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Image of the Issue

Simultaneous thoracic aortic endovascular graft and transfemoral transcatheter aortic valve replacement in a patient with a descending aortic thrombus

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ABSTRACT

Severe descending thoracic and abdominal aortic pathology can deter consideration of transfemoral (TF) access for transcatheter aortic valve replacement (TAVR) in adults with severe symptomatic aortic stenosis (AS) and may lead to utilization of alternative access sites. We report a case of an 88-year-old frail woman with severe symptomatic AS referred for TAVR with demonstration of a large thrombus in the descending thoracic aorta immediately distal to the left subclavian artery. Given concerns of thrombus embolization with femoral advancement of the transcatheter valve, coverage with a thoracic aortic endograft was planned immediately prior to the TAVR.

1. Introduction

Severe descending thoracic and abdominal aortic pathology can deter consideration of transfemoral (TF) access for transcatheter aortic valve replacement (TAVR) in adults with severe symptomatic aortic stenosis (AS) and may lead to utilization of non-femoral access sites [1–5], associated with higher morbidity risk [6]. Endovascular aortic repair prior to TAVR in individuals with severe descending aortic pathology can make femoral access permissible. We describe a case of thoracic aortic endograft followed by TF TAVR in the same setting.

2. Case presentation

An 88-year-old frail woman with severe symptomatic aortic stenosis (AS) and prior coronary artery bypass graft surgery presented to valve clinic for evaluation for transcatheter aortic valve replacement (TAVR). Gated CT angiography demonstrated a large thrombus projecting into the aortic lumen immediately distal to the left subclavian artery on the greater curvature (Fig. 1A-C). Given concerns of thrombus embolization with femoral advancement of the transcatheter valve, coverage with a thoracic aortic endograft was planned immediately prior to the TAVR.

The patient underwent general anesthesia and was intubated. Left femoral arterial (LFA) and venous access (LFV) were obtained. Right femoral access (RFA) was obtained and two Proglide (Abbott Vascular, Irvine CA) devices were deployed for preclosure followed by placement of a 7-French sheath. On the left, both an angled Glidewire Advantage (Terumo Medical Corporation, Somerset, NJ) and Glidecath catheter (Terumo Medical Corporation, Somerset, NJ) catheter were used to carefully navigate past the thrombus into the ascending aorta. A catheter exchange was performed and a marking pigtail catheter was placed in the ascending aorta. On the right, the angled Glidewire and Glidecath catheter were again utilized to navigate into the ascending aorta, followed by exchange to a stiff double curved Lunderquist Extra-Stiff wire (Cook Medical, Bloomington, IN). An aortogram was performed demonstrating the area of thrombus with good seal zones proximally and distally (Fig. 1D). A Zenith Alpha 30 mm × 109 mm thoracic endovascular graft (Cook Medical, Bloomington, IN) was inserted up the RFA and positioned with the edge of the fabric just distal to left subclavian artery. After appropriate positioning was confirmed, the endograft was successfully deployed (Fig. 1E). The delivery device was removed and a 16-French Edwards sheath was advanced via the RFA. The pigtail catheter from the LFA was re-wired and retrieved from behind the graft and subsequently advanced through the graft again. Completion angiogram demonstrated good angiographic result with coverage of the area of intramural hematoma. An additional aortogram run was then performed distally demonstrating no evidence of any embolization to the superior mesenteric artery, bilateral renal arteries, or the iliac bifurcation. A catheter was subsequently advanced into the

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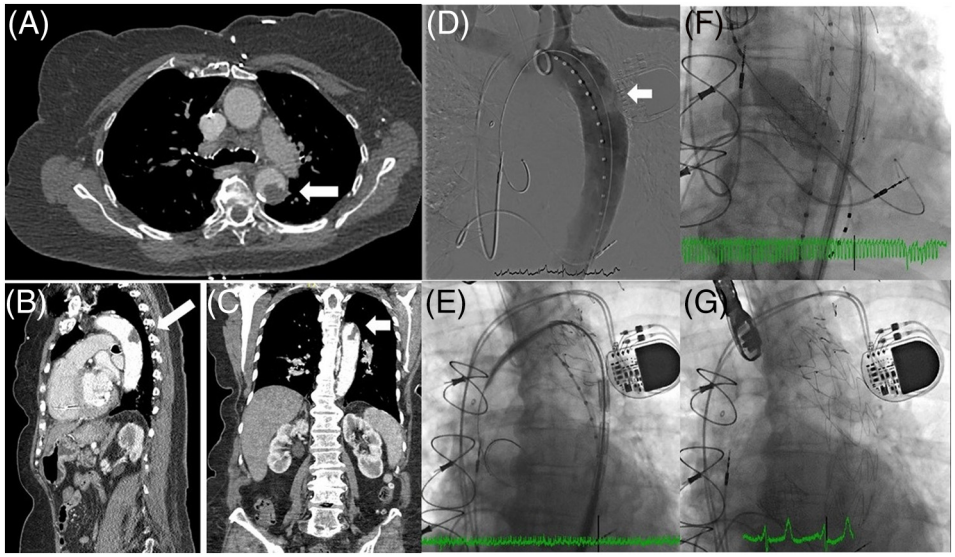

Fig. 1. CT Scan demonstrating a large thrombus projecting into the aortic lumen immediately distal to the aortic arch on the greater curvature (A-C). Aortogram demonstrating the area of thrombus with good seal zones proximally and distally (D). Deployment of a Cook Alpha 30 mm × 109 mm thoracic endograft just distal to left subclavian artery (E). Deployment of a 23 mm Sapien 3 valve (Edwards Life Sciences, Irvine, CA) with rapid pacing (F). Fluoroscopy of deployed thoracic endograft and transcatheter heart valve (G).

left ventricle (LV) via the RFA sheath. A 20 mm balloon was advanced through the graft and around the arch and balloon aortic valvuloplasty was performed with rapid pacing. A 23 mm Sapien 3 valve (Edwards Life Sciences, Irvine, CA) was advanced through the stent graft and around the arch. Valve deployment was performed with rapid pacing (Fig. 1F–G). Transesophageal echocardiogram demonstrated optimal valve position with no evidence of paravalvular leak. Patient had unremarkable post-procedural course and was seen at 30-day follow up with improvement in cardiac symptoms.

3. Discussion

We describe a case presentation of an 88-year-old frail woman with severe symptomatic AS and a large aortic thrombus involving the descending thoracic aorta who underwent simultaneous TF-TAVR and TF-EVAR.

To the best of our knowledge, this is the first published case of planned simultaneous EVAR followed by TF-TAVR using an Edwards Sapien 3 valve in a patient with an aortic thrombus. Femoral access for TAVR may be challenged by severe descending thoracic and abdominal aortic pathology. Endovascular aortic grafts prior to TAVR have previously been performed for coarctation of the aorta [7] and for aortic aneurysms [8–12], however these have been described as staged approaches [7,8] or as a single approach where TAVR or balloon aortic valvuloplasty were performed prior to the EVAR [9–12]. A single stage procedure as we have described may present with some disadvantages including a higher risk of acute kidney injury given higher contrast administration [13], or possibly lower reimbursement for a simultaneous procedure as opposed to two staged procedures. Regardless, we still advocate for a simultaneous procedure instead of a staged procedure, which may be associated with increased risk of access related complications given the need for repeat vascular access.

In patients with severe descending aortic pathology, a multidisciplinary Heart Team-Vascular Team approach may be considered when evaluating access algorithms. This case illustrates that same setting endovascular aortic endograft followed by TF TAVR is both safe and feasible.

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