

## COMPLICATED POPLITEAL ARTERY ANEURYSM. CASE REPORT

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**ABSTRACT.** We present a case of a popliteal artery aneurysm in a 55 years old male, who presented with pain and a pulsatile mass in the right popliteal fossa. Angiography as well as Angio-CT examination revealed a popliteal artery aneurysm. We performed a femoro-distal popliteal by-pass with the ligation of the aneurysmal arterial segment. The popliteal vein was found thrombosed and the long saphenous vein was therefore spared.

**KEYWORDS** popliteal aneurysm, ruptured arterial aneurysm, peripheral aneurysmal disease, by-pass

### INTRODUCTION

Popliteal aneurysms are the most frequent aneurysms found in the lower limbs. They are found in about 1% of the adult population and are infrequent in females. They are associated with the presence of contralateral aneurysm in 30-50% of cases and with abdominal aortic aneurysms in 30-60%. Their main complication is arterial ischemia secondary to the thrombosis of the aneurysm, although it can also be presented in the form of compression symptoms or distal embolization. Spontaneous rupture is an uncommon complication and it is associated with arterial diameters of > 4 cm. The amputation rate

associated with ruptured popliteal aneurysms is 25% 9 (A. Ysa et al., 2007).

### CASE REPORT

A 55-years old male patient presented to our department complaining of pain and swelling in the right popliteal fossa. The medical history revealed a prior left femoro-tibial by-pass using the ipsilateral long saphenous vein (LSV), intervention made for multiple aneurysms along the superficial femoral and popliteal artery, which caused ischemic symptoms due to distal embolization. He also underwent PTA for a right external iliac critical stenosis in February 2010.

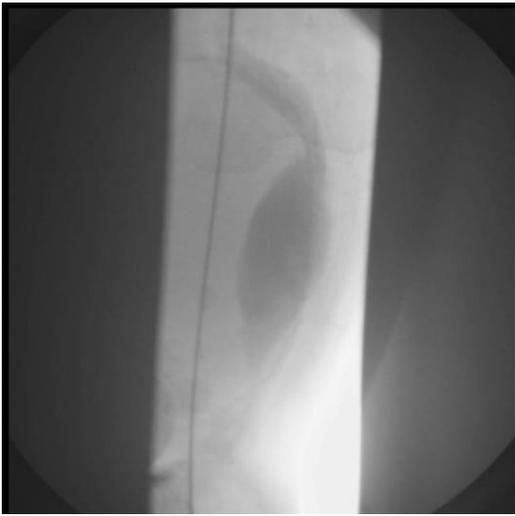
**Figure 1:** Ruptured popliteal aneurysm clinical presentation



The physical examination showed inflammation in the popliteal fossa with a pulsatile mass causing considerable increase in its diameter. All peripheral pulses were palpable.

Urgent duplex scanning was performed, showing a giant 8.5/12.5 cm, partially thrombosed aneurysm of the right popliteal artery.

We performed an angiography that confirmed the diagnosis of true popliteal artery aneurysm, revealing also an infra-renal abdominal aortic aneurysm with a diameter of 4.3 cm and several other smaller aneurysms along the hypogastric arteries.



**Figure 2:**

a) arteriography of the aneurysm before rupture

b) hypogastric artery aneurysm

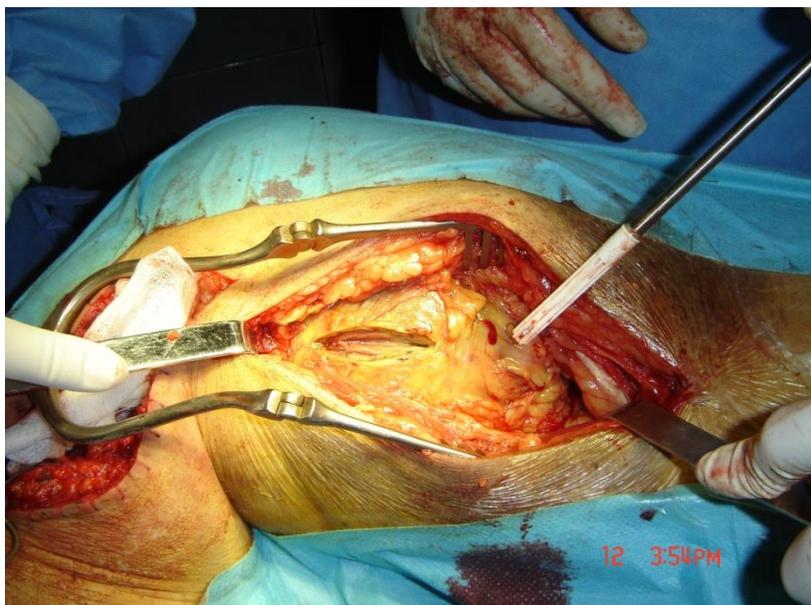


Three days after his admission the patient reported sudden pain in the popliteal fossa with an increase of the limb diameter. An emergency CT-angiography was performed, which confirmed the rupture of the popliteal aneurysm.

**Figure 3:** CT-angiography image of the ruptured popliteal aneurysm, and abdominal aorta aneurysm

Urgent surgical intervention consisting of femoro-popliteal by-pass and aneurysm excision was decided upon.

Intraoperatively we found a thrombosed popliteal vein, reason for which the great saphenous vein could not be used as an autologous graft being the only option for venous return of the leg. Instead a below-knee femoro-popliteal bypass was performed using polytetrafluoroethylene (PTFE) prosthesis. Because of its massive size and the initial dissection needed for distal control, we resected the aneurysm completely.



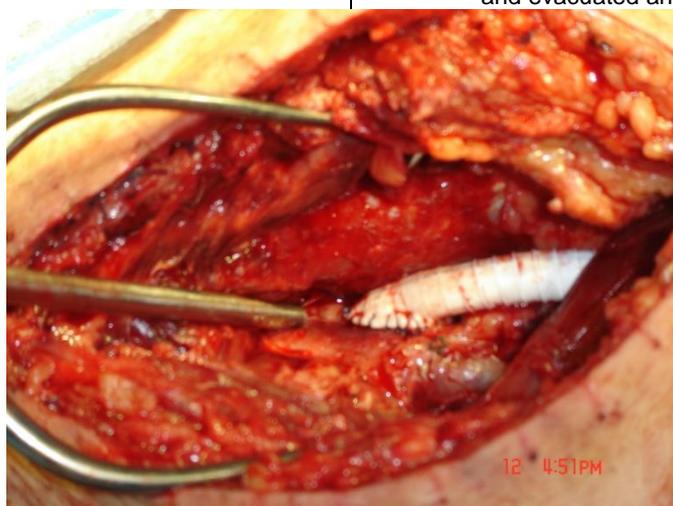
**Figure 4:** Intraoperative aspect of the aneurysm before excision



**Figure 5:** Aspect of the evacuated thrombus



**Figure 6:** Intraoperative aspect of the opened and evacuated aneurysm



**Figure 7:** Distal anastomosis of the PTFE graft

The patient had an uneventful postoperative course, apart from a mild oedema, and regained ambulatory function of the extremity. The control duplex scanning reported good patency of the graft. The patient was discharged from the hospital with antithrombotic and antibiotic treatment (ciprofloxacin) for 2 weeks.

He was also included in a follow-up program to assess the development of the 4.3 cm abdominal aortic aneurysm, and the multiple, bilateral, small hypogastric artery aneurysms. The follow-up of the revascularization technique (1 month, 6 months and then annually) through duplex scanning is important, not only for the early detection of potential graft problems, but also to verify the complete exclusion of the aneurysm and to avoid potential problems related to leakages (A. Ysa et al., 2007).

## DISCUSSION

After the aorto-iliac system, the popliteal artery is the most common site of aneurysm formation. The ratio of popliteal to aortic aneurysms is estimated to be 1:10 to 1:20, and 5% to 10% of those with aortic aneurysms have popliteal aneurysms. Associated aneurysms are common. Approximately 50% of patients have bilateral popliteal aneurysms, one third

has aortic aneurysms, and one fourth has femoral aneurysms. The incidence of extrapopliteal aneurysms is highest among those with bilateral popliteal aneurysms; up to 78% of such patients have aortic aneurysms. These patients continue to develop other, remote aneurysms, and new aneurysms have been documented in 6% of treated patients at 1 year and 49% at 10 years, illustrating the need for lifelong surveillance.

Popliteal aneurysms classically manifest in several ways. In about one half of affected patients, they manifest with limb ischemia from thrombosis (around 32%) or embolization (around 20%). Approximately 37% of the aneurysms are asymptomatic and are detected by palpation or ultrasonographic examination. Popliteal aneurysms can also manifest with symptoms from compression of adjacent structures (around 10%), notably nerve (causing paresthesias or other deficits) or vein (leading to deep venous thrombosis). Rupture is rare, with an overall incidence of 2.1%.

Unfortunately, no reports describing rupture documents the size of the aneurysm. It may be that the relatively thigh bony and musculo-fascial relations of the popliteal artery offer some degree of protection (Karl A. Illig et al., 1998)

## CONCLUSIONS

Popliteal artery aneurysms are limb threatening because of their potential to cause embolism, thrombosis, and, uncommonly, rupture. Their timely diagnosis before complications is a relevant clinical issue. For instance, elective repair of a popliteal aneurysm results in substantially better outcomes than revascularization for acute aneurysmal thrombosis or delayed revascularization for chronic limb ischemia resulting from repeated subclinical embolism.

Ultrasonography or CT angiography are the radiological investigations of choice. A CT angiography is still the gold standard test for diagnosing ruptured popliteal aneurysms. It is recommended to perform a preoperative arteriogram to assess the run-off and rule out distal embolization (A. Ysa et al., 2007).

When contemplating exclusion bypass for such operations, it would be useful to have an ultrasound scan of the venous system to allow appropriate preoperative planning in term of conduit formation (A Chaudhuri et al., 2006).

The 14% incidence of popliteal artery aneurysm among men with aortic aneurysm suggests that routine Doppler ultrasound scanning should be considered as a screening test in male patient with AAA.

The etiology of femoral and popliteal aneurysms probably involves the interaction of a genetic alteration that predisposes to the loss of the arterial wall integrity following local forces such as repeated flexion of the arteries at the hip and knee. The familial as well as genetic bases of these lesions remain unresolved at the present time (Karl A. Illig et al 1998).

Definition of the genetic basis for aneurysms, aortic or peripheral, will hopefully be aided by the complete mapping of the human genome, which will form the basis for determining if gene functions exists that interact to produce these diseases.

Unfortunately, the clinical relevance of these lower extremity aneurysms discovered in association with AAAs is ill defined at present, and there remains a need for a prospective natural history study to establish their actual significance (Aparna Diwan et al.,2002)

## AUTHOR CONTRIBUTION

All authors have contributed equally to the present work.

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