Spinal cord ischemia after endovascular repair of TAAA with F/B grafts: real incidence and strategies for prevention

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No disclosure on this topic
OSR Experience: BEVAR/ FEVAR for TAAA

46 cases (2013 – 2017)

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>76 (IQR 69 – 79)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 70 aa</td>
<td>25 cases (54%)</td>
</tr>
<tr>
<td>≥ 80 aa</td>
<td>9 cases (20%)</td>
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<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Male</td>
<td>72%</td>
</tr>
<tr>
<td>Hypertension</td>
<td>98%</td>
</tr>
<tr>
<td>Smoking</td>
<td>87%</td>
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<tr>
<td>Hyperlipemia</td>
<td>61%</td>
</tr>
<tr>
<td>Diabetes</td>
<td>20%</td>
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<tr>
<td>CAD ≥ 1 (SVS/AAVS)</td>
<td>54%</td>
</tr>
<tr>
<td>COPD ≥ 1 (SVS/AAVS)</td>
<td>75%</td>
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<tr>
<td>Renal ≥ 1 (SVS/AAVS)</td>
<td>44%</td>
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<tr>
<td>Renal stage ≥ II</td>
<td>85%</td>
</tr>
<tr>
<td>II (GFR 60-89 mL/min)</td>
<td>39%</td>
</tr>
<tr>
<td>III (GFR 30-59 mL/min)</td>
<td>33%</td>
</tr>
<tr>
<td>IV (GFR 15-29 mL/min)</td>
<td>9%</td>
</tr>
<tr>
<td>V (GFR &lt; 15 mL/min)</td>
<td>4%</td>
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</tbody>
</table>

Crawford Classification

- I: 5 (11%)
- II: 19 (41%)
- III: 16 (35%)
- IV: 6 (13%)

Mean diameter: 65 ± 12 mm
Post-dissecting= 7 (15%)
High risk patients for SCI!

46 cases

- Previous aortic surgery – 83% (38 pts)
- At least 2 previous aortic surgeries – 20% (9 pts)

Patients with collateral network impairment
SCI prevention strategies

a. Staged procedure

a. Avoid unnecessary thoracic coverage

a. Early limb reperfusion
a) Staged procedure
To limit the spinal cord ischemia rate

Overall rates of SCI:
- NonStaged 37.5%
- Staged 11.1%

- All neurologic injuries in the staged group were temporary

Conclusions:
“...staged repair appears both to protect against SCI and to enhance overall survival in extensive aortic repair.”
Staged procedure in OSR experience

34 cases / 46 (74%)

First - Thoracic step (70%)

Visceral step (all)

Third - Limb step (37%)

76 days

20 days
Different staging options

a. One branch open

b. Perfusion branches

c. All branch open

d. Controlateral limb open
Different staging options

a. One branch open

b. Perfusion branches

c. All branch open

d. Controlateral limb open
Different staging options

a. One branch open

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Different staging options

a. One branch open

b. Perfusion branches

c. All branch open

d. Contralateral limb open
b) Avoid unnecessary thoracic coverage

NO t-branch device in Type IV

Type IV TAAA

CT branch Celiac trunk

Zenith t-branch

34 mm

99 mm

15 mm
Use fenestrated design in Type IV TAAA

Custom-made graft

Bertoglio L et al. J Vasc Surg 2017
c) Early limb/pelvis reperfusion

Spinal cord protection

Overall rates of SCI:
- Liberal 25%
- Early reperfusion 2.1%

Conclusions:
“... The early restoration of arterial flow to the pelvis and lower limbs, and aggressive peri-operative management significantly reduces SCI following type I-III TAAA endovascular repair.”
Uni femoral approach for FEVAR

Preloaded device

No contralateral limb access used!

Maurel et al. J Vasc Surg 2017
# OSR results

TAAA endo repair: 46 cases

<table>
<thead>
<tr>
<th></th>
<th>30-day Results</th>
<th>6 month</th>
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<tbody>
<tr>
<td><strong>Clinical success</strong></td>
<td>33 (75%)</td>
<td>40 (90.9%)</td>
</tr>
<tr>
<td><strong>Related Mortality</strong></td>
<td>3 (6.5%)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Un-related Mortality</strong></td>
<td>0</td>
<td>3 (10.0%)</td>
</tr>
<tr>
<td><strong>Type I-III Endoleak</strong></td>
<td>8 (17.4%)</td>
<td>1 (3.4%)</td>
</tr>
<tr>
<td><strong>Endo reintervention</strong></td>
<td>0</td>
<td>7 (10.3%)</td>
</tr>
<tr>
<td><strong>Stroke</strong></td>
<td>1 (2.2%)</td>
<td>1 (2.2%)</td>
</tr>
<tr>
<td><strong>Permanent SCI</strong></td>
<td>2 (4.3%)</td>
<td>-</td>
</tr>
<tr>
<td><strong>Temporary SCI</strong></td>
<td>3 (6.5%)</td>
<td>-</td>
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New perspectives
Misace & PAPAartis

Spinal cord preconditioning with intercostal and lumbar arteries
preoperative embolization
Conclusion
Conclusion

- Incidence spinal cord ischemia not negligible
- Tailor the procedure to the single patient risk factors
- Multistaged approach and early limb reperfusion
- Role of MISACE to be evaluated