SCIENTIFIC LETTER

CHRONIC PSEUDOANEURYSM OF THE POPLITEAL ARTERY

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ABSTRACT

A 28-year-old male patient was admitted to the Orthopedic Service for a joint biopsy due to significant swelling in the left knee. He had a history of laparotomy for multiple gunshot wounds one year earlier, a mass in the left knee with severe pain, joint retraction, and gait limitation. Physical examination revealed a giant and reluctant mass in the left suprapatellar region. The tomographic study with vascular contrast showed a decrease in the caliber of the left superficial femoral artery in its distal portion prior to the emergence of the adductor canal, secondary to a large mass in the posterior compartment of the ipsilateral thigh. Arteriography showed a pseudoaneurysm of the left popliteal artery with a significant decrease in the caliber of the left superficial femoral artery. A firearm projectile was identified in the right knee. It was treated with open surgery and cell salvager Medtronic™, the pseudoaneurysm was resected, and raffia of the popliteal vein and arterial reconstruction with polytetrafluoroethylene prosthetic graft was performed.

Keywords: *pseudoaneurysm, popliteal artery, arterial reconstruction, open surgery, graft, polytetrafluoroethylene.*

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INTRODUCTION

The origin of arterial pseudoaneurysm is usually traumatic due to penetrating wounds, including firearms or bladed weapons[1]. The diagnosis of this entity is, in general, clinical. Physical examination and, sometimes, auxiliary diagnostic methods are essential to confirm it. We present the case of a male patient in whom the striking feature is the prolonged period of chronicity and in whom, with a complete anamnesis, the differential diagnosis can be established, given that the patient was initially referred for a scheduled joint biopsy.

MATERIALS AND METHODS

A 28-year-old male patient was referred to our center for a giant mass in the left knee of more than nine months of evolution to perform a scheduled osteoarticular biopsy. He had a history of exploratory laparotomy approximately one year before, which required, in another institution, enterorraphy of the small intestine and transverse colon, right kidney and a hepatic segment due to multiple gunshot wounds at close range and a gunshot wound in the external face of the left knee (*Figure 1*). The patient was admitted with a giant mass in the left knee with a reluctant, non-pulsatile consistency, difficulty walking and using crutches due to excellent joint retraction, and high-intensity pain. An angiotomography was performed, which showed a large mass in the left suprapatellar region of approximately 8 cm x 10 cm in diameter with mass effect, so an evaluation by the Vascular Surgery Service was requested (*Figures 2 to 5*).

An arteriography was requested, which revealed a pseudoaneurysm of the left popliteal artery with slowing of the flow of the superficial femoral artery and recanalization in infrapatellar vessels (*Figure 6*). Open surgical exploration under general anesthesia with a right jugular central line and left radial arterial line was decided. The left suprapatellar approach was performed through the inner aspect of the lower third of the thigh, and the cell retriever Medtronic™ was prepared for autotransfusion if necessary. Carefully, the soft tissues were dissected down to the exposure of the left popliteal artery pseudoaneurysm, which involved popliteal vessels (*Figure 7*). The pseudoaneurysm was resected, and a linear lesion was observed on the anterior-external aspect of the popliteal vein, approximately 3 cm, which was corrected with raffia of Prolene™ 5-0 (*Figure 8*). The popliteal artery was reconstructed with a 6 mm diameter ringed Goretex™ prosthetic graft, as the mass effect of the pseudoaneurysm thrombosed the left saphenous vein. Systemic heparinization was indicated with 7500 IU of heparin sodium, and proximal and distal end-to-end anastomosis was performed with 5-0 Prolene. Good recovery of distal flow and pulse was observed. No fasciotomy was performed, and no drains were used (*Figures 9 to 11*). The patient had no intraoperative complications and was hospitalized for 24 hours in the intermediate care unit, where he underwent antibiotic and antithrombotic prophylaxis. He was then transferred to the general ward, where he remained for five days, with good evolution of the wound and a notable reduction of pain that allowed reducing the dose of opioid analgesics. He was discharged for outpatient rehabilitation and physical therapy, and peripheral vasodilators and post-surgical control by outpatient clinic were indicated.

FIGURE 1. The medial approach of the popliteal artery and left popliteal pseudoaneurysm.

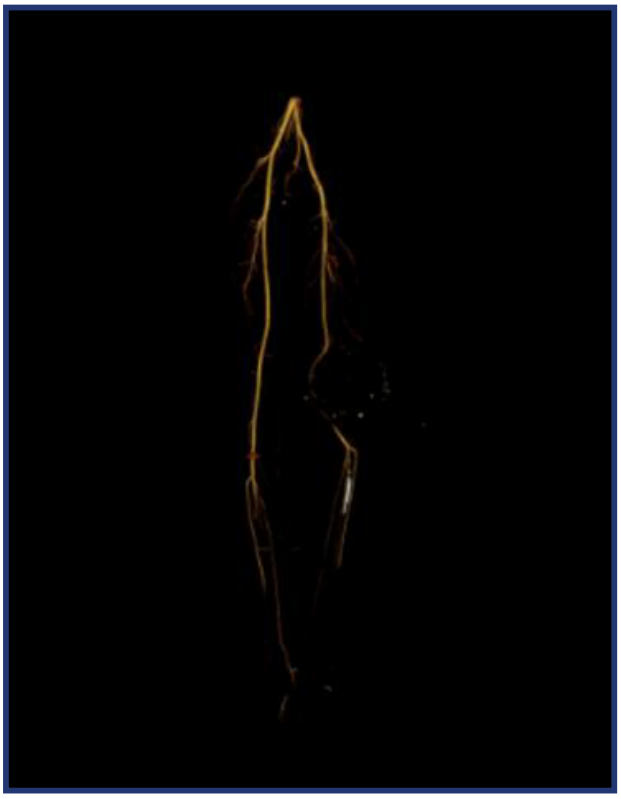

FIGURE 2. Angiotomography of the lower limbs with 3D reconstruction; a popliteal pseudoaneurysm with flow slowing in the superficial femoral artery is identified.

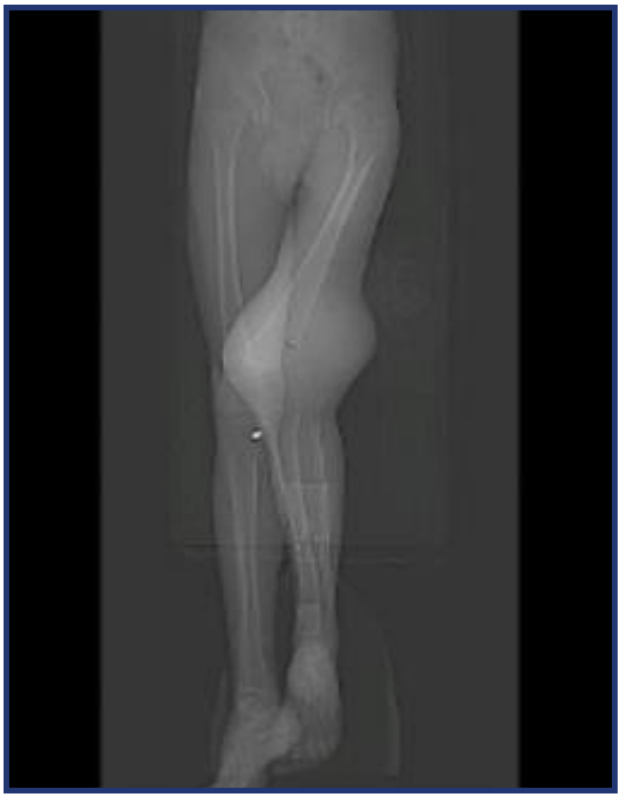

FIGURE 3. Angiotomography in simple plane of radiographic reconstruction showing a left suprapatellar mass.

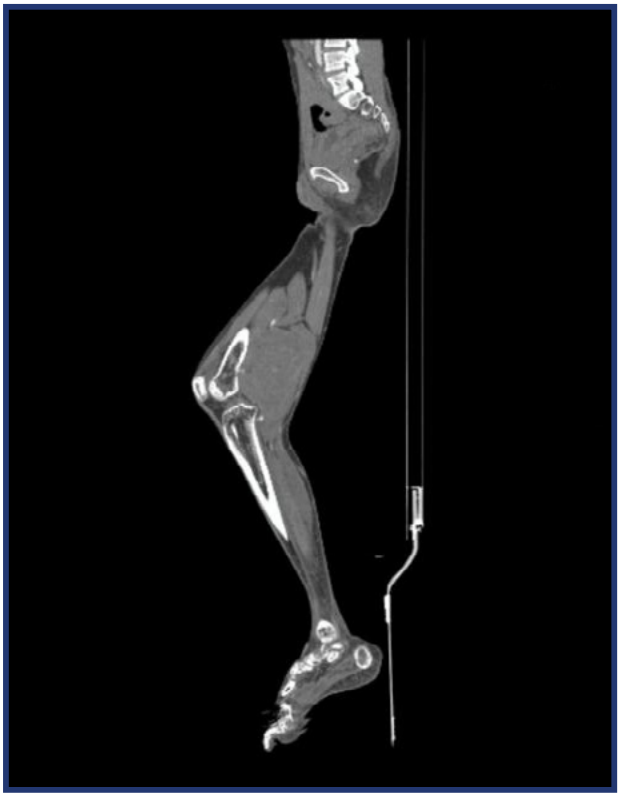

FIGURE 4. Angiographic sagittal plane showing a mass in the left popliteal fossa.

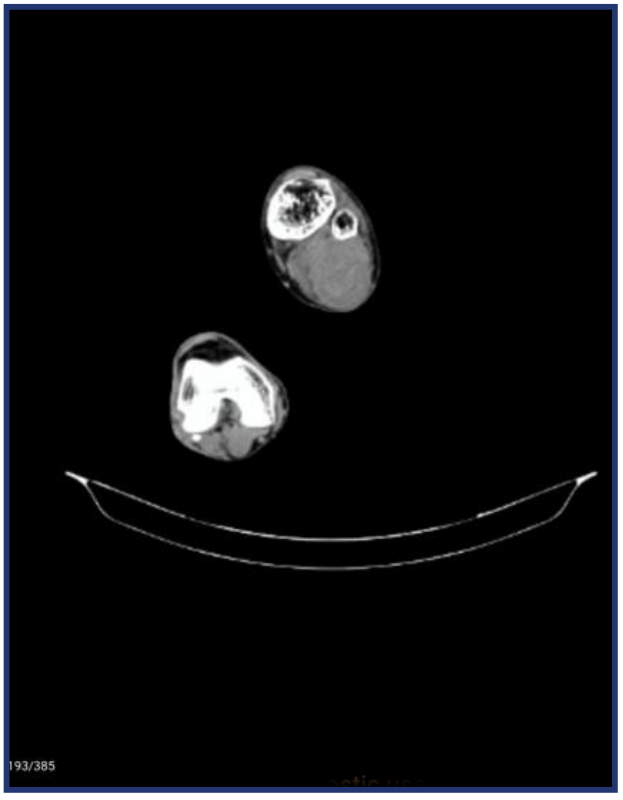

FIGURE 5. Angiographic sagittal plane of the popliteal fossa showing a giant pseudoaneurysm of the popliteal artery.

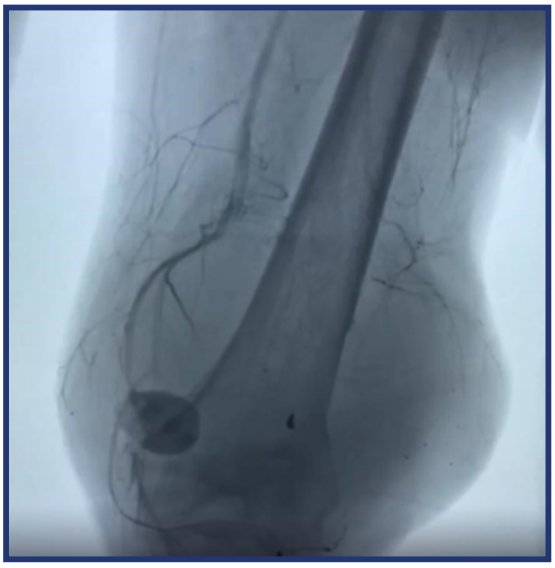

FIGURE 6. Arteriography of the left femoropopliteal axis showing a pseudoaneurysm in the left popliteal artery.

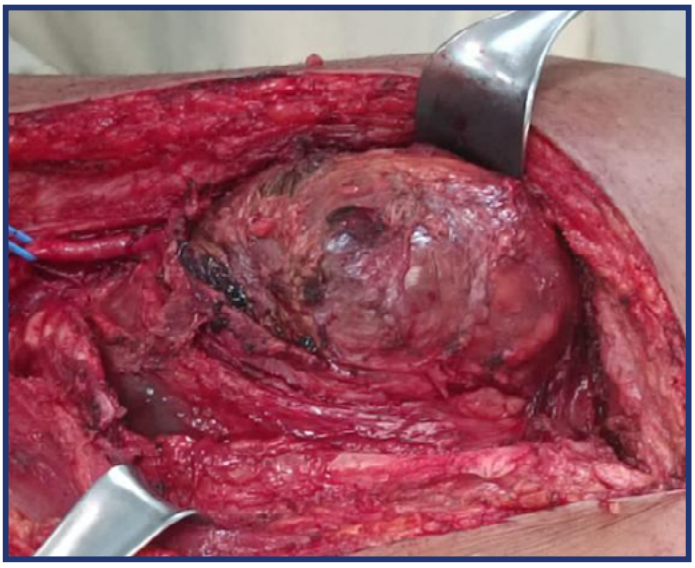

FIGURE 7. Popliteal artery and left popliteal pseudoaneurysm.

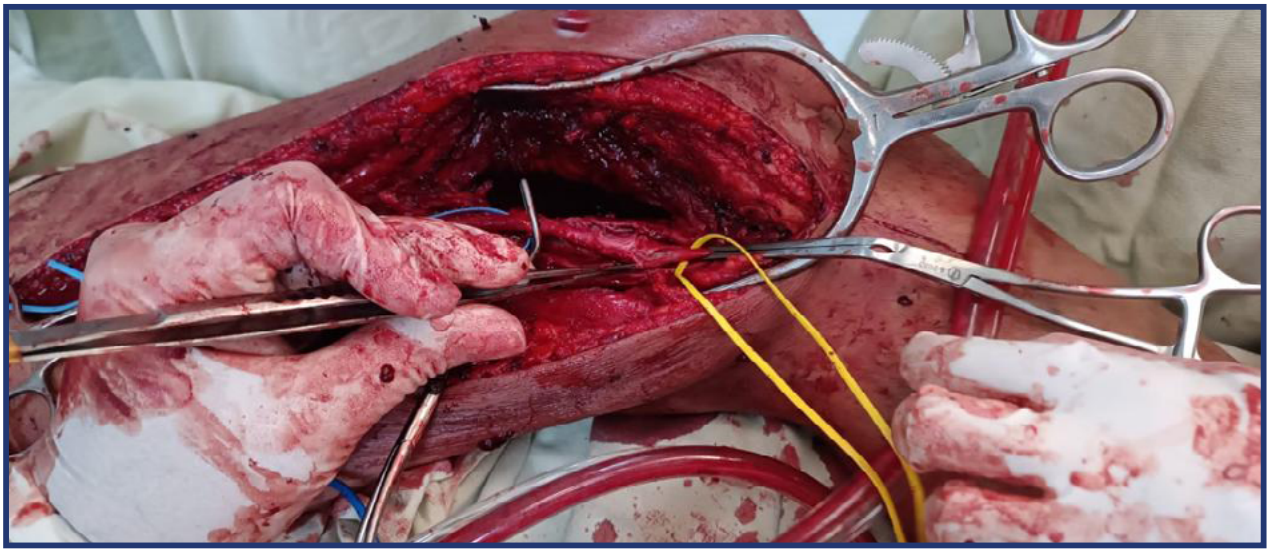

FIGURE 8. Resection of the pseudoaneurysm with an irregular linear lesion of the popliteal vein.

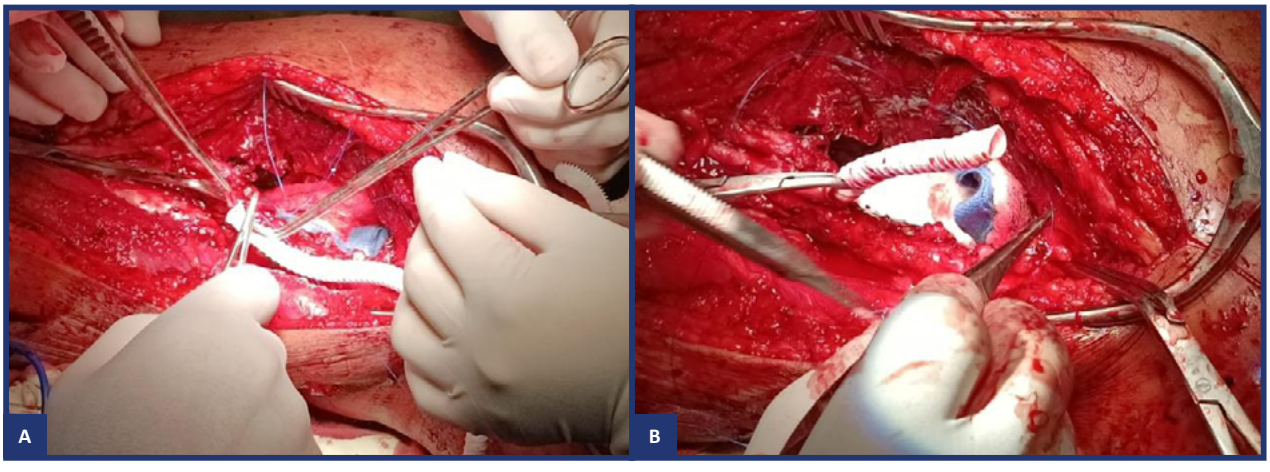

FIGURE 9. **A** and **B**: confection of proximal anastomosis with prosthesis.

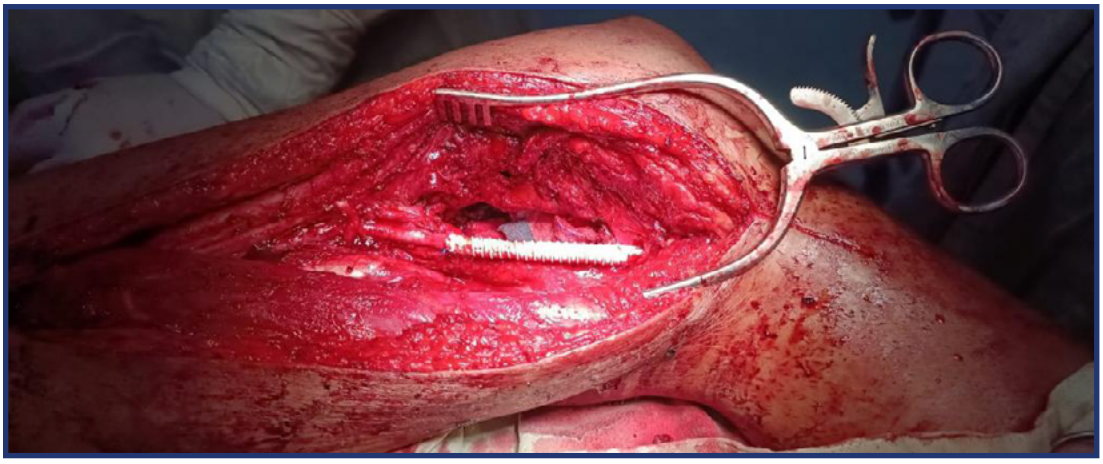

FIGURE 10. Primary reconstruction of the popliteal artery with terminal-terminal anastomosis with prosthesis.

FIGURE 11. Careful soft tissue synthesis in the popliteal region to protect the prosthetic graft.

DISCUSSION

The diagnosis of arterial pseudoaneurysms of traumatic origin in their late or chronic evolution is infrequent since the patient is usually in a window period of 6 to 8 hours to resolve the ischemia; otherwise, the consequences are generally catastrophic due to active bleeding that can be life-threatening[1].

These pseudoaneurysms have a significant risk of complications and limb loss. Sixty-two percent are associated with penetrating traumatic injuries, and 37% with iatrogenic injuries[2,3]. Their presentation is usually late, and the most common clinical findings are painful edema and pulsatile mass on physical examination[4]. Auxiliary diagnostic methods are of great help in establishing the diagnosis of certainty and planning the definitive course of action; among them, arterial duplex and angiotomography with three-dimensional reconstruction stand out[5]. In the case of the patient presented here, it was decided to perform conventional surgery since the popliteal artery aneurysm involved a significant extension of the vessel and also involved the popliteal vein on its external side. The approach was medial with resection of the affected arterial segment with interposition of a 6 mm diameter ringed polytetrafluoroethylene (PTFE) prosthesis with terminal-terminal anastomosis and venous raffia of the affected segment[6,7]. Given that the popliteal fossa is an anatomical area challenging to approach, endovascular repair was considered[8,9]. The risk of migration with placement of an endovascular device was considered to increase the risks of thrombosis, with exacerbation of the pre-existing lesion or the difficulties inherent to the movement of the popliteal artery and the device when walking; that is, flexion of the knee joint could accentuate the tortuosity between two fixed points, one proximal (the adductor muscle conduit) and the other distal to the origin of the anterior tibial artery, which can lead to stent fracture or thrombosis[10-12].

Ligation of the popliteal vein has a high correlation with compartment syndrome. In this case, the venous lesion was at the expense of its external aspect with a linear lesion that required simple raffia[13,14]. Other studies also document that amputation rates do not depend on the venous lesion treatment technique[15,16]. In this procedure, fasciotomy was not

performed due to the careful management of the dissection of the different planes of the region and because a prosthetic graft was used for the primary reconstruction of the popliteal artery. To protect the graft against possible infections, it was covered with the vastus externus muscle and the long portion of the adductor magnus muscle; there was no need to place a drain.

RESULTS

The patient underwent open surgery under general anesthesia with cell salvage to reduce the risk of hypovolemia. A giant pseudoaneurysm of the left popliteal artery was resected, and primary arterial reconstruction was performed with a prosthetic graft. No fasciotomy or drains were used. Bacterial and antithrombotic prophylaxis was indicated, and systemic anticoagulation was not used to reduce bleeding risks[17]. Surgical time was approximately 4.5 hours, which reduced the risk of ischemia and amputation[18,19]. Autologous saphenous vein grafting was not used, given that the giant pseudoaneurysm thrombosed a large part of the homolateral internal saphenous vein; the venous vessels of the contralateral lower limb were preserved for eventual reoperation[20]. The patient presented no complications and was discharged on his fifth day of hospital stay with negative blood cultures at 72 hours. On discharge, peripheral vasodilators (cilostazol and acetylsalicylic acid) were prescribed, and physical therapy sessions were indicated to achieve a favorable evolution with early rehabilitation.

In the first instance, the patient had been referred for an etiological diagnosis of a mass of probably osteoarticular origin. Physical examination and ancillary diagnostic methods allowed for establishing the definitive, timely diagnosis in a patient with joint retraction, gait difficulty, and a giant mass in the knee.

CONCLUSION

Chronic popliteal artery pseudoaneurysm as a nosological entity is rare due to its high morbimortality, either with reversible ischemia with loss of function of the affected limb or loss of the limb and, sometimes, even death of the patient due to incoercible bleeding. In this case, it was mistaken for a pathology of osteoarticular origin, and the medical anamnesis and physical examination played an essential role in making the diagnosis certainty.

Declarations
The authors declare no conflict of interest.

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