AAA-repair in patients with chronic renal insufficiency: EVAR or Open Repair

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Disclosures:

**Consultant:** Bolton Medical/ Medtronic/ Biotronik/ W.L. Gore/ Aptus/ Cordis/ Jotec/ C.R. Bard/ iVascular/ Lombard Medical

**Proctor:** Cook Medical/ Bolton Medical/ Medtronic/ W.L. Gore/ Aptus/ Cordis/ iVascular
1. Background

2. OR vs EVAR in patients with renal insufficiency

3. How to reduce renal damage during EVAR

4. Summary
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4. Summary
“Pre-operative renal function is a major determinant of outcome from AAA repair, whether by open or endovascular repair”.

All patients must have serum creatinine measured and eGFR estimated preoperatively. **Level 2c, Recommendation C.**
AAA Surgical Risk Scores

Evaluation of five risk prediction models for elective abdominal aortic aneurysm repair using the UK National Vascular Database

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EVAR vs OR
Three different scenarios

A. Patients without end stage renal failure
B. Patients with chronic renal disease
C. Long term renal function after AAA repair
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A. Patients without end stage renal failure
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OR vs EVAR (Retrospective cohort study)
6516 Nationwide AAA patients without end stage of renal failure or dialysis

EVAR was associated with a lower risk of postprocedural acute renal failure
Table II. Univariate and multivariate predictors of postprocedure acute renal failure among patients undergoing abdominal aortic aneurysm repair

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Number of admissions (n = 6516)</th>
<th>Unadjusted OR (95% CI)</th>
<th>Adjusted OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Endovascular repair (%)</td>
<td>2651 (40.7)</td>
<td>0.41 (0.33-0.52)</td>
<td>0.42 (0.33-0.53)</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Youngest quartile (23-67)</td>
<td>1688 (25.9)</td>
<td>1.28 (0.90-1.81)</td>
<td>1.18 (0.84-1.67)</td>
</tr>
<tr>
<td>Second quartile (68-73)</td>
<td>1697 (26.0)</td>
<td>1.87 (1.34-2.60)</td>
<td>1.61 (1.16-2.24)</td>
</tr>
<tr>
<td>Third quartile (74-78)</td>
<td>1646 (25.3)</td>
<td>1.90 (1.40-2.59)</td>
<td>1.76 (1.27-2.43)</td>
</tr>
<tr>
<td>Fourth quartile (79-94)</td>
<td>1485 (22.8)</td>
<td>1.38 (1.10-1.73)</td>
<td>1.24 (0.98-1.56)</td>
</tr>
<tr>
<td>Female gender (%)</td>
<td>1279 (19.6)</td>
<td>6.24 (4.91-7.94)</td>
<td>5.78 (4.49-7.43)</td>
</tr>
<tr>
<td>Chronic kidney disease (%)</td>
<td>520 (8.0)</td>
<td>2.72 (2.12-3.50)</td>
<td>2.31 (1.79-2.99)</td>
</tr>
<tr>
<td>Congestive heart failure (%)</td>
<td>639 (9.8)</td>
<td>1.34 (1.08-1.66)</td>
<td>1.11 (0.88-1.38)</td>
</tr>
<tr>
<td>Chronic lung disease (%)</td>
<td>2233 (34.3)</td>
<td>2.08 (0.82-5.25)</td>
<td>2.20 (0.79-6.08)</td>
</tr>
<tr>
<td>Chronic liver disease (%)</td>
<td>58 (0.9)</td>
<td>0.90 (0.64-1.27)</td>
<td>0.88 (0.62-1.26)</td>
</tr>
<tr>
<td>Diabetes mellitus (%)</td>
<td>757 (11.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital type* (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>391 (6.0)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Urban nonteaching</td>
<td>2,548 (39.1)</td>
<td>0.75 (0.51-1.08)</td>
<td>0.64 (0.43-0.96)</td>
</tr>
<tr>
<td>Urban teaching</td>
<td>3,574 (54.9)</td>
<td>0.76 (0.52-1.10)</td>
<td>0.76 (0.51-1.13)</td>
</tr>
<tr>
<td>Hospital volume (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>700 (10.7)</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>High</td>
<td>5,816 (89.3)</td>
<td>0.77 (0.56-1.06)</td>
<td>0.96 (0.69-1.35)</td>
</tr>
</tbody>
</table>

OR, Odds ratio; CI, confidence interval.

*Hospital type not available for 3 admissions.
EVAR vs OR

Three different scenarios

A. Patients without end stage renal failure
B. Patients with chronic renal disease
C. Long term renal function after AAA repair
National registry
8701 matched AAA patients with CKD (5811 EVAR vs 2890 OR)

OR was associated with higher mortality and morbidity

Table V. Postoperative outcomes of propensity-matched patients with mild vs severe chronic kidney disease (CKD) undergoing endovascular (EVAR) and open (OAR) abdominal aortic aneurysm (AAA) repair

<table>
<thead>
<tr>
<th>Variable</th>
<th>EVAR (1:2 match, n = 1116)</th>
<th>OAR (1:2 match, n = 569)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mild (n = 746)</td>
<td>Severe (n = 370)</td>
</tr>
<tr>
<td>30-day mortality</td>
<td>2.6</td>
<td>5.7</td>
</tr>
<tr>
<td>Any complication</td>
<td>10.6</td>
<td>19.2</td>
</tr>
<tr>
<td>Wound complications</td>
<td>2.9</td>
<td>3.8</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>2.3</td>
<td>2.8</td>
</tr>
<tr>
<td>Ventilation &gt;48 hours</td>
<td>2.6</td>
<td>4.9</td>
</tr>
<tr>
<td>Acute renal failure</td>
<td>0.9</td>
<td>6.2</td>
</tr>
<tr>
<td>Stroke</td>
<td>0.5</td>
<td>1.6</td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td>0.7</td>
<td>1.1</td>
</tr>
<tr>
<td>Cardiac arrest</td>
<td>0.7</td>
<td>1.9</td>
</tr>
<tr>
<td>Bleeding (&gt;4 units transfused)</td>
<td>0.7</td>
<td>1.9</td>
</tr>
<tr>
<td>Sepsis</td>
<td>1.5</td>
<td>3.2</td>
</tr>
<tr>
<td>Shock</td>
<td>1.2</td>
<td>3.2</td>
</tr>
</tbody>
</table>

Data are presented as percentage of the patients.

Values of P < .05 are statistically significant.
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Comparison of the effects of open and endovascular aortic aneurysm repair on long-term renal function using chronic kidney disease staging based on glomerular filtration rate

Joseph L. Mills Sr, MD, Son T. Duong, MD, Luis R. Leon Jr, MD, Kaoru R. Goshima, MD, Daniel M. Ihnat, MD, Christopher S. Wendel, MS, and Angelika Gruessner, MS, PhD, Tucson, Ariz

OR vs EVAR (Retrospective cohort study)
223 AAA patients from two centers

• OR was associated with significant acute fall in GFR
• EVAR was associated with a worse Renal function in the long-term follow-up

Overall

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Renal protection during EVAR

- Preop. endovenous volume expansion
- Iso- and low-osmolar contrast election
- CO₂-angiography
- Wire and bone land-markers
- IVUS
- FUSION-overlapping technique
- Best endograft choice
- CEUS for surveillance rather than angioTC
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EVAR is not contraindicated in CKD patients

OR is associated with higher mortality and morbidity in CKD patients

There are some renal protective procedures

Avoid angio CT during follow-up. Switch to Duplex exam (color or CEUS)
ACTUALIDAD DE LOS TEMAS CLAVE Y MÁS ALLÁ
STATUS UPDATE ON KEY POINTS & BEYOND

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