

CASE REPORT

Infected femoral artery pseudoaneurysm ligation and revascularisation: A case report

Mohammed Alsagheer Alhewy  | Ehab Abd Elmoneim Ghazala | Hassan Gado |
Wael Abdo Abdo Abd-Elgawad | Ahmed Atef Khamis

Department of Vascular and Endovascular Surgery, Faculty of Medicine, Al-Azhar University, Assiut, Egypt

Correspondence

Mohammed Alsagheer Alhewy,
Department of Vascular and Endovascular Surgery, Faculty of Medicine, Al-Azhar University, Assiut, Egypt.
Email: elsagher2030@azhar.edu.eg

Key Clinical Message

Although ligating femoral pseudoaneurysm is a safe procedure, some cases require revascularization, and the appropriate treatment should be tailored to the patient.

Abstract

In this case report, we highlight the challenge in treating infected femoral artery pseudoaneurysm. The patient, a 37-year-old male intravenous drug abuser, presented to the emergency department with a 2-month history of a progressively growing lump over his right groin. Two days before the presentation the swelling became hot and painful. After physical examination, it was revealed that the localized swelling is about 15×15 cm in size. It is pulsating, expanding in all directions, moving from side to side, and has been reduced in size due to proximal artery compression with the inflamed overlying skin causing slight flexion of the right hip joint and there was serosanguineous discharge as well. The affected leg was warm with intact motor and sensory function, palpable femoral, and popliteal arterial pulses, but non-palpable left posterior tibial and anterior tibial arterial pulses, both of which had triphasic wave signals on a portable hand-held Doppler (there was below knee marked edema). CT angiography (CTA) revealed a large well-defined heterogeneous cystic structure at the right groin with an average diameter of 11×10×9 cm, with a connection with the common femoral artery. After proximal and distal control, excision of the infected femoral pseudoaneurysm, a swab was taken, and ligation of the common femoral artery superficial femoral artery, and profunda femoral artery. No signals were detected on the posterior or anterior tibial arteries by hand-held Doppler and oxygen saturation on the big toe was markedly decreased, so we did an extra-anatomic lateral ilio-femoral anastomosis using silver-impregnated vascular graft.

KEYWORDS

arterial ligation, femoral artery, infected femoral artery pseudoaneurysms, revascularization

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial](https://creativecommons.org/licenses/by-nc/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

© 2024 The Authors. *Clinical Case Reports* published by John Wiley & Sons Ltd.

1 | INTRODUCTION

Infected femoral artery pseudoaneurysm (IFAP) is a serious medical condition in parenteral drug abusers that requires difficult and contentious treatment. Ligation without revascularization is frequently linked to late intermittent claudication and amputation. IFAPs have been reported in the literature for more than 20 years.¹ Intravenous or parenteral drug abuse is the most common cause of IFAP. This complication of intravenous drug abuse is not only limb-threatening but can also be life-threatening and poses a difficult management problem for the vascular surgeon.^{2,3} The presentation and treatment of a patient who acquired an IFAP due to intravenous drug abuse will be discussed in this case report.

2 | CASE HISTORY/ EXAMINATION

We present the case of a 37-year-old male, intravenous drug abuser, with a 2-month history of a progressively growing lump over his right groin. Two days before the presentation the swelling became hot and painful. After physical examination, it was revealed that the localized swelling is about 15 × 15 cm in size (Figure 1). It is pulsating, expanding in all directions, moving from side to side, and has been reduced in size due to proximal artery compression with the inflamed overlying skin causing slight flexion of the right hip joint and there was serosanguineous discharge as well. He was referred to the Al-Azhar Faculty of Medicine hospital emergency department. At his admission, a physical examination revealed a febrile patient (38.6c), in pain but hemodynamically stable: blood pressure of 139/72 mmHg and regular pulse of 89

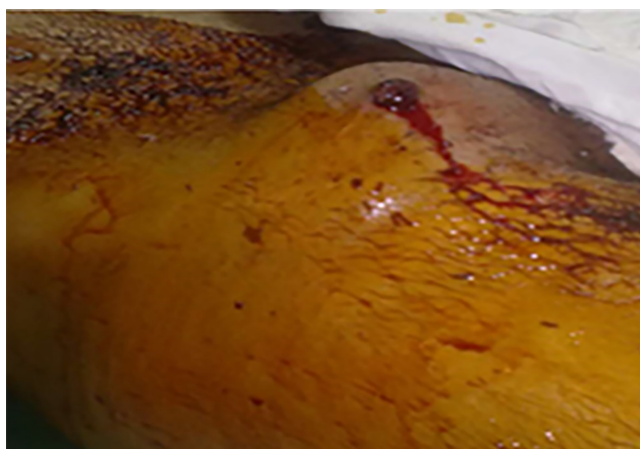


FIGURE 1 IFAP with serosanguinous discharge.

beats/min. Cardiac and pulmonary consultation revealed normal results, the affected leg was warm with intact motor and sensory function, palpable femoral, and popliteal arterial pulses, but non-palpable left posterior tibial and anterior tibial arterial pulses, both of which had triphasic wave signals on a portable hand-held Doppler (there was below knee marked edema). The patient has a history of bilateral varicosity surgical excision. His hemogram revealed that he had mild microcytic microchromic anemia and MCV with mild thrombocytopenia, a high increase of leukocytosis ($21,000/\text{mm}^3$), and C-reactive protein (212 mg/L). Creatinine and electrolyte tests were in the normal range. Blood culture and urine culture came back sterile. After a computerized tomographic angiogram (CTA) a large well-defined heterogeneous cystic structure was noted at the right groin with an average diameter of $11 \times 10 \times 9$ cm, with a connection with the common femoral artery (CFA) and active contrast seen inside, with mass effect on the related distal segment of the superficial femoral artery (SFA) and superficial femoral vein (SFV) (Figure 2A,B).

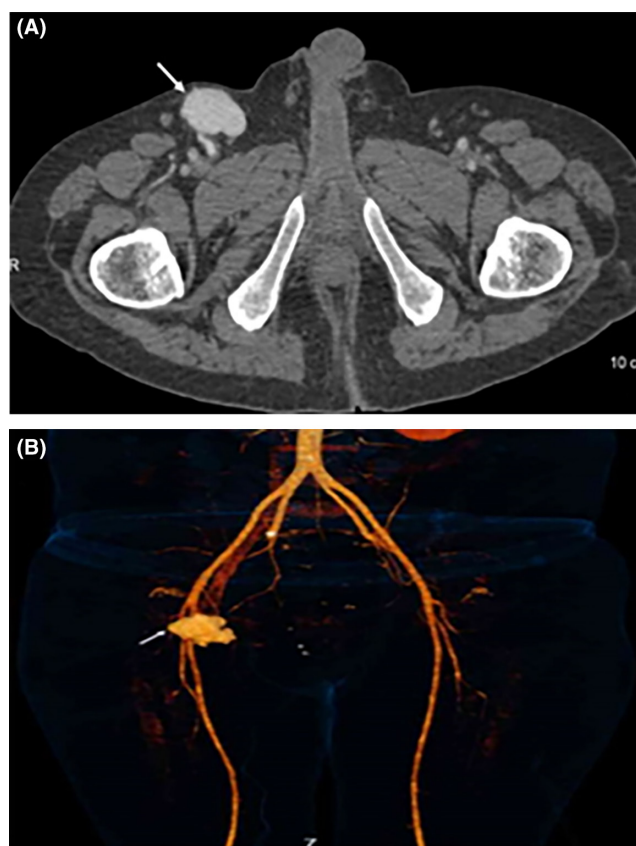


FIGURE 2 Radiological findings of the case before the operation. (A) A multiplanar reconstructed image in axial view and (B) a volume-rendering image in anterior–posterior view. The morphology of the pseudoaneurysm and SFA are clearly presented in the image.

3 | METHODS

He was scheduled for emergency surgery (surgery was performed within 4 h of admission). The intervention was performed under general anesthesia. Intraoperatively, proximal control was obtained via abdominal incision and vessel loop control of the ipsilateral external iliac artery. Another distal thigh supragenicular incision was made for exploration and distal control of the distal SFA artery. Excision of the infected femoral pseudoaneurysm, a swab was taken, and ligation of the common femoral artery, SFA, and profunda femoral artery. No signals were detected on the posterior or anterior tibial arteries by hand-held Doppler and oxygen saturation on the big toe was markedly decreased, so we did an extra-anatomic lateral ilio-femoral anastomosis using silver-impregnated vascular graft. Surgical hemostasis was done with anatomical closure of the wounds in layers and surgical dressing without an external drain for abdominal or supragenicular wounds. The femoral wound was connected to a negative pressure vac dressing (Figure 3).

The patient was moved to the intensive care unit in the postoperative period. The next day, he was transferred to the regular ward, because no complications were noticed. The patient was put under specific bi-antibiotherapies (tazobactam/piperacillin 4 g × 4/24 h + Clindamycin 600 mg × 4/24 h), heparin in curative dose, and aspirin 75 mg/day. A histological test of the surgical specimen

revealed a Methicillin-Resistant Staph Aureus (MRSA) sensitive to linezolid, so we changed the antibiotic treatment to linezolid. Clinical and biological inflammatory findings improved during the follow-up period. Hematological and biochemical analyses were within normal range.

4 | CONCLUSION AND RESULTS

The patient's postoperative course was uncomplicated, and he was discharged under acceptable clinical conditions 14 days later with clopidogrel and oral antibiotics. He had palpable pedal pulses. The patient was scheduled for follow-up sessions, at 1, 3, and 6 months.

Our conclusion highlights that while ligating femoral pseudoaneurysms is generally considered safe, certain situations necessitate revascularization. Therefore, treatment for IFAPs should be individualized to the patient's specific needs. Managing IFAPs presents a challenging and debatable clinical scenario.

5 | DISCUSSION AND TAKE-HOME MESSAGE

An IFAP is a limb and life-threatening situation. The common femoral artery is the most reported localization

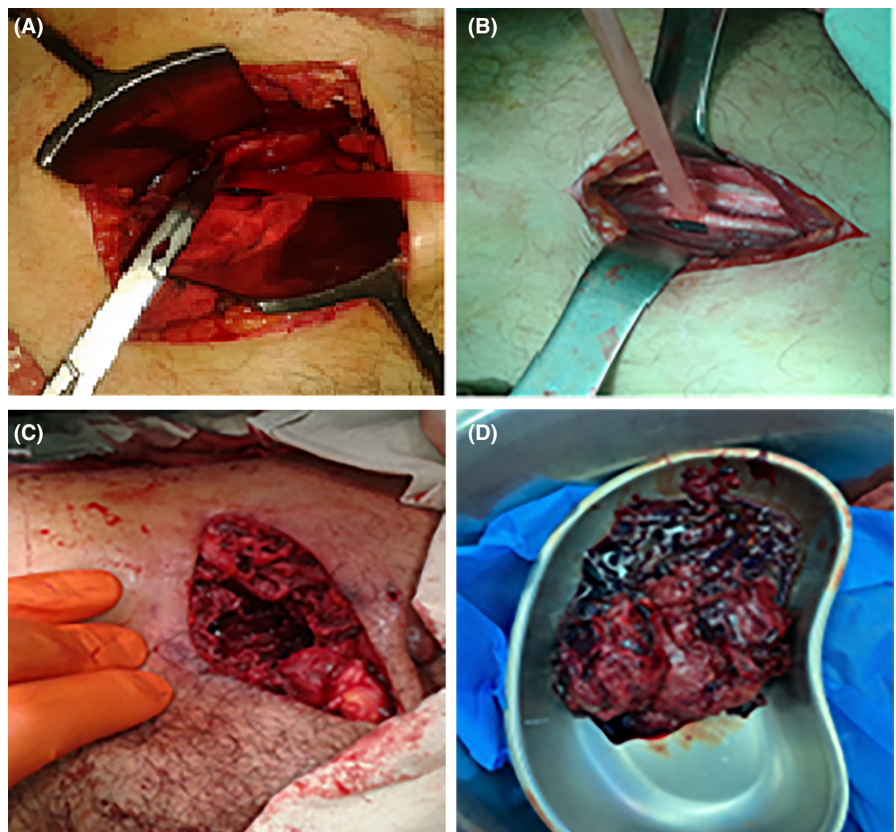


FIGURE 3 (A) Exploration of right external iliac artery and control. (B) Exploration of the distal part of the superficial femoral artery (SFA) and control. (C, D) Excision of pseudoaneurysm and ligation of all bleeding sources.

in literature.⁴ The usual clinical presentation of uncomplicated cases is a pulsatile tender mass associated with crepitus and general septic syndrome.⁵ Swelling from a large pseudoaneurysm, or hematoma may potentially cause nerve and vascular compression with accompanying neuropathy, venous thrombosis, claudication, or, in rare cases, catastrophic limb ischemia.⁶ Duplex ultrasound and CTA are the main diagnostic modalities. The risk factors incriminated for developing IFAPs are intravenous drug abuse, immunosuppressive state, chronic renal impairment, elderly people, peripheral ischemia, malnutrition, and underlying malignancy.⁷ A patient aged 37 years old was an intravenous drug abuser, which made him vulnerable to developing this disease. The management of IFAPs is still controversial. It may be divided into three large groups:

1. Radiological: compression with probe associated or not with an injection of thrombin.
2. Surgical: artery ligation, evacuation, bypass, and amputation.
3. Endovascular: embolization, covered stent, stent-assisted embolization, or combined options.^{8,9}

Due to the specificity of the disease and the diversity of management modalities, the appropriate approach should be decided in a multidisciplinary discussion. Hong et al. insisted in their publication titled “Femoral Pseudoaneurysm Leading to Necrotizing Fasciitis at the Femoral Arterial Puncture Site” on the essential role of a team approach at an early stage for the meticulous treatment of this rare entity.¹⁰ The swelling was present in the right groin of our patient. It was pulsating with vascular compression signs, which were impalpable left posterior and anterior tibial arterial pulses with triphasic wave signals as evaluated by duplex ultrasonography. The indicated diagnostic technique is CTA. It provides a comprehensive and precise identification of the anatomical location of the lesion as well as a clear view of the collaterals. In this clinical case, therapeutic options are restricted due to the large diameter of the aneurysm and the presence of sepsis. The management was oriented toward treating sepsis and avoiding ischemia. The surgical options include (1) stumps ligation: The ultimate risk of arterial ligation is limb ischemia. However, Huebl and Read¹¹ published encouraging results about patients with SFA treated by ligation of the femoral artery. Singh et al.⁴ shared interesting findings in their systematic review and meta-analysis comparing ligation alone with immediate revascularization in the context of pseudoaneurysm of the femoral artery secondary to intravascular drug use. The study suggests no significant difference in mortality or incidence of amputation between the two groups; instead, it

was noted a significantly higher reintervention and bleeding rate for the revascularized patient.⁴ (2) Arterial ligation associated with delayed limb revascularization after cooling the septic condition and in case of intermittent claudication or critical ischemia of the limb.¹² (3) Direct revascularization consists of pseudoaneurysm debridement with (in situ) or extra-anatomical reconstructions. The pathological segment will be replaced by an autologous graft in the anatomical pathway or by a prosthetic bypass in the extra-anatomical pathway.¹³ The autologous saphenous panel vein graft is the most suitable conduit with a well-reputed result. A strong advantage of this conduit is resistance to infection and low reintervention rates. Even so, the risk of hemorrhage and infection persistence is unpredictable because of the extension of infection in both arterial and venous walls, also autologous saphenous vein graft is not suitable for extraanatomical bypass. Thus, direct anatomic revascularization may sometimes be an unreasonable decision. (4) Covered stents with vacuum sealing drainage for treatment of infected femoral pseudoaneurysms. Recent advances have made endovascular stent-graft placement an effective and minimally invasive alternative technique for the treatment of aneurysms. Semba et al.¹⁴ reported the first cases in which endovascular SGs were used to repair mycotic aneurysms of the thoracic aorta. Zhang et al.¹⁵ have reported technical success in all their patients, using covered stents with vacuum sealing drainage. He concluded that a covered stent is convenient and rapid to control massive hemorrhage in IFAPs of intravenous drug abuse. Early debridement of infected tissue with continued vacuum sealing drainage may shorten the time of wound care and make the incidence of stent infection relatively low. Fu et al.¹⁶ reported stent-graft placement with early debridement and antibiotic treatment for femoral pseudoaneurysms and concluded that stent-graft placement controls massive hemorrhage rapidly, gives enough time for subsequent treatment for pseudoaneurysms due to intravenous drug abuse, and reduces the incidence of postoperative claudication. With appropriate broad-spectrum antibiotics and early debridement, the incidence of stent-graft infection is relatively low. It is an effective alternative, especially as a temporary bridge measure for critical patients. However, the high cost, uncertain long-term prospects, high demand for medical adherence, and the risk of using the conduits for re-puncture call for a cautious selection of patients.¹⁶ However, placing an endoprosthesis in an infected field is debatable.¹⁵ El Husseiny et al.¹⁷ reported a case of necrotizing fasciitis causing complete femoral vessel necrosis and thrombosis in an intravenous drug abuser treated by an extra-anatomic trans obturator iliofemoral anastomosis with favorable follow-up. In our patient, the absence of a distal pulse and the development of an ischemic picture

after ligation of the femoral artery confronts us to make revascularization by an extra-anatomic lateral iliofemoral anastomosis. So, our take-home message is that although ligating femoral pseudoaneurysm is a safe procedure, some cases require revascularization, and the appropriate treatment should be tailored to the patient. Treating IFAPs is challenging and contentious.

AUTHOR CONTRIBUTIONS

Mohammed Alsagheer Alhewy: Conceptualization; formal analysis; project administration; supervision; writing – original draft; writing – review and editing. **Ehab Abd elmoneim Ghazala:** Data curation; investigation; methodology; writing – original draft; writing – review and editing. **Hassan Gado:** Data curation; investigation; methodology; validation; writing – original draft; writing – review and editing. **Wael Abdo Abdo Abd-Elgawad:** Data curation; formal analysis; investigation; methodology; writing – original draft; writing – review and editing. **Ahmed Atef khamis:** Data curation; formal analysis; investigation; writing – original draft; writing – review and editing.

FUNDING INFORMATION

There was no financial support for this work.

CONFLICT OF INTEREST STATEMENT

All authors have no conflict of interest.

DATA AVAILABILITY STATEMENT

Data sharing does not apply to this article as no datasets were generated or analyzed during this study.

ETHICS STATEMENT

The research ethics committee approved the case study at Al-Azhar University with Code number (MSR/AZ.AST./VAS015/39/214/12/2022).

CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

ORCID

Mohammed Alsagheer Alhewy  <https://orcid.org/0000-0002-2025-6172>

REFERENCES

1. Arora S, Weber MA, Fox CJ, Neville R, Lidor A, Sidawy AN. Common femoral artery ligation and local debridement: a safe treatment for infected femoral artery pseudoaneurysms. *J Vasc Surg.* 2001;33(5):990-993.
2. Corriere MA, Guzman RJ. True and false aneurysms of the femoral artery. *Semin Vasc Surg.* 2005;18(4):216-223.

3. Tresson P, Huvelle U, Bordet M. Femoral artery ligation for treatment of infected groin pseudoaneurysm in injected drug abusers. *Clin Anat.* 2022;35(8):1138-1141.
4. Singh AA, Ashcroft J, Stather PW. Ligation alone versus immediate revascularization for femoral artery pseudoaneurysms secondary to intravascular drug use: a systematic review and meta-analysis. *Ann Vasc Surg.* 2021;73:473-481.
5. Mokhtari S, Besancenot A, Besancenot J, Leroux F. Ruptured femoral artery pseudoaneurysm revealed by necrotizing fasciitis complicated with lower limb acute ischemia. *Ann Vasc Surg-Brief Rep Innov.* 2022;2(2):100061.
6. Şahin M, Yücel C, Kanber EM, İlal Mert FT, Bıçakhan B. Management of traumatic arteriovenous fistulas: a tertiary academic center experience. *Ulus Travma Acil Cerrahi Derg.* 2018;24(3):234-238.
7. Al Shukry S, Ommen J. Necrotizing fasciitis report of ten cases and review of recent literature. *J Med Life.* 2013;6(2):189-194.
8. Inaraja-Pérez GC, Adoración RC, Jose-Antonio LS, Maria-Isabel LG, Irene SV. A bailout solution for an urgent situation: endovascular exclusion and embolization of an infected femoral pseudoaneurysm. *Ann Vasc Surg.* 2020;69:454-454. e5.
9. Algin A, Erdogan MO, Yusufoglu K, Findikli HA, Aydin H. Femoral artery pseudoaneurysm due to a gunshot injury. *J Pak Med Assoc.* 2018;1(68):130-132.
10. Hong SC, Choi HJ, Kim YB. Pseudoaneurysm leading to necrotizing fasciitis at the femoral arterial puncture site. *Arch Plast Surg.* 2014;41:81-84.
11. Huebl HC. Aneurysmal abscess. *Minn Med.* 1966;49:11-16.
12. Samarakoon LB, Ho DC, Tan YK, Kum SW, Lim DM. Infected femoral pseudoaneurysms in intra-venous drug abusers: a decade of experience from a Singapore Tertiary Centre. *Singapore Med J.* 2021;62(3):135-138.
13. Qiu J, Zhou W, Zhou W, et al. The treatment of infected femoral artery pseudoaneurysms secondary to drug abuse: 11 years of experience at a single institution. *Ann Vasc Surg.* 2016;36:35-43.
14. Semba CP, Sakai T, Slonim SM, et al. Mycotic aneurysms of the thoracic aorta: repair with use of endovascular stent-grafts. *J Vasc Interv Radiol.* 1998;9(1):33-40.
15. Zhang M, Zhang H, Tang B, Fu J, Yan H, Luo H. Outcomes of covered stents with vacuum sealing drainage for treatment of infected femoral pseudoaneurysms in intravenous drug addicts. *Ann Vasc Surg.* 2022;1(81):300-307.
16. Fu Q, Meng X, Li F, et al. Stent-graft placement with early debridement and antibiotic treatment for femoral pseudoaneurysms in intravenous drug addicts. *Cardiovasc Intervent Radiol.* 2015;38:565-572.
17. El Housseiny M, Edriss S, Kassab T, Abtar HK, Terro JJ. Necrotizing fasciitis causing complete femoral vessels necrosis and thrombosis in an intravenous drug abuser: a case report. *Int J Clin Res.* 2021;2(1):11-16.

How to cite this article: Alhewy MA, Ghazala EAE, Gado H, Abd-Elgawad WAA, Khamis AA. Infected femoral artery pseudoaneurysm ligation and revascularisation: A case report. *Clin Case Rep.* 2024;12:e8693. doi:[10.1002/ccr3.8693](https://doi.org/10.1002/ccr3.8693)