



Avoiding Venous Anastomotic Dehiscence of an Arteriovenous Graft in a Super-Obese Patient

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Surgeons avoid creating arteriovenous fistulae in obese patients owing to deep vessels, cannulation complications, and inconsistent outcomes. We describe placing an arteriovenous polytetrafluoroethylene (PTFE) graft between the brachial artery and axillary vein to avoid these complications. A 39-year-old super-obese woman with end-stage renal disease had undergone several hemodialysis access procedures on both arms. We traced the course of the arteriovenous graft course with the patient sitting and lying down. The ideal course was more accurate with the patient sitting; thus, the patient sat when the course was drawn, before lying on the operating bed. The PTFE graft was placed between the right brachial artery and axillary vein, according to the course in the opposite arm. No anastomotic dehiscence or pseudoaneurysm has taken place during 2 years of follow-up. In super-obese patients, the ideal course for arteriovenous grafts should be drawn while they are sitting, avoiding skin folds. This tip could avoid anastomotic dehiscence and pseudoaneurysm between the axillary vein and a PTFE graft.

Keywords: Aneurysm, Arteriovenous anastomosis, False, Obesity, Surgical wound dehiscence

Introduction

Autogenous arteriovenous fistulae are the gold standard for use in hemodialysis owing to their superior performance, low risk of infection, and long-lasting patency [1]. However, surgeons tend to avoid creating arteriovenous fistulae in obese patients owing to deep vessels, cannulation complications, and inconsistent outcomes [2]. According to Kats et al. [3], the primary failure rate of these fistulae was similar in obese (body mass index [BMI] >30 kg/m²) and non-obese (BMI <30 kg/m²) patients (46% versus 41%, p=0.45), but long-term fistula survival was worse in obese than in non-obese patients, because secondary survival was worse in the obese group (hazard ratio, 2.74; p=0.004). A polytetrafluoroethylene (PTFE) graft is useful when appropriate venous access has not been successful, but PTFE grafts have a high complication rate. Here, we report a case of graft failure due to anastomotic dehiscence and a pseudoaneurysm in a super-obese patient (BMI ≥50 kg/m²) [4,5] and present a surgical technique that could be successfully used in such patients.

Case report

The patient was a 39-year-old super-obese woman with end-stage renal disease secondary to granulomatous interstitial nephritis. She had undergone several different hemodialysis access procedures on both arms.

She was transferred to our hospital because a U-shaped arteriovenous graft on her right forearm was infected. The infected graft was removed surgically, and a permanent catheter was inserted through the right internal jugular vein. After the infection was controlled, a left arteriovenous PTFE graft was placed between the brachial artery and axillary vein in a routine fashion. At that time, her weight was 136.2 kg, her height was 160.8 cm, and her BMI was 52.7 kg/m².

After 1 year and 8 months, she was transferred to the emergency room because the left arteriovenous graft had no thrill and murmur. Her weight was 198.5 kg and her BMI was 77.34 kg/m², indicating a weight gain of 62.3 kg. Ultrasound findings revealed anastomotic dehiscence and a pseudoaneurysm with a hematoma between the axillary

vein and graft (Fig. 1). The left arteriovenous graft was packed with a fresh thrombus. On fistulography, anastomotic dehiscence and a pseudoaneurysm between the axillary vein and PTFE graft were confirmed. The venous end of the graft and the axillary vein were separated by 2 cm, in which a pseudoaneurysm was present. Although the graft was filled with a thrombus, the unstable and fresh hematoma was a risk factor for bleeding. An Amplatzer vascular plug II (AGA Medical Corp., Golden Valley, MN, USA) was placed at the venous end of the graft because of arterial flow blockage. With the patient lying on her back, we drew the required course of the arteriovenous graft on her upper arm; subsequently, with the patient sitting, we drew the ideal course of the arteriovenous graft on the same upper arm. There was a large difference between the 2 courses; a longer and more curved course was drawn when the patient was sitting than when she was lying down (Fig. 2).

We decided to place a new right arteriovenous graft following the course that was drawn when the patient was sitting. Before surgery, a permanent catheter was inserted through the right internal jugular vein. The patient was seated, and the desired course was drawn. Subsequently, the patient was placed on the operating bed. The PTFE graft was placed between the right brachial artery and axillary vein according to the course in the opposite arm. There has been no anastomotic dehiscence or pseudoaneurysm between the axillary vein and the PTFE graft during a 2-year follow-up period.

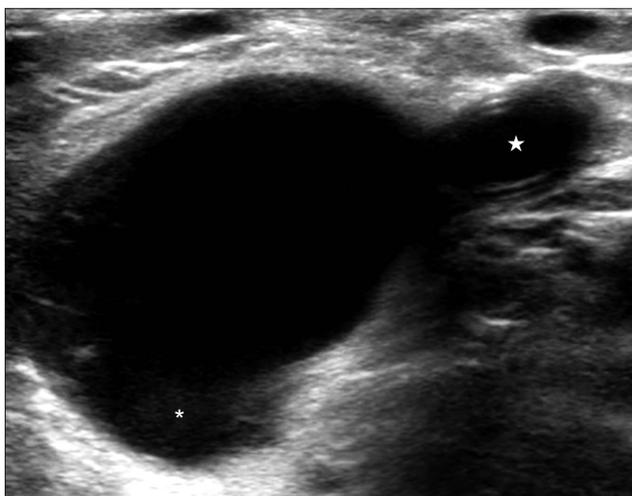


Fig. 1. Ultrasound image showing anastomotic dehiscence and a pseudoaneurysm with a hematoma between the axillary vein and the graft. An asterisk (*) indicates an axillary vein and a star (☆) indicates a free-floating polytetrafluoroethylene graft.

The patient provided written informed consent for publication of clinical details and images.

Discussion

The patient in this case experienced 1 arteriovenous fistula failure and 3 arteriovenous graft failures, and 4 re-operations were performed. The previous failures were associated with graft infection; however, the cause of the last graft failure was different. We assumed that it was caused by anastomotic dehiscence due to the graft moving down with traction of the surrounding soft tissue. The course of the graft changed to a downward course, and in particular, the course changed most near the medial skin fold. Based on our findings, we decided to place a new right arteriovenous graft between the right brachial artery and axillary vein with a course that was drawn while the patient was seated before surgery. After we performed the procedure using this technique 2 years ago, the patient has not experienced any anastomotic dehiscence or pseudoaneurysm.

Patients with morbid obesity are more likely than non-obese individuals to have large axillary and medial upper-extremity fat pads. It is possible that the weight of the



Fig. 2. Courses of the arteriovenous graft with the patient sitting and lying down. (A) Sitting. (B) Lying down. Red arrow: with the patient sitting, we drew the course of the arteriovenous graft that we believed was the most ideal on her upper arm. Yellow arrow: with the patient lying on her back, we drew the course of the arteriovenous graft that we believed was the most appropriate on her upper arm. This course corresponded to the actual course of the arteriovenous graft where the previous dehiscence occurred. The arteriovenous graft appeared on the left when lying down, and there were some differences between the 2 courses. White arrow: deep wrinkle inside the left arm.

tissue around a PTFE graft is higher in such patients than in patients with a normal BMI. Furthermore, our patient gained 62.3 kg over a period of 20 months after the operation for placement of a left arteriovenous PTFE graft in the upper arm. During this period, the patient's large medial weight gain resulted in the formation of deep wrinkles on the inside of the arm. The subcutaneous tissue of the left upper arm might have adhered to the PTFE graft, and the anastomotic site between the axillary vein and the PTFE graft might have been pulled slowly downward when she was either sitting or standing because of weight gain around the graft. Consequently, the excess tissue around the PTFE graft caused anastomotic dehiscence and a pseudoaneurysm between the axillary vein and the PTFE graft.

In patients with super-morbid obesity, the ideal course for an arteriovenous graft should be drawn while the patient is seated in order to avoid medial skin folds, and the graft should be placed according to this course. This simple tip could help avoid anastomotic dehiscence and a pseudoaneurysm between the axillary vein and the PTFE graft. In addition, this tip could be applied to create a new route for basilic vein transposition or superficialization of the cephalic vein, as well as arteriovenous grafts in obese patients with large medial fat pads.

Conflict of interest

No potential conflict of interest relevant to this article

was reported.

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