Emergency Intraoperative Vascular Surgery Consultations at a Tertiary Academic Center

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Disclosures: None

• Emergency Vascular Consultations in Non Vascular Surgery

• Vascular Surgeons as emergency intraoperative consultants
  • Objective: To describe the spectrum of cases that required vascular surgical emergency intraoperative consultation over 15 years a tertiary academic center (Jan 2002 - Dec 2016)

Background

Methods

2519 Consults to Vascular Surgeons (Vascular Surgeon + Other Surgeon)

2100 Planned Vascular OR Consultations

419 Emergency Vascular OR Consultations

Demographics

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Average</th>
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</thead>
<tbody>
<tr>
<td>Age at time of surgery</td>
<td>57 (14-90)</td>
</tr>
<tr>
<td>BMI (kg/m^2)</td>
<td>28.3 (13-75)</td>
</tr>
<tr>
<td>Male Gender</td>
<td>50.8%</td>
</tr>
<tr>
<td>Patient History:</td>
<td></td>
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<tr>
<td>Smokers (F/C)</td>
<td>49.8%</td>
</tr>
<tr>
<td>Diabetic</td>
<td>18.8%</td>
</tr>
<tr>
<td>CAD</td>
<td>18.5%</td>
</tr>
<tr>
<td>CKD Stage II or Greater</td>
<td>15.5%</td>
</tr>
<tr>
<td>Antiplaletter use</td>
<td>24.0%</td>
</tr>
<tr>
<td>Anticoagulant use</td>
<td>14.9%</td>
</tr>
</tbody>
</table>

Aria Classification:

- Class I: 2.3%
- Class II: 27.8%
- Class III: 50.4%
- Class V: 4.5%

Features of Consultation:

- Cancer Resection: 57.3%
- Trauma: 5.0%
- Infected Field: 4.3%
- Re-operative field: 6.2%

Initial Case Acuteness:

- Elective (scheduled): 77.3%
- Urgent (6 hours): 16.2%
- Emergent (1 hour): 6.4%

Consulting Service and Acuteness

- Trauma: 10.3%
- Urology: 9.9%
- General Surgery: 15.0%
- Ortho & Neuro: 9.9%
- Cardiac: 18.4%
Primary Indication for Initial Consultation

- Revascularization: 51%
- Control Bleeding: 32%
- Ureteral Disruption: 11%
- Other: 6%
- None: 1%

Actual Assistance Provided

- 60% (n=231) ≥ 2 indications addressed
- 21% (n=81) ≥ 3 indications addressed

Complexity!!!

Anatomic Location of Procedure

- Abdominal: 30%
- Lower Extremity: 23%
- Pelvis: 17%
- Thoracic: 15%
- Visceral Veins: 14%
- Multiple Vessels: 13%
- Lower Extremity Arteries: 12%
- Pelvic Veins: 11%
- Pelvic Arteries: 11%
- Lower extremity Veins: 10%
- SVC or IVC: 9%
- Head and Neck Arteries: 9%
- Head and Neck Veins: 9%
- Upper Extremity Arteries: 8%
- Upper Extremity Veins: 7%
- Upper Extremity: 6%
- Lower Extremity: 5%
- Retroperitoneal: 3%
- Head & Neck: 1%

Vessels Treated

- Operative Time:
  - Mean: 7.4 hours
  - Median: 6.4 hours
  - Range: 107 minutes (1.8 hours) to 1360 minutes (22.6 hours)

- EBL:
  - Mean: 3,100 ml
  - Median: 1,500 ml
  - Range (10ml - 30,000ml)

Outcomes: Complications

- 30-day complication rate [N=413]
  - Any complication: 234 (51.8%)
  - Any medical complication: 132 (32.0%)
  - Any surgical complication: 149 (36.1%)
  - Any vascular surgical complication: 29 (7.0%)
Outcomes: Complications (Surgical)

Surgical complications (N=413)
- Surgical site infection 32 (7.7%)
- Bleeding 27 (6.5%)
- Bowel ischemia 12 (2.9%)
- Organ leak (biliary, pancreatic, bladder, bowel) 11 (2.7%)
- Organ loss 8 (1.9%)
- Limb ischemia 7 (1.7%)
- Deficiency or excretion 6 (1.4%)
- Other 9 (2.2%)

30-day reoperations (N=413)
- Patients with no reoperations 296 (71.7%)
- Patients with 1 or more reoperation 117 (27.9%)
- Total number of reoperations 297 (range 0-10)

30-day vascular surgery complications (N=413)
- Total number of vascular reoperations 16 (3.8%)
- Graft occlusion, rupture, infection 3 (0.6%)
- Re-interventions 6 (1.4%)

Outcomes: Disposition and Survival

Post-Operative Disposition (N=413)
- Median in-hospital LOS (days) 15 (0-128)
- Percentage ICU stay 273 (66.2%)
- Median ICU LOS (days) 4 (0-59)
- GUC to Rehab or SNF 116 (28.3%)
- 30-day readmissions 79 (20.6%)

Mortality (N=419)
- Intraoperative 6 (1.4%)
- 30-day 31 (7.4%)
- 1 Year 111 (26.5%)

Predictors of 30-day Complications

Multivariate analysis of any 30-day complication

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Adjusted Hazard Ratios</th>
<th>p value</th>
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<tbody>
<tr>
<td>Never Smoker</td>
<td>ref</td>
<td></td>
</tr>
<tr>
<td>Diabetes (DM)</td>
<td>2.22 (1.14, 4.34)</td>
<td>0.019</td>
</tr>
<tr>
<td>Urgency of index operation</td>
<td>2.53 (1.28, 4.25)</td>
<td>0.006</td>
</tr>
<tr>
<td>Elective</td>
<td>ref</td>
<td></td>
</tr>
<tr>
<td>Urgent</td>
<td>4.85 (1.57, 14.95)</td>
<td>0.006</td>
</tr>
<tr>
<td>Emergent</td>
<td>2.57 (1.36, 4.84)</td>
<td>0.004</td>
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</tbody>
</table>

Survival Analysis

- Oncologic vs Non-Oncologic; procedures
  - 55%/15 yrs
  - 35%/15 yrs

Discussion

- Vascular Surgeons play an essential role
  - Managing vascular complications
  - Assisting in the safe conduct of complex operations
  - Virtually all services in any hospital with complex surgery.
  - Appropriate hospital resources
  - Diverse open surgical skillset & wide range of anatomy

Conclusion

- The “Firemen of the OR”
- Appropriate training is needed in order to continue to lead in this role.