Institutional And Administrative Barriers To Adequate Spinal Cord Protection Treatment After TAAA Repair – Open And Endo

Charles Acher MD
Division of Vascular Surgery
University of Wisconsin
Madison, Wisconsin

Financial Disclosure

• Nothing to Report

Data for this Presentation

• Survey with responses from 55 predominately academic affiliated institutions
• Database of results from over 100 publications detailing outcomes for > 20,000 TAAA and TEVAR patients
• Concurrent database of our own patients tracked for last 30 years

Phases of care and Players in the Game

Preop
Surgeon-APP’s
Anesthesiologist

Intraop
Anesthesiologist-
Surgeon

Postop
Anesthesia-Intensivist
–Surgeon/Nursing

Obstacles

Theory

Communication & Education

Co-operation

Effective SC protection

Theory-What Really Makes the Difference

Good Things
• Spinal fluid drainage (SF Pressure)
• Hypothermia
• Higher MAP & CI (perfusion pressure)
• Drugs
  • Steroids
  • Neurochemical protection (Endorphin and EAA inhibitors)
  • Papavarine
  • Calcium Channel Blockers
  • Nitroglycerin

Bad Things
• Hypotension
• Anemia
• Nitroprusside, hydralazine (alpha blockers)
• Poor cardiac function(cardiac index)
• Hyp or Hypotension
**Operative Treatment Protocol**
- Cerebral Spinal Fluid drainage (83 cc, < 8 mmHg)
- Neurochemical protection (naloxone 1 μg/kg/hr, methylprednisolone - 30 mg/kg, barbiturate burst suppression)
- Adequate cardiac output and perfusion pressure (MAP 100-110)
- Hypothermia (< 34°C)
- Rapid Renal Cooling (300-400 cc/kidney of LR at 4°C with 12.5 gm mannitol & 1000 U heparin)
- Volume replacement with Blood, FFP 2/1
  - Intercostal identification and implantation

**Post Operative Protocol**
- Gradual emergence from anesthesia
- SFD keeping pressure < 8 mmHg (8 for TEVAR) until awake with normal neuro exam.
- Naloxone for 48 hrs
- FFP drip at 75 cc/hr for 24 hrs
- Passive rewarming - *Never* a “Bear Hugger”
- Analgesia with Fentanyl – “no morphine”
- No alpha-blockers or nitroprusside for BP control
- Optimize BP (MAP > 90) and Cardiac Index (> 2)

**SCI Effect on Survival**
*Desert et al., Fate of TEVAR Patients with SCI, JVS September 2013*
TEVAR Survey

<table>
<thead>
<tr>
<th>SFD Pressure</th>
<th>Goals</th>
<th>mmHg</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;15%</td>
<td>23.81</td>
<td>2.45</td>
</tr>
<tr>
<td>&lt;12%</td>
<td>45.14</td>
<td>5.10</td>
</tr>
<tr>
<td>&lt;10%</td>
<td>23.81</td>
<td>6.77</td>
</tr>
<tr>
<td>&lt;8%</td>
<td>7.14</td>
<td>0.24</td>
</tr>
<tr>
<td>&lt;5%</td>
<td>0.53</td>
<td>0.98</td>
</tr>
</tbody>
</table>

Deficit Risk by SFD Pressure

Controlled by SFD Pressure

MAP Goal (mmHg)

<15% <12% <10% <8% <5%

23.81 45.24 23.81 7.14 0.53

O/E Paralysis

%SFD Pressure Goals mmHg

Deficit Risk by SFD Pressure

0.00 0.50 1.00 1.50 2.00 2.50 3.00

2.98 0.47 1.26 0.54 0.77 0.53 0.38 0.24 0.06 0.00

Process of Implementation and Change

Theory

New Information

Protocols

Outcomes

Education

Cooperation and Ownership

Time to Rescue Drain

%< 60 60-120 > 120 Do not know

38.78 26.53 10.2 24.49

Seamless Integration Across Phases of Care

Preop

Surgeon-APPs-Anesthesiologist

Intraop

Anesthesiologist-Surgeon

Postop

Anesthesia-Intensivist-Surgeon-Nursing

Theory-Protocols and Teamwork the KEY

Thank You