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CASE REPORT

SURGICAL MANAGEMENT OF FEMORAL ARTERY PSEUDOANEURYSM FOLLOWING CORONARY ANGIOGRAPHY IN A COMPLEX COMORBID ELDERLY PATIENT: A CASE REPORT

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ABSTRACT

Femoral artery pseudoaneurysm is a significant complication of endovascular procedures, particularly in elderly and comorbid patients. This report aims to present a case of iatrogenic femoral artery pseudoaneurysm following coronary angiography in an elderly patient and to emphasize the importance of early diagnosis and appropriate intervention to prevent complications. A 70-year-old female with multiple comorbidities presented with right inguinal swelling and pain four months after undergoing coronary angiography via the right femoral artery. Imaging revealed a 31×40 mm pseudoaneurysm connected to the femoral artery. Due to symptom progression, surgical exploration was performed, and a 2 mm arterial wall defect was repaired with primary suturing. The postoperative course was uneventful. This case report emphasizes that early recognition and timely surgical management of pseudoaneurysms may prevent unfavorable outcomes and lead to favorable recovery.

Keywords: Coronary angiography, femoral artery, pseudoaneurysm

INTRODUCTION

Iatrogenic femoral artery pseudoaneurysm is a well-described complication following percutaneous vascular interventions such as coronary angiography (1). The incidence of pseudoaneurysm formation has become an increasingly common complication due to the growing prevalence of endovascular interventions (1-3). Risk factors include advanced age, the use of anticoagulants, large-bore catheterization, underlying vascular fragility, female sex, obesity, and low puncture site (4). While small-sized pseudoaneurysms can often be managed conservatively, surgical intervention becomes inevitable in complex cases (5). Vascular complications that arise after interventional procedures can significantly affect both the course of treatment and the prognosis (3). This case report presents the clinical course, diagnostic evaluation, and therapeutic approach in a patient who developed a femoral artery pseudoaneurysm following coronary angiography. The report highlights the importance of early recognition and appropriate management strategies in minimizing morbidity and optimizing outcomes in patients undergoing endovascular procedures.

CASE REPORT

A 70-year-old female with a history of diabetes mellitus type 2, secondary hypertension, chronic heart failure, atrial fibrillation (AF), hypothyroidism, an unruptured abdominal aortic aneurysm, a prior ischemic cerebrovascular event, and mitral and aortic valvular disease presented to Trakya University Emergency Department on March 10, 2023, with diffuse extremity pain. Her past surgical history included implantable cardioverter-defibrillator ablation three months prior, total abdominal hysterectomy with bilateral salpingo-oophorectomy ten years prior, and left foot surgery secondary to trauma 40 years prior.

On admission, the patient was found to be in AF, and bilateral pulmonary crackles were noted. Following diuretic therapy, findings regressed. Cardioversion was attempted with a 15-joule

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synchronized electrical shock under anesthesia. Although sinus rhythm was briefly achieved, AF recurred within one minute. Intravenous amiodarone was initiated, but sinus rhythm was not restored. The patient was informed and scheduled for follow-up.

On April 27, 2023, coronary angiography was performed via the right femoral artery. Four months later, on August 25, the patient presented with swelling in the right inguinal region. Ultrasonography revealed a pseudoaneurysm measuring 31×40 mm with a 4×5 mm neck connecting to the femoral artery. The diagnosis was confirmed by duplex Doppler ultrasound, which showed the classic "to-and-fro" waveform (6).

On September 7, the patient returned with worsening pain and swelling. Physical examination revealed palpable distal pulses. The cardiovascular surgery consultation did not indicate the need for emergent intervention. At outpatient follow-up on September 18, a pulsatile 5 cm mass was noted in the right inguinal region. Doppler ultrasonography confirmed arterial flow, and a pseudoaneurysm was diagnosed. The patient was hospitalized for definitive treatment.

On October 2, surgical exploration was performed under local anesthesia. A 6 cm incision over the femoral region exposed a pseudoaneurysm sac with a 2 mm arterial wall defect and active bleeding from the anterior surface of the superficial femoral artery (Figure 1). The pseudoaneurysm sac was completely excised, and the arterial defect was primarily repaired using 2/0 Prolene sutures (Figure 2). Hemostasis was confirmed, and a Hemovac drain was placed. The wound was closed in layers with Dexon and Prolene sutures.

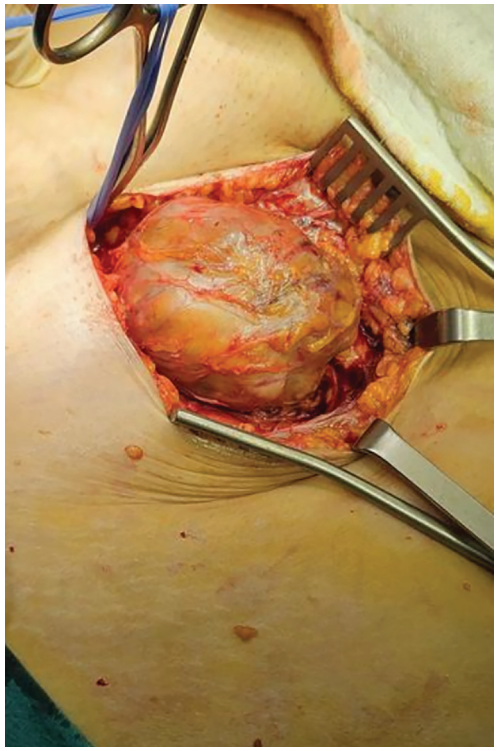

Figure 1: Intraoperative view showing the pseudoaneurysm sac.

As the patient had no recently implanted coronary stent, chronic warfarin therapy was discontinued upon admission, with a recorded international normalized ratio (INR) of 2.18, and daily INR monitoring was initiated. After the INR decreased to 1.75 on the fourth day of hospitalization, bridging anticoagulation with low-molecular-weight heparin (Clexane 0.6 mg, 2x1) was initiated. Surgery was performed once the INR reached a safe operative level of 1.2. The evening dose of low-molecular-weight heparin was withheld prior to surgery. Oral anticoagulation with warfarin (5 mg/day) was resumed on the first postoperative day. This therapy was continued in combination with Clexane (0.6 mg, 2x1) until discharge to maintain therapeutic INR levels, with daily INR monitoring. The patient was discharged with a therapeutic INR level above 2 following an uneventful postoperative course. Written informed consent was obtained from the patient to publish the case report.

DISCUSSION

Iatrogenic pseudoaneurysms represent significant vascular complications following percutaneous arterial interventions, most commonly associated with femoral artery catheterization (7). Unlike true aneurysms, pseudoaneurysms do not involve all three layers of the arterial wall (8). They have been reported in various vascular territories, including the femoral, popliteal, and brachial arteries, with the femoral artery - particularly distal to the bifurcation of the common femoral artery - being the most frequently affected site (8). The incidence ranges from 0.1% to 5.5%, but decreases significantly to approximately 0.02% when ultrasound guidance is employed during vascular access (8).

Several risk factors contribute to the development of pseudoaneurysms, including advanced age, female sex, use of anticoagulants, and the specific site of arterial access (8-10). Clinically, pseudoaneurysms often present with a pulsatile mass and localized symptoms such as ecchymosis and pain (4).

Figure 2: Excised pseudoaneurysm sac following surgical removal.

Diagnosis is primarily established using Doppler ultrasonography, which provides a detailed evaluation of pseudoaneurysm size and the presence of intraluminal thrombus (11).

Small pseudoaneurysms (<2 cm) often resolve spontaneously via thrombosis, whereas larger lesions typically require interventional treatment (8). In our clinical practice, open surgical repair is preferred for pseudoaneurysms with a neck diameter of ≥3 mm. This approach is particularly favored when the pseudoaneurysm sac remains active without evidence of intraluminal thrombosis and the risk of skin necrosis is present. A variety of therapeutic options are available. While surgical repair remains the gold standard in complex or refractory cases, minimally invasive approaches such as ultrasound-guided compression therapy and percutaneous thrombin injection have also proven to be effective (10). For instance, Samal et al. (10) reported four cases in which percutaneous thrombin injection was successfully performed under fluoroscopic guidance with temporary balloon occlusion, without any complications.

Previous reports of pseudoaneurysms in elderly and comorbid patients emphasize the critical importance of early diagnosis and a multidisciplinary management approach (12). Endovascular techniques are increasingly preferred due to their minimally invasive nature, and advanced methods such as ultrasonography-guided suture-mediated vascular closure devices and ultrasound-guided thrombin injection (UGTI) are considered highly effective treatments (13). In the case of pseudoaneurysms, treatment decisions should be individualized according to patient-specific risk factors, pseudoaneurysm characteristics, and available institutional resources. In this context, this case demonstrates that appropriate patient selection and timely intervention, especially in the face of acute threats such as impending skin necrosis or technical constraints, open surgical repair remains a safe and effective treatment option (12-14).

In the present case, the patient was on chronic anticoagulation therapy because of AF and had multiple comorbidities, including heart failure and a history of cerebrovascular events, contributing to a high overall bleeding risk. In anticoagulated patients, the likelihood of persistent flow through the pseudoaneurysm neck and incomplete thrombosis has been reported more frequently (15). Additionally, the pseudoaneurysm had a relatively wide neck (4×5 mm) and had progressively enlarged over serial examinations, both of which are known predictors of thrombin injection failure (15, 16). For these reasons, surgical repair was considered a safer and more definitive treatment option in this patient.

What distinguishes this case is the early recognition of the pseudoaneurysm in a patient with multiple complicating risk factors, including AF and ongoing anticoagulant therapy, which pose challenges to both diagnosis and management. The excision of the pseudoaneurysm sac under local anesthesia and primary repair of the artery demonstrates a personalized approach that balances patient safety with treatment efficacy.

The presence of anticoagulation is an important clinical factor that directly influences the choice of treatment for femoral artery pseudoaneurysms. Morphological characteristics of the pseudoaneurysm, such as neck width, size, and lobulation, are predictors of UGTI failure, with surgical repair being considered a more reliable option for wide-necked or symptomatic lesions (16). Although there are case series demonstrating successful UGTI even in patients receiving warfarin or direct oral anticoagulant therapy, ongoing anticoagulation requires a patient-specific risk-benefit assessment when deciding on management (14).

Studies have shown that pseudoaneurysms larger than 2 cm, those with a wide neck, those that rapidly expand, or those occurring in patients receiving therapeutic anticoagulation have lower success rates with ultrasound-guided compression or thrombin injection (15, 17). In such high-risk cases, surgical repair is considered a more definitive and reliable treatment option, which is consistent with the approach selected for our patient.

CONCLUSION

This case highlights the necessity of prompt diagnosis and the importance of individualized treatment planning to mitigate potentially life-threatening complications such as rupture or distal embolization. It emphasizes the essential role of interdisciplinary collaboration among cardiology, vascular surgery, and radiology teams in optimizing patient outcomes and the effectiveness of primary surgical repair in appropriately selected patients.

Ethics

Informed Consent: *Written informed consent was obtained from the patient for this study.*

Footnotes

Conflict of Interest: *The authors declare no conflict of interest.*

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