

CASE REPORT



An interesting case of chronic pulmonary thromboembolism caused by a femoral arterial aneurysm

Naveen Bhamri, Devendra Kumar Agrawal and Sudhansu Sekhar Parida

Department of Cardiology, Max Super Speciality Hospital, New Delhi, India

ABSTRACT

Femoral artery aneurysm (FAA) is an unusual peripheral arterial aneurysm that can result in potential rupture, thrombosis and embolism. FAA can variably present as an asymptomatic mass or acute lower limb-threatening ischemia. We present a rare case of asymptomatic FAA causing proximal deep vein thrombosis, leading to chronic pulmonary thromboembolism. Endovascular intervention was performed to secure FAA. This report signifies FAA as a differential diagnosis of DVT and chronic pulmonary thromboembolism. Although an open surgical approach is generally preferred for FAA repair, minimally invasive endovascular repair can be considered a safe alternative technique.

KEYWORDS

Femoral artery aneurysm;
Endovascular therapy; Deep
venous thrombosis;
Pulmonary embolism

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Introduction

Femoral artery aneurysm (FAA) is a rare vascular condition characterized by an abnormal localized dilation of the femoral artery [1]. Despite its infrequent occurrence, FAA poses significant clinical challenges due to the potential risks of rupture, thrombosis, and embolism. While FAA may present in various clinical scenarios, ranging from asymptomatic masses to acute lower limb-threatening ischemia, prompt diagnosis and appropriate management are essential to prevent potentially life-threatening complications. FAA, though uncommon, can have serious consequences, making it crucial to understand its clinical presentation, underlying etiology, and management strategies. The clinical presentation of FAA can be diverse, adding to the complexity of its diagnosis. In some cases, FAA may remain asymptomatic and be incidentally detected during routine physical examinations or imaging studies. However, asymptomatic FAA requires careful monitoring due to the risk of potential complications over time. On the other hand, FAA can manifest as an acute, lower limb-threatening ischemia, requiring immediate intervention to salvage the affected limb. Understanding the spectrum of FAA presentations is crucial for timely identification and appropriate management. Undiagnosed or untreated FAA can lead to severe complications such as rupture, thrombosis, and embolism [2].

FAA are typically pseudoaneurysms that can mimic other vascular disorders, leading to diagnostic challenges. One such uncommon scenario is the compression of the femoral vein by FAA, resulting in venous stasis and thrombosis. This unique complication can mimic deep venous thrombosis (DVT) and, in severe cases, may lead to chronic pulmonary thromboembolism. However, proximal DVT due to venous compression is extremely rare. We report such an uncommon case presenting with further complications of chronic pulmonary thromboembolism.

Materials and Methods

A 60-year-old male patient presented at our center with a history of shortness of breath and right pedal edema for one

month. His medical history was not suggestive of any significant disease such as coronary artery disease and hypertension. A clinical examination showed a non-tender, pulsatile mass in the right femoral region with well-felt pulsation in the lower limb. The patient did not have symptoms of claudication pain. There was no previous history of any invasive intervention or trauma to the femoral region. The transthoracic echocardiographic evaluation did not find any regional wall or valvular abnormalities with a left ventricular ejection fraction of 60%. Contrast-enhanced computed tomography (CT) of the chest demonstrated a linear filling defect is seen at the bifurcation of the right pulmonary artery extending into the origin of the right upper lobe pulmonary artery suggestive of chronic pulmonary thromboembolism. Doppler ultrasound examination of the right groin area showed femoral arterial aneurysm and proximal venous thrombosis in the femoral vein.

Results

CT angiography of the lower abdomen and lower limbs was performed. It revealed a thick walled fusiform aneurysm (52 x 40 mm) involving a superficial femoral artery with peripheral eccentric thrombus resulting in compression of the right femoral vein with thrombus in common femoral vein extending into the saphenofemoral junction (Figure 1). Endovascular intervention was planned to address femoral arterial aneurysm. Acetylsalicylic acid (ASA) 100 mg and clopidogrel 600 mg were administered before the procedure. An angiographic study performed via left common femoral access confirmed a large aneurysm in the right superficial femoral artery (SFA) (Figure 2A). Prior to the intervention, 7500 IU of intravenous unfractionated heparin was administered to the patient. A vascular stent-graft (Fluency plus 8 mm X 60 mm) was deployed to cover the aneurysmal segment of SFA through the left common femoral arterial access. A subsequent angiographic study confirmed a complete aneurysm seal without identification of any endoleak (Figure 2B). Inferior vena cava (IVC) filter was placed in the infrarenal segment of IVC

*Correspondence: Dr. Naveen Bhamri, Department of Cardiology, Max Super Speciality Hospital, Shalimar Bagh, New Delhi, 110088, India, e-mail: drbhamrinaveen@rediffmail.com

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through left common femoral venous access. The procedure went uneventful. Oral ASA 100 mg/day, clopidogrel 75 mg/day, and subcutaneous injection enoxaparin 6000 IU twice

a day were administered during hospitalization. The patient was discharged with the above antiplatelet drugs and direct oral anticoagulant rivaroxaban 20 mg/day. The patient was asymptomatic at a follow-up visit at one month.



Figure 1. Computed tomography image showing femoral arterial aneurysm compressing the femoral vein.

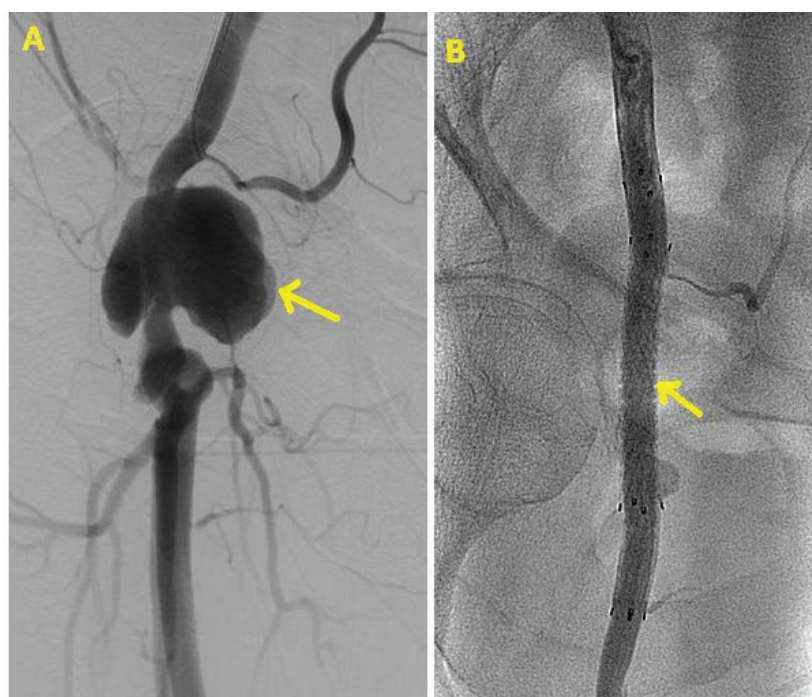


Figure 2. 2A: Angiographic study showing large aneurysm in the right superficial femoral artery and 2B: after cover stent placement.

Discussion

Peripheral artery aneurysms are characterized as a 50 percent or greater increase in artery diameter or an increase in diameter of more than 2 centimeters [3]. True FAAs are exceptionally rare, with an incidence of 0.005% [4]. True aneurysm involves all of the vessel wall layers, unlike pseudoaneurysm. In clinical practice, femoral artery pseudoaneurysms are more commonly observed as complications of diagnostic or interventional arterial procedures. The risk factors for FAA include elderly male patients, hypertension, hyperlipidemia, smoking, coronary artery disease, peripheral vascular disease, vasculitis,

and connective tissue disorders [5-9]. The clinical manifestation of FAA ranges from detecting asymptomatic mass on routine physical inspection (as in our case) to acute limb-threatening ischemia (Figure 3).

In the present case, the femoral arterial aneurysm was considered a true aneurysm in the absence of any femoral intervention history. However, magnetic resonance imaging could have been useful in distinguishing between real and pseudoaneurysm. In such cases, it is also essential to search for concomitant aortic or other peripheral artery aneurysms in the ipsilateral or contralateral limbs, as the reported

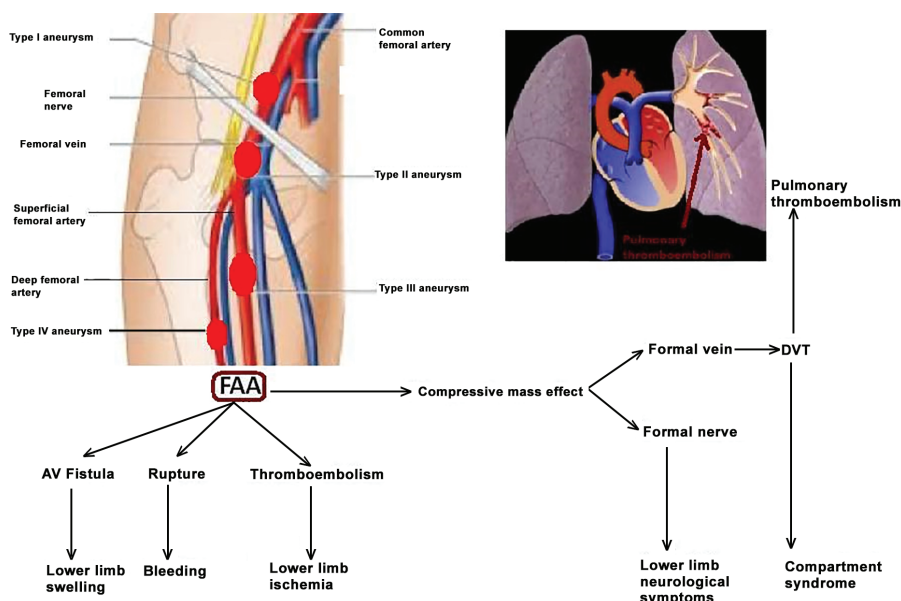


Figure 3. Pathophysiological consequences of femoral arterial aneurysm.

occurrence rates for such aneurysms range greatly, varying from 29 to 92 percent [10,11]. Fortunately, any other aneurysm was not found in the present case. DVT due to FAA is an exceedingly unusual disorder due to direct aneurismal compression on the venous system resulting in venous stasis and thrombosis. It is similar to May-Thurner syndrome, where compression of left common iliac vein by right common iliac artery causes DVT [12].

Although there are anecdotally reported DVT cases caused by FAA, however, DVT and chronic pulmonary thromboembolism due to aneurysm of the femoral artery was not reported previously [13-15]. Venous thromboembolism such as DVT and pulmonary embolism (PE) is a relatively common cause of mortality globally, with an annual incidence of 117 per 100,000 populations. Almost half of the DVT cases progress to PE, with a fatality rate of 30% in the absence of early detection and timely management. Apart from the compression effect, Lee et al. have proposed the role of the immune response, inflammation, and

an activated coagulation system in causing venous thrombosis in patients with an aortic aneurysm in extensive database analysis. IVC filter was deployed in the present case to prevent further pulmonary embolization [16].

Symptomatic FAA is managed mainly with open surgical intervention. (Figure 4) The repair is typically guided based on the aneurysm's diameter and location, along with associated symptoms. Asymptomatic and small-sized FAA (<3.0 cm) can be observed with a yearly clinical assessment and vascular imaging. Symptomatic and asymptomatic patients with large aneurysms (≥ 3.0 cm) are considered for surgical repair to avoid potential complications from thrombosis, embolization, or rupture. Ultrasound-guided percutaneous thrombin injection has been considered as an effective therapy for femoral pseudoaneurysm. However, thrombin injection is not preferred in the presence of concurrent DVT as it could further cause more inflammation and scarring and thereby exacerbating DVT [17].

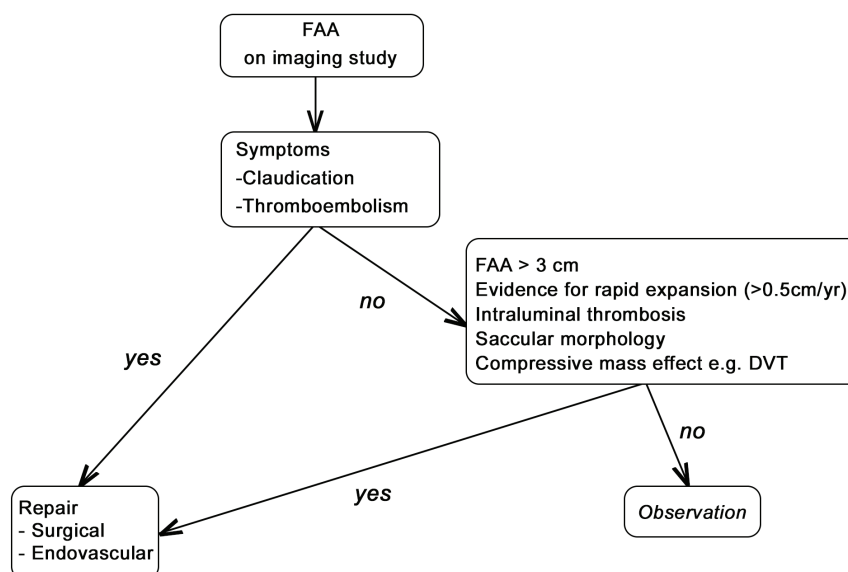


Figure 4. Management strategies of femoral arterial aneurysm.

Even though open surgery is regarded as the standard treatment for FAAs, surgical repair may necessitate extensive groin and abdominal dissections to achieve vascular control. It may result in skin necrosis, lymphatic complications, and infection [18]. There is little experience with endovascular management for FAA. Endovascular repair is mostly considered for critically ill, hemodynamically unstable, and unfit patients for open surgical repair [1]. Generally, stent placement in the common femoral artery is discouraged due to the possibility of potential fracturing of the stent or migration due to the hip joint's repetitive flexion. In a small series of patients with FAAs, benefits of a less invasive endovascular procedure such as greater patient compliance, a reduced hospital stay, and a shortened procedural duration have been demonstrated while treating complex FAAs effectively [19]. In our case, endovascular stent placement was preferred as it was quite feasible in the superficial femoral artery compared to the common femoral artery.

Conclusions

The femoral vein can be compressed by a FAA leading to venous stasis and thrombosis. It should be taken into account as a differential diagnosis of DVT and chronic pulmonary thromboembolism. Although an open surgical approach is generally preferred for FAA repair, minimally invasive endovascular repair is gaining interest in managing such cases with the anatomically feasible lesion. It can be considered a safe alternative technique.

Informed consent

Informed consent was taken from all the patients during the procedure.

Disclosure statement

No potential conflict of interest was reported by the authors.

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