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A Cost and Outcome Analysis of Endovascular vs Open Repair of Blunt Traumatic Aortic Injuries

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Background: Aortic injury is the second most common cause of death after blunt trauma. Thoracic endovascular aortic repair (TEVAR) has been rapidly adopted as an alternative to the traditional open repair (OR) for treatment of traumatic aortic injury (TAI). This paradigm shift has improved the outcomes in these patients. The purpose of this study is to evaluate the inpatient cost and outcomes of TEVAR compared to OR for patients with TAI.

Methods: We analyzed prospectively collected data from the institutional trauma registry between April 2002 and June 2010. These data were supplemented with a retrospective review of hospital financial accounts. Primary outcomes were mortality and total hospital charges. Secondary outcomes included major complications, intensive care unit (ICU), preoperative, postoperative, and total hospital length of stay (LOS). Univariate analysis was performed for comparison of outcomes and cost. Logistic regression was used to compare the rates of complications. Wilcoxon rank sum test was used to compare the median cost of the treatments.

Results: One hundred and six (106) consecutive patients (74 male, mean age 36.4 years) underwent OR (n = 56) and TEVAR (n = 50) for treatment of TAI. Detailed data are shown in the Table. The proportion of patients who underwent TEVAR compared to OR increased from 0% to 100% during the study period. The TEVAR patients were significantly older than the OR patients. There was no significant difference in the injury severity score (ISS), mortality, stroke, paraplegia, total LOS, ICU LOS, or median hospital cost. The incidence of uninsured patients was similar in both groups. Due to a policy of delayed selective management, the preoperative LOS was significantly higher for TEVAR. The rate of complications was significantly higher for OR. For patients who underwent OR, the estimated relative risks (95% CI) of mortality and complications were 2.23 (0.45, 11.00), and 1.79 (1.23, 2.84), respectively. Our findings were not impacted when the comparisons were made adjusted for age.

Variable	*OR (N = 56)*	*TEVAR (N=50)*	P *value*
Male N (%)	39 (69.6)	35 (70.0)	1.00
Age mean (SD)	32.16 (14.23)	41.06 (20.32)	**.012**
ISS mean (SD)	37.96 (9.98)	36.68 (9.81)	.51
Mortality N (%)	5 (8.9)	2 (4.0)	.44
Stroke N (%)	0 (0.0)	1 (2.0)	.48
Paraplegia N (%)	0 (0.0)	0 (0.0)	1.00
Total LOS mean (SD)	33.49 (29.08)	27.74 (23.83)	.27
Pre-op LOS mean (SD)	2.77 (6.38)	11.14 (18.51)	**<.0001**
Post-op LOS mean (SD)	29.73 (28.56)	16.88 (13.61)	**.0035**
ICU LOS mean (SD)	19.80 (21.57)	16.94 (16.39)	.44
Complications N (%)	32 (57.14)	16 (32.00)	**.012**
Total charges median	$85,379	$86,431	.64
Un-insured N (%)	17(30.36)	14(28.00)	.68

Conclusions: Compared to OR, patients who underwent TEVAR, despite being older, had a significant reduction in complications. Although the observed mortality rate for OR was at least twice that of TEVAR (8.9% vs 4.0%), the difference was not found to be statistically significant. The median cost of TEVAR was not significantly different compared to OR.

Long-Term Secondary Procedures after Aneurysm Repair: Is EVAR Really Worse than Open Repair

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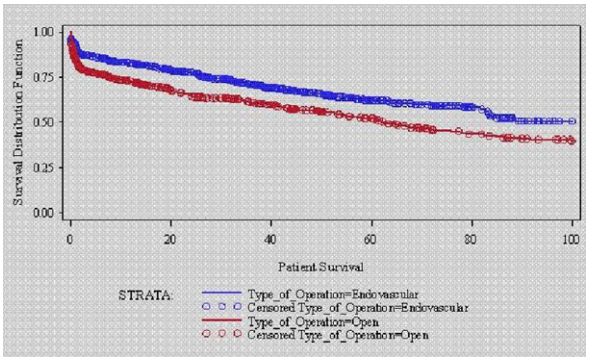
Background: Since the development of endovascular repair (EVAR) of abdominal aortic aneurysm (AAA), there remains concerns regarding its durability, need for secondary procedures, and associated long-term morbidity. We compared these two approaches to evaluate their respective long-term durability.

Methods: All patients who had undergone endovascular and open AAA repair were identified from a prospectively maintained registry. Health system charts, medical communication, and national death indices were reviewed. Secondary interventions were classified as vascular (aortic graft or remote) and nonvascular (incisional or gastrointestinal).

Results: Between July 1985 and August 2009, 1923 patients underwent 1990 AAA repair procedures (EVAR = 1064; Open = 926). Patients were followed up to 290 months (mean 27.6 ± 35.9) and identified with 420 surgical encounters (EVAR 224%-21.1%; Open 196%-21.2%). Most (323%-76.9%) encounters were related to vascular disease: 173 (EVAR = 128; Open = 45) were related to the aortic graft; 150 (EVAR = 96; Open = 54) were related to nonaortic vascular disease. The remaining 97 (23.1%) surgical encounters included incisional hernias, small bowel obstruction, intrabdominal abscesses, and wound dehiscence requiring operation. Of these 97 (EVAR - 0, Open - 97) encounters, 65 required surgical intervention, 14 required hospitalization, and 18 required outpatient only consultation. By survival analysis for a period of 100 months, all-cause mortality rate was 24.5% after EVAR and 38.8% after open repair. One-year survival was 83.6% (±1.22) and 72.4% (±1.76), while 5-year survival was 63.6% (±2.17) and 51.9% (±2.41) for EVAR and open repair, respectively (log-rank *P* value <.0001).

Conclusions: EVAR patients require more late secondary vascular interventions than open AAA repair, but patients who undergo open repair have more nonvascular long-term morbidity. Long-term survival is better after EVAR compared to open repair in this selected patient group.



National Utilization and Outcome of Carotid Artery Revascularization in Octogenarians

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Background: The benefits of carotid endarterectomy (CEA) and carotid artery angioplasty and stenting (CAS) in octogenarians remain unclear. Octogenarians were excluded from seminal CEA trials. CAS may have increased complications in this patient cohort. The objective of this study was to examine the national utilization and outcome of CEA and CAS in octogenarians.

Methods: The Nationwide Inpatient Sample (2004-2005) was utilized. ICD-9 codes were used to identify CEA and CAS cases. Outcomes included in-hospital stroke and death. Comparisons were performed between older and younger patients. Analysis was performed among octogenarians to identify whether improved outcomes were noted with either procedure.

Results: A total of 54,658 cases were analyzed; 10,826 were in octogenarians (19.8%). Octogenarians who underwent carotid procedures were more likely to be female (45.6% vs 41.5%, $P < .001$) and to die in the hospital (1.0% vs 0.6%, $P < .001$) than younger patients who underwent carotid procedures. There were no overall differences in the prevalence of preoperative symptoms (5.4% vs 5.3%), the use of CAS as opposed to CEA (6.0% vs 5.8%), or the overall rate of periprocedural stroke (1.1% vs 1.1%) between octogenarians and younger patients. However, asymptomatic oc-