

Spontaneous giant popliteal artery aneurysm

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Abstract

A 60 year old male presented with sudden onset of pain in right lower limb, difficulty in standing and antalgic gait since 3 days. There was no history of trauma. Examination showed a non-tender, compressible, pulsatile 10 x 6 cm swelling in the right popliteal fossa. His blood investigations were within normal range. Arterial duplex ultrasonography of right lower limb showed right sided popliteal artery aneurysm (PAA) with foci of thrombus in it. CT-angiography confirmed the findings. He underwent popliteal artery aneurysmectomy and interposition of graft. He was discharged on postoperative day 5. We will be describing a case of spontaneous giant PAA and discuss the protocol that we follow.

Keywords: Aneurysm, Rupture; Vascular diseases; Popliteal artery; Aneurysmectomy

Introduction

Although Popliteal Artery Aneurysms (PAA's) are uncommon with <0.1 % of incidence, they constitute about 70% of peripheral artery aneurysms [1]. Majority of them occur in elderly male and are often asymptomatic. The most common presentation is intermittent claudication. Other symptoms include acute limb ischemia (ALI) and bleeding following

aneurysmal rupture [2,3]. PAA's occur following atherosclerosis, trauma, mycotic aneurysms or inflammatory arteritis and usually associated with abdominal artery aneurysm [2]. Purpose of this study is to review indications and contraindications for PAA surgery and describe the protocol that we follow.

Case Report

A 60 year old male patient was referred by an Intervention Radiologist to surgery outpatient department. Patient presented with complaints of sudden onset refractory pain in the right lower limb and difficulty in walking. Patient was limping and had antalgic gait since 3 days. There was no history of trauma. Patient was a non-smoker, non-diabetic and non-hypertensive. On arrival, patient was hemodynamically stable; both lower limbs were warm with palpable peripheral arterial pulses. There was a non-tender, compressible, pulsatile swelling measuring 10 x 6 cm in the right popliteal fossa. Also, patient had bilateral lower limb varicose veins. His blood investigation reports, such as hemogram, liver function test, renal function test, coagulation factors were within normal range. Arterial duplex ultrasonography (DUS) of right lower limb showed right sided PAA with echogenic foci of thrombus. Right side popliteal vein showed normal flow. CT-angiography (Figure 1a & 1b) showed right sided thick walled PAA with thrombus in the lumen.

Although distal vessels were atherosclerotic, blood flow was essentially normal in the distal vessels. Left lower limb arterial system was normal. Patient was referred from department of intervention radiology because angioplasty or endovascular stent placement was not feasible owing to its large size across the knee joint. Therefore, an open surgical approach was planned as it was not amenable for endovascular intervention. Patient underwent excision of aneurysm (Figure 2a) and reconstruction of the vessel using ipsilateral reverse short saphenous vein graft. Aneurysmectomy specimen was sent for histopathological examination (Figure 2b). Although, in the immediate post-operative period saturation in the operated limb was recordable along with preserved toe movements, six hours after surgery saturation in right lower limb reduced and subsequently it was not recordable. However, toe movements were present.

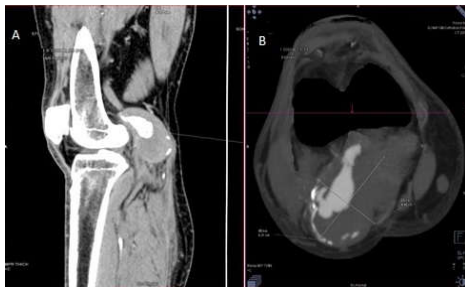
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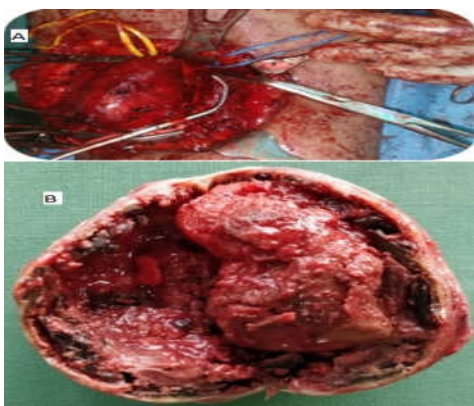
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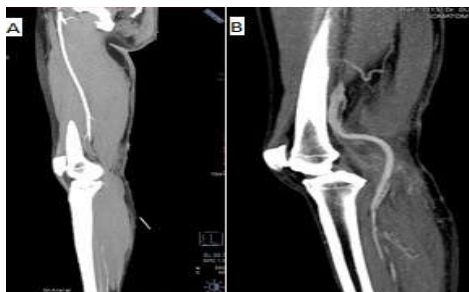


**Figure 1: A. longitudinal section of right sided popliteal artery aneurysm
B. Sagittal section of right sided popliteal artery aneurysm**



**Figure-2: A: Aneurysm dissection
B. Cut section of excised specimen of right sided popliteal artery aneurysm**

A bedside DUS of right lower limb showed no blood flow in the distal vessels and the entire graft appeared thrombosed. CT-angiography (Figure 3a) showed thrombus in its entire length of graft with extension for about 10cm both in the proximal as well as in the distal aspect of the graft. Also, there were a few collaterals visible supplying distal part of the limb. Wound was re-explored and the venous graft was excised. Further, embolectomy was performed using a 4 French Fogarty catheter. A prosthetic graft (8-mm gelatin coated dacron graft) was placed between the cut ends of the popliteal artery and anastomosed. Procedure was uneventful. Saturation, temperature and toe movements were restored in the ipsilateral lower limb after the completion of surgery. CT-angiography (Figure 3b) performed on fourth postoperative day that confirmed normal flow in the operated limb.



**Figure-3: A: Thrombosed short saphenous vein graft in its entire length
B. Post-re-exploration CT-angiography showing patency of synthetic graft and distal flow**

In the postoperative period, patient received antibiotics, analgesics and anticoagulants as described in Figure 4. Patient was ambulated on Day-2 following re-exploration. Subsequently, patient was discharged on postoperative day five. He was on follow up once in 6 months. During his follow up period, patient had developed wound infection that was managed conservatively.

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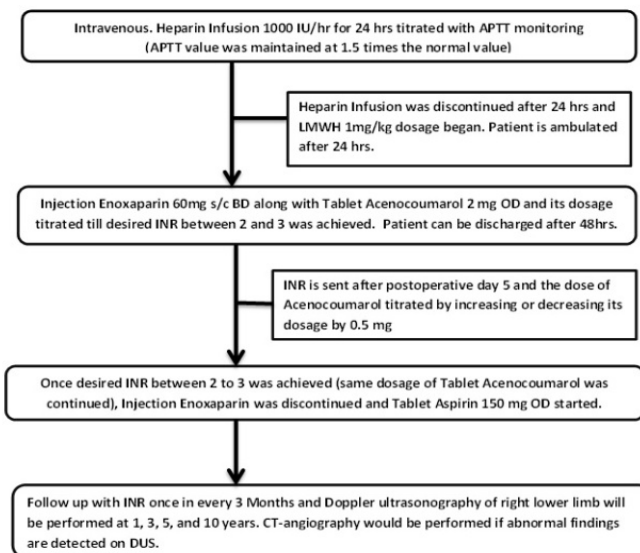


Figure-4: Postoperative treatment algorithm

Discussion

PAA's are generally defined as dilated popliteal artery when luminal diameter more than or equal to 2 cm [3]. PAA's are the most common peripheral artery aneurysms with an estimated incidence of less than 0.1% [1]. Notably 80% of them are asymptomatic and 50% present bilateral. PAA's are common in elderly male above 60 years of age with established cardiovascular disease [4]. Symptomatic PAA's need treatment in order to prevent devascularisation of limb [4]. PAA's generally become symptomatic when they are associated with either thromboembolism, acute rupture or compression of adjacent structures [5].

According to an article published by Dawson I, et al, about 70% of the asymptomatic PAA's presented with complications, such as thrombosis, distal limb embolization, and rupture when they were followed over five years without treatment [6]. Nearly 50% of PAA's present with ALI and among these about 20 - 60% result in limb loss [7]. Thus, PAA's of more than or equal to 3 cm in diameter need intervention. Patient presenting with intermittent claudication is generally intervened electively; however, ALI, rupture of aneurysm and bleeding, and gangrene of the limb requires an emergency surgery.

Management approach for PAA's has been a fiercely debatable topic over decades. Two modalities of treatment have been established. One being traditional surgical approach (excision of aneurysm and interposing graft) and the other being endovascular intervention (angioplasty or stent) [8].

Lately, endovascular approach is preferred over traditional surgical modality; however, surgical treatment is considered the best approach over endovascular stenting in large aneurysms to prevent from fatal complication [9,10]. Intervention is considered if patient symptomatic or in asymptomatic cases with aneurysm size more than 2cm. Although endovascular approach is associated with higher re-intervention rate, it is preferred to surgery due to short duration of hospital stay, less post-operative pain and need for blood transfusion. The endovascular treatment has anatomic limitations related to popliteal artery and its location but it is not inferior to surgical repair [11,12].

Our patient was referred from an intervention radiologist for surgical treatment due to its large size. A few difficulties were encountered during the surgery like atherosclerotic walls of vessels that was fragile and not holding the suture adequately, large size of aneurysm and its presence in the deeper cavity was posing difficulty during dissection and anastomosis.

Initially, we did aneurysmectomy and cut ends were anastomosed using reverse short saphenous vein graft; however, as the venous graft thrombosed on the first postoperative day, we had to re-explore and re-vascularise the limb using prosthetic graft.

Rest post-operative period was uneventful. In the immediate postoperative period, anticoagulation therapy started with injection heparin 1000 IU/hour (continuous

intravenous infusion) for 24 hours. Patient was ambulated on second postoperative day onwards. Patient received injection Enoxaparin 60 mg twice a day subcutaneously for next five days with effect from second postoperative day.

Also, Tablet Acenocoumarol 2 mg once daily was started from second postoperative day; further, the drug dosage was titrated till desired INR (between 2 and 3) was achieved [13]. Injection Enoxaparin was stopped on day six and tablet Aspirin 150 mg OD was started. Role of lifelong aspirin post intervention has been recorded in the past [14,15].

Antiplatelet and anticoagulation therapy is being continued as it inhibits platelet aggregation, progressive neo-intimal hyperplasia and graft thrombosis; furthermore, it helps in maintaining patency of graft [16].

Conclusion

Giant popliteal artery aneurysm are best managed by

- Surgical approach
- Aneurysmectomy with interposition graft is the treatment of choice.
- Long term regular follow-up with antiplatelet and anticoagulation therapy is recommended.

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