Treatment of acute visceral aortic pathology with fenestrated/branched endovascular repair in high-surgical-risk patients

Salvatore T. Scali, MD,[a] Alyson Waterman, MD,[a] Robert J. Feezor, MD,[a] Tomas D. Martin, MD,[b] Philip J. Hess Jr, MD,[b] Thomas S. Huber, MD, PhD,[a] and **Adam W. Beck, MD,[a]** *Gainesville, Fla*

Objective: **The safety and feasibility of fenestrated/branched endovascular repair of acute visceral aortic disease in high-risk patients is unknown. The purpose of this report is to describe our experience with surgeon-modified endovascular aneurysm repair (sm-EVAR) for the urgent or emergent treatment of pathology involving the branched segment of the aorta in patients deemed to have prohibitively high medical and/or anatomic risk for open repair.**

Methods: **A retrospective review was performed on all patients treated with sm-EVAR for acute indications. Planning was based on three-dimensional computed tomographic angiogram reconstructions and graft configurations included various combinations of branch, fenestration, or scallop modifications.**

Results: **Sixteen patients (mean age [± standard deviation], 68 ±10 years; 88% male) deemed high risk for open repair underwent urgent or emergent repair using sm-EVAR. Indications included degenerative suprarenal or thoracoabdominal aneurysm (six), presumed or known mycotic aneurysm (four), anastomotic pseudoaneurysm (three), false lumen rupture of type B dissection (two), and penetrating aortic ulceration (one). Nine (56%) had previous aortic surgery and all patients were either American Society of Anesthesiologists class IV (n = 9) or IV-E (n = 7). A total of 40 visceral vessels (celiac, 10; superior mesenteric artery, 10; right renal artery, 10; left renal artery, 10) were revascularized with a combination of fenestrations (33), directional graft branches (six), and graft scallops (one). Technical success was 94% (n = 15/16), with one open conversion. Median contrast use was 126 mL (range, 41-245) and fluoroscopy time was 70 minutes (range, 18-200). Endoleaks were identified intraoperatively in four patients (type II, n = 3; type IV, n = 1), but none have required remediation. Mean length of stay was 12 ± 15 days (median, 5.5; range, 3-59). Single complications occurred in five (31%) patients as follows: brachial sheath hematoma (one), stroke (one), ileus (one), respiratory failure (one), and renal failure (one). An additional patient experienced multiple complications including spinal cord ischemia (one) and multiorgan failure resulting in death (n = 1; in-hospital mortality, 6.3%). The majority of patients were discharged to home (63%; n = 10) or short-term rehabilitation units (25%; n = 4), while one patient required admission to a long-term acute care setting. There were no reinterventions at a median follow-up of 6.2 (range, 1-16.1) months. Postoperative computed tomographic angiogram was available for all patients and demonstrated 100% branch vessel patency, with one type III endoleak pending intervention. There were two late deaths at 1.4 and 13.4 months due to nonaortic-related pathology.**

Conclusions: **Urgent or emergent treatment of acute pathology involving the visceral aortic segment with fenestrated/branched endograft repair is feasible and safe in selected high-risk patients; however, the durability of these repairs is yet to be determined. (J Vasc Surg 2013;58:56-65.)**

Despite the evolution of aortic stent graft design, 30%-45% of all patients who present with abdominal aortic aneurysms will have unfavorable anatomy to undergo elective endovascular repair with commercially available devices,[1,2] often because of proximity or involvement of the visceral aorta. Good-risk patients may tolerate elective, open repair of complex aneurysmal disease extending into the visceral aorta; however, patients with poor cardiac, pulmonary, and/or renal function have >40%-70% morbidity and 40%-60% perioperative mortality in the emergent setting.[3-8] Although significant advancements in anesthetic care, operative technique, and postoperative management have occurred, these results have not substantially changed over the past 3 decades.[8,9]

Outcomes for thoracoabdominal aortic aneurysm (TAAA) repair are largely determined by the clinical presentation, with procedures performed emergently being highly correlated with perioperative mortality.[3,10-12] The use of "chimney," "snorkel," and "periscope" techniques, as well as fenestrated and branched endografts has greatly broadened the management options for patients with aortic disease extending to the visceral segment.[2,13-16] As evidenced by the growing body of literature, the use of these techniques is becoming increasingly common, with promising outcomes being reported for patients with highly lethal conditions.[17-20]

From the Division of Vascular Surgery and Endovascular Therapy[a] and Division of Thoracic and Cardiovascular Surgery,[b] University of Florida College of Medicine.

Author conflict of interest: none.

Presented at the Twenty-fifth Annual Meeting of the Florida Vascular Society, Naples, Fla, May 4, 2012.

Additional material for this article may be found online at www.jvascsurg.org.

Reprint requests: Adam W. Beck, MD, Division of Vascular Surgery and Endovascular Therapy, University of Florida College of Medicine, PO Box 100128, 1600 SW Archer Rd, Room NG-45, Gainesville, FL 32610 (e-mail: adam.beck@surgery.ufl.edu).

The editors and reviewers of this article have no relevant financial relationships to disclose per the JVS policy that requires reviewers to decline review of any manuscript for which they may have a conflict of interest.

0741-5214/$36.00

Copyright © 2013 by the Society for Vascular Surgery. Published by Elsevier Inc. All rights reserved.

http://dx.doi.org/10.1016/j.jvs.2012.12.043

Clinical trials are currently underway for prefabricated, *customized* devices for the visceral aorta, but these require weeks to months to manufacture and, thus, cannot be used in the emergent setting. Moreover, devices designed for "off-the-shelf" use are also being developed and currently entering clinical trials but are likely many years from widespread availability.[21,22] Because of these limitations, surgeons have used device modification to facilitate treatment of patients who are deemed to be prohibitively high risk for open repair.[23] The application of these techniques in the urgent or emergent setting remains unproven and poorly represented in the current literature.

This study was performed to determine our outcomes with surgeon-modified, fenestrated, and branched surgeon-modified endovascular aneurysm repair (sm-EVAR) devices in high-risk patients with acute visceral aortic disease.

METHODS

Subjects and database. A retrospective review of our endovascular aortic registry was queried for patients treated with acute pathology approximating or involving the visceral segment of the aorta. Patients treated with sm-EVAR were identified and those treated with "chimney" stents or debranching procedures were excluded. Between January 2010 and July 2012, 16 patients were identified. Indications included symptomatic or ruptured presentations of the following pathologies: TAAA, anastomotic pseudoaneurysm, dissection-related and mycotic aneurysm, as well as penetrating aortic ulceration. Urgent patients were categorized by presence of symptoms defined by a presentation of abdominal, flank, and/or back pain that was not attributable to a nonaortic pathology. Emergent presentations were defined by evidence of radiographic rupture and/or hemodynamic lability. This study was approved by the University of Florida Institutional Review Board (#161-2012).

All subjects were initially considered for open repair but subsequently judged to be prohibitively high risk due to the predicted likelihood of experiencing profound morbidity or death with open repair based on a combination of medical comorbidities[24-26] and/or anatomic complexity. Although individualized to each scenario, high-risk anatomic criteria generally included acute complicated dissections, visceral patch pseudoaneurysms, and mycotic aneurysms. Medical high risk was defined as patients anticipated being unable to tolerate aortic cross-clamping or open thoracotomy (because of a combination of multiple advanced medical comorbidities). Significant medical comorbidities were defined based on the Society for Vascular Surgery (SVS) reporting guidelines.[26]

Because of the unique constellation of medical and anatomic factors that defined high risk for each patient, there was consensus opinion obtained regarding risk for open repair in each case among the members of the group (Vascular Surgery and/or Cardiovascular Surgery) that open repair was prohibitively high risk. Patients were anticipated to have a reasonable probability of successful endovascular repair, and the patients and/or their families were thoroughly informed of the "off-label" nature of this type of repair.

Patient records were reviewed to obtain demographic and medical history, as well as details of case conduct and technical outcome. Preoperative computed tomographic angiograms (CTAs) were reviewed to evaluate aortic anatomy. Although a variety of aortic pathologies were treated, lesion extent was categorized into the Crawford classification according to the reporting standards for thoracic endovascular aortic repair (TEVAR)[27] in an effort to further highlight the magnitude of the type of open surgical reconstruction that would be required if not completed with endovascular repair, as well as to risk-stratify patients for spinal cord ischemia events related to the boundaries of the aortic treatment zones. Patient records were reviewed to capture periprocedural morbidity. Preoperative SVS comorbidity risk scores were calculated in a manner previously reported ($\geq$8 considered high medical risk).[26,28] The Social Security Death Master File was queried to determine survival.

Preoperative planning and operative technique. All patients were able to be hemodynamically stabilized at presentation and admitted to the intensive care unit for resuscitation and patient/family counseling prior to operative intervention. Those with contained rupture were managed with permissive hypotension with a goal mean pressure above 50 mm Hg, similar to reported descriptions of ruptured aneurysm management.[29] When time allowed, prophylactic spinal drains were placed selectively based on described guidelines from our group[30] and surgeon preference. Subjects were treated using modified Cook (Cook Medical, Inc, Bloomington, Ind) endografts and customized in the operating room using plans based on a preoperative three-dimensional reconstruction of axial imaging (TeraRecon Inc, San Mateo, Calif).

All patients remained hemodynamically stable during induction, and anesthetic preparation was performed concomitantly with graft modification. A two-team approach was used to achieve vascular access while the graft was prepared. Patients were repaired with a variety of endograft configurations including fenestrated/branched "composite" grafts (nonmodified Endologix Powerlink at the bifurcation with a surgeon-modified Cook TX2 proximally, n = 1), modified bifurcated grafts (n = 1), and fenestrated/branched tube grafts (n = 14) with or without a distal bifurcated Cook Zenith device (Fig 1).

This report is not intended to be a technical description of how to perform graft modification, and each graft was highly customized to the patient's anatomy, so a detailed narrative of each case is beyond the scope and purpose of this analysis. However, various methods of modification were employed to accommodate individual anatomy, including combinations of scallops, fenestrations, and directional graft branches (Fig 1). As a general rule, fenestrations and scallops were placed in segments of the device that would approximate the aortic wall diameter with full main body deployment, and branches were used when the target vessel was in an aneurysmal segment of the aorta.

Download English Version:

https://daneshyari.com/en/article/5995003

Download Persian Version:

https://daneshyari.com/article/5995003

Daneshyari.com