

Stent Graft Using Kilt Technique for an Abdominal Aortic Aneurysm with a Severely Angulated Neck



Kyu-Hwan Park, MD, Ung Kim, MD, PhD *

Division of Cardiology, Yeungnam University Medical Center, Daegu, Korea

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Endovascular aneurysm repair has become a standard treatment for abdominal aortic aneurysm (AAA). However a severely angulated aneurysmal neck is one of the most common anatomical limitations of endovascular repair, and is associated with poor outcomes. We successfully treated a patient who had an abdominal aortic aneurysm with a severely angulated aortic neck using kilt technique with thoracic stent graft. The technique might be an excellent alternative strategy to overcome anatomical obstacles like a hostile aortic neck.

Keywords

Abdominal aortic aneurysm • Endovascular procedure

Introduction

Endovascular aneurysm repair (EVAR) has become a standard treatment for abdominal aortic aneurysm (AAA) because it is less invasive and associated with shorter hospitalisation and lower periprocedural mortality than open surgery [1,2]. Its indications are influenced by a variety of anatomical considerations, especially angulated aneurysmal neck [3]. Angles greater than 60° between the infrarenal segment and aneurysmal sac are relative contraindications for EVAR due to high complication rates, such as endoleak, and a higher risk of stent migration or fracture [4,5]. Several attempts have been made to overcome anatomical obstacles and allow AAA treatment by EVAR, but there are few reports on treatment of AAA with a severely angulated neck using thoracic stent graft, referred to as the 'Kilt' technique to alter the angulation of aortic neck suitable for EVAR [6]. Here the authors report the case of 81-year-old male who underwent EVAR using kilt technique with a thoracic stent graft.

Case

An 81-year-old male patient visited our cardiovascular clinic complaining of a pulsating sensation in his abdomen. He had already been diagnosed to have a large AAA by contrast-enhanced computed tomographic (CT) scan at the first admission for abdominal pain and anaemia four months previously. A CT scan taken at this second visit demonstrated a 7.0 cm-sized infrarenal AAA with highly angulated aortic neck of 84.7° between the suprarenal and infrarenal segments and 86.5° between the infrarenal segment and aneurysmal sac (Fig. 1). The patient had a history of cerebrovascular accident, diabetes, hypertension, and atrial fibrillation, and was taking oral hypoglycaemic anti-hypertensive agents, and warfarin. Based on considerations of his wishes and medical conditions, we decided on endovascular treatment. During routine preprocedural evaluations, a 6.5 cm-sized long severe stenotic lesion was observed at the left superficial femoral artery (SFA) with low ankle-brachial index (0.85) indicating possible technical difficulties

*Corresponding author at: Yeungnam University Medical Center, 170, Hyeonchungno, Namgu, Daegu 705-717, Korea. Tel.: +82 53 620 3832; fax: +82 53 621 3310, Email: woongwa@hanmail.net

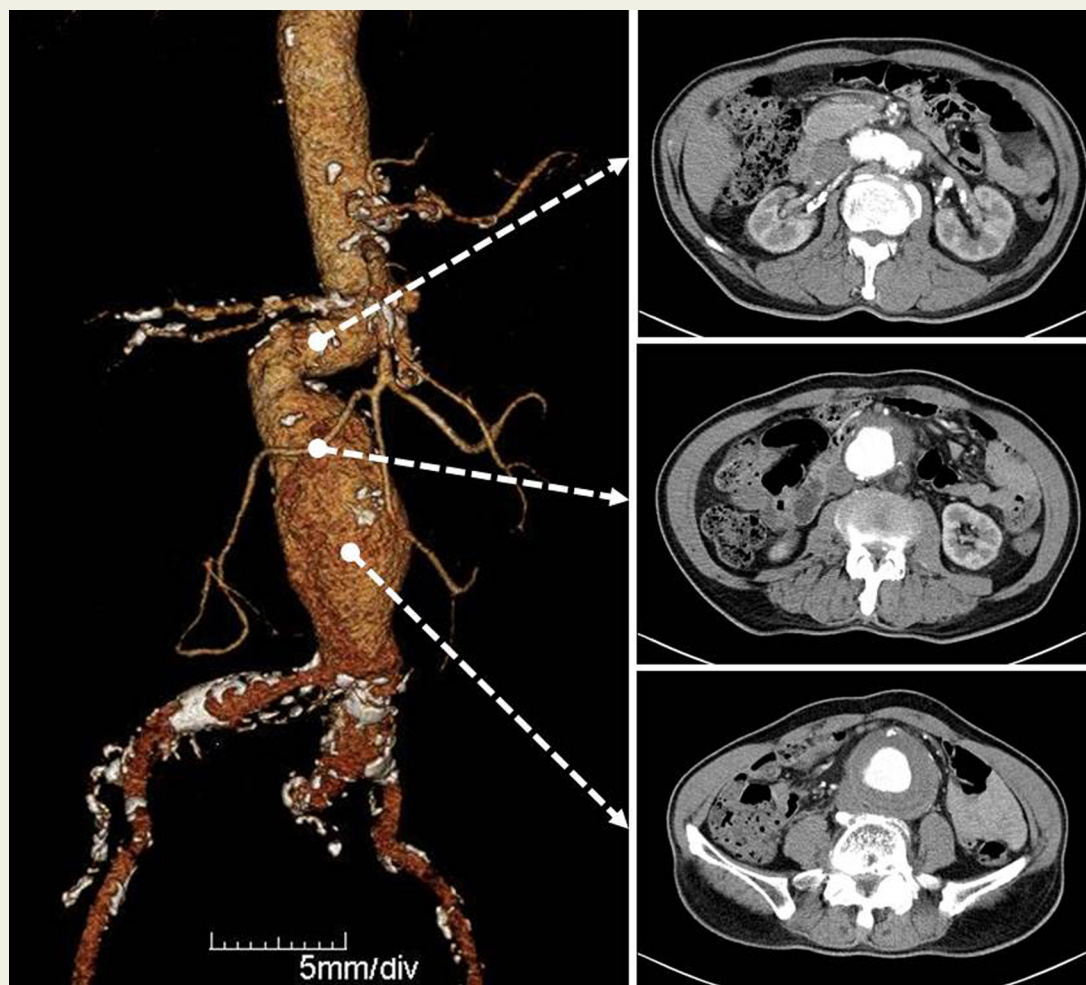


Figure 1 Preoperative atrial phase 2-dimensional (right panel, axial section of abdomen) and 3-dimensional (left panel) reconstruction computed tomography image of abdominal aortic aneurysm with a severely angulated aortic neck (86.5° , between the infrarenal segment and aneurysmal sac).

deploying graft stents via the left femoral artery. Accordingly, percutaneous transluminal angioplasty was performed at the left SFA before EVAR.

Endovascular aneurysm repair was performed under local anaesthesia. Briefly, after puncturing both common femoral arteries, a SEAL[®] thoracic stent graft (28 X 80 mm; S & G Biotech Inc., Seongnam, S. Korea) was initially deployed to the severely angulated aneurysmal neck for proximal sealing. Subsequently, a SEAL[®] bifurcated stent graft (30 X 40 mm) was delivered at the aneurysmal sac to overlap the thoracic stent (Fig. 2). Two SEAL[®] bifurcated stent graft extensions (12 X 120 mm) were then delivered at each common iliac artery. Post-dilation balloon angioplasty was performed on the aortic wall and overlapping zone to completely seal the stent grafts (Fig. 3).

Postprocedural aortography revealed no evidence of any kind of endoleak, and these observations were confirmed by CT angiography at one-, three-, and 12-months postoperatively (Fig. 4). The patient was followed for 18 months without any specific complications.

Discussion

Recent meta-analyses have showed that patients with a hostile AAA neck anatomy have higher rates of type I endoleaks, secondary interventions, and higher one-year mortality [3,7]. Several endografts are being manufactured to overcome it – the Endurant[®], Aorfix[®], and Anaconda[®] [8,9]. Bench testing indicated neck angulation has no influence on type I endoleak rates when using the Aorfix[®] device [10]. A recent study supported the continued application of the Aorfix[®] graft to highly angulated necks [11]. Also mid-term outcomes following EVAR with the Endurant[®] graft were not influenced by severe proximal neck angulation [12]. However, there have still been no reports of data of their long-term efficacy [13].

Some authors have tried to use thoracic stent graft to treat cases with severely angulated aortic neck and showed its feasibility as an alternative strategy [14,15]. We performed an EVAR with the ‘kilt’ technique for the case of AAA accompanied by a severely angulated aortic neck

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