# Aneurysmal degeneration and rupture of deep vein conduit with formation of an arterial-vaginal fistula 13 years after creation of a femoral-femoral bypass

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## ABSTRACT

The autologous deep vein is a suitable alternative to prosthetic or cadaveric grafts as a bypass conduit because of its superior durability and lower risk of complications. Aneurysmal degeneration of deep vein grafts is rarely seen but can potentially be fatal when it does occur. We describe the case of an 87-year-old woman who presented with acute vaginal bleeding due to the rupture of an aneurysmal femorofemoral bypass vein graft into the vagina. The patient presented 13 years after the initial procedure, highlighting the need for long-term monitoring and the early recognition of this potentially catastrophic complication. (J Vasc Surg Cases and Innovative Techniques 2018;4:287-91.)

**Keywords:** Infected bypass graft; Aneurysm; Rupture of femoral-femoral bypass graft

Depending on the surgical site, the incidence of prosthetic vascular graft infections is reported between 0.5% and 5%. Despite their rarity, these complications are associated with morbidity and mortality rates of up to 75%.[1,2] Treatment involves removal of the graft and extra-anatomic bypass or in situ reconstruction with autologous vein or antibiotic-soaked graft material.[3,4] The use of autologous deep vein as the conduit has been shown to reduce risk of reinfection and thrombosis while having superior durability over prosthetic or cadaveric allografts.[4] Known complications of autologous deep vein grafts include stenosis, thrombosis, compartment syndrome, and venous stasis of the donor extremity; however, aneurysmal degeneration of the deep vein graft is rarely described.[4,5] We report the case of an aneurysmal autologous deep vein femorofemoral bypass graft that subsequently ruptured into the vagina of an 87-year-old woman 13 years after the initial procedure. Consent for publication of this case report was obtained from the patient's next of kin.

## CASE REPORT

The patient is an 87-year-old white woman who was transferred to our institution from an outside facility with complaints of acute vaginal bleeding and a pulsatile mass in the mons pubis. Her history was significant for aortoiliac occlusive disease, coronary artery disease, renal artery stenosis, atrial fibrillation on warfarin, and hypertension. In the 1990s, the patient received a cardiac catheterization complicated by a significant injury to her common femoral artery requiring a left to right femorofemoral bypass with polytetrafluoroethylene graft. She then presented to our institution in 2004 with infection of the polytetrafluoroethylene bypass graft and underwent complete excision of the graft and replacement of the left to right femorofemoral bypass graft with autologous deep vein. The patient was observed as an outpatient with duplex ultrasound for routine surveillance. A 2.2-cm aneurysmal dilation of the midportion of the deep vein graft was first noted on duplex ultrasound in October 2013, which was 9 years after the creation of the bypass. The patient was asymptomatic at the time and had no changes in her ankle-brachial indices. As she did not complain of pain or exhibit signs of mass effect or distal embolization, she was managed nonoperatively with annual ultrasound examinations to monitor for aneurysmal growth. The aneurysm size remained stable on yearly ultrasound examination until 2016, when it was noted to be 3.5 cm in size (Fig 1). The patient remained asymptomatic with no significant findings on physical examination. Because of her advanced age and poor functional status, the decision was made to continue with conservative management without operative repair. The patient and family were repeatedly educated on the signs and symptoms of aneurysm rupture during their clinic appointments.

In 2017, the patient presented with vaginal bleeding, and computed tomography angiography (CTA) demonstrated an 8.0 × 8.1 × 8.2-cm aneurysm of the midportion of the vein graft with rupture into the vagina (Fig 2). A three-dimensional CTA reconstruction can be seen in Fig 3.

Physical examination was remarkable for a large, pulsatile mass in the mons pubis and bright red blood at the vaginal introitus. The patient was hemodynamically stable and oriented on examination. Laboratory test results were notable for a hemoglobin level of 8.5 g/dL and a supratherapeutic international normalized ratio of 5.0. She was taken to the

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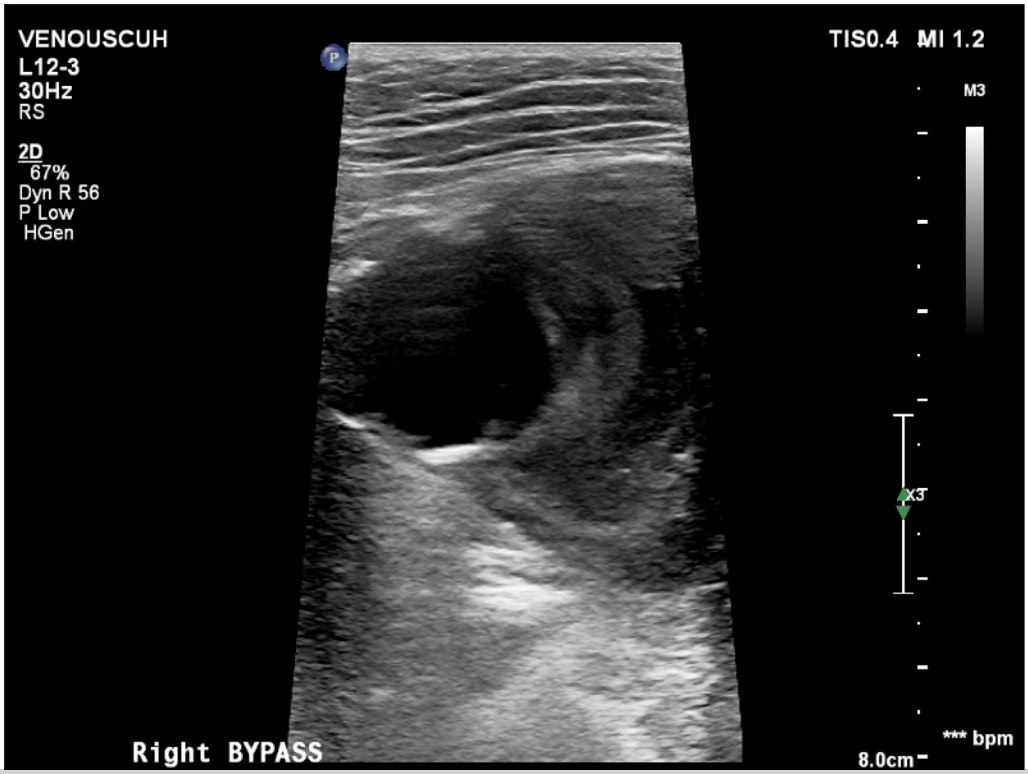


**Fig 1.** Duplex ultrasound demonstrating a 3.5-cm aneurysmal dilation of the midportion of the bypass graft from October 2016.

operating room emergently for repair of the ruptured vein graft aneurysm. After administration of local anesthesia, ultrasound was used to locate the femorofemoral graft. Incisions were made lateral to the mons pubis overlying the bypass and carried down to the vein graft. Proximal and distal control around the bypass graft was obtained with vessel loops. The vein graft was then ligated and left in situ. Rifampin-soaked Dacron was then tunneled through a new plane superior to the existing graft and was interposed between the proximal and distal cuffs of the prior femorofemoral graft. Prosthetic Dacron was used in this case as it was a readily available, suitable, and cost-effective option during this emergent repair. Alternative conduit options included CryoVein (CryoLife, Kennesaw, Ga) and contralateral deep vein; however, deep vein harvest would have required general anesthesia, longer operative times, and prolonged recovery in this already frail patient. A stent graft was not used because the femorofemoral bypass graft was ectatic (13 mm in size) proximal and distal to the aneurysm, and there was not enough working length to deploy a stent graft.

The patient tolerated the procedure well and had biphasic bilateral Doppler signals at case completion. The hospital course was uncomplicated, and she was doing well at her first postoperative visit. The repair was found to be patent on 6-month postoperative duplex ultrasound examination. After this postoperative visit, the patient died of complications related to undiagnosed colorectal carcinoma.

## DISCUSSION

Aneurysmal degeneration into neighboring organs has been well described in cases of abdominal aortic aneurysm rupture into the duodenum or erosion into adjacent vertebral bodies.[6,7] These can occur in atherosclerotic, traumatic, or mycotic aneurysms.[8] In addition, there have been several reports of iliac artery-ureteral fistulas secondary to iliac artery aneurysms, chronic ureteral stents, and combination vascular and urologic procedures.[9,10] To our knowledge, we report the first case of aneurysmal degeneration of autologous superficial femoral vein conduit rupturing into the vagina. The pathogenesis of aneurysmal erosion into neighboring structures has been attributed to inflammatory changes during aneurysm formation, including abnormal amounts of metalloproteinases and increased proteolytic degradation.[11] Aneurysmal degeneration of vein grafts primarily occurs at anastomotic sites and can result from the mechanical stress of physiologic movement and mismatch in size of the conduit and native artery. True aneurysmal dilation of venous bypasses may occur during several years, as in our case, and be secondary to atherosclerosis, uncontrolled hypertension, hypercholesterolemia, and smoking.[12] A 16-year study completed at our institution looked at the long-term results of 336 femoropopliteal vein grafts that were used to treat 144 infected aortofemoral bypasses, 21 infected aortic-iliac grafts, and

**Fig 2.** Computed tomography angiography (CTA) demonstrating arterial-vaginal fistula with leakage of contrast material into vagina.

22 infected axillofemoral bypasses.[13] No cases of aneurysmal degeneration were reported in this series, and infection recurred in <2% of patients. Reinfection was found to occur in cases of profound sepsis and was attributed to highly virulent organisms, such as *Candida*, *Pseudomonas*, and polymicrobial infections. In their series of 154 superficial femoral vein grafts, Schulman et al[14] described only one case of aneurysmal degeneration occurring 8 years after the index procedure. Unlike in our case, fistula formation was not seen.

Our patient had significant uterine prolapse on preoperative CTA, and this could have potentially provided anterior pressure on the posterior aspect of the graft, leading to fistula connection. Our case highlights the need for continued monitoring of aneurysmal grafts and suggests that asymptomatic vein graft aneurysms should be treated when they demonstrate growth, even in elderly and frail patients, to prevent rupture. Whereas the patient presented with an extremely rare outcome, it should be a recognized complication for aneurysmal femorofemoral bypass grafts using autologous deep vein.

## CONCLUSIONS

Our case describes an aneurysmal autologous vein femorofemoral bypass graft with rupture into the vagina. Although this is an exceptionally rare complication, vascular surgeons should be aware of this potentially fatal complication. Despite routine surveillance of the graft, rupture of the aneurysm occurred in our patient. This may suggest a need for early intervention in patients with asymptomatic aneurysmal autologous vein grafts.

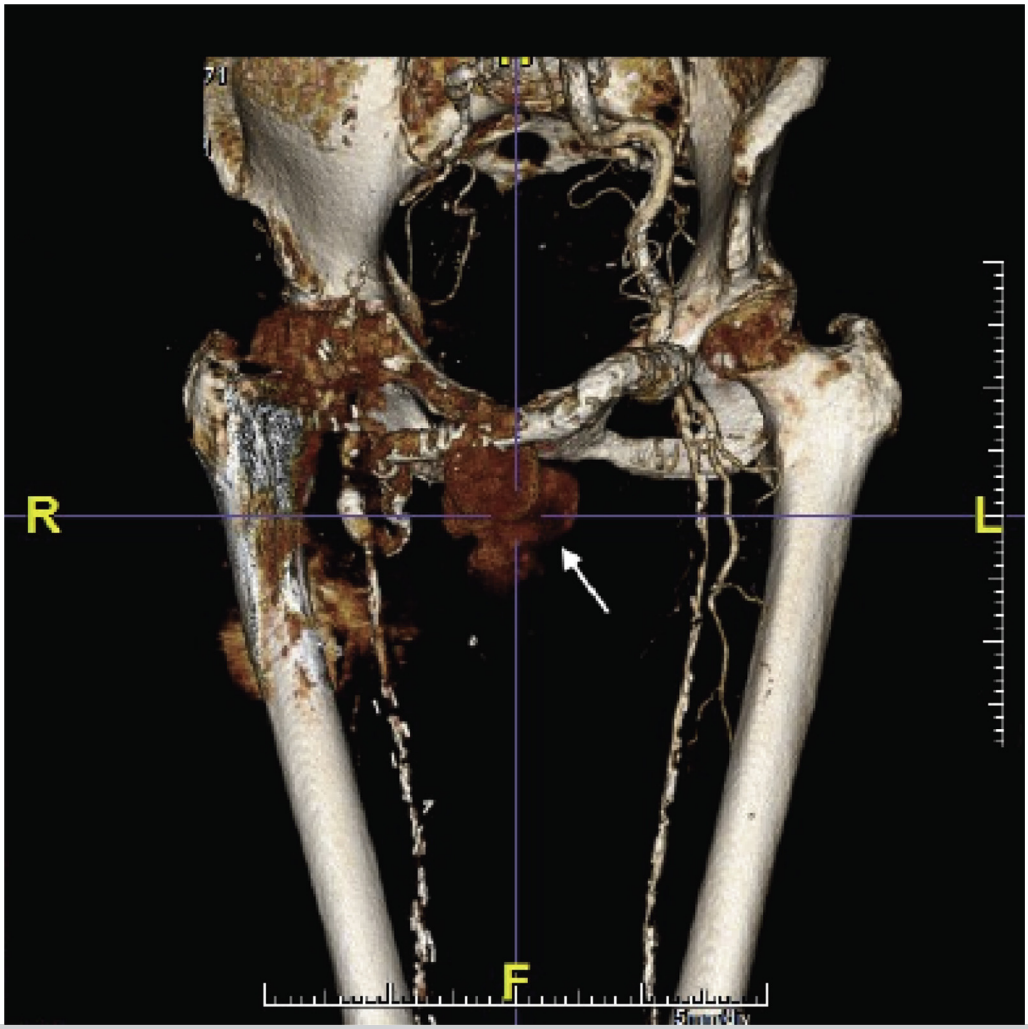


**Fig 3.** Three-dimensional computed tomography angiography (CTA) reconstruction demonstrating the aneurysmal femorofemoral deep vein graft. The *arrow* signifies extravasation from the ruptured bifemoral graft.

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