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Case Report
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Tibioperoneal Trunk True Aneurysm Complicated by Acute Limb Ischemia

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Abstract

Background: True aneurysmal location on the Tibioperoneal Trunk (TPT) appears to be extremely rare in the literature. Inferior limb true aneurysms are mainly reported to involve the popliteal, or the femoral arteries. We report the clinical presentation of a true TPT aneurysm extended to the origin of the Anterior Tibial Artery (ATA) and complicated by sudden arterial thrombosis and threatening acute limb ischemia.

Method: A 86-year old patient was admitted with recent symptoms suggesting inferior right limb acute ischemia. The clinical diagnostic was confirmed by duplex and further detailed by urgent CT-angiography evaluation. A 4.4 cm-diameter, totally thrombosed TPT true aneurism was diagnosed. The arterial circulation of the right limb was promptly reestablished owning a popliteal-anterior tibial, saphenous vein bypass.

Result: The treated limb showed quick clinical and hemodynamic recovery without request for fasciotomies. There were neither ischemic, nor neurologic, short, or long-term sequelae in rehabilitation. A brief literature review focusing on these rare true aneurismal presentations was additionally undergone.

Conclusion: True TPT aneurisms represent extremely rare vascular pathological entities documented in the literature. Most of these cases unmask with abrupt ischemic inferior limb symptoms. Unless diligent surgical revascularization, their prognostic remains grim, with high limb loss rates.

Keywords: True aneurysm; Acute ischemia; Tibioperoneal trunk; Tibial bypass; Infra-popliteal aneurysm

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Introduction

True aneurysmal involvement of the Tibioperoneal Trunk (TPT) appears to be exceedingly rare, according to dedicated literature [1]. A majority of true inferior limb aneurysms preferentially affect the popliteal, the femoropopliteal segments and only exceptionally the tibial arteries [1,2]. The present case report describes a rare clinical presentation of a true TPT aneurysm extending to the Anterior Tibial Artery's (ATA) origin, which induced sudden arterial thrombosis and acute ischemia of the inferior limb.

Case Presentation

An 86-year-old men was addressed by his General Practitioner because of intense pain, coldness and blueish color of the right leg. These symptoms were noted shortly before admission. His medical past included refractory hypertension, active tobacco use, hypercholesterolemia, incipient Alzheimer's disease, ulcer with delayed hemorrhagic complications, Chronic Obstructive Pulmonary Disease, moderate chronic renal insufficiency and previous aorto-biiliac Dacron prosthesis revascularization for symptomatic Abdominal Aortic Aneurism (AAA) performed three years ago. The clinical exam revealed acute ischemia symptoms (stage IIa) of his right leg [1]. Blood analysis proved normal hemoglobin level, moderate renal insufficiency (GFR=41/reference 60) and incipient rhabdomyolysis (CK=1.7 mg/dL). Iconographic assessment combined Duplex and CT-angiography imaging. Both methods evinced correct patency of previous aorto-iliac surgery, a 23 mm-diameter left external iliac artery aneurysm and complete occlusion of the right distal popliteal artery (P2 and P3 segments). The origin and the proximal part of ATA was occluded (Figure 1A). Beyond a short stump, the lower TPT, the Posterior Tibial (PTA) and the Peroneal Arteries (PA) were equally occluded (Figure 1A,1B). Only the ATA showed remote patency, however with poor pedal vessel

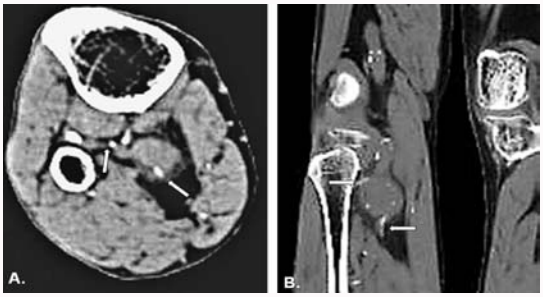

Figure 1: Preoperative Angio-CT imaging:
(A) An axial Angio-CT view showing the TPT aneurysm, the ATA origin (upper arrow) and the initial segment of the PTA and the Peroneal artery (lower arrow). **(B)** Sagittal exploration evincing the same anatomical features at the ATA origin (upper arrow) and the TPT bifurcation (lower arrow).

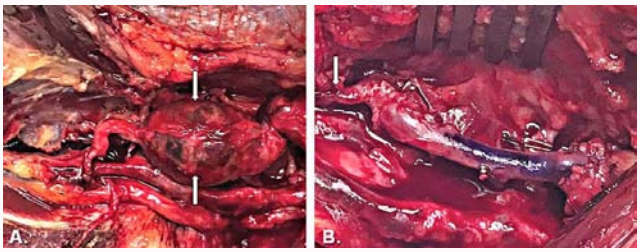

Figure 2: Perioperative aspects:
(A) The initial presentation of the TPT aneurysm. In this view, the ATA origin is masked by the aneurismal body. **(B)** The popliteal-ATA bypass using an inversed saphenous vein. The PTA and the Peroneal trunk origins proved long, chronic and unpassable occlusions harboring heavy calcifications and without available back-flow. These trunks were further sutured and excised, allowing sole reconstruction of the perfusion via the ATA.

outflow visualization. Despite demanding interpretation by lack of uniform contrast filling, a true infra-popliteal aneurysmal structure was diagnosed (Figure 1A,1B). Excepting the mentioned left external iliac aneurysmal formation, the patient had no other homolateral, or contralateral proved aneurysms. Urgent surgical revascularization for "inferior limb preservation" was required.

Treatment

Taking into account the present clinical and radiological features, a surgical approach on the distal popliteal and infra-popliteal arteries was decided. Using a medial infra-genicular access, the TPT aneurysm was isolated (Figure 2A) and further excised. The aneurysmal disease involved equally the ATA origin that was further chosen as an outflow vessel for bypass (Figure 1B). Both PTA and PA proved entire length chronic occlusions, harboring huge atherosclerotic and calcific wall disease. After targeted upstream thrombectomy of the popliteal artery (the P2-P3 segments) and correct inflow regain, the ATA was equally reperfused using additional thrombectomy with a 5F Fogarty balloon-catheter (Edwards co. the USA). The final arterial flow in the right distal leg was reestablished by interposing a popliteal-anterior tibial artery venous bypass (Figure 2B). The internal saphenous conduit (a 3 mm-diameter vessel) was harvested via the same incision and placed in a reversed position (Figure 2B). The popliteal-ATA bypass was performed on the proximal ATA segment using a terminal--terminal, veno-arterial anastomoses (Figure 2B). Concomitant intraoperative PTA and PA exploration showed unpassable chronic calcific occlusions, and no available collateral back-flow. These trunks were sutured at their origin and further excised. The correct ATA recovered flow was documented by direct examination and by perioperative Doppler. The postoperative period revealed a correct distal calf and foot reperfusion, with the recuperation of the dorsalis pedis artery pulse. The right limb regained ABI was 1.2. No related ischemic, neurologic, precocious, or long-term sequelae were noted in recovery. Histologic analysis demonstrated "common" atherosclerotic inflammatory and chronic degenerative aneurysmal disease.

Discussion

A review of the literature reveals that true aneurisms of the infragenicular vessels are rare pathological entities [1-5]. Among them, true infra-popliteal aneurysmal presentations are extremely rare, while specifically those of the TPT involvement only exceptionally mentioned [1-4]. Currently, for this region, most pseudoaneurysms were described as to associate local trauma or iatrogenic risk-factors. True aneurysms were also observed, yet often linked with autoimmune, inflammatory, genetic, or with mycotic etiologies [3,4].

According to two recent analysis of the literature made by Sagar et al. [4] and Hattam et al. [5] the reported number of true infra-popliteal aneurysmal cases is inferior to 50, that of isolated PTA aneurysms appears lower than 15, and probably even scarcer (less than 5) concerning those involving the TPT region [1,4,5]. Most of the previous TPT notifications concern dominant PTA localizations that rather "stretch" over the TPT bifurcation [1,3-5]. Consistent with other analogous reports, the present case can be associated with a much wider and systemic aneurysmal arterial disease of the patient [1-5]. It is represented in this case by previously treated AAA and coexisting left external iliac uncomplicated aneurysmal formation. Taking into account the scarce available information referring to the tibial aneurysmal disease and particularly for true TPT aneurysmal cases, any uniform strategy for treatment appears difficult to be defined [4- 6]. While some previous reports recommend punctual surveillance of these aneurysms (especially in elderly patients), others advise prompt surgical treatment nonaligned to any specific symptomatology [1,4,5]. Finally, most authors unanimously prone to revascularization in symptomatic and still recoverable limb presentations [2-5]. However, at the present time there are no clear recommendations concerning medical, versus surgical or endovascular interventional therapy, in symptomatic or asymptomatic patients. Uniform guidelines for specific aneurysmal surveillance, ligation, embolization, thrombolysis and/or parallel revascularization, according to the remnant tibial trunks and collateral perfusion are still lacking [1,4,5]. Beyond occasional endovascular approaches mainly for posttraumatic pseudoaneurysm formations, the contemporary interventionist does not avail consistent data for punctual strategy of treatment in the tibial arteries or for TPT aneurysmal disease [2,5,6]. Most of the indications are dictated by good clinical sense and the local team expertise [5]. Concerning the present case, an eventual primary endovascular strategy was not indicated because of the long popliteal and tibial Chronic Total Occlusions (CTO), adding probable fresh thrombus at all levels, beyond dense infra-genicular calcifications. Such hostile anatomic features for angioplasty represent marks of local severe atherosclerotic disease adding chronic micro-embolic participation. Secondly, the endovascular approach was avoided to minimalize complementary renal function alteration due to the contrast medium administration. Initiatory thrombolysis as a preparatory strategy to revascularization was equally discussed yet eluded from treatment because of severe comorbidities and following medical multidisciplinary consensus. In this setting, persistent and

instable hypertension, adding notable gastro-intestinal bleeding antecedents pleaded against this strategy.

It should be finally emphasized that in this case, alike any other similar infrequent clinical presentations, a thorough clinical diagnostic coupled to mindful awareness and good clinical sense shared by a team of specialists, may compensate for the lack of current recommendations in the available literature.

Conclusion

Tibioperoneal trunk true aneurysmal disease represents an extremely rare localization of this systemic arterial degenerative pathology. It embodies a limb-threatening arterial disease that without prompt diagnostic, revascularization and diligent surveillance, can enhance a sharp risk for major amputation and high morbi-mortality rates.

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