

Endovascular treatment of a post catheterization pseudoaneurysm: A stitch in time saves nine

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Abstract

External iliac artery (EIA) pseudoaneurysms are a well-known complication after arterial catheterization procedures. Most develop as a result of high femoral puncture. Small asymptomatic pseudoaneurysms are usually of no consequence but large symptomatic pseudoaneurysm carries a significant risk of rupture with serious life-threatening consequences and needs to be treated. We report here a case of EIA pseudoaneurysm in a 60 year old male patient after a cardiac catheterization procedure. CT angiography demonstrated a large pseudoaneurysm arising from the EIA and compressing the urinary bladder. Patient complained of abdominal pain and felt dizzy and required transfusions due to rapidly developing anaemia secondary to blood loss. Conventional angiography revealed free extravasation of contrast from the EIA. Percutaneous intervention through femoral access was performed by deploying a covered stent which effectively sealed off the perforation site with no evidence of contrast extravasation.

Keywords: Pseudoaneurysm, External iliac artery, Femoral artery puncture, Covered stent.

Introduction

Pseudo-aneurysms are a consequence of arterial wall damage. The resulting haematoma becomes confined in the adjacent tissues by fascial planes. The most common causes of arterial pseudoaneurysm include trauma, tumour, infection, vasculitis, inflammation, chemotherapy, atherosclerosis radiotherapy, infarction, iatrogenic damage from surgery and angiographic procedure.¹ Improper puncture technique during femoral artery access is a major cause of pseudoaneurysm in the EIA. With low morbidity and mortality, endovascular approaches to aorto-iliac pathology should be preferred to open surgical techniques.² Endovascular treatment of iliac pseudoaneurysms has evolved from the use of endovascular stents alone, to grafted stents, stents in

combination with coils, and covered stents.³ Collectively, these approaches have replaced the traditional surgical procedure of excision of the pseudoaneurysm and repair of the artery as the conventional treatment.

To our knowledge we present herein the first local reported case of endovascular pseudoaneurysm repair using deployment of a covered stent. This case also highlights the importance of the femoral puncture technique during cardiac catheterization.

Case Report

A 60 year old man was admitted on 15 February 2014 with severe pain in his right groin and lower abdomen with feeling of dizziness on standing. A week earlier he had undergone stenting to the left anterior descending artery through a right femoral approach at another hospital. Following the procedure the patient experienced pain and swelling in his right groin and lower abdomen. External haematoma was identified and was managed with manual compression. Doppler ultrasound identified a pseudoaneurysm of the EIA. The patient became anaemic with a drop of Haemoglobin from 13 to 7.8gm/dl for which he received multiple blood transfusions. His general condition improved, although he continued to have mild pain in his lower abdomen. He was discharged on conservative management with advice to follow-up. Three days later the intensity of abdominal pain increased with feeling of dizziness and was referred to our institute for a second opinion. On examination he was a febrile, with a pulse of 100 beats/min, a BP of 120/70mmHg with a postural drop of 20mmHg. Distal pulses were present; however there was no palpable swelling or bruit over the femoral artery. However there was ecchymosis and tenderness in his right groin with limitation of leg mobility. CT angiogram (Figure-1) showed a large pseudoaneurysm with a large pelvic haematoma on the right side measuring 10.3cmx5.2cm which was filling through the distal part of the right EIA above the level of the right inguinal ligament. The patent lumen of the pseudoaneurysm measured 3.0x2.6cm. The haematoma was compressing the urinary bladder without causing urinary symptoms. Angiogram was performed through the right femoral

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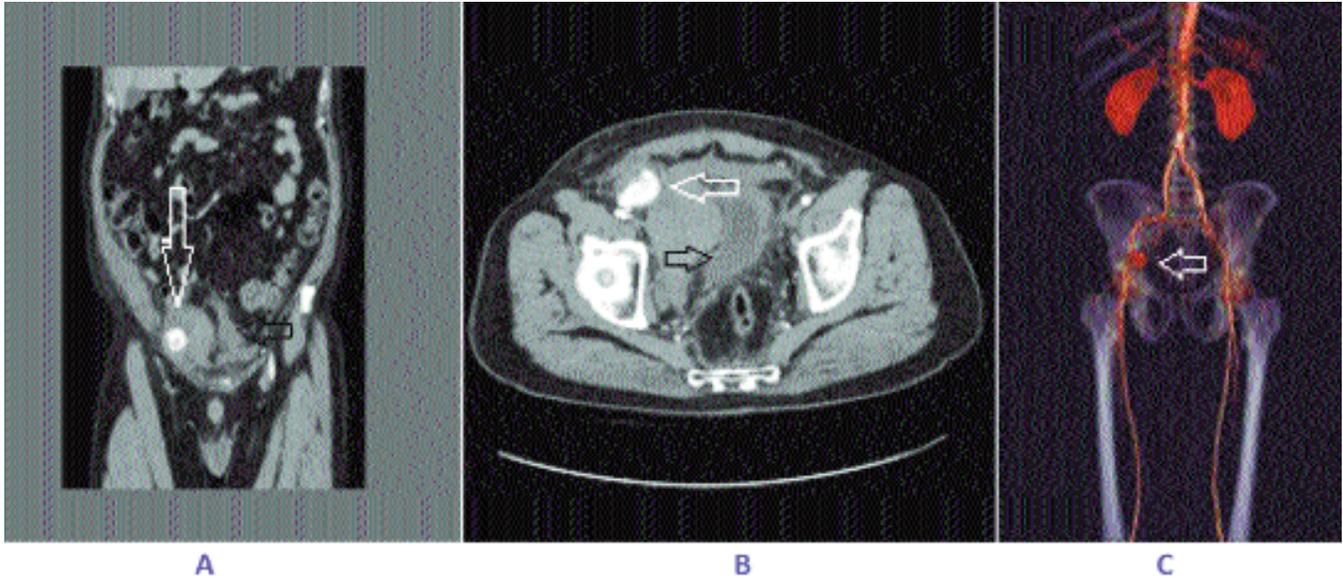


Figure-1: Contrast-enhanced CT scan images showing a large pseudoaneurysm (white arrow) of external iliac artery measuring 10.3x5.2cm and compressing the urinary bladder (black arrow).

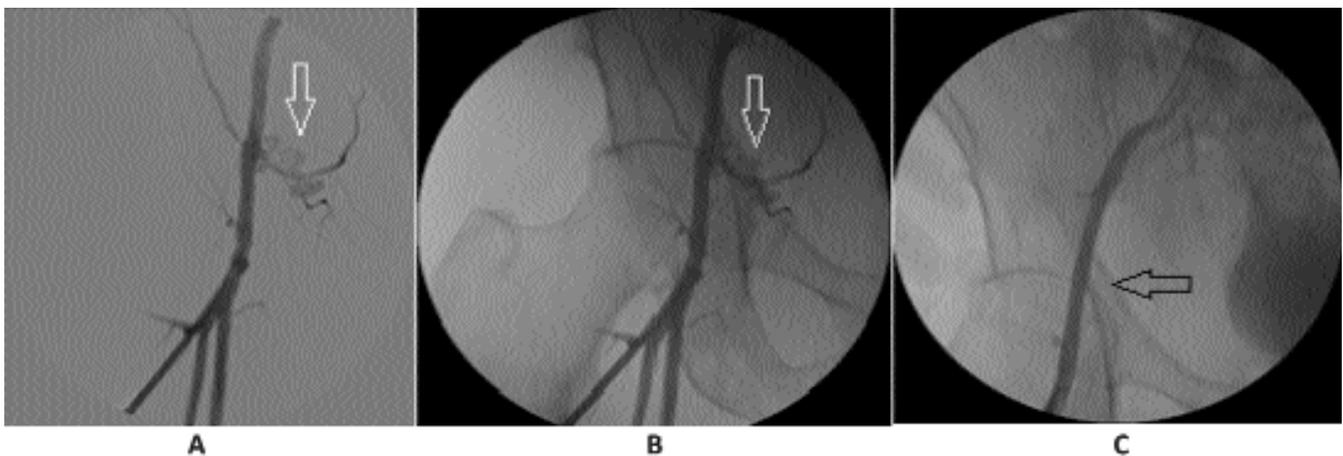


Figure-2: Percutaneous intervention for pseudoaneurysm of the external iliac artery. A and B, before covered stent placement, showing contrast extravasation (white arrow) at the superior border of the femur head. C, after stent placement, showing patent external iliac artery without contrast extravasation (Black arrow).

artery. To avoid access site complications, the correct location of the puncture site was identified with the help of fluoroscopy.⁴ The common femoral artery courses over the femoral head in 92% of cases, and 99% of the time the bifurcation of the common femoral artery is below the middle of the femoral head. Needle entry into the artery was at the inferior aspect of the upper inner quadrant of the femoral head (in an antero-posterior projection).⁵ Ultrasound guided arterial puncture is another effective and safe procedure in localizing the artery thus avoiding inadvertent high or low puncture.

However we commonly use fluoroscopic guided puncture in our institute because of the familiarity and comfort with this technique by our interventional cardiologist. Angiography showed free extravasations of contrast from the right EIA. A covered stent, 8mmx40mm (Boston Scientific) was deployed and a repeat angiogram showed no further extravasations (Figure-2). The result showed complete exclusion of the pseudoaneurysm and good patency of the EIA. Post-procedure the patient recovered well and at 2 months of follow-up he is asymptomatic.

Discussion

Post-catheterization pseudoaneurysm is one of the most common vascular complications of diagnostic (0.05% to 2%)⁶ and interventional (2% to 6%) catheterization procedures.⁷ Patient and procedural factors may contribute to the formation of pseudoaneurysm, but of particular importance is the increased incidence of pseudoaneurysms when the puncture site is not in the common femoral artery, but rather is located in the superficial or deep femoral artery or the EIA.⁷ The probable mechanism of pseudoaneurysm in our patient was the high puncture site during femoral access. Another likely cause could have been innocuous guide-wire perforation that may have occurred during percutaneous coronary intervention. Vascular complications are less common when the interventionist uses ultrasound or fluoroscopy with localization of the femoral head to puncture the femoral artery.^{8,9}

Spontaneous thrombosis may occur of small pseudoaneurysms; hence in the absence of pain, observational management of small pseudoaneurysms (2.0 cm) is reasonable. However, large sized pseudoaneurysms (>3 cm) and those causing pain carries a high incidence of spontaneous rupture with catastrophic consequences and must be treated.¹⁰

Until the early 1990s, the only treatment available for pseudoaneurysm was surgery. The disadvantages of surgery for the treatment of pseudoaneurysm are that it may require general anaesthesia in high cardiovascular risk patients, although surgery can be accomplished using local infiltration. Thus surgery for pseudoaneurysm repair in the emergency situation in patients with high cardiovascular risk patients carries considerable procedure related morbidity and mortality.¹¹⁻¹³ Lumsden and colleagues reported a surgical complication rate of 20% after pseudoaneurysm repair. Complications included bleeding, infection, neuralgia, prolonged hospital stay, perioperative myocardial infarction, and, rarely, death. Hence surgery is rarely employed to treat the usual post-catheterization pseudoaneurysms. Endovascular approach with covered stent placement, offers a less invasive approach for the exclusion of iliac artery pseudoaneurysm.^{1,3} In this case, complete exclusion of the pseudoaneurysm was achieved by deployment of a covered stent within the EIA (Figure-2).

In conclusion, endovascular repair is an attractive option to treat patients with EIA pseudoaneurysms. It offers a minimally invasive procedure which minimizes the cardio-respiratory stress seen in open surgery. Utmost emphasis should be placed on proper puncture technique during catheterization procedures. Head of the femur should be localized with the help of fluoroscopy, thus achieving vascular access on the first puncture without perforating the posterior wall of the femoral artery. This will ensure minimizing the complications related to vascular access during cardiac catheterization.

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