might be indicative of unstable angina(^6); only patients with a past diagnosis of myocardial infarction to exclude patients with a history of noncardiac chest pain inaccurately coded as angina (ie, those with no underlying ischemic heart disease who might benefit from screening and optimization of medical management)</td>
</tr>
<tr>
<td>Percutaneous coronary intervention with balloon angioplasty or stent placement for stable coronary disease</td>
<td>Literature(^3)^(^5),(^3)^(^6)</td>
<td>Coronary stent placement or balloon angioplasty for patients with an established diagnosis of ischemic heart disease or angina (≥6 mo before the procedure); procedure not associated with an ED visit,(^8) which might be indicative of acute coronary syndrome</td>
<td>Only patients with a past diagnosis of myocardial infarction to exclude patients with a history of noncardiac chest pain inaccurately coded as angina</td>
</tr>
<tr>
<td>Renal artery angioplasty or stenting</td>
<td>Literature(^3)^(^7),(^3)^(^8)</td>
<td>Renal/visceral angioplasty or stent placement</td>
<td>Diagnosis of renal atherosclerosis or renovascular hypertension noted in procedure claim</td>
</tr>
<tr>
<td>Carotid endarterectomy in asymptomatic patients</td>
<td>CW(^3)^(^3),(^3)^(^9)</td>
<td>Carotid endarterectomy for patients without a history of stroke or TIA and without stroke, TIA, or focal neurological symptoms noted in claim</td>
<td>Operation not associated with an ED visit(^5); only female patients(^1)</td>
</tr>
<tr>
<td>IVC filters to prevent pulmonary embolism</td>
<td>Literature(^4)^(^0),(^4)^(^1)</td>
<td>Any IVC filter placement</td>
<td>No additional restrictions</td>
</tr>
</tbody>
</table>
Introduction

• Carotid endarterectomy is under increased scrutiny
• The value of carotid endarterectomy is dependent on outcomes
• How can we improve outcomes in carotid endarterectomy?
  – Technical
  – Patient Selection
Introduction

• How do we best select patients to undergo carotid endarterectomy?

• Frailty is a syndrome with decreased physiologic reserves arising from cumulative comorbid conditions. ¹, ²

Frailty as a Predictor of Surgical Outcomes in Older Patients

Martin A Makary, MD, MPH, FACS, Dorry L Segev, MD, PhD, FACS, Peter J Pronovost, MD, PhD, Dora Syin, MD, Karen Bandeen-Roche, PhD, Purvi Patel, MD, MPH, Ryan Takenaga, MD, Lara Devgan, MD, MPH, Christine G Holzmueller, BLA, Jing Tian, MS, Linda P Fried, MD, MPH

The unadjusted incidence of complications after minor procedures was 3.9% in nonfrail, 7.3% in intermediately frail, and 11.4% in frail patients; after major procedures, the unadjusted incidence was 19.5% in nonfrail, 33.7% in intermediately frail, and 43.5% in frail patients.
## RISK ANALYSIS INDEX (RAI)

1. **Age**  
   - Score with Cancer:  
     - Score without Cancer:  

2. **Sex**  
   - Female = 0/ Male = 5

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1. **Renal Insufficiency**  
   - No = 0/ Yes = 6

2. **Congestive Heart Failure**  
   - No = 0/ Yes = 4

3. **Shortness of Breath at Rest**  
   - No = 0/ Yes = 8

4. **Weight Loss (>10 lbs) in last 3 Months**  
   - No = 0/ Yes = 5

5. **Poor Appetite**  
   - No = 0/ Yes = 4

6. **Residence Other than Independent Living**  
   - No = 0/ Yes = 8

7. **Cognitive Decline in last 3 Months**  
   - No / Yes

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1. **Activities of Daily Living**  
   - With Cognitive Decline:  
     - Without Cognitive Decline:  

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**TOTAL SCORE**: 25 (0-85)


Study Design

• All patients in NSQIP database who underwent CEA from 2005 – 2011 (n = 44,832)
• A quality and frailty team matched variables from RAI to preoperative NSQIP parameters
• Primary outcome measures: Stroke, MI, Death, Length of Stay
RAI Score Breakdown

All Patients

Symptomatic Patients

Asymptomatic Patients

92%

88%

94%
All Patients

* p = Cochran-Armitage Trend Test
Symptomatic Patients

- Stroke ($p = 0.009$)
- Death ($p < 0.0001$)
- MI ($0.002$)

* $p = $ Cochran-Armitage Trend Test
Asymptomatic Patients

Stroke (p = 0.22)
Death (p < 0.0001)
MI (p = 0.04)

*p = Cochran-Armitage Trend Test
Length of Stay

- All Patients
- Symptomatic Patients
- Asymptomatic Patients
# RISK ANALYSIS INDEX (RAI)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Score with Cancer</th>
<th>Score without Cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Age</td>
<td><strong>75</strong></td>
<td>(13-20)</td>
</tr>
<tr>
<td>2.</td>
<td>Sex</td>
<td>Female = 0/ Male = 5</td>
<td>5 (5)</td>
</tr>
<tr>
<td>1.</td>
<td>Renal Insufficiency</td>
<td>No = 0/ Yes = 6</td>
<td>6 (6)</td>
</tr>
<tr>
<td>2.</td>
<td>Congestive Heart Failure</td>
<td>No = 0/ Yes = 4</td>
<td>0 (4)</td>
</tr>
<tr>
<td>3.</td>
<td>Shortness of Breath at Rest</td>
<td>No = 0/ Yes = 8</td>
<td>0 (8)</td>
</tr>
<tr>
<td>4.</td>
<td>Weight Loss (&gt;10 lbs) in last 3 Months</td>
<td>No = 0/ Yes = 5</td>
<td>0 (5)</td>
</tr>
<tr>
<td>5.</td>
<td>Poor Appetite</td>
<td>No = 0/ Yes = 4</td>
<td>0 (4)</td>
</tr>
<tr>
<td>6.</td>
<td>Residence Other than Independent Living</td>
<td>No = 0/ Yes = 8</td>
<td>8 (8)</td>
</tr>
<tr>
<td>7.</td>
<td>Cognitive Decline in last 3 Months</td>
<td>No / Yes</td>
<td></td>
</tr>
</tbody>
</table>

1. Activities of Daily Living
   - With Cognitive Decline: _____(-2-21)
   - Without Cognitive Decline: ____2 (0-16)

**TOTAL SCORE** 25 (0-85)
Administer RAI in Clinic

Low RAI Score
- Excellent Outcomes
- Surgical Techniques
- Hospital Practices

Poor Outcomes

High RAI Score
- Further Workup
- Comprehensive Geriatric Assessment
- Alternative Treatment
- Appropriate Patient Counseling

Thank you. Questions?