Disclosure: N. Gupta: Nothing to disclose; C. Moreira: Nothing to disclose; J. Raffetto: Nothing to disclose; E. Graveraveux: Nothing to disclose; S. White: Nothing to disclose; S. Mattera: Nothing to disclose; J. McPhee: Nothing to disclose.

Improving Outcome Prediction Accuracy of Carotid Endarterectomy (CEA) in Asymptomatic Patients Using a Novel Frailty Risk Score (FRS)

Objectives: CEA in asymptomatic patients is recommended only when postoperative complications and mortality are kept low; but predicting CEA complications in a specific patient remains elusive. To better predict 30-day postoperative complications, we calculated a novel point-weight ordinal Frailty Risk Score (FRS) by an analysis of 20 preoperative risk factors based on their individual odds ratios (ORs) as predictors of postoperative complications and mortality. We aimed to examine the predictive contribution value of five levels of FRS on four outcomes (stroke, myocardial infarction [MI], and mortality), and of a composite of the three outcomes in all primary asymptomatic CEAs in the 2005 to 2011 American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database (n = 121,015).

Methods: To compare the predictive value of this calculated FRS with that of patient demographics and surgical variables alone, we examined the predictive contribution value of five levels of FRS on four outcomes (stroke, myocardial infarction [MI], and mortality), and of the composite of the three outcomes in all primary asymptomatic CEAs in the 2005 to 2011 ACS-NSQIP database (n = 39,859).

Results: Thirty-day mortality occurred in 273 patients (0.7%), stroke in 527 (1.3%), MI in 801 (0.8%), and the composite outcome was positive in 1008 (2.5%). We found that by itself, the FRS level was strongly and significantly associated with all four outcomes (Table). For stroke, we used only three levels of frailty because the stroke rate no longer increased after this point, and found that for the lowest vs highest frailty levels, the rate of stroke was 1.1% vs 2.4% (P < .0001). Percentage of patients that were positive for the composite outcome was 1.7% in lowest vs 15.2% in the highest FRS group (P < .0001).

Conclusions: An easy-to-calculate FRS can help stratify risk based on preoperative patient characteristics and will help to identify asymptomatic patients for whom CEA is risky.

Table. Percentage of patients positive for each outcome by frailty level

<table>
<thead>
<tr>
<th>Frailty level</th>
<th>Death (%) (95% CI)</th>
<th>Stroke (%) (95% CI)</th>
<th>MI (%) (95% CI)</th>
<th>Composite outcome (%) (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.2 (0.2-0.3)</td>
<td>0.2 (0.2-0.3)</td>
<td>0.4 (0.3-0.5)</td>
<td>1.7 (1.5-1.9)</td>
</tr>
<tr>
<td>2</td>
<td>0.7 (0.6-0.9)</td>
<td>1.3 (1.2-1.5)</td>
<td>0.8 (0.7-0.9)</td>
<td>2.6 (2.4-2.8)</td>
</tr>
<tr>
<td>3</td>
<td>1.6 (1.2-2.0)</td>
<td>2.4 (1.9-2.9)</td>
<td>1.7 (1.3-2.1)</td>
<td>5.1 (4.4-5.8)</td>
</tr>
<tr>
<td>4</td>
<td>3.0 (1.7-4.4)</td>
<td>1.6 (0.6-2.6)</td>
<td>2.2 (1.1-3.4)</td>
<td>6.4 (4.5-8.3)</td>
</tr>
<tr>
<td>5</td>
<td>10.7 (8.6-12.8)</td>
<td>1.8 (0.9-2.4)</td>
<td>5.4 (3.2-9.5)</td>
<td>15.2 (8.2-21.8)</td>
</tr>
</tbody>
</table>

CI, Confidence interval; MI, myocardial infarction.

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Development of a Successful Follow-Up Program for Patients After Endovascular Aneurysm Repair
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Objectives: Patients treated with endovascular abdominal aortic aneurysm (AAA) repair (EVAR) require lifelong follow-up. Although a variety of post-EVAR surveillance protocols have been suggested, adherence to follow-up outside of industry-funded clinical trials has been challenging. We aim to describe an effective system for EVAR surveillance over 10 years that results in exceptional follow-up.

Methods: From 2003 to 2013, 225 EVARs were performed for elective, symptomatic, or ruptured AAA using a variety of commercially available devices at a single, rural, academic center. After repair, all patients were followed up every 6 to 12 months with clinic visits and imaging (computed tomography or ultrasound). All patients were entered into the Vascular Quality Initiative database, which was audited quarterly by hospital quality personnel. At the time of the audit, a list of EVAR patients due for imaging was generated and forwarded to a dedicated vascular clinic nurse who arranged imaging and clinic visits for those missing follow-up. Mortality and rationale for incomplete follow-up were recorded in a prospective follow-up database.

Results: In hospital mortality was 0.9% for elective or symptomatic AAA and 25% for ruptured AAA. Most (99%) were discharged to home and 98% remained independent at 1 year. All-cause mortality was 7.2%, 25.4%, 44.9%, and 68.1% at 1, 3, 5, and 10 years. Median follow-up was 3.7 years. Using the above protocol resulted in comprehensive follow-up of patients at 1, 3, and 5 years of 96%, 92%, and 84%, respectively. A significant drop off in adherence to follow-up was noted at 9 years. Resources required to accomplish this were minimal, with <0.05 nursing full-time equivalents and <0.05 full-time equivalents for hospital quality personnel (Fig).

Conclusions: EVAR has acknowledged rates of short-term and long-term failure so that implantation of the stent graft is only part of successful treatment of AAA. The follow-up program we describe is comparable to that achieved in industry-sponsored trials. With many groups currently enrolling in the Vascular Quality Initiative, the methodology presented here is reproducible.

Venous Thromboembolism in High-Risk Patients: Are We Doing Enough for Prevention?
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Objectives: Hospital-acquired venous thromboembolism (VTE) is a costly quality and safety indicator thought to be preventable. Embedding risk-assessment models into the electronic medical record (EMR) to increase appropriate use of VTE prophylaxis for low-risk, medium-risk, and high-risk patients is one strategy to decrease VTE events. We proposed that high-risk patients receiving prophylaxis with mechanical and pharmacologic methods would have a lower VTE rate than those who received one prophylactic modality or none.

Methods: All medical and surgical patients admitted from October 1, 2011, to October 31, 2012 were reviewed. The EMR was reviewed for the VTE risk-assessment score determined upon admission, the type of VTE prophylaxis used, and the rate of hospital-acquired VTE by risk category.

Results: Of the 24,960 patients admitted, 175 (0.71%) developed VTE during their hospital stay. At the time of admission, 16.7% (4164) were assigned to the high-risk group, of which 71.3% (2967) received mechanical and pharmacologic prophylaxis, 13.0% (542) mechanical alone,