

Re-Rupture of Abdominal Aortic Aneurysm after Endovascular Repair from Infected Endograft

Efrain Aguilar*, Tuong Nguyen, Thaer Obaid, Rashad Choudry and Evan Deutsch

Department of Vascular Surgery, Einstein Medical Center, Philadelphia, United States

Abstract

Introduction: Successful endovascular aortic aneurysm repair (EVAR) aims to prevent catastrophic rupture, however despite technical excellence at index operation, long term follow up remains and atory. This is due to the fact that delayed aortic rupture may occur in certain patients after EVAR. We present a technically challenging case which illustrates this concern.

Case report: An 82 year old man underwent successful EVAR using a redesigned, clinical trial graft (Medtronic, Minneapolis, MN), five years prior to presentation. He was lost to follow after the initial procedure. At presentation to us, he demonstrated a 13.5cm, ruptured infrarenal aortic aneurysm due to proximal aortic neck enlargement and endograft slippage. Emergency repair included a proximal supra-renal endograft extension (Endologix, Irvine, CA), femoralfemoral bypass (PTFE), and open abdomen with negative-pressure therapy (Abthera, KCI, San Antonio, TX) He survived and was discharged with close follow-up. He re-presented six months later with flank pain and a WBC 22,000. A CT Scan was concerning for a new contained aortic rupture (16cm) and a recurrent proximal endograft slip.

High clinical suspicion resulted in a return to operating room for axillary to femoralfemoral artery bypass (PTFE), followed by explantation of the endograft system, aortic sac resection, and omental flap coverage. Operative cultures yielded *Staphylococcus epidermidis*. He survived again and was discharged on a plan for long term antibiotics on post-operative day 10.

Conclusion: Long term follow up after EVAR may help to identify patients at high risk for endo-graft failures. Aortic neck enlargement leading to rupture may result from primary aneurysm growth, however infection can be an important cause. Time honored open aortic surgical techniques remain an important tool for every vascular surgeon.

Keywords: Rupture aneurysm; Endograft infection; Abdominal aortic aneurysm; Infected endograft; Re-ruptured abdominal aneurysm after EVAR; EVAR for ruptured AAA

Introduction

Aortic aneurysm repair has evolved since it was described by Parodi and colleagues in 1991 [1]. Currently endovascular graft repair is the main method used for Abdominal Aortic Aneurysmal (AAA) repair with lower morbidity; mortality and hospital stay [2]. Patients undergoing EVAR encounter unique complications such as endoleaks. The overall incidence of early and late type I endoleak is thought to be up to 20%, depending on the series, device, and local practice patterns, with intraoperative type I endoleaks reported at a rate of 3% to 7% [3]. Endoleaks are associated with increased morbidity and mortality, hence close follow up is of paramount importance. Patients with incomplete follow-up have higher fatal complication rates than patients with frequent follow-up [4]. Clinical follow-up schedules have generally reflected the protocols in many clinical trials of EVAR, with post procedure surveillance CT scans being performed at approximately 1 month, 6 months, 12 months and annually thereafter [5]. AAA ruptures after EVAR is one of the complications secondary to endoleaks. Management of AAA rupture after EVAR can be done by intravascular means and it is well described in the literature [6]. Re-rupture after endovascular repair is a very rare event that can be secondary to multiple risk factors including larger initial aneurysm size, poor sealing zones, female gender, presence of aorto-enteric fistula, and stent-graft infection [5]. Infection of the Endograft is a rare entity however it has a devastating complication with high mortality. Infection is reported to be below 1% following EVAR and less than 5% after TEVAR [7,8]. This data arise from multiple single center retrospective studies. We present a patient that had a re-rupture of an AAA, and its etiology was

confusing due to the presence of a possible infection of the endograft requiring explanation with extra-anatomical bypass.

Case Report

An 82-year-old male, with history of infrarenal AAA, presented to the emergency department in our hospital with sudden onset of abdominal and back pain. It is important to mention that Five years prior he had undergone successful EVAR using a redesigned, clinical trial graft (Medtronic, Minneapolis, MN), at an outside hospital. Computer tomography was obtained which showed a 13.5 cm ruptured infrarenal aortic aneurysm with a type I endoleak secondary to proximal aortic neck enlargement and endograft migration. In order to save his life emergency repair included a proximal supra-renal endograft extension (Endologix 34 × 80 mm, Irvine, CA) with a suprarenal fixation that was deployed into the left limb, effectively creating an aortouniiliac device. Left to right femoro-femoral bypass (PTFE) was then created. His repair was complicated by abdominal compartment syndrome which was managed with decompressed laparotomy and negative pressure wound vac therapy (Abthera, KCI, San Antonio, TX). Patient recovered satisfactorily and was then discharged with close follow-up

*Corresponding author: Md. Efrain Ernesto Aguilar, Einstein Medical Center Philadelphia, Philadelphia, PA United States, E-mail: aguilare@einstein.edu

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including serial imaging. As recommended per guidelines our patient had follow up CT scans at 1 month, and before 6 months showing stable appearance to the infra renal abdominal aortic aneurysm. No evidence of leak was seen. The previously described right-sided pelvic fluid collection likely representing resolving hematoma after aortic rupture further was decreased in size. Patient was stable clinically and on his images. Ten months after the procedure patient presented to the emergency department in our hospital complaining of mild back pain with 2 weeks of duration with mild gait disturbance and no other associated symptom. Repeated CT scan was performed that showed aortouniiliac stent graft in place with mild distal migration of the proximal portion of the graft. No evidence of endoleak. Infrarenal abdominal aorta aneurysm minimally increased in size compared to the prior study. Faint haziness around the abdominal aorta, most pronounced around the aneurysm that was increased since the prior study suggesting aortitis. No evidence of aneurysm rupture. Patient was admitted to the surgical intensive care unit for observation and was discharged home when clinically stable. Eleven months after the index procedure for AAA rupture, the patient presented with another episode of flank pain and leukocytosis of 22,000. CT angiogram showed a new contained 16.5 cm infrarenal aortic aneurysm rupture and a recurrent proximal endograft migration. With the high suspicion for infected endograft the patient was taken to the operating room for extra anatomic bypass and explantation of endograft. An axillary to femoral-femoral bypass (PTFE) was performed followed by an excision of the endograft, which was completely detached proximally. The aneurysmal sac contained a foul smelling purulent material indicative of an infectious process. The aortic sac was resected; ligation of the infra renal abdominal aorta with omental flap coverage was performed. Operative cultures yielded *Staphylococcus epidermidis*. Post-operatively patient was monitored in the surgical intensive care unit showing remarkable recovering and was discharged home.

Discussion

Endovascular aneurysm repair has gained wider acceptance as a feasible alternative to conventional open repair. As more number of EVARs is performed, increased number of complications has been reported. Infected endovascular graft is a feared and devastating complication that's associated sepsis, hemorrhaging, and dissociation of arterial and graft interface with high morbidity and mortality [9]. The incidence of infected endograft is rare and has been reported in literature from 0.2-3% [10]. Ducasse et al. reported a 0.4% incidence of AEI in 9,739 procedures. Similarly, the review by Fiorani et al. of the literature and international practitioner survey yielded a 0.4% AEI incidence. Mortality rates after AEI have been reported as high as 18%. In this case report we present a patient with evidence of infected endograft which may be the etiology of multiple recurrent endograft failure and rupture. At the third presentation for abdominal aneurysm rupture, he presents with classic signs and symptoms of ruptured aortic aneurysm. The leukocytosis and history of vague weakness raised our suspicion for infected endograft. *Staphylococcus Epidermidis* was isolated from OR culture and confirmed our suspicion. Although the most common organism causing endograft infections are caused by *S. aureus*, other common organism associated with AEI includes *S. epidermidis*, *Enterococcus*, *E. coli*, *Streptococcus* species [11]. Fungal infections are extremely rare [12]. Currently there are no standard of care for the management of infected endograft. However, the general consensus in many small reported cases suggests that surgical excision with intravenous antibiotics is the mainstay therapy [2,11]. The standard surgical approach includes two parts: explantation of the infected endograft and revascularization with extra-anatomic bypass [8,9]. Conservative management with IV antibiotic alone may be the only option for patients that will not survive an open procedure. In

selected cases, simple resection of the aneurysms sac and leaving the stent graft behind has been described. Unfortunately the mortality in these frail patients can be up to 40% [10]. Appropriate follow up for patients with EVAR presents another challenge. The current SVS recommendation for surveillance post EVAR after the first year is CT scan at one month and 12 months. Recommendation for long-term follow up after one year is ambiguous and depends on several risk factors. Re-rupture of AAA after EVAR is extremely rare. Rates are described to be 1.2% per patient per year depending on the type of endograft and degree of follow-up [5]. 50% of AEI presents between 25-70 months post EVAR [13]. Our patient presented 11 months after the 2nd procedure with ruptured aneurysm. He had extremely close follow-up. This underscores the importance of regular and long-term surveillance to detect evidence of impending rupture and prevent catastrophe.

Conclusion

Long term follow up after EVAR may help to identify patients at high risk for endo-graft failures. Aortic neck enlargement leading to rupture may result from primary aneurysm growth, however infection can be an important cause. Time honored open aortic surgical techniques remain an important tool for every vascular surgeon.

Conflict of Interest

Authors have no conflict of interest to disclose.

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