Acute Renal Failure is more common after Open repair for RAAAs than after EVAR

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Disclosures
• Research Support
  o Medtronic, Cook
• Speaker
  o WL Gore

Introduction
• Ruptured AAA (rAAA) continues to carry very high mortality
• Renal impairment following successful rAAA repair:
  o Common
  o Multifactorial
• Evidence that renal outcomes may differ between open repair and EVAR

Aim
• Assess incidence and outcomes of acute kidney injury following ruptured AAA repair

Acute kidney Injury (AKI)
• Many definitions
• RIFLE classification (Risk; Injury; Failure; Loss; End-stage) now widely used, but not ideal
• The Aneurysm Renal Injury Score (ARISe) classification modifies RIFLE to suit post-operative AAA patients*

ARISe

<table>
<thead>
<tr>
<th>Score</th>
<th>Definition</th>
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<tbody>
<tr>
<td>1</td>
<td>Rise in serum creatinine &gt; 26μmol/L but &lt; 50% increase from baseline or urine output &lt; 0.5mL/kg/h for 6 hours within 7 days</td>
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<tr>
<td>2</td>
<td>Rise in baseline serum creatinine 50-99% within 7 days</td>
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<tr>
<td>3</td>
<td>Rise in baseline serum creatinine ≥ 100% within 7 days</td>
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<tr>
<td>4</td>
<td>Requirement for temporary renal replacement therapy</td>
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<tr>
<td>5</td>
<td>Permanent renal replacement therapy</td>
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</tbody>
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* J Endovasc. Ther 2013;20:331-333
Methods

- Analysis of prospectively collected database over eight year period: 2006-14
- Acute kidney injury subdivided into 3 categories:
  - Mild/moderate: ARISe ≤ 2
  - Severe: ARISe ≥ 3
  - Requiring RRT (ARISe ≥ 4)

Demographics

- 205 patients treated for RAAA, 125 open, 80 EVAR
- EVAR patients slightly older (77 yrs vs. 74 yrs P = 0.02)
- No difference in pre-operative creatinine (mean 144μmol/L)
- Median length of stay 12 days (IQR 6-25 days)
  - EVAR 8.5 days (IQR 5-16.5 days)
  - Open 14 days (IQR 7-27 days) p < 0.01

Mortality

- 30-day mortality 22%
  - EVAR 16%
  - Open 25%
  - Adjusted P=0.03
- 12 month mortality 31%
  - EVAR 29%
  - Open 32%

Renal outcomes

- 36% severe acute kidney injury
  - EVAR 26% vs Open 43% (Adjusted p < 0.01)
- 31% required RRT
  - EVAR 23% vs Open 36% (Adjusted p = 0.03)
- High pre-operative creatinine strongly associated with severe acute kidney injury or need for RRT (P < 0.01)

Length of stay following AKI

- Patients suffering severe AKI had significantly prolonged LOS:
  - ARISe < 3: Median 10 days (IQR 7-18)
  - ARISe ≥ 3: Median 26 days (IQR 13-40)
  - Requiring RRT: Median 25 days (IQR 11-44)
  - P < 0.01 for both comparisons

Survival following AKI

- Mid-term survival following severe AKI reduced
- 12 months
  - ARISe < 3: 13%
  - ARISe ≥ 3: 44%
Survival following AKI

- Mid-term survival following severe AKI reduced
- 12 months
  - ARISe < 3: 13%
  - ARISe ≥ 3: 44%
  - Requiring RRT: 52%
- Adjusted P < 0.01 for both comparisons

Conclusions

- Acute kidney injury is common following rAAA repair
- Open repair is associated with higher incidence of severe AKI than EVAR
- AKI strongly associated with mid-term survival
- Early RIT may have a role in improving outcomes and warrants further study