A rare para-anastomotic femoral artery aneurysm in a patient with history of femoro-popliteal bypass graft occlusion

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ABSTRACT
INTRODUCTION: Para-anastomotic aneurysms may develop as a late complication of arterial reconstructions. They are mostly seen after abdominal aortic procedures and also are mostly encountered as pseudoaneurysms.
PRESENTATION OF CASE: We report a true para-anastomotic aneurysm in the common femoral artery of a 57 year old man with an occluded femoro-popliteal bypass graft. We discuss the surgical management and possible causation of this extremely rare condition.

DISCUSSION: Para-anastomotic aneurysms can have some life-threatening consequences, such as erosion of adjacent tissues, distal embolization from mural thrombus and rupture of the aneurysmal sac.
CONCLUSION: Endovascular treatment using stent grafts is highly effective, but it has some handicaps such as occlusion of major arterial orifices. For this reason, surgical reconstruction is the preferable choice for the management of para-anastomotic aneurysms.

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1. Introduction

Arterial reconstructions including primary suture closure or bypass surgery with venous or prosthetic grafts can lead to a para-anastomotic aneurysm (PAA) as a late and rare, but challenging complication [1]. PAAs can be seen in any location where surgery is performed. They may present as ongoing dilation of the arterial wall adjacent to the anastomosis [2]. PAAs are often related to graft infection, but they may be caused by sterile degenerative processes [3]. Because of some negative outcomes of PAAs, such as embolic or thrombotic events, and rupture and erosion of adjacent structures [4], its management is urgent.

There are many cases reporting para-anastomotic aneurysms after abdominal aortic surgery, with an incidence of 2.9% at the proximal anastomotic site and 8.7% at the distal anastomotic site [5]. PAA of the iliac artery has also been reported by Maras et al. [6]. But no case report presenting a para-anastomotic true aneurysm of the femoral artery, as in our case, has been encountered in the literature. We report a case of a huge para-anastomotic true aneurysm of the common femoral artery in a patient with a past history of femoro-popliteal bypass surgery.

2. Presentation of case

A 57-year-old male was referred to our vascular surgery clinic complaining of a large painful mass in the left groin for six months. He stated that, five years previously he had a prosthetic femoro-popliteal bypass graft because of claudication. He denied any recent trauma to the groin. He was a non-smoker. He was not claudicating and had normal peripheral pulses. Normal peripheral pulses were present in all four limbs. He had moderate cardiac insufficiency (ejection fraction 40%), arterial hypertension and type II diabetes mellitus.

Color duplex ultrasonography (CDU) demonstrated a 4.7 × 4.1 × 3.4 cm saccular aneurysm arising from the anterior aspect of the left common femoral artery (CFA) having a mural thrombus with a thickened wall. This was limited between the inguinal ligament and the left common femoral artery, just proximal to the orifice of the superficial femoral artery. The proximal superficial and deep femoral arteries were patent with a triphasic flow pattern. The prosthetic graft was occluded. Because of the concordance of the coronary artery and peripheral arterial occlusive diseases, coronary and peripheral arterial angiography were performed by the cardiology department. The coronary arterial tree was normal. There were no stenotic or aneurysmal segments along the abdominal aorta to the common femoral arteries (Fig. 2A). Angiographic images showed a significant aneurysmal segment of...
Fig. 1. Giant pulsating mass in the left groin.

Fig. 2. Arteriography. Normal abdominal aorta and iliac arteries (A), aneurysm of the CFA (B).

Fig. 3. Surgical procedure, showing large volume mural thrombus in CFA aneurysm (A), showing aneurysmal sac after removing mural thrombus (B).

Fig. 4. Femoral artery reconstructed with biologic vascular graft.

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Fig. 1. Giant pulsating mass in the left groin.

Fig. 2. Arteriography. Normal abdominal aorta and iliac arteries (A), aneurysm of the CFA (B).

Under general anesthesia, via a longitudinal groin incision, the proximal neck on the CFA was isolated 3 cm proximal to the aneurysmal sac. The distal neck on the superficial femoral artery 3 cm to the aneurysmal sac was isolated in the same way. The prosthetic graft was also identified. After clamping the proximal and distal healthy necks, dissection continued into the aneurysm. It was seen that the PTFE graft was occluded and that there was no trouble with the anastomosis of that graft (e.g., leakage or rupture of the suture). The aneurysmal sac was opened, and after removing abundant mural thrombus, orifices of healthy sections of proximal common femoral artery, superficial femoral artery and deep femoral artery were identified (Fig. 3A and B). With examination after the removing clamps, it was seen that the antegrade flow from the common femoral artery and the retrograde flow from the deep femoral artery were satisfactory. However, the retrograde flow from the superficial femoral artery was not as satisfactory as in the other two vessels. The aneurysmal sac between all three healthy orifices was resected. Then, embolectomies with 4F and 3F Fogarty catheters were performed on the superficial and deep femoral arteries. An embolectomy catheter easily passed through the deep femoral artery. But, it did not pass through the superficial femoral artery as easily as the deep femoral artery. No thrombotic material was removed from any of the arteries.

A vascular segment was reconstructed by interposition of an 8 mm biologic vascular graft (OMNIFLOW® II Vascular Prosthesis, Bio Nova Europa LTD, United Kingdom) between the common femoral and deep femoral arteries. By a second short segment of 8 mm, the biologic vascular graft was anastomosed to the first graft by an end to side technique proximally and to the superficial femoral artery by an end to end technique distally (Fig. 4). The reason for the primary interposition between the common and deep femoral arteries was that the deep femoral artery was the source of the collateral arteries to the below knee arteries. Anastomotic techniques employed were continuous sutures using 5.0 polypropylene thread. The postoperative period of the patient was uneventful and
Peripheral pulses were intact. He was discharged on the 4th P.O. day. During out-patient follow up for two months, there was no recurrence of his groin mass, pain in the groin or claudication.

3. Discussion

Para-anastomotic aneurysms are one of the rare but challenging late complications of prosthetic vascular reconstructions. They usually result from a slow degenerative process of the vascular wall adjacent to the anastomosis. They can have some life-threatening consequences, such as erosion of adjacent tissues, distal embolization from mural thrombus and rupture of the aneurysmal sac [4]. The incidence of femoral aneurysms has been reported as 0.1–5% after groin procedures such as cardiac catheterization [7] and 1–10% after vascular reconstructions [8]. Those incidences given in the literature included both true and false para-anastomotic aneurysms. The real incidence of true aneurysms is not clear.

Para-anastomotic aneurysm in any segment of a vessel can be a sign of a systemic issue causing aneurysmal dilatation in other parts of that vascular structure [9]. Because of this understanding, the concurring aneurysms in other vascular segments, mostly the abdominal aorta [10], must be screened carefully. In our patient, by screening with conventional peripheral angiography, we did not encounter any other aneurysmal dilatation within the arterial tree from the aorta distally, apart from the aneurysm in the left common femoral artery.

Etiologic considerations of para-anastomotic aneurysms include prosthetic graft infection, an ongoing previous dilatation process [11] or peripheral occlusive disorders [12]. In our case, the prosthetic graft was sterile and taking information from previous imaging studies, most importantly, the ones done for preparation of the femoro-popliteal bypass surgery, no evidence of an aneurysmal process had been shown. Certainly, there may still have been a process that began earlier that could not be established with imaging studies. But in our patient, it seems that the peripheral occlusive disease was the most effective etiologic factor. Occlusion of the prosthetic femoro-popliteal bypass graft can be shown as evidence supporting this hypothesis.

Intravascular therapy using stent grafts is a highly effective choice for the treatment of para-anastomotic aneurysms. However, it has some important limitations, such as aneurysms located in the close vicinity of major arterial orifices [13]. In this case, the orifice of the deep femoral artery was included in the aneurysmal segment, and if we had used a stentgraft it would have closed, causing ischemia in the lower leg. For such reasons, surgical reconstruction is the preferable choice for the management of para-anastomotic aneurysms. Excision of the aneurysmal sac having mural thrombus is an indispensable part of the operation, aimed at decompression of surrounding structures and limiting the development of postoperative infection. A biologic vascular graft can be an important protective measure against postoperative infection: no post-operative infection was detected in our patient during follow-up for two months.

Conflicts of interest

None.

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None.

Author contribution

The patient was under the care of Mustafa Aldemir, Fahri Adali, and Önder Akci analyzed the data. Mustafa Aldemir, Serpil Erkoç and Osman Tansel Darcın wrote the manuscript. All authors reviewed and approved the final manuscript.

Ethical approval

None.

Consent

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 by the Editor-in-Chief of this journal on request.

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