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Case Report

A rare case of large femoral hematoma after femoral artery cannulation

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ABSTRACT

Femoral vessel cannulation is a commonly performed procedure in clinical practice. However, hematomas are a frequent complication of this procedure. Notably, hematoma formation is more likely to occur with femoral arterial cannulation compared to venous cannulation. If a hematoma does form, management can range from external compression to surgical intervention. In this report, we present a rare case of a large femoral hematoma without external skin cover, which is an unusual presentation of a common complication associated with femoral vessel cannulation. An elderly female presented with complaints of a raw area, pain, and blackening at the site of femoral artery cannulation for 10 days. She underwent coronary angioplasty and stenting 20 days prior. On examination, she exhibited a large hematoma over the right groin at the cannulation site without external skin covering. She underwent hematoma debridement with a gracilis muscle flap covering of the exposed femoral vessels. Early recognition and prompt evacuation of hematoma, assessment of femoral vessel breach and its management, as well as plastic reconstruction of exposed vessels, are vital for favorable outcomes.

Keywords: Femoral hematoma, Femoral artery cannulation, Percutaneous transluminal coronary angioplasty, Gracilis muscle flap.

INTRODUCTION

Femoral vessel cannulation is a commonly performed procedure in clinical practice for various purposes such as transluminal coronary angioplasty and stenting, transvenous cardiac pacing, pulmonary arterial monitoring, placement of inferior vena cava filter, and when peripheral venous access is not obtainable. This approach offers the advantage of superficial and easy access.[1] Hematomas are a frequent complication following catheterization via the femoral artery or vein. Four distinct types of hematomas have been observed in patients experiencing post catheterization bleeding, retroperitoneal, intraperitoneal, groin, thigh.[2] Femoral artery hematoma is more prevalent compared to femoral venous hematoma following cannulation due to the higher pressure and potential for more significant bleeding if the artery is inadvertently punctured.[3] Recognition of these hematoma types is crucial as some may expand internally without external signs of bleeding, necessitating surgical intervention. The etiology of hematomas involves multiple patient-related and procedure-related factors. Patient-specific factors include body mass index, female gender, degree of arterial calcifications, and platelet counts before the procedure. Procedure-specific risk factors encompass the urgency of the procedure, site of arterial cannulation, sheath size, combined arterial and venous access, use of antiplatelet medications, and anticoagulation.[4]

CASE REPORT

A 61-year-old female presented with complaints of swelling, blackening, and a raw area at the site of femoral artery cannulation in the right groin and upper thigh persisting for the past 10 days. She had undergone

percutaneous transluminal stenting of the left anterior descending artery branch of the coronary artery 20 days prior, which was uneventful. Initially, mild bruising was noted post-procedure at the puncture site without swelling and a compression dressing was applied. The patient was discharged on the same day.

Ten days later, she had a complaint of a small raw area with minimal oozing, mild pain at the cannulation site, and occasional fever, prompting consultation with a local doctor. Initially managed with dressing and oral medications, the raw area progressively increased in size and she noticed blood clots over it, leading her to seek further management at our hospital.

Figure 1: Pre operative.

The patient has a history of diabetes mellitus, hypertension, and ischemic heart disease for over 5 years with ongoing medication. Upon examination, approximately 10×12 cm oval-shaped black-colored blood clot was observed in the right groin region, devoid of overlying skin. It was foul smelling, with hyperpigmented surrounding skin, while distal pulses were palpated normally.

Table 1: Preoperative blood investigations.

Investigations	Patient value	Normal range
Hb (gm/dl)	7.6	12-14
Total leucocyte count (U/l)	16000	4000-10000
Platelets count (U/l)	412000	150000-410000
Total protein (gm/dl)	4.7	6-8.3
Albumin (gm/dl)	2.8	3.5-5.5
PT/INR (mins)	20.2/1.51	12-16/1-1.2

Ultrasonography of the local area indicated a hematoma approximately 61×105×90 mm in size in the right inguinal region anterior to the common femoral vessels, extending up to the right upper thigh. CT Angiography of both lower limbs revealed calcified yet patent arteries. The patient underwent surgery under general anesthesia after receiving two units of blood transfusion. The hematoma was debrided from the floor of the raw area and tissue samples were sent for culture and sensitivity, fungal culture, and KOH mount. Approximately 1×1 cm area of the femoral vessels was exposed after debridement. There was no active bleeding observed from the femoral vessels. integrity of the femoral vessels was checked in the raw area and no breach in the vessel's wall was found. The exposed vessels were covered by a gracilis muscle flap and negative suction drain was kept at the muscle donor site.

Figure 2: (A) Post debridement wound & (B) debrided hematoma.

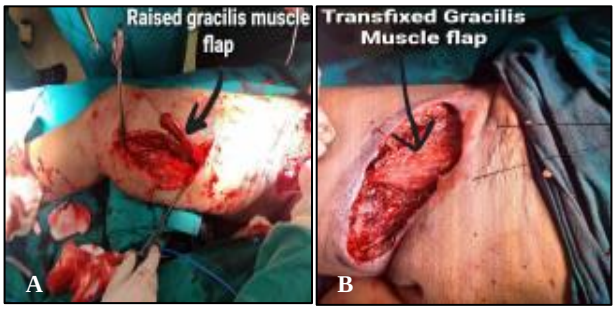

Figure 3: (A) Raised gracilis muscle flap & (B) transfixed gracilis muscle flap.

The patient tolerated the procedure well and was put on higher antibiotics. Postoperatively, her haemoglobin increased to 11 gm/dl, and her WBC count decreased to 7500 mm³. Her postoperative recovery was smooth, with the negative suction drain removed on the 5th postoperative day. She was discharged with oral antibiotics and has been attending regular follow-up appointments without any complaints.

DISCUSSION

The femoral canal, approximately 1.3 cm long, is situated in the anterior thigh and represents the most medial aspect of the femoral sheath. Within the femoral triangle, the contents from medial to lateral are the femoral vein, femoral artery, and femoral nerve. Cannulation of the femoral artery typically occurs at the base of the femoral triangle, just inferior to the inguinal ligament but above the bifurcation of the femoral artery, corresponding to 2-3 cm below the mid-inguinal point.[5] Femoral cannulation is performed with the patient in a supine position, the

ipsilateral leg straight, abducted and externally rotated, thereby facilitating access to the femoral triangle with the operator positioned on the ipsilateral side. In emergency scenarios, cannulation is guided by palpating the femoral arterial pulse and performing the procedure 1 cm medial to the palpated pulse. Proximity to the inguinal ligament increases the risk of retroperitoneal bleed and peritoneal injury.[6] Hematoma formation is more common following femoral arterial puncture compared to femoral venous puncture, with arterial hematomas occurring at an incidence rate of 10%.[3,7] Initial management involves direct manual compression at the access site. Asymptomatic groin hematomas are typically monitored with serial physical examinations to assess progression or resolution. Hemodynamically unstable patients may require fluid resuscitation and blood product administration, with cessation of all anticoagulants and blood thinners. Most hematomas resolve spontaneously, rarely necessitating intervention.

Symptomatic cases may require percutaneous aspiration, while those with severe instability may require open groin exploration and evacuation. The femoral vessels should be inspected and vascular injury should be repaired if found. In cases of extensive hematomas, such as the presented case, plastic reconstruction may be necessary to cover exposed vessels. The gracilis muscle flap is commonly preferred for such reconstructions by reconstructive microsurgeons.[8]

Depending on the clinical indication, the gracilis flap can be employed as a local flap based on its rotational arc for wound coverage or reconstructive purposes. The gracilis muscle, characterized as a long strap muscle with a long distal tendon, is supplied by a dominant neurovascular pedicle consisting of an artery (average 1.5 mm internal diameter) and two venae comitantes (average 2.0 mm internal diameter). The single motor nerve i.e., anterior branch of the obturator nerve, can be traced retroperitoneally to achieve a considerable length of 8-10 cm. Employing a two-team approach, one team harvests the gracilis flap and manages the defect while the other prepares the recipient site.[9]

CONCLUSION

Our patient received interdisciplinary care involving two departments, the general surgical team conducted debridement of the femoral hematoma, while the plastic surgical team performed gracilis muscle flap reconstruction.

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