Thrombosed Femoral Artery Pseudoaneurysm: Complication of Cardiac Catheterization

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We present a case of catheter induced pseudoaneurysm of femoral artery and postprocedural course. This type of complications occurs in 2% to 8% patients after interventional procedures via trans femoral access and has overall trend of increase due to significant number of this procedures in diagnostic and interventional cardiology. A 74-year-old female was admitted to Vascular department complaining of severe pain in her left groin. On physical examination, there was a femoral mass palpable but non-pulsatile in her left groin. Color Doppler documented the presence of femoral pseudoaneurysm as well as “to-and-fro” flow pattern on the pseudoaneurysm neck. CT arteriogram showed pseudoaneurysm with mostly thrombosed cavity, diameter of 85 x 27 mm. We concluded for further surgical repair. Key words: femoral artery pseudoaneurysm, cardiac catheterization, “to-and-fro” flow pattern

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1. INTRODUCTION

Femoral artery pseudoaneurysm (FAP) after cardiac catheterization is one of the most frequent complications after various invasive cardiovascular procedures related to the femoral arterial access site. FAP occur in 0.2% to 0.5% of diagnostic angiograms and 2% to 8% after interventional procedures via trans femoral access and this type of complications increase due to significant increase of diagnostic and interventional procedures. The incidence of FAP has increased due to more frequent use of thrombolytics, antiplatelet agents and anticoagulants, and larger-sized cannulas for interventional procedures as well (1, 2, 3, 4).

Superficial femoral artery (SFA) pseudoaneurysms occur mainly in individuals with atherosclerotic disease or atherosclerotic plaques in femoral artery segment but also can be associated with infections, inflammatory, immunologic or connective tissue disorders (1, 4, 5).

Most patients with non-atherosclerotic pseudoaneurysms of SFA are asymptomatic initially and later present with a pulsatile, expanding mass or hematoma near or along the anatomical course of SFA in the thigh and have a history of trauma or interventional or surgical procedure (3, 4, 5).

Color Doppler examination has been the mainstay of diagnosis and criteria are: branch of color flow in a mass separate from the affected artery, and a typical “to-and-fro” Doppler waveform in the pseudoaneurysm neck.

Pathway of pseudoaneurysmatic formation is due to fail of an arterial puncture site close, allowing arterial blood to jet into the surrounding tissues and form a pulsatile or non-pulsatile hematoma. These lesions lack a fibrous wall and are contained by a surrounding shell of hematoma and the overlying soft tissues. It can present as a new thrill or bruit, pulsatile or non-pulsatile hematoma, or pain or tenderness. Complications of pseudoaneurysms include rupture, distal embolization, local pain, neuropathy and local skin ischemia (3, 5, 6, 7, 8).

Ultrasound-guided compression repair has been shown to be a safe and cost-effective method for achieving pseudoaneurysm thrombosis. However, it carries considerable drawbacks including long procedure times, discomfort to patients, high recurrence rate in patients receiving anticoagulant therapy and an overall 3.6% complication rate. Treatment of FAP can be done also by percutaneous thrombin injection with the initial use of high dose thrombin (average dose of 1,100 IU) and newest approach with low-dose thrombin injections (average dose used 192 IU). This method has the same efficacy and high success rate (3, 7, 8, 9).

2. CASE PRESENTATION

We report a case of a 74-year-old female who developed pseudoaneurysm of the superficial femoral artery after cardiac catheterization. Patient
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The patient was admitted to Vascular department suffering of severe pain and hematoma of left leg, precisely left medial femoral region with radial propagation. Pain occur a month ago with gradually crescendo and turn to severe pain in previous seven days. In natural history she was treated at Cardiology department 6 months ago as acute coronary syndrome, non-Q myocardial infarction of anteroseptal wall presenting with stable angina. In anamnesis she had arterial hypertension, tobacco smoking, diabetes mellitus type 2, hyperlipidaemia. Standard drug treatment with angiotensin-converting enymes (ACE) inhibitors, statins, and calcium-channel blockers (CCB) was introduced. Month ago cardiac catheterization was performed and in post procedural period she developed gradually expanding swelling on medial aspect of her left thigh. The mass was non-pulsatile, moderate to severely tender and soft on palpation with no change in color of the overlying skin.

The patient was vitally stable with ESR of 11/1st hr, white blood cell count of 6,8 x10⁹/L, RBC 3,83 10⁹/L, hemoglobin of 132 g/L, hematocrit of 39,2%. A possible pseudoaneurysm was suspected, and Color Doppler was performed on the same day which established the diagnosis of pseudoaneurysm of the left superficial femoral artery. An ultrasound showed a saccular pseudoaneurysm (longitudinal diameter of 89 mm) of femoral artery with narrow neck (diameter of 1,5 mm) and „to-and-fro“ flow pattern. Pseudoaneurysm consist of two parts and isthmus between, where distal part is completely thrombosed (longitudinal diameter of 52 mm) (Figure 1 and 2).

CT angiogram showed in general aspect a number of calcified atheroplaques on magistral arteries, and left femoral pseudoaneurysm with deep hematoma of left medial infrainguinal region as well as thrombosed cavity (Figure 3, 4 and 5). Patient was referred to vascular surgeon and definitive surgical repair was done.

3. DISCUSSION

Pseudoaneurysms occur as a complication of femoral artery puncture and as a result of bleeding into surrounding soft tissue, with fibrous encapsulation and a narrow communication between the vessel and the fluid sac. Because they are not the result of true arterial wall dilatation, they are actually false aneurysms or pulsating hematomas. The vessel wall does not heal, and the blood flows back and forth between the two spaces during the cardiac cycle (3, 5, 6).

If a pulsatile or non-pulsatile mass is showed in post procedural period i.e. after cardiac catheterization, diagnostic dilemma include pseudoaneurysm, hematoma, arteriovenous fistula (AVF) but also a thrombosed aneurysmatic cavity. To distinguish these conditions from one another a Color Doppler and/ or CT angiography should be done. A thrombosed pseudoaneurysm cavity showed „no-flow“ or “color-coded-free” mass, whereas pulsatile pseudoaneurysms and fistulae can be differentiated by color-coded flow pattern. Typically blood flow in a pseudoaneurysm assumes a swirling pattern, with flow directed toward the transducer in half of the lumen and flow directed away from the transducer in the other half of the lumen. Because blood flow into the pseudoaneurysm lumen goes in one direction during systole and exits the pseudoaneurysm in the opposite direction during diastole, the resultant waveform shows a „to-and-fro“ pattern. Arteriovenous fistulas may coexist with...
pseudoaneurysms and showed high-velocity flow pattern and turbulence at the site of an A-V communications and tissues (7, 8, 9, 10).

What we have had in our patient is; pseudoaneurysm of 89 mm longitudinal and 27-32 mm transversal diameter with thrombosed cavity in distal and isthmus portion and “to-and-fro” flow in the neck and proximal part of aneurysm. In our case we highly suspect that puncture was done through the calcified atheroplaque. We referred case to vascular surgeons and definitive repair was done by surgical management.

Repair of femoral pseudoaneurysms include surgical management, duplex guided compression, percutaneous coil embolization, and percutaneous implantation of endovascular covered stents. Small femoral pseudoaneurysms (less than 2 cm) usually clot spontaneously requiring no treatment. Small infragenual AVFs may resolve spontaneously or close after duplex ultrasonographic controlled external compression (11, 12, 13, 14).

Larger pseudoaneurysms and AVFs or combined lesions were treated surgically to prevent complications like enlargement of the pseudoaneurysm with the resulting risk of haemorrhage, arterial thrombosis, compression of adjacent neurovascular structures, cutaneous ulceration, venous hypertension, and high output congestive heart failure. In large pseudoaneurysms there is also a possibility of a thigh compartment syndrome due to a false aneurysm (11, 12).

On the other hand, indication for surgical procedure are: rapid enlargement of mass, distal ischemia, neurological deficit due to local pressure from hematoma or mass, or distal embolization. Therefore, surgery should be preferably reserved for emergency cases, whereas patients with stable pseudoaneurysms may be managed with less invasive methods. The endoluminal vascular repair with stent graft offers the advantage of a minimally invasive approach, no surgical incision, a reduced risk of infection and shortened hospitalization and may therefore represent an effective and safe therapeutic approach (3, 11, 12, 13, 14).

REFERENCES