ARR3.
Left Subclavian Artery Coverage During Endovascular Thoracic Aortic Repair and Risk of Perioperative Stroke or Death
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Objectives: Anatomic factors may dictate left subclavian artery (LSA) coverage during endovascular thoracic aortic repair (TEVAR); associations between LSA coverage, stroke, and death are inconsistent in published reports. We examined the 2005-2008 ACS-NSQIP data file to determine perioperative risk of stroke or death after LSA coverage.

Methods: TEVAR procedures, LSA coverage, and subclavian revascularization were identified by CPT codes. Patients with simultaneous coronary, ascending or abdominal aortic, or non-vascular abdominal procedures were excluded. Associations between LSA coverage and 30-day stroke and mortality were examined with logistic regression. Effects of subclavian revascularization with LSA coverage were assessed with Fisher’s exact test.

Results: From 862 identified TEVAR procedures, 53 patients were excluded and 809 formed the basis of this analysis. 279 procedures (38%) included LSA coverage; subclavian revascularization was performed in 53 (7%). 30-day stroke and mortality rates were 5.2% and 7.1%. In multivariate models, LSA coverage was associated with perioperative stroke (OR 2.4; 95% CI 1.2-4.5; p = 0.009) and death (OR 1.9; 95% CI 1.0-3.6; p = 0.042). Subclavian revascularization was not associated with decreased stroke or mortality in patients undergoing LSA coverage.

Conclusions: LSA coverage is associated with increased risk of perioperative stroke and death; no protective subclavian revascularization effect was observed.

Multivariate predictors of stroke and mortality. Univariate p < 0.10 for all displayed covariates.

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Covariate</th>
<th>OR (95% CI)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stroke</td>
<td>Emergent procedure</td>
<td>3.10 (1.46-6.58)</td>
<td>0.003</td>
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<td>Left subclavian artery coverage</td>
<td>2.36 (1.24-4.49)</td>
<td>0.009</td>
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<tr>
<td>Mortality</td>
<td>Age (years)</td>
<td>1.46 (1.02-2.10)</td>
<td>0.041</td>
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<td>WBC (1000/mL3)</td>
<td>1.35 (1.04-1.74)</td>
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<td></td>
<td>Emergent procedure</td>
<td>2.23 (1.08-4.58)</td>
<td>0.030</td>
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<td></td>
<td>Units PRBC transfused</td>
<td>1.26 (1.15-1.38)</td>
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<td>Left subclavian artery coverage</td>
<td>1.92 (1.02-3.61)</td>
<td>0.042</td>
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</tbody>
</table>

RR4.
Sideways Movement of the Endograft Within the Aneurysm Sac Is Associated With Late Adverse Events
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Objectives: Previous studies have shown the importance of proximal and distal endograft fixation. There is little information on the middle, unsupported section of the endograft. We have quantified sideways movement of the endograft within the AAA sac and correlated it to late adverse events.

Methods: Patients who underwent EVAR between January 1997 and December 2007 were analyzed. Patients with a digital available preoperative CT-angiography (CTA), postoperative CTA and at least one follow-up CTA thereafter were included. Changes in endograft position within the AAA sac were measured. Patients with sideways movement ≥5mm were placed in the movement group (MG) and were compared with patients with no movement (<5mm, NM group). To analyze the association of sideways endograft movement and EVAR related complication the following outcome measures were noted: AAA rupture, AAA-related death, conversion, secondary procedures, AAA growth (≥5mm), proximal migration (≥10mm), and new onset type 1/3 endoleaks.

Results: 144 patients (mean age 76 year) were included. Follow-up was 43 ± 27 months. Fifty patients (35%) had sideways endograft movement. AAA diameter (MG 60 ± 9 vs NM 57 ± 9mm, p < 0.05), and proximal and iliac endograft fixation lengths were significantly different between the groups (MG 18 ± 8 vs NM 25 ± 11mm, p < 0.05 and MG 35 ± 15 vs NM 42 ± 16mm, p < 0.05). There was no significant difference between the groups in terms of AAA rupture and AAA-related death (one fatal AAA rupture, NM group). Patients in the MG group had a significantly higher conversion rate (14 vs 0%, p < 0.001) and had more secondary procedures (44 vs 6%, p < 0.001). Patients in the MG had significantly more AAA growth (42 vs 10%, p < 0.001), more proximal migration (66 vs 5%, p < 0.001) and more often type 1/3 endoleaks (36 vs 3%, p < 0.001).

Conclusions: Sideways movement of the device within the AAA sac is associated with late adverse events. Con-
versely, lack of movement is correlated with long-term success.

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**RR5.**

**Continued Favorable Results With Type IV Thoracoabdominal Aortic Aneurysm Repair**

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**Objectives:** Type IV (T4) thoracoabdominal aneurysm repair despite low risk of spinal cord ischemia (SCI) is reported to have significant morbidity and mortality. This study evaluated clinical outcomes to identify predictors of major morbidity in T4 repair.

**Methods:** All T4 repairs at MGH from 1/89 - 9/09 were evaluated with respect to clinical features, technical operative details and 30-day outcomes. Logistic regression identified predictors of morbidity and survival was assessed using Kaplan-Meier.

**Results:** 179 patients underwent T4 repair with elective repair in 156 (87%) and urgent in 23 (13%). All operations were conducted with clamp/sew technique and routine hypothermic renal perfusion. Clinical features were age 73 ± 8, male 113 (63%), prior CVA 23 (13%), CAD 90 (50%) and Cr > 1.8 (CRI) 26 (15%). Aneurysm (size 6.2 ± 1.1 cm) pathology was degenerative in 174 (97%). Operative reconstruction consisted of a beveled proximal anastomosis incorporating the celiac, SMA, and right renal arteries origins (visceral clamp 35 ± 11 min) and a side-arm graft to the left renal artery in 166 (93%). Technical details included previous AAA repair in 52 (29%), OR time 290 ± 90 min, EBL 2.4 ± 1.4 l and spleenectomy 56 (31%). 30-day outcomes were mortality 5 (2.8%), MI 5 (2.8%), pulmonary 30 (17%), any renal comp. 36 (20%), hemodialysis 5 (2.8%) and SCI 4 (2.2%). Univariate predictors of complications included eGFR (p = 0.02) and CRI (p = 0.02), while CVA (p = 0.02), visceral clamp time (p = 0.04) and any complication (p < 0.01) predicted 30-day mortality. History of CRI independently predicted postoperative complication or death (OR 3.0 [95% CI: 1.6-8.8]). One-, five- and ten-year survival rates were 89 ± 2%, 64 ± 4% and 35 ± 5%, respectively. Post-operative SCI increased long-term mortality (OR 17 [95% CI: 3.6-83]).

**Conclusions:** T4 TAA repair is associated with favorable perioperative results. The evident significance of CRI should figure prominently in clinical decision making. Patients who survive the physiologic stresses of repair have favorable long-term survival.

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**RR6.**


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**Objectives:** Although EVAR is reputable as affording superior perioperative and mid-term survival than OSR, approximately 50% of AAAs are anatomically unsuitable for EVAR using contemporary devices. We aim to gauge extending use of current commercially-available devices for pararenal AAAs compared to the current standard OSR. Primary Endpoints were aneurysm related survival and cost per Quality-Adjusted-Life Years (QALY).

**Methods:** From 2002-2009, 1868 patients with AAA were seen at our unit. 118 patients had intervention for pararenal AAAs which were reported by consultant radiologists as ‘unsuitable for EVAR’. 66 of these had OSR and 52 had PEVAR. The PEVAR group was older (74.3 years vs 70.9 years, p = 0.004) with significantly higher mean SVS co-morbidity scores (p = 0.002) and Kertai Probability Indices (p = 0.004). All procedures were done within 14 days of diagnosis. Mean aneurysm diameter was significantly higher for PEVAR (7.9cm vs 6.2cm, p = 0.002). 83% of PEVAR endografts were 36mm diameter. All OSR were done with diagonal proximal clamp, preserving flow to the highest renal artery. Renal arteries were re-implanted in five cases and the IMA once.

**Results:** 5-year aneurysm-related survival rates were higher with PEVAR (98% vs 92.4%, P>0.05), although this did not reach statistical significance. 5-year freedom from secondary intervention was similar between PEVAR (88.7%) and OSR (98%, P>0.05). 5-year all-cause survival was also statistically similar (PEVAR, 44.2% vs OSR 80.4%, p = 0.155). 5-year intervention-free survival was shy of significance with PEVAR (48.5%) vs OSR (76.8%, p = 0.0503). 30-day morbidity (p < 0.0002), Length of hospital stay (p < 0.0005), 5-year Q-TWiST (p < 0.01) and cost per QALY (p < 0.01) were all significantly reduced with PEVAR vs OSR.

**Conclusions:** Endografts can be effectively used to treat difficult pararenal AAAs with acceptable long-term aneurysm-related survival and enhanced cost per QALY and reduced perioperative morbidity, mortality and waiting time from diagnosis to treatment.

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