

Endovascular Treatment of Popliteal Artery Aneurism and Occlusive Arterial Disease-A case Report

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Abstract

There is no level A evidence to determine open repair (OR) or endovascular repair (ER) intervention to treat popliteal artery aneurysms. This article addresses a case of endovascular treatment of both popliteal artery aneurysm (PAA) and below knee peripheral atherosclerotic occlusive disease (PAD) in which we opted for endovascular treatment with satisfactory outcome, as well as a discussion about indications and expected results. We concluded that endovascular treatment is effective in treating this for it resolves the symptoms by recanalization of the artery system with little risks during the procedure and with short hospital stay.

Keywords: Popliteal artery; Aneurysm; Arterial occlusive disease

Introduction

Surgical treatment of popliteal artery aneurysms (PAA) has advanced over time. Constant development of new endovascular techniques has converted these into the most attractive methods available today. To repair PAA open surgical approach is usually durable, and can be performed with low risk. Some physicians have recommended stent grafts to repair popliteal aneurysms. Endovascular PAA repair with covered stents is increasingly used, some achieved patency rates similar to open surgery [1,2].

Aneurysm repair was performed without per operative deaths and the risks associated with open surgery. It is, however, unclear when an endovascular approach is preferred to traditional open repair with great saphenous vein bypass [2]. PAA may cause serious ischemic complications associated with thrombosis or embolization resulting in limb loss. Untreated PAA will progress to complications in almost 70% of cases in 5 years and has a strong association with limb loss in up to 30-40% of patients [3-5]. Our indication for treating asymptomatic aneurysm is a diameter of >20 mm. In symptomatic patients indication for surgery was unrelated to aneurysm's diameter [1-5]. We present a case of a male with a PAA associated with PAD treated with endovascular techniques. These techniques have arisen as a reliable and safe alternative for the treatment of peripheral artery disease below-the-knee arteries of patients and have become the first option in the treatment of obstructive lesions in patients with high risk for conventional revascularization.

Case Report

A 71-year-old male was admitted in March, 2014 complaining of pain and swelling behind his right knee aggravating throughout the last six months. Past medical history of hypertension, heavy smoker and had critical claudication of the right leg. Over the past few months, the patient had experienced worsening leg pain after walking and the popliteal aneurism was in incidental finding. There was no history of any trauma or local/systemic infection.

Physical examination revealed a regular heart rate of 72 beats per minute and a blood pressure of 140/90 mmHg. On the left side there were normal palpable femoral and popliteal pulses, but no palpable distal pulses. In the right leg a palpable pulsatile mass in the upper popliteal fossa was revealed. Right distal pulses were weak, while the ankle brachial index (ABI) for the left and right limb was 1.0 and 0.6 respectively. Color duplex ultrasonography demonstrated a huge PAA and peripheral artery disease below-the-knee arteries.

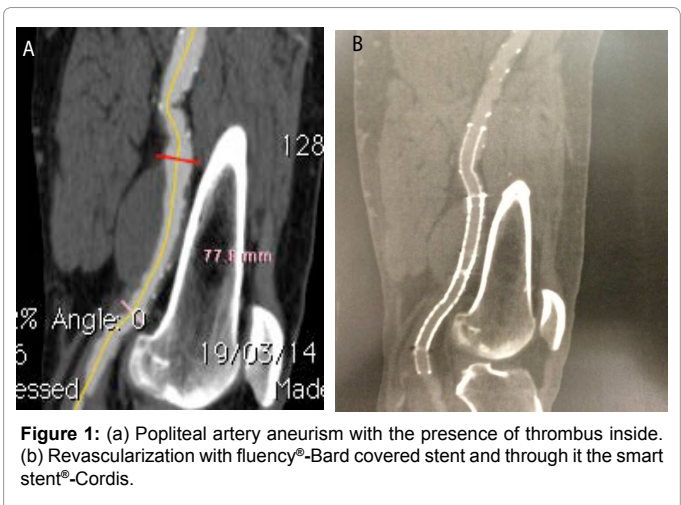


Figure 1: (a) Popliteal artery aneurism with the presence of thrombus inside. (b) Revascularization with fluency®-Bard covered stent and through it the smart stent®-Cordis.

Computed tomography angiogram (CTA) depicted a popliteal mass (38 cm × 35 cm × 7.8 cm) extending from the mid thigh to popliteal fossa, with the presence of thrombus inside. (Figure 1) (a) thrombus (b) Revascularization with Fluency®-Bard covered stent and through it the smart stent®-Cordis. (Figure 2) (a) Distal peripheral atherosclerotic disease (b) Final result after endovascular treatment of popliteal artery aneurism and occlusive arterial disease. The CTA revealed a small infra renal aortic aneurism.

Procedure

Technical approach-endovascular repairs of the PAA procedures are performed in the operating room. The ER was performed with the patient under spinal anesthesia. The access was made by an open

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Figure2: (a) Distal peripheral atherosclerotic disease (b) Final result after endovascular treatment of popliteal artery aneurysm and occlusive arterial disease.

ipsilateral access and the percutaneous puncture trans common femoral artery with 9F sheath. First of all we reconfirmed preoperative CTA findings, measured PAA diameter and length and diameter and length of the adjacent normal arterial segments to be used as graft landing zones. The treatment of the below knee arterial disease of the right leg was done with balloon angioplasty, with Sleek[®]-Cordis balloon 1.5, 2.0 and 3.5 mm to very small arteries to determine the influence of infrapopliteal outflow vessel. Also we used Powerflex[®]-Cordis 4.0 and 5.0 mm balloon diameter to treat the atherosclerotic disease. The PAA was excluded with Fluency[®]-Bard covered stent, 9.0 mm × 60 mm. We deployed two endografts to provide adequate landing zones and fully cover longer aneurysm. First we deployed the distal endograft and than brought the distal end of the second device to match up with the proximal end of the deployed graft. Through the endografts we deploy the Smart Stent[®]-Cordis 9.0 mm × 80 mm to improve radial force. The stents landing zones were 1.0 cm distally to the endograft end. Diameters and lengths were chosen based on precise intra- operative arterial measurements. We perform knee-flexion maneuvers after graft deployment to determine any anatomical kinking that may occur. Physical examination in the immediate postoperative showed femoral, popliteal and dorsalis pedis pulse on the right lower limb. In the immediate postoperative the patient was given clopidogrel 300 mg and AAS 200 mg. The patient had an uneventful recovery in the immediate postoperative period. He was discharged 24 hours after the procedure for follow-up at the outpatient clinic. He has been using clopidogrel 75 mg, AAS 100 mg and simvastatin 40 mg. He is currently on follow up and reports complete remission of symptoms, ABI=0.8, as he is able to take a daily walk of 1.000 meters and faces no limitations, such as claudication of the right lower limb.

Discussion

PAA is the most common peripheral aneurysm presenting bilaterally in 50% and coexisting with abdominal aortic aneurysm (AAA) in 50% of cases and 80% are asymptomatic at the time of diagnosis [6].

A diameter greater than 2.0 cm, especially for aneurysms with a significant thrombus load or with chronic distal embolic occlusion, is an acceptable indication for intervention. Patients with severe claudication are considered for elective repair [1,2,5,7,8]. Concomitant distal arterial occlusive disease is frequently associated with popliteal aneurysms, yet did not appear to substantially impact either long-term graft patency or limb salvage in open approach [9]. Due to the risk, treatment in the symptomatic stage is recommended in PAA>2.0 cm mainly with PAD, either with surgical by pass, interposition or endovascular means using covered stents [10]. In the literature technical success was achieved in 100% with complete aneurysm thrombosis and no perioperative complications such as stent fractures, device migration or separation could be detected [10]. However others failed to prove the superiority of ER over OR. If anatomy is suitable, ER of PAA in the elderly and high-risk patients is justified [2]. The approach to repair these aneurysms has become a subject of debate, particularly with the increased utilization of endovascular techniques. We do OR to treat popliteal aneurysm, in this specific case we chose endovascular approach to treat both the arterial atherosclerotic disease and the Popliteal artery aneurysm. In our case, based on patient's age and the compromised distal run-off, we decided to proceed with an ER approach to treat both concurrently with a shorter mean hospital stay [1,2,10-12]. The advances of bioengineering in the two last decades are quite evident, and the field of endovascular surgery and minimally invasive techniques has accompanied this development, aiming at overcoming its limitations. The management of popliteal artery aneurysm and chronic obstructive lesions of the femoral-popliteal axis still needs improvement when it comes to long-term heavily calcified atherosclerotic disease. However, the case herein reported is an example of the technological advances and the development of new devices that may significantly help and provide effective and safe results in the treatment of patients with indication for endovascular approach as the best choice of surgical treatment.

Conclusion

In conclusion, the use of ER provides distinct advantages to treat popliteal artery aneurysm and chronic obstructive lesions. Patients at high risk for open repair or without suitable vein should be considered as candidates for endovascular repair. We agree that patients with both popliteal artery aneurysm and occlusive arterial disease are good candidates to ER. A careful analysis of the patient and lesion's characteristics are necessary in choosing the right therapeutic approach.

Consent

A written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review.

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