Endovascular Management of Aortic Endograft Occlusion

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Abstract

Endovascular aortic repair is becoming the standard of care for abdominal aortic aneurysm. Despite aorta being a high flow system, there is still a definite risk of endograft occlusion. Management of occluded aortic endograft is highly controversial. Successful endovascular relining in aortic endograft occlusion is a technically demanding and forthcoming secondary intervention, not been studied extensively. We are reporting a case of aortic endograft thrombosis in a morbidly obese, 64-year-old gentleman with multiple comorbidities presenting with lifestyle-limiting claudication. The patient had a history of abdominal aortic aneurysm repair with aorto-uni-iliac device and femorofemoral bypass. The patient was managed by relining of aortic endograft with graft thrombectomy and snorkeling of the left renal artery. Postoperative course was uneventful. After 1 year of follow-up, the patient is free of symptoms with patent endograft. More empirical evidence is yet required to make the standard guidelines for the management of aortic endograft occlusion.

Keywords: Aneurysm, claudication, endograft occlusion

INTRODUCTION

Aortic endograft occlusion is a rare but known entity characterized by ischemia of the lower extremity.[1-6] With the development of newer generation devices, the incidence of aortic endograft occlusion has considerably reduced.[7] Besides an endoleak, occlusion is one of the major indications for re-intervention following endovascular aortic repair (EVAR). The management of aortic endograft thrombosis is not standardized and varies individually. We are reporting a case of aortic endograft occlusion managed successfully by endovascular intervention.

CASE REPORT

A 64-year-old morbidly obese (body mass index - 37.2 kg/m²) gentleman presented with lifestyle-limiting claudication (claudication distance - 100 m) limited to bilateral calf and thigh for 6 months. There was no history of buttock claudication. The patient had multiple comorbidities in the form of diabetes mellitus, hypertension, chronic obstructive pulmonary disease, and coronary artery disease (operated with coronary artery bypass grafting 15 years back). The patient was treated with endovascular aortic repair using Medtronic Endurant II aorto-uni-iliac device with coil embolization of the right internal iliac artery with femorofemoral bypass for infrarenal abdominal aortic aneurysm with left common iliac artery occlusion 2 years back. On examination, the patient had no tissue loss but no peripheral pulses were palpable in groin. Computed tomography (CT) angiography [Figure 1] showed total thrombotic occlusion of aortic stent graft and femorofemoral crossover graft. Bilateral renal arteries were normally opacified. About 50%-60% stenosis was observed in the superior mesenteric artery and celiac artery was normal. Two-dimensional echocardiography showed basal and apical regional wall motion abnormality with ejection fraction of 55%. Rest of the biochemical parameters were normal.

In view of multiple comorbidities and poor functional status, the patient was planned for relining of endograft. Initial aortic endograft thrombectomy was attempted through the right open groin approach using Fogarty thromboembolectomy catheter and adherent clot catheter, but no significant thrombus could be retrieved. The entire track in the aortic endograft was balloon dilated [Figure 2]. Left renal artery was cannulated through left brachial artery percutaneous.
heparin for 7 days and dual antiplatelet therapy. Follow-up CT was performed at 1 month and 1 year which showed patent endografts with no evidence of endoleak [Figure 4]. The patient is clinically stable with no symptoms of lower extremity ischemia.

**Discussion**

Aortic endograft occlusion is a known complication with a reported incidence of 0%–7.2%. Aortic endograft occlusion is a rare but known entity characterized by ischemia of lower extremity. With the development of newer generation devices, the incidence of aortic endograft occlusion has considerably reduced. Besides an endoleak, occlusion is one of the major indications for re-intervention following EVAR.

There are various kinds of risk factors described in the literature responsible for occlusion. However, the significance is poorly understood. Cochennec et al. summarized the four significant risk factors (young age, type of device, kink, and underlying approach. Aortic relining was performed with Medtronic Endurant II aorto-uni-iliac device (28 mm × 14 mm × 102 mm and 16 mm × 16 mm × 124 mm) and snorkeling of the left renal artery using balloon expandable covered stent Atrium Advanta (6 mm × 38 mm) [Figure 3]. Critical stenosis was noted in right external iliac artery. Hence, aortic endograft was extended into the right distal external iliac artery using Medtronic Endurant II stent graft (16 mm × 10 mm × 124 mm). Femorofemoral graft thrombectomy was also performed at the same time using graft thrombectomy catheter, and thrombus was retrieved with good back bleed.

Postoperatively, the patient was mobilized on next day. The patient had no signs of buttock claudication. On day 3, the patient was discharged, free from claudication with palpable pulses in the groin. The patient received low molecular weight
stenotic disease) incriminating the endograft occlusion. No possible explanation had been identified for the young age. Kink can be diagnosed on the table by performing an aortogram post-EVAR without any stiff wire and can be corrected by placing a bare metal stent across the kink. Arterial disease during or after the surgery impairs the outflow converting a high-flow system in a low-flow system and predisposes to endograft occlusion.\(^5\) van Zeggeren et al. has reported that aorto-uni-iliac device is associated with higher rate of graft limb occlusion as compared to bifurcated graft, but the statistical significance could not be demonstrated.\(^8\) Some authors have suggested that smaller graft limb diameter or extension of endograft into external iliac artery may cause graft occlusion but cause-effect relationship has yet to be proven.\(^2,4\)

In this patient, progressive systemic atherosclerosis involving right external iliac artery appeared to result in the endograft occlusion. This hypothesis can be supported by the fact that the patient had systemic atherosclerosis evidenced by coronary artery disease and left iliac artery occlusive disease and was accelerated by poor lifestyle, obesity, uncontrolled diabetes, and persistent smoking.

Fifty percent of the patients with endograft occlusions are detected on follow-up CT scans and are asymptomatic or have mild claudication. Patients presenting with acute limb ischemia are reported to have poor outcome. The indications for intervention include asymptomatic preocclusive limbs and symptomatic endograft occlusion.\(^8\)

There are various types of surgical options for the intervention including graft explantation with aortobifemoral or aortobiiliac bypass, extra-anatomical bypass (axillofemoral or supraceliac thoracobifemoral bypass), and endovascular relining of aortic endograft. The decision for type of intervention is based on the individual patient characteristics. The outcomes of individual interventions have not been reported so far. Direct aortic reconstructions may be associated with the best long-term outcome, but aortic endograft thrombosis leading to inflammation around the aorta makes the surgery highly challenging. Endovascular relining of the aorta with extension of landing zone is also liable to thrombosis. In the present case, endovascular intervention was performed with the intention to treat the symptoms.

**Conclusion**

Chronic aortic endograft occlusion is a challenging entity, and it can be recanalized using total endovascular means with acceptable medium-term patency as observed in this case.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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**Conflicts of interest**

There are no conflicts of interest.

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