A rare long-term Dacron graft complication: Pseudoaneurysm formation and graft deformation

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Abstract

Dacron vascular grafts have been used safely since decades. However, long terms complications including organ loss or death may be observed. Evaluation of the graft using ultrasonography and computed tomography in asymptomatic cases is beneficial particularly in early diagnosis of the late vascular graft complications. We present a 57 year old male patient who underwent femoro-popliteal by-pass 8 years ago, and developed deformity and pseudoaneurysm at the non-anastomotic site on dacron-graft who was successfully treated with endovascular intervention. Although surgical treatment is employed in first place among treatment modalities, advancements in percutaneous interventional methods and diversity of the materials used have constituted these interventions as alternatives of surgical treatment.

Introduction

Dacron grafts were first introduced in peripheral arterial reconstructions in 1957, and despite the reported safe long term results, these grafts are known to have rare late complications including pseudoaneurysm formation, graft rupture and intrinsic graft failure (1). These complications have been reported to occur 7 years after the graft implantation on average and might be associated with errors in the manufacturing and use of the prosthesis (2). Previously the recommended treatment consisted of removal of the graft and re-implantation of a novel graft; whereas currently endovascular interventions have become treatment alternatives, thanks to increasing experience with endovascular interventional methods and technological advancements.

The objective of this case presentation was to present a case of femoro-popliteal bypass with Dacron graft, who developed graft deformation and pseudoaneurysm formation treated successfully with endovascular stent grafting.

Case Report

A 57 year old male patient was presented with left leg pain and swelling in the thigh. History revealed that these complaints began suddenly one month ago and gradually aggravated. Left femoro-popliteal bypass procedure had been performed with 7 mm Dacron (Medi-Tech, Boston Scientific, Natick, MA) graft 8 years ago and no trauma or additional surgical interventions had taken place since then. An 8 cm, palpable, pulsatile mass was determined on 1/3 proximal thigh on the anteromedial side. There was no thrill or murmur on the mass lesion on auscultation. The lesion was sensitive with no warmth or rush. No ischemic signs were observed in the leg. Routine laboratory parameters were within normal range.

Doppler ultrasonographic (USG) examination revealed deformation of the graft and pseudoaneurysm formation on the non-anastomotic site on dacron-graft who was successfully treated with endovascular intervention. Although surgical treatment is employed in first place among treatment modalities, advancements in percutaneous interventional methods and diversity of the materials used have constituted these interventions as alternatives of surgical treatment.

Digital subtraction angiography (DSA) demonstrated that left femoro-popliteal graft was patent; however, there was an irregular contoured filling at an approximately 4 cm segment on the proximal site. Deformation led to intra-luminal stenosis. Additionally, there was a defect on the anterior graft wall at this level and a pseudoaneurysm formation extending subcutaneously (Figure 1a).

Treatment of the patient with endovascular stent grafting was planned. A self-expanding stent graft of 10x60 mm was inserted on the deformed portion of the graft. Dilatation of the...
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Figure 1. Digital Substraction Angiography
a) The patent left femoro-popliteal graft with irregular contoured filling at the proximal site in a 4 cm segment and deformation leading to intra-luminal stenosis.
b) Dilatation of the stent with a 9x60 mm balloon on the proximal stenotic area
c) Control angiography revealing patent stent lumen with no evidence pseudoaneurysm formation.

stent with a 9x60 mm balloon was performed since the expansion was inadequate on the proximal stenotic area (Image 1b). Complete patency was obtained.

Control angiography and Doppler USG examinations revealed that the lumen of the stent was patent, distal flow was improved, and pseudoaneurysm was completely thrombosed (Image 1c).

Post-operatively 4x5000 units of heparin was administered in the first 24 hours. Afterwards, acetylsalicylic acid 300 mg and clopidogrel 75 mg were initiated and the patient was discharged on postoperative day 1. Control visit at 1 month revealed that there was no pain and the mass lesion was significantly smaller. Distal lower extremity pulses were palpable. The graft was patent and there was no sign of stenosis or pseudoaneurysm formation on control Doppler USG.

Discussion

Safe long term results obtained with Dacron vascular grafts have led to their widespread use. Therefore their long term rare complications are better known. The incidence of non-anastomotic aneurysm formation in Dacron grafts is estimated as 0.5-3% (3). However, it should be noted that this incidence might be much higher in deed, since graft thrombosis secondary to graft degeneration prevents such complications be diagnosed and leads to underestimation of the pathology.

Structural impairment of the graft in time has a multifactorial etiology (2,3). Potential causes include manufacturing errors, inappropriate storage conditions, inappropriate surgical procedures, material fatigue and biodegradation. Intrinsic graft failure might be defined as graft failure resulting entirely of manufacturing material, storage conditions and inappropriate surgical procedures in the absence of any direct graft trauma or infection. Focal ectasia or pseudoaneurysm may be secondary to a hole or tear on the graft wall (3). Because of this possibility, each synthetic vascular graft must be checked under static pressure in order to avoid production related complications of graft materials before reconstruction of vasculature.

Intrinsic graft failure occurs 7 years after the implantation on average; however, cases occurring at 1 year to 19 years have been reported in the literature (4,5). Reports of structural error are utterly rare with the latest vascular Dacron prosthesis on the market (1). Graft dilatation and rupture might lead to organ loss or death. Therefore close follow up USG, computed tomography or DSA are recommended (6).

Excision of the damaged graft and re-implantation with open surgical repair remain to be the gold standard method among the treatment options of these complications. However, percutaneous endovascular methods are used more frequently due to their ease, lower risks and lack of the need for general anesthesia. Additionally, shorter hospitalization and lower costs are among the other significant advantages.

In conclusion, Late graft complications are severe issues that might be life threatening or lead to organ loss. Intermittent
follow up of patients with prosthesis grafts using imaging modalities is therefore quite important.

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Conflicts of Interest

The authors declared no conflicts of interest with respect to the authorship and/or publication of this article.

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