In direct comparison with small AAAs, medium (*P* = .39) and large (*P* < .001) groups both required secondary intervention more frequently, with hazard ratios of 2.32 (95% confidence interval, 1.045-5.156) and 4.74 (95% confidence interval, 2.115-10.637), respectively. Overall 10-year survival was 72% in the small, 63.1% in the medium, and 49.8% in the large group (*P* < .001) with no known AAA-related deaths. Age-adjusted all-cause mortality differed significantly among the group aged 75 to 84 years (30.4% small, 51.6% medium, 55.7% large; *P* = .017).

Conclusions: EVAR for small AAAs demonstrates improved long-term outcomes when compared with EVAR for medium and large AAAs. These data suggest that EVAR for AAAs ranging from 4 to 5 cm may have better outcomes than EVAR for age-matched patients with larger aneurysms.

Percutaneous Endovascular Repair of Juxtarenal Aortic Aneurysm Using Customized Cook Zenith Fenestrated Stent Graft

Mateus P. Correa, Gustavo S. Oderich. Mayo Clinic, Rochester, Minn

Introduction: Fenestrated endovascular aortic repair (FEVAR) has been used with increasing frequency to treat juxtarenal aortic aneurysms. We present the preoperative planning, stent graft design, and technique of implantation of a Cook Zenith (Cook Inc, Brisbane, Australia) customized fenestrated stent graft in an 80-year-old woman with an enlarging 6-cm juxtarenal aortic aneurysm.

Methods: Computed tomography angiography (CTA) with centerline of flow analysis was used for measurements, and a customized stent graft was designed with two 6- × 8-mm renal artery fenestrations. Under general anesthesia, bilateral percutaneous transfemoral access was established with placement of preclosure sutures. After systemic heparinization, a 20F sheath was introduced via the right transfemoral approach. The sheath valve was punctured for placement of selective catheters to locate both renal arteries. The Cook Zenith fenestrated component was oriented extracorporeally, introduced, and deployed via the left transfemoral approach. The renal arteries were accessed through the renal fenestrations, and 7F hydrophilic sheaths were placed over 0.035-inch Rosen wires. A diameter-reducing wire, which constrained the device, was removed, the uncovered stent was deployed, and the top cap was retrieved. The proximal neck was balloon dilated. Renal alignment stents were deployed and flared proximally using 10-mm angioplasty balloons. Selective renal arteriographies showed widely patent renal arteries with no endoleak. The repair was completed with deployment of a distal bifurcated component via the left transfemoral approach and a right iliac limb extension. Completion angiography showed widely patent target vessels, stent grafts, and iliac arteries without endoleak. Total contrast volume was 62 mL, fluoroscopy was 40 minutes, and operating time was 82 minutes. The patient was dismissed home the next day without complications, and a CTA showed no endoleak or stent graft complications in 18 months of follow-up.

Conclusions: Customized fenestrated stent grafts have expanded the indications of endovascular repair to include patients with inadequate infrarenal aortic neck or involvement of the visceral arteries. The technique can be performed using a total percutaneous approach and has the potential to reduce mortality, morbidity, blood loss, operative time and hospital stay compared with open surgical repair.

Long-Term Results for Endovascular Repair of Acute Complicated Type B Aortic Dissection

Jennifer M. Hanna, Asvin Ganapathi, Nicholas Andersen, Richard L. McCann, G. Chad Hughes. Duke University Medical Center, Durham, NC

Introduction: Despite the lack of current U.S. Food and Drug Administration approval for management of acute complicated type B aortic dissection, thoracic endovascular aortic repair (TEVAR) has replaced open surgical management for this indication due to promising short-term and midterm safety and efficacy. However, because of the relatively recent adoption of this technology, long-term results with a view towards durability and requirement for secondary procedures are limited. As such, the objective of this study is to report long-term outcomes of TEVAR for acute (≤2 weeks from symptom onset) complicated type B dissection.

Methods: Between July 2005 and June 2012, 47 patients underwent TEVAR for the management of acute complicated type B dissection at a single referral institution (Table I). Indications for intervention included rupture in eight (17%), malperfusion in 23 (49%), and/or refractory pain or hypertension in 18 (38%; Table II). Fisher exact *t* test was used to compare continuous variables, and χ^2 test was used to compare categoric variables. A Kaplan-Meier analysis with a log-rank test was used to compare aortic vs overall survival.

Results: Primary technical success was 100%. In-hospital/30-day rates of death, stroke, permanent paraplegia/paraparesis, and new dialysis were 0%, 2% (n = 1), 2% (n = 1), and 4% (n = 2), respectively. Overall survival was 83% at 84 months, with none of the late deaths attributable to the aortic pathology (Fig). The composite reintervention rate related to the index procedure was 28% (n = 13). Median time to reintervention was 4.5 months (interquartile range, 1.4-8.1 months; Table III).

Conclusions: In the largest reported series with the longest follow-up to date, the current results confirm the excellent short-term outcomes of TEVAR for acute complicated type B dissection and further demonstrate that these results are durable over the long-term as well. The data support the continued use of TEVAR for acute complicated type B aortic dissection.

Figure 1: Aorta-Specific and Overall Survival

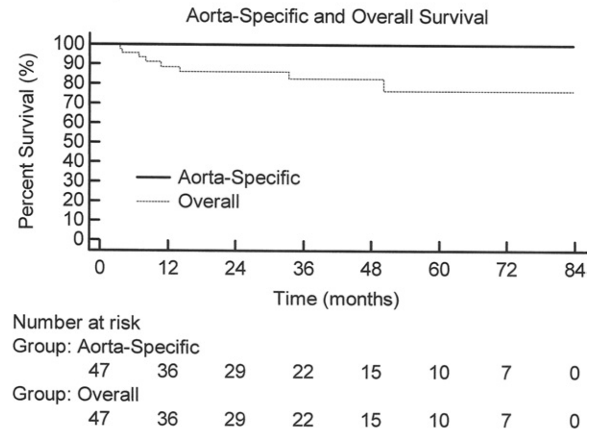

Fig 1.

Table 1. Demographic characteristics and associated comorbidities

Variable	*Thoracic endovascular aortic repair (N=47)*
Median age (IQR), years	59.0 (53.5-70.5)
Male gender	34 (72%)
Median BMI (IQR)	28.3 (25.1-31.1)
Marfan syndrome	4 (9%)
Hyperlipidemia	22 (47%)
Prior aortic surgery	11 (23%)
Diabetes mellitus	5 (11%)
History of hypertension	43 (91%)
Tobacco use	25 (53%)
Chronic obstructive pulmonary disease	6 (13%)
Renal insufficiency (cr>1.5)	17 (36%)
History of stroke/TIA	3 (6%)
Coronary artery disease	8 (17%)

IQR, Interquartile range; *BMI*, body mass index; *Cr*, creatinine; *TIA*, transient ischemic attack

Table 2. Clinical and radiographic characteristics on admission

Variable	*Thoracic endovascular aortic repair (N=47)*
SBP on admission, mean ± SD, mm Hg	156 ± 37
DBP on admission, mean ± SD, mm Hg	76 ± 22
Hypotension/shock on admission	2 (4%)
Clinical or radiographic malperfusion on admission	23 (49%)
Visceral malperfusion	11 (23%)
Renal malperfusion	10 (21%)
Iliofemoral malperfusion	12 (26%)
Spinal malperfusion	2 (4%)
Presenting aortic symptoms	44 (94%)
Back pain	33 (70%)
Anterior chest pain	22 (47%)
Refractory pain/hypertension	18 (38%)
Rupture	8 (17%)
Diameter of descending aorta, mean ± SD, cm	4.8 ± 1.0

DPB, Diastolic blood pressure; *SBP*, systolic blood pressure; *SD*, standard deviation

Table 3. 30-day/in-hospital and late adverse events

Variable	*Thoracic endovascular aortic repair (N=47)*
Death	
30-day death	0 (0%)
Late death	8 (17%)
Aorta-related deaths	0 (0%)
Stroke	1 (2%)
Permanent paraplegia/paraparesis	1 (2%)
Acute renal failure (Cr>2.0 and 2 times baseline Cr)	4 (9%)
New-onset dialysis	2 (4%)
Prolonged mechanical ventilation (>48 hours)	3 (6%)
Myocardial ischemia	0 (0%)
Postoperative length of stay (IQR), days	5 (3–7)
Reintervention	13 (28%)
Open	3 (23%)
Endovascular	10 (77%)
Median time to reintervention (IQR), months	4.5 (1.4–8.1)
Median time to follow-up/death (IQR), months	33.4 (13.6–55.2)

Cr, Creatinine; *IQR*, interquartile range

In Situ Laser Fenestration During Thoracic Endovascular Aortic Repair Is an Effective Method for Left Subclavian Artery Revascularization

Richard E. Redlinger, Jr, Sadaf S. Ahanchi, Jean M. Panneton. Eastern Virginia Medical School, Norfolk, Va

Introduction: We have previously described our early experience using retrograde laser fenestration to revascularize the left subclavian artery (LSA) during zone II thoracic endovascular aortic repair (TEVAR). This technique uses a relatively simple intraoperative method of endograft modification to revascularize aortic branches for a variety of acute thoracic aortic pathologies. The aim of this study is to present our expanded experience and midterm outcomes of TEVAR with laser fenestration to revascularize the LSA as an alternative to debranching.

Methods: A retrospective review of the electronic medical records was conducted of all patients who underwent TEVAR with LSA revascularization via laser graft fenestration from September 2009 through August 2012. TEVAR was carried out with deployment of a Dacron endograft over the orifice of the LSA. Through retrograde brachial access, a 0.018-inch guidewire was placed at the ostium of the LSA, followed by laser catheter fenestration of the graft. Balloon-expandable covered stents were deployed through the fenestration to traverse the endograft and LSA; the endograft portion of the covered stent was flared. Routine postoperative follow-up imaging with computed tomography angiography was performed to assess for TEVAR and LSA fenestration patency, endoleak, and aneurysm/dissection exclusion.

Results: TEVAR with laser fenestration was successfully performed in 22 patients (12 men; mean age, 57 years; range, 37-83 years) in an urgent or emergency setting secondary to unremitting symptoms. Thirteen patients had large symptomatic thoracic aortic aneurysms (10 secondary to chronic dissection); four patients had acute symptomatic type B aortic dissection, and five patients had intramural hematoma or penetrating aortic ulcer. An average of two endografts (range, 1-4) were placed during TEVAR. LSA-covered stents ranged from 8 to 10 mm in diameter. Mean operative time for TEVAR with laser fenestration was 154 ± 65 minutes. The average hospital length of stay was 12 ± 7 days. There were no fenestration-related complications. One patient developed postoperative paraplegia, and one patient died of massive hemoptysis in the postoperative period, for an in-hospital mortality rate of 4.5%. At a mean follow-up of 8 months (range, 1-32 months), two patients had died (9%) of non–TEVAR-related causes. Follow up computed tomography angiography imaging demonstrated a 100% primary patency for the LSA stents. One patient had an asymptomatic LSA stent stenosis. Two patients had type II endoleaks from the LSA that required reintervention. Both were successfully managed with endovascular coil embolization. There were no fenestration-related type I or III endoleaks.

Conclusions: In situ retrograde laser fenestration is a feasible and effective option for LSA revascularization during TEVAR involving a spectrum of acute thoracic aortic pathologies. Laser fenestration provides a rapid, reproducible method of fenestrating the endograft material. The high technical success, low fenestration-related morbidity, and excellent midterm patency support this technique of intraoperative endograft modification. Longer follow-up remains necessary to determine the durability of this technique.