Surveillance Recommendations Following TEVAR Should be Based on Initial Indication for Repair

R. Anthony Meena, MD
Jaime Benaroch-Gampel, MD
Bradley G. Leshnower, MD
Guillermo A. Escobar, MD
Yazan Duwayri, MD
William D. Jordan, Jr., MD
Ravi R. Rajani, MD
Disclosures

• No relevant financial or nonfinancial relationships to disclose
Introduction

• Patient compliance inconsistent for all etiologies of aortic disease

• Paucity of literature on compliance with surveillance imaging post-TEVAR

• No current SVS surveillance guidelines
Introduction: Guidelines

2010 ACCF/AHA/AATS/ACR/ASA/SCA/SCAI/SIR/STS/SVM Guidelines for the Diagnosis and Management of Patients With Thoracic Aortic Disease


Endorsed by the North American Society for Cardiovascular Imaging
Introduction: Guidelines

- Contrast-enhanced scans at the following time points:
  - Year one post-discharge:
    - 1m
    - 2m
    - 6m
    - 12m
  - Annually thereafter
- Independent of initial indication for TEVAR
Research Questions

1. What factors affect compliance?
   • Socioeconomic factors?
   • Indication for repair?

2. Should all procedures be under the same surveillance standards?
Methods

• **Design:** Retrospective analysis of electronic medical records

• **Setting:** Large, multicenter hospital system, including academic, private, and public hospitals

• **Study population:** Any index TEVAR operations

• **Exclusions:**
  • Any patient expiring within 12m of initial TEVAR
  • Subsequent TEVARs (except in analysis of postoperative complications)
Methods: Definitions

• Major Indications:
  1. Aneurysm
  2. Dissection
  3. Penetrating Aortic Ulcer/Intramural Hematoma
  4. Transection

• Compliance:
  • *Overall compliance* = any contrast-enhanced scan within 12m of discharge
  • *Compliance score* = 0-4 based upon number of contrast-enhanced scans at ACCF/AHA-defined time points
Methods: Definitions

• Aorta-Specific Complications:
  • Postoperative sac expansion
  • Rupture
  • Need for additional aortic intervention
Results: Patient Demographics

- 329 TEVAR Operations
  - 22 Patients Deceased Within 12 Months
  - 44 Re-Interventions
  - 1 TEVAR for Non-Traditional Indication for Repair

- 262 Included Patients

- Dissection (n=103)
- Aneurysm (n=105)
- PAU/IMH (n=36)
- Transection (n=18)
**Results:** Patient Demographics

<table>
<thead>
<tr>
<th></th>
<th>Aneurysm</th>
<th>Dissection</th>
<th>PAU/IMH</th>
<th>Transection</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient Demographics (n=262)</strong></td>
<td>(n=105, %)</td>
<td>(n=103, %)</td>
<td>(n=36, %)</td>
<td>(n=18, %)</td>
</tr>
<tr>
<td><strong>Average Age (years)</strong></td>
<td>67.6 ± 12.7</td>
<td>55.3 ± 11.8</td>
<td>68.1 ± 12.8</td>
<td>32.1 ± 9.5*</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>35 (33.3)*</td>
<td>55 (53.4)</td>
<td>18 (50.0)</td>
<td>11 (61.1)</td>
</tr>
<tr>
<td>Caucasian</td>
<td>53 (50.5)*</td>
<td>33 (32.0)</td>
<td>15 (41.7)</td>
<td>3 (16.7)</td>
</tr>
<tr>
<td>Multiracial/Other</td>
<td>6 (5.7)</td>
<td>7 (6.8)</td>
<td>1 (2.8)</td>
<td>4 (22.2)</td>
</tr>
<tr>
<td>Unknown/Unreported</td>
<td>11 (10.5)</td>
<td>8 (7.8)</td>
<td>2 (5.6)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td><strong>Mean Follow-Up (months)</strong></td>
<td>18.6</td>
<td>22.9</td>
<td>19.0</td>
<td>13.6</td>
</tr>
</tbody>
</table>
## Results: Patient Demographics

<table>
<thead>
<tr>
<th></th>
<th>Aneurysm (n=105, %)</th>
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</tr>
<tr>
<td><strong>Insurance Status</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uninsured</td>
<td>3 (2.9)</td>
<td>5 (4.9)</td>
<td>0 (0.0)</td>
<td>4 (22.2)</td>
</tr>
<tr>
<td>Government-Issued</td>
<td>66 (62.9)</td>
<td>42 (40.8)</td>
<td>21 (58.3)</td>
<td>2 (11.1)</td>
</tr>
<tr>
<td>(Medicaid/Medicare/Tricare/Vet)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td>33 (31.4)</td>
<td>39 (37.9)</td>
<td>13 (36.1)</td>
<td>6 (33.3)</td>
</tr>
<tr>
<td>Auto/Worker’s Compensation</td>
<td>1 (1.0)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>6 (33.3)</td>
</tr>
<tr>
<td>Unknown/Unreported</td>
<td>2 (1.9)</td>
<td>17 (16.5)</td>
<td>2 (5.6)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td><strong>Average Distance from Hospital (miles)</strong></td>
<td>48.7</td>
<td>45.5</td>
<td>31.7</td>
<td>19.0*</td>
</tr>
</tbody>
</table>
Results: Overall Compliance

- Total: 77%
- Aneurysm: 76%
- Dissection: 82%
- Transection: 72%
- PAU/IMH: 72%

p > 0.05
Results: Overall Compliance

Race

Insurance Status

p > 0.05

p > 0.05
Results: Compliance Score

Compliance Score 68%

All p>0.05 when compared with remaining cohort.
Results: Complication Rate

- Aneurysm: 43.8%
- Dissection: 67%
- PAU/IVH: 33.3%
- Transection: 0%

* p<0.05, when compared with remaining cohort
Results: Freedom from Aorta-Specific Complications
Discussion

• Compliance
  • Patients not following up at recommended time intervals
  • Guidelines should be indication-specific rather than indication-independent
    • Financial burden
    • Radiation safety
    • Benefit?

• Complications
  • Pathophysiology intrinsically different
Discussion

• **Strengths:**
  - Large sample size
  - Multicenter hospital system

• **Limitations:**
  - External referrals to healthcare system
  - Varying degree of challenging or frail repairs
  - Physician knowledge of/confidence in surveillance guidelines
Summary

1. Initial indication for repair and socioeconomic status were not associated with a difference in compliance.

2. Dissection was associated with an increased complication rate, while transection patients did not experience postoperative complications.
Conclusions

• TEVAR for dissection should be subject to stricter surveillance guidelines than TEVAR for other indications
Conclusions

- Transection: one contrast-enhanced CT within 12m
- Aneurysm, PAU/IMH: contrast-enhanced CT at 1-2m, 12m
- Dissection: contrast-enhanced CT at 1-2m, 6m, 12m, annually
Thank You
Appendix

• By Hospital:
  • Statistically significant difference in indication for repair (i.e. all transection patients were treated at county/public hospital)
  • No significant difference in overall compliance or complication rate

• Proximal Graft Zones:
  • No statistically significant difference in complication rate
  • Statistically significant difference in overall compliance (p=0.03)

• Decreasing guidelines, improving compliance
  • Middle East: simplifying clinical guidelines in the setting of Afib decreased the incidence of Afib
  • Evidence that simplifying guidelines can improve outcomes after a procedure, but does not speak necessarily to improved compliance