Cost effectiveness analysis of FEVAR vs. CHEVAR in juxtarenal aortic aneurysms

A new insight in the old debate

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Disclosure

Speaker name:
Konstantinos P. Donas

I have the following potential conflicts of interest to report:

- [ ] Consulting
- [ ] Employment in industry
- [ ] Stockholder of a healthcare company
- [ ] Owner of a healthcare company
- [ ] Other(s)

- [x] I do not have any potential conflict of interest
January 1977 and December 2017: 5664 patients in 87 papers
The role of open and endovascular treatment with fenestrated and chimney endografts for patients with juxtarenal aortic aneurysms

Konstantinos P. Donas, MD, PhD, Markus Eisenack, MS, Giuseppe Panuccio, MD, PhD, Martin Austermann, MD, PhD, Nani Osada, PhD, and Giovanni Torsello, MD, PhD, Münster, Germany

Objective: To present endovascular techniques in the treatment of juxtarenal aortic aneurysms (JAAAs) in relation to surgical repair; this is the “gold standard.”

Methods: Between January 2008 and December 2010, 90 consecutive patients were diagnosed with primary degenerative JAAAs (≥5.0 cm) and assigned prospectively to different operative strategies on the basis of morphologic and clinical characteristics. In particular, 59 patients were treated by endovascular means such as fenestrated endovascular abdominal aortic repair (f-EVAR, n = 29) or chimney endovascular abdominal aortic repair (ch-EVAR, n = 30) endografting, and 31 patients underwent open repair (OR, n = 31).

Results: Early procedure-related and all-cause (30-day) procedure-related mortality was 0% for the endovascular group and 6.4% (n = 2/31) for the OR group, due to systemic inflammatory response syndrome with consecutive multi-organ failure (P = .023). Persistent postoperative hemodialysis occurred only after OR (2/31; 6.4%). The overall estimated pre- and postoperative median estimated glomerular filtration rate and creatinine values were similar in the three subgroups. There was one left renal artery occlusion for each endovascular subgroup, which presented as flank pain and was treated by iliaco-renal bypass in both cases. Transfusion requirements and length of hospital stay were significantly less in the endovascular group (P = .014 and P = .004, respectively).

Conclusions: Endovascular treatment of JAAA is a safe alternative for the short-term management of JAAA. (J Vasc Surg 2012;56:285-90.)
Acceptable risk for open repair
Young patient (< 68 y)  yes  open repair
Accessory polar renal arteries

No

→ EVAR

→ symptomatic or rapid eccentric growth (>0.5 cm/annually), presence of at least 15mm neck distance between the target vessel and the lower upper aortic side branch, patent left subclavian artery, absence of severe kinking of the descending aorta or extensive thrombus in the aortic arch and juxtarenal segment, involvement of less than 2 aortic side branches

No

→ f-EVAR

→ yes  Chimney
Cost-effectiveness analysis of chimney/snorkel versus fenestrated endovascular repair for high-risk patients with complex abdominal aortic pathologies

Gergana T. TANEVA ¹ *, Konstantinos P. DONAS ¹, Georgios A. PITOULIAS ², Martin AUSTERMANN ¹, Frank J. VEITH ³, Giovanni TORSELLO ¹
<table>
<thead>
<tr>
<th>Characteristics</th>
<th>F-EVAR (N=37)</th>
<th>Ch-EVAR (N=111)</th>
<th>P value</th>
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<tr>
<td>Cook fenestrated endograft</td>
<td>37</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Endurant II abdominal endograft</td>
<td>–</td>
<td>111</td>
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<tr>
<td>Previous MI</td>
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<td>0.211</td>
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<td>32</td>
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<tr>
<td>Type I endoleak</td>
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<td>0.023</td>
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<td>Mean stented vessels</td>
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<td>1.4±0.5</td>
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Estimation of the costs

SFH financial control department
## Costs Analysis

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</thead>
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<tr>
<td>Hospital stay of primary OP, days</td>
<td>9.0 (9.6-12.4)</td>
<td>8.0 (8.6-11.4)</td>
<td>0.956</td>
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<td>Cost of primary OP, euros</td>
<td>42,116 (40,678-45,071)</td>
<td>22,171 (23,563-27,936)</td>
<td>&lt;0.001*</td>
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</table>

40 months
<table>
<thead>
<tr>
<th>Case</th>
<th>Cause for reintervention</th>
<th>Procedure</th>
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<td>F-EVAR</td>
<td>80% in-stent stenosis of SMA bridging device</td>
<td>Endolining (Advanta, Getinge Maquet, Mijdrecht, the Netherlands and Viabahn, Gore, Flagstaff, AZ, USA)</td>
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<td>Case 2</td>
<td>80% in-stent stenosis of LRA bridging device, left CIA stenosis</td>
<td>Endolining of the LRA (two Advanta), CIA stenting (SMART, Cordis, Fremont, CA, USA)</td>
</tr>
<tr>
<td>Case 3</td>
<td>Type Ic endoleak from LRA bridging device</td>
<td>Endolining (LifeStream, Bard Medical, Covington, GA, USA)</td>
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</tbody>
</table>

| Case 1 | Occlusion of both chimney (LifeStream, Bard Medical, Covington, GA, USA) in RRA and LRA Migration of the aortic stent graft without evidence of type IA endoleak* | Recanalization of LRA and deployment of a second bare-metal stent (Hippocampus, Medtronic, Minneapolis, MN, USA) Fixation of the Endograft with 7 Endoanchors (Aptus, Medtronic, Minneapolis, MN, USA) |
| Case 2 | Occlusion left RA chimney                                                    | Thrombectomy (Penumbra, CA, USA), DCB angioplasty and endolining (Viabahn, Gore, Flagstaff, AZ, USA) |
| Case 3 | Type I + II endoleak                                                         | Onyx embolization and coiling (Axium, Medtronic, Minneapolis, MN, USA)     |
| Case 4 | Occlusion of RRA chimney                                                     | Unsuccessful endovascular recanalization                                   |
| Case 5 | Occlusion LRA lined chimney (Advanta, Getinge Maquet, Mijdrecht, the Netherlands with Viabahn, Gore, Flagstaff, AZ, USA) | Thrombectomy (Penumbra, CA, USA), endolining (VBX, Gore, Flagstaff, AZ, USA) |

*Case 1 received a second reintervention.

mesenteric artery; CIA: common iliac artery; DCB: drug-coated balloon.
FEVAR Reinterventions
Visceral stent patency in fenestrated stent grafting for abdominal aortic aneurysms

Frederike A
Foppe Bekl
Groningen

Objective: Few studies have evaluated the use of fenestrated stent grafts for treating abdominal aortic aneurysms. The aim of this study was to analyze the outcomes of fenestrated endovascular aneurysm repair (FEVAR) at an academic center.

Methods: All patients who received FEVAR between January 2009 and December 2011 were reviewed. Patients with thoracic, renal, visceral, or iliac artery aneurysms were included. All patients were examined as per the European Aneurysm Device Evaluation criteria. In brief, technical success was defined as the absence of any aneurysmal enlargement at follow-up. Clinical success was defined as the absence of symptoms related to the aneurysm or any other complication.

Results: A total of 128 patients underwent FEVAR, with a mean follow-up of 4 years. Renal aneurysms were treated in 47 patients (37%); 92.4% of these aneurysms were successfully treated. Of these, 10% of renal aneurysms were associated with visceral stenosis (9.4%), of which 10% of patients underwent an operation for occlusion or stenosis (P < .01).

Conclusions: Patency rates of visceral artery stent grafts in FEVAR were 95.7% at 1 year and 88.6% at 4 years. Patency rates were affected by stent fractures, which occurred more in uncovered compared with covered stents. Renal artery stent stenosis occurred more in uncovered compared with covered stents. Renal dysfunction was significantly associated with renal stent occlusion or stenosis. (J Vasc Surg 2014;59:298-306.)

Fig 5. Fractured uncovered stent in superior mesenteric artery (SMA) of 72-year-old man. Since the patient had no abdominal complaints, no intervention was performed.
CHEVAR Reinterventions
CHEVAR Reinterventions

- Kidney function: 38.7%
- TER Clearance: 77.5 ml/min/1.73sqm
Total costs with reinterventions

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<td>42,128 (41,160-45,863)</td>
<td>22,872 (23,997-28,475)</td>
<td>&lt;0.001*</td>
</tr>
</tbody>
</table>
Conclusions

Incidence of reinterventions between FEVAR and CHEVAR is comparable ($p > 0.05$)

Reinterventions of FEVAR are associated with bridging-device complications

Reinterventions of CHEVAR are caused by inadequate planning and are related to persistent gutters or chimney grafts occlusions
Conclusions

CHEVAR is significantly cost-effective technique compared to FEVAR
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