

# Ruptured Mycotic Common Femoral Artery Pseudoaneurysm:

Fatal Pulmonary Embolism after  
Emergency Stent-Grafting in a Drug Abuser

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*The rupture of a mycotic femoral artery pseudoaneurysm in an intravenous drug abuser is a limb- and life-threatening condition that necessitates emergency intervention. Emergency stent-grafting appears to be a viable, minimally invasive alternative, or a bridge, to subsequent open surgery. Caution is required in cases of suspected concomitant deep vein thrombosis in order to minimize the possibility of massive pulmonary embolism during stent-grafting, perhaps by omitting stent-graft postdilatation or by inserting an inferior vena cava filter first. We describe the emergency endovascular management, in a 60-year-old male intravenous drug abuser, of a ruptured mycotic femoral artery pseudoaneurysm, which was complicated by a fatal pulmonary embolism. (Tex Heart Inst J 2014;41(6):634-7)*

Intravenous drug abusers can present with abscesses, cellulitis, or endocarditis.<sup>1</sup> The development of a mycotic pseudoaneurysm is less frequently reported. We describe the emergency endovascular management, in a drug abuser, of a ruptured mycotic femoral artery pseudoaneurysm, an effort that was complicated by a fatal pulmonary embolism (PE).

**Key words:** Aneurysm, false; aneurysm, infected/surgery; aneurysm, ruptured; blood vessel prosthesis implantation; combined modality therapy; debridement; disease management; endovascular repair; femoral artery/surgery; mycosis; sequelae; substance abuse, intravenous/complications

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## Case Report

In October 2010, a 60-year-old man presented with malaise, fever, and a painful mass in the right groin and thigh. The patient had a 20-year history of intravenous drug use and was positive for hepatitis C. On examination, he kept his right hip slightly flexed and was unable to stretch it or walk because of severe discomfort. There was crepitus locally in the thigh, which suggested the presence of gas in the subcutaneous tissues. Although the femoral pulse was palpable, the overlying groin mass was not considered to be particularly pulsatile. As a result, a diagnosis of femoral pseudoaneurysm was considered unlikely. A computed tomogram suggested the presence of a large right iliopsoas abscess extending down the anterolateral and posterior surface of the thigh, with gas inside it. The patient was taken to the operating room and placed under local anesthesia and intravenous sedation; an incision was made in the area of the lateral thigh, where the palpable crepitus was maximal. Gas, pus, and necrotic material were evacuated and samples were sent for culture. Local débridement and washout were performed, and the wound was left open. The patient was admitted to the surgical ward and started on broad-spectrum antibiotics. The plan was to observe him and decide on the need for further and more radical drainage of the psoas abscess after follow-up imaging. Over the next 48 hours, the patient improved, and only low-grade pyrexia was noted. However, on the 3rd day his condition deteriorated again, with further groin pain, hypotension, and tachycardia. His hematocrit level had dropped to 24%, and then to 17%. Ultrasonograms revealed a large pseudoaneurysm of the femoral artery (diameter, 4.5 × 3.5 cm), accompanied by multiple enlarged inguinal lymph nodes and thrombosis of the superficial femoral vein. At this point, an urgent vascular surgical opinion was requested, and the patient was taken for magnetic resonance angiography. This confirmed the diagnosis of pseudoaneurysm, a lesion that originated at the junction of the common femoral and superficial femoral arteries; the profunda femoris was thrombosed. When we reviewed the computed tomograms

from 3 days earlier, we saw that possible contrast extravasation suggested a pseudoaneurysm. However, this had not been fully grasped at the time. The patient was now progressively tachycardic and hypotensive, indicating active bleeding. The diagnosis of a ruptured mycotic femoral pseudoaneurysm was made, and the patient was immediately taken to the operating room. We chose a minimally invasive approach.

With the patient under local anesthesia and intravenous sedation, the procedure was performed via a left groin puncture and a crossover approach, using an 8F, 45-cm-long, flexible Super Arrow-Flex® sheath (Arrow International; Reading, Pa), which was advanced into the right common femoral artery. Angiography showed a large ruptured pseudoaneurysm arising from the junction between the common and superficial femoral arteries (Fig. 1). The profunda femoris artery appeared to be occluded. Contrast medium was leaking up into the retroperitoneum (Fig. 2). We deployed an 8-mm × 10-cm GORE® Viabahn® Endoprosthesis covered stent (W.L. Gore & Associates, Inc.; Flagstaff, Ariz) to cover the arterial defect and postdilated it with a 7-mm balloon (Fig. 3). A completion angiogram showed patent common and superficial femoral arteries with complete exclusion of the pseudoaneurysm (Fig. 4). The pulsatile effect of the palpable mass in the thigh and groin had disappeared. The entire procedure had lasted 20 minutes, and the fluoroscopy time was 3 minutes. The patient was transfused perioperatively with 4 units of red blood cells and 5 units of fresh frozen plasma.

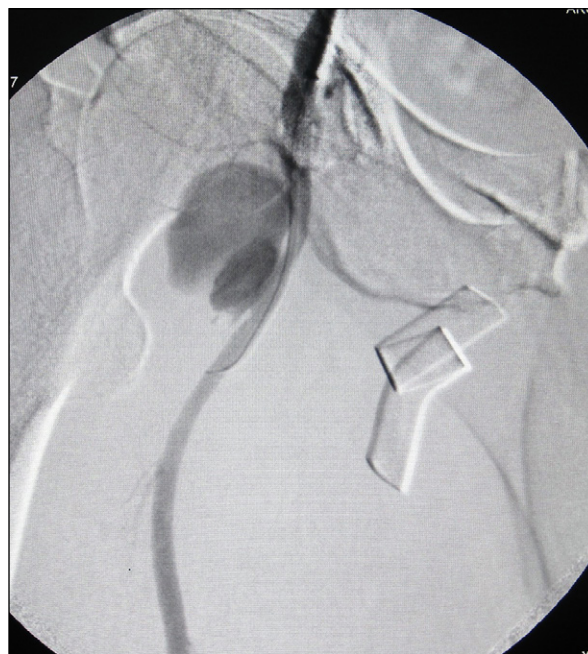
The patient was transferred to the vascular ward in hemodynamically stable condition. Twenty minutes later, he experienced severe acute respiratory distress, secretion of pink frothy sputum, and bowel movements, followed by cardiac arrest. He was immediately intubated and was started on cardiopulmonary resuscitation but died 50 minutes later. Postmortem examination revealed massive PE as the cause of death.

## Discussion

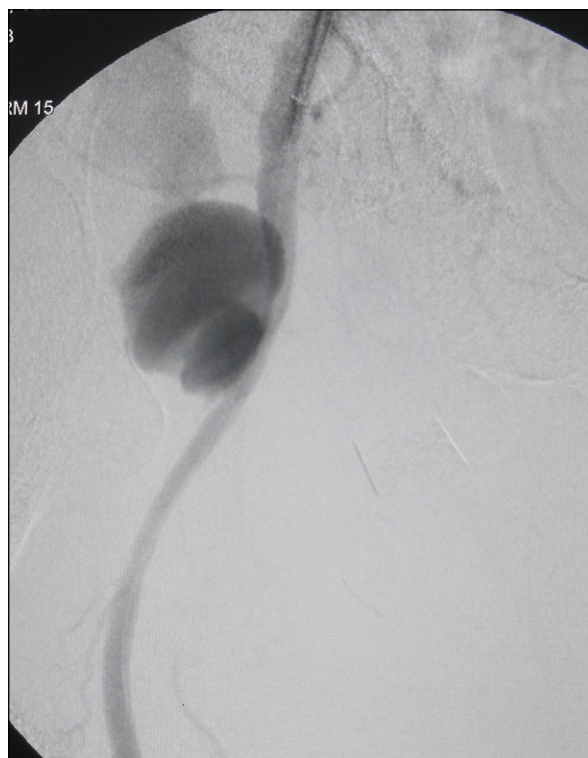
A study from San Francisco estimated the annual prevalence of mycotic pseudoaneurysm in intravenous drug abusers to be 0.03%.<sup>1</sup> As a general rule, any soft-tissue swelling in the groin of an intravenous drug abuser is suspect as a pseudoaneurysm until proven otherwise. Such patients should immediately be referred to a vascular surgeon for investigation and management. Otherwise, rapid expansion and rupture might occur.

Surgical management is challenging because of the extensive destruction of the arterial wall.<sup>1,2</sup> Ligation followed by débridement is an option, but one that carries an increased risk of limb loss if collateralization via the profunda femoris artery is inadequate. Alternatively, direct repair and reconstruction can be performed; however, this is associated with a high risk of recurrent

infection, even if extensive débridement has been done and autologous venous material is used. Although native veins are more resistant to infection than is prosthetic

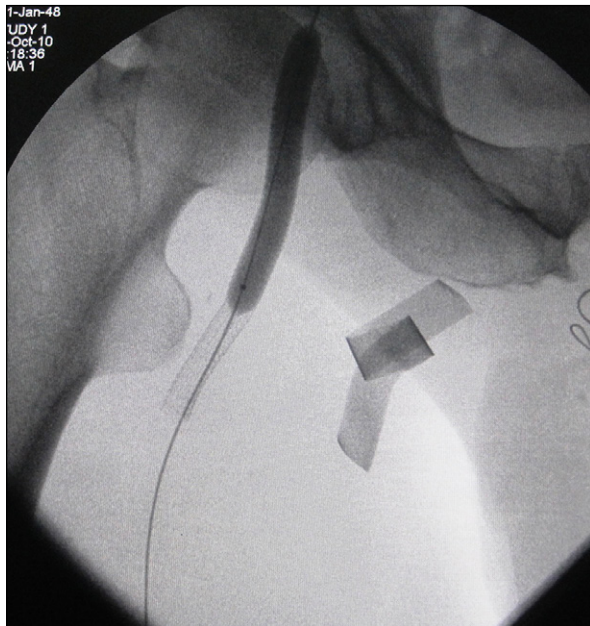


**Fig. 1** Intraoperative angiogram shows a pseudoaneurysm arising from the junction between the common and superficial femoral arteries.



**Fig. 2** Intraoperative angiogram shows that contrast medium appears to be leaking cranially and tracking below the inguinal ligament, toward the retroperitoneal space.

material, earlier intravenous drug use has usually left them occluded or chronically diseased. The best alternative for a successful outcome is to eradicate the local sepsis by draining the infected material and débriding all nonviable tissues, to ligate the arterial defect or the artery itself and, if needed, to revascularize the lower



**Fig. 3** Intraprocedural angiogram shows an 8-mm × 10-cm self-expanding stent-graft deployed across the arterial defect and postdilated with a 7-mm balloon.



**Fig. 4** Completion angiogram shows successful pseudoaneurysm exclusion.

limb through a new, noninfected plane. This last can be an extra-anatomic measure, such as a bypass through the obturator foramen.

None of the above was considered a satisfactory option in this debilitated patient. As a result, we chose a minimally invasive endovascular alternative that could act as a bridge to subsequent open surgery. The plan was to deploy a stent-graft, to transfuse and stabilize the patient, and then to drain the psoas abscess more extensively the next day. Definitive open surgery would have been needed at a later stage, had signs of recurrent local or systemic sepsis developed.

A literature search identified only one other report of a bleeding femoral artery in a drug abuser who was treated by means of a stent-graft.<sup>3</sup> This was a case of a ruptured mycotic pseudoaneurysm treated initially by surgical resection and arterial reconstruction with venous material. Before that patient's discharge from the hospital, there was massive bleeding from the vein-graft anastomosis, which necessitated the deployment of a stent-graft on an emergency basis. Although the original intention was to deploy the stent-graft as a bridge to definitive surgical treatment, no additional surgery was necessary because the patient appeared well after 16 months of follow-up and the stent-graft repair remained patent, with no clinical or biochemical signs of infection. This is not surprising: earlier reports<sup>4-8</sup> had also suggested that stent-grafting could be considered definitive for the treatment of a mycotic iliac or femoral artery aneurysm, in patients who displayed no sign of infection or vascular occlusion.

Another useful option is a hybrid approach that combines endovascular with open surgery. This staged approach consists of emergency percutaneous stent-graft deployment at the site of the arterial defect, with the patient under local anesthesia—to be followed by extensive surgical débridement at a later date. In a study of 6 patients who presented with ruptured infected anastomotic femoral pseudoaneurysm,<sup>9</sup> all 6 were treated by means of this hybrid approach. It is of note that in all 6 patients extensive surgical débridement and pseudoaneurysm excision was accomplished successfully 1 to 3 days after stent-graft placement under local anesthesia, without the need for extended vascular exposure for proximal and distal control. There were no deaths within 30 days, and all stent-grafts remained patent during follow-up, without endoleak or signs of recurrent local or systemic infection. Two patients died at 8 and 10 months after the procedure—of heart failure and acute myocardial infarction, respectively.

Although our procedure was technically successful in excluding the patient's pseudoaneurysm and arresting the life-threatening bleeding, he died of massive PE. Deep vein thrombosis (DVT) and PE are common occurrences in intravenous drug abusers. Whether PE was precipitated by stent-grafting or was simply a coinci-

dence is unknown. In the former instance, one possible explanation would be that pre-existing thrombus in the femoral vein was compressed during balloon postdilation of the stent-graft in the neighboring femoral artery and was dislodged to cause PE after our patient's arrival in the ward. In any event, these manipulations in the region of the femoral vessels during stent-grafting were minimal and certainly less vigorous than those required during open surgery. It is impossible to predict whether the omission of stent-graft postdilation would have eliminated this fatal sequela. Given that our patient would not have been a good candidate for anticoagulation (of the DVT), an alternative would have been to first insert an inferior vena cava filter through the left femoral vein, and then to deploy the stent-graft. In retrospect, this maneuver might have protected our patient from massive PE. However, at the time, we were unsure whether we were confronting a recent episode of DVT or a chronic occlusion.

### Conclusion

In conclusion, rupture of an infected femoral artery pseudoaneurysm in drug abusers is a limb- and life-threatening condition that necessitates emergency intervention. Emergency stent-grafting appears to be a viable minimally invasive alternative to difficult and complex open surgery. A hybrid approach—an endovascular procedure combined with secondary surgical débridement and pseudoaneurysm excision—might prove to be the definitive treatment in patients who experience no recurrent sepsis during follow-up. Caution is necessary in cases of suspected concomitant DVT, in order to minimize the possibility of massive PE, perhaps by declining to postdilate the stent-graft or by placing an inferior vena cava filter first.

## References

1. Tsao JW, Marder SR, Goldstone J, Bloom AI. Presentation, diagnosis, and management of arterial mycotic pseudoaneurysms in injection drug users. *Ann Vasc Surg* 2002;16(5):652-62.
2. Naqi SA, Khan HM, Akhtar S, Shah TA. Femoral pseudoaneurysm in drug addicts—excision without revascularization is a viable option. *Eur J Vasc Endovasc Surg* 2006;31(6):585-7.
3. Lupattelli T, Garaci FG, Basile A, Minnella DP, Casini A, Clerissi J. Emergency stent grafting after unsuccessful surgical repair of a mycotic common femoral artery pseudoaneurysm in a drug abuser. *Cardiovasc Intervent Radiol* 2009;32(2):347-51.
4. Kwon K, Choi D, Choi SH, Koo BK, Ko YG, Jang Y, et al. Percutaneous stent-graft repair of mycotic common femoral artery aneurysm. *J Endovasc Ther* 2002;9(5):690-3.
5. Callaert JR, Fourneau I, Daenens K, Maleux G, Nevelsteen A. Endoprosthetic treatment of a mycotic superficial femoral artery aneurysm. *J Endovasc Ther* 2003;10(4):843-5.
6. Sanada J, Matsui O, Arakawa F, Tawara M, Endo T, Ito H, et al. Endovascular stent-grafting for infected iliac artery pseudoaneurysms. *Cardiovasc Intervent Radiol* 2005;28(1):83-6.
7. Clarke MG, Thomas HG, Chester JF. MRSA-infected external iliac artery pseudoaneurysm treated with endovascular stenting. *Cardiovasc Intervent Radiol* 2005;28(3):364-6.
8. Mofidi R, Bhat R, Nagy J, Griffiths GD, Chakraverty S; East of Scotland Vascular Network. Endovascular repair of a ruptured mycotic aneurysm of the common iliac artery. *Cardiovasc Intervent Radiol* 2007;30(5):1029-32.
9. Klonaris C, Katsargyris A, Vasileiou I, Markatis F, Liapis CD, Bastounis E. Hybrid repair of ruptured infected anastomotic femoral pseudoaneurysms: emergent stent-graft implantation and secondary surgical debridement. *J Vasc Surg* 2009;49(4):938-45.