Are cardiology evaluations of any value before vascular operations: What is of value?

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**Disclosures**

Nothing to Disclose

**Background**

**Preoperative Consultation**

- Goal is to use specialty specific knowledge from the consultant to decrease post operative cardiac events
- ACC/AHA 2014 guidelines for noncardiac surgery
- National hospital variation
- Mixed results in low and moderate risk general surgery

**Objective**

To understand statewide variation in preoperative cardiology consultation prior to major vascular surgery and to determine whether consultation was associated with differences in perioperative myocardial infarction (poMI).

**Post Op MI**

Blue Cross Blue Shield of Michigan Vascular Intervention Collaborative

Multi-institution
- 29 Hospitals

Patient Population
- Elective or urgent open or endovascular peripheral bypass (n=3037), EVAR (n=1822), or open abdominal aortic aneurysm (n=332) repair
  - January 2012 - December 2014
- Demographics, preoperative cardiology consultation, medications, procedural details, and hospital characteristics

Methods

Outcomes
- Primary outcome included perioperative myocardial infarction (poMI)

Statistical Analysis
- Patient Level:
  - Risk stratified by RCRI category to analyze poMI
- Hospital Level:
  - Stepwise multivariable logistic regression modeling of poMI across hospitals grouped into quartiles by rate of preoperative cardiology consultation

Patient Level

Baseline characteristics of patients with and without preoperative cardiology consultation

<table>
<thead>
<tr>
<th>Demographic</th>
<th>No Preoperative Cardiology Consultation (n=5728)</th>
<th>Preoperative Cardiology Consultation (n=5191)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>67.4 (15.4)</td>
<td>67.9 (15.7)</td>
<td>0.24</td>
</tr>
<tr>
<td>Male (%)</td>
<td>64.2 (20.4)</td>
<td>63.0 (20.8)</td>
<td>0.80</td>
</tr>
<tr>
<td>Female (%)</td>
<td>35.8 (20.4)</td>
<td>37.0 (20.8)</td>
<td>0.80</td>
</tr>
<tr>
<td>Race</td>
<td>White 590 (32%)</td>
<td>558 (32%)</td>
<td>0.69</td>
</tr>
<tr>
<td>Black</td>
<td>182 (10.4%)</td>
<td>181 (10.7%)</td>
<td>0.94</td>
</tr>
<tr>
<td>Other</td>
<td>589 (34%)</td>
<td>42 (2.7%)</td>
<td>0.08</td>
</tr>
<tr>
<td>Education</td>
<td>200 (9.0%)</td>
<td>13 (2.7%)</td>
<td>0.08</td>
</tr>
<tr>
<td>Ejection Fr</td>
<td>230 (10.4%)</td>
<td>60 (4.0%)</td>
<td>0.08</td>
</tr>
<tr>
<td>Family History of CAD</td>
<td>133 (3.8%)</td>
<td>133 (4.0%)</td>
<td>0.65</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>239 (6.1%)</td>
<td>239 (6.5%)</td>
<td>0.80</td>
</tr>
<tr>
<td>Hypertension</td>
<td>228 (8.0%)</td>
<td>228 (8.0%)</td>
<td>0.80</td>
</tr>
<tr>
<td>Diabetes</td>
<td>421 (14.0%)</td>
<td>389 (14.8%)</td>
<td>0.60</td>
</tr>
<tr>
<td>Pre-CRI</td>
<td>293 (65.8%)</td>
<td>275 (69.7%)</td>
<td>0.10</td>
</tr>
<tr>
<td>Opioid Use</td>
<td>107 (35.8%)</td>
<td>107 (35.8%)</td>
<td>0.80</td>
</tr>
<tr>
<td>COPD</td>
<td>95 (20%)</td>
<td>95 (20%)</td>
<td>0.80</td>
</tr>
<tr>
<td>NSTE-TIMI 1B</td>
<td>166 (3.6%)</td>
<td>166 (3.6%)</td>
<td>0.80</td>
</tr>
<tr>
<td>Bl of CAD</td>
<td>151 (3.6%)</td>
<td>151 (3.6%)</td>
<td>0.80</td>
</tr>
<tr>
<td>Pre-PCI</td>
<td>579 (34%)</td>
<td>579 (34%)</td>
<td>0.80</td>
</tr>
<tr>
<td>Pre-MI</td>
<td>345 (22%)</td>
<td>345 (22%)</td>
<td>0.80</td>
</tr>
<tr>
<td>creat. &lt;15 mg/dL</td>
<td>44 (2.5%)</td>
<td>44 (2.5%)</td>
<td>0.80</td>
</tr>
</tbody>
</table>

Exclude records due to multiple hospitalization

Patients included in the analysis

- 5191 (90.6%)

Exclude records out of normal parameter or have missing value

No cardiac consultation

Cardiac consultation

24% (94.7%)

Analysis of 30-day poMI Following Risk Stratification of Patients by RCRI Category

<table>
<thead>
<tr>
<th>RCRI</th>
<th>No Consultation</th>
<th>Consultation</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (n=1873)</td>
<td>10 (0.9%)</td>
<td>2 (0.3%)</td>
<td>0.318</td>
</tr>
<tr>
<td>2 (n=1837)</td>
<td>14 (1.5%)</td>
<td>18 (2.0%)</td>
<td>0.476</td>
</tr>
<tr>
<td>3 (n=942)</td>
<td>10 (2.4%)</td>
<td>23 (4.4%)</td>
<td>0.110</td>
</tr>
<tr>
<td>4 (n=509)</td>
<td>6 (2.9%)</td>
<td>24 (7.2%)</td>
<td>0.051</td>
</tr>
</tbody>
</table>

Revised Cardiac Risk Index (CRl): 1:score 1, 2:score 1, 3:score 2, 4:score over 3.5
Statewide Variation in Preoperative Cardiology Consultation Prior to Vascular Surgery

Statewide Variation

- Preoperative cardiology consultation varied greatly between the 29 hospitals within the state with a 12.6 fold difference (6.9%-87.5%, P<0.001).
  - Consultation was independent of hospital location, size, or mission (academic vs. private).

Increased Odds Ratio of poMI

- Race-African American
- Hypertension
- Diabetes
- CVD or TIA
- Prior MI
- High Risk Procedure

Reduced Odds Ratio of poMI

- Hospital Q4
  - Preoperative cardiology consultation >66% of patients

Rate of Preoperative Subspecialty Consultation Within Hospital Quartiles

Medical Consultation

- The hospitals in the highest quartile of preoperative cardiology consultation (Q4) were also found to have statistically higher rates consultation with a variety of medical services.

Preoperative Cardiology Consultation and Vascular Surgery

1. Preoperative cardiology consultation for vascular surgery varies greatly between institutions
   - Independent on hospital location (city versus suburb/town), mission (academic versus community status), or size.
2. At the patient-level, there was no association between cardiac consultation and poMI.
3. At the hospital-level, high preoperative consulting hospitals (rate >66%) had a reduction in poMI compared to all other hospitals.
   - These hospitals were also had a statistically greater consultation rate with a variety of medical specialties.

So what should be done?
Preop Evaluation

- Biomarkers: Trpnl and NT-BNP
- Only cards consults for most complex patients

Thanks!