

Reconstruction of External Iliac Vein for an Iatrogenic Venous Hypertension due to Iatrogenic Vein Injury, A Case Report

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Abstract

Iatrogenic major vessel injuries are rare but life-threatening complications for oncologists. Although the procedures for arterial reconstruction are clear and precise, venous repair techniques are controversial. In case of excessive exanguination, prompt surgical intervention is required. Repair techniques such as venorrhaphy, patching, and end-to-end anastomosis should be considered. If ligation is performed in the major vein, clinical signs of venous hypertension, such as swelling and edema, may occur. We performed interposition between the femoral vein and common iliac vein using a 10-mm dacron graft. Graft interposition is a safe and effective surgical procedure when necessary to restore venous blood flow. Our aim is to contribute to the literature on this gray area with the surgical intervention we applied in such a complicated case.

Keywords: Femoral vein, iliac vein, reoperation, vascular system injuries, veins

Introduction

Lower extremity edema can develop due to many reasons such as kidney failure, heart failure, pericarditis, thyroid disease, malnutrition syndromes, pregnancy,

adverse drug effects, liver failure, obesity, and vascular diseases⁽¹⁾. Bilateral edema is frequently caused by systemic reasons⁽¹⁾. However, unilateral edema is commonly seen due to primary or secondary venous and



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lymphatic diseases⁽¹⁾. Additionally, acute swelling, with a duration of swelling less than 72 h, is seen in deep vein thrombosis, trauma, and infectious circumstances⁽¹⁾. Doppler ultrasound, computed tomography, magnetic resonance imaging, and venography are imaging techniques that clarify the diagnosis⁽¹⁾. Treatment options change by diagnosis. Occlusive disease occurring hours after the surgical procedure makes us think of surgical complications. Cessation of blood flow by ligation can be a life-saving option in life-threatening uncontrolled bleeding⁽²⁾. If the ligated vessel is a vein and the other veins that will provide drainage of the region are insufficient or underdeveloped, swelling and tension in the region may be seen in the acute period because adequate venous drainage cannot be provided. Possible diagnoses are clarified using imaging methods. Doppler ultrasound is the first option imaging technique, and computed tomography (CT), magnetic resonance imaging, and venography are other options⁽¹⁾. If clinical suspicion of vessel damage is supported by imaging, treatment is considered to be repair of vessels for required flow at reoperation. Compression therapy may also be considered after surgical repair and blood flow restoration.

Case Presentation

A 63-year-old male patient with diabetes, benign prostatic hyperplasia, and hypertension was admitted to the general surgery department with abdominal pain and bloating. Physical examination revealed a mass in the left lower quadrant. CT imaging revealed a mass adjacent to the iliac artery and iliac vein associated with the ileum and descending colon. Wide excision of the mass was performed by general surgeons using a median incision, sparing the ureter. One hour after the operation, sudden swelling, tension, and pain in the left leg were observed, and imaging was performed using venous Doppler ultrasound. Afterwards, the tension and swelling in the leg gradually increased. According to the ultrasound report, there was partial thrombus in the common femoral artery but no flow; there was also no flow and no thrombus in the deep femoral vein, superficial femoral vein, and no thrombus in

the popliteal vein and calf veins, and there was no arterial problem. The general surgery department consulted the vascular surgery team regarding the ultrasound report. As a vascular surgery team, we recommended reoperation and venous repair (Figure 1). The midline incision was reopened, and access to the iliac artery and vein was achieved. Common iliac artery pulsation was observed. It was observed that the integrity of the external iliac vein was impaired. Flow was not observed in the external iliac vein, but it was observed that it was ligated. Simultaneously, the inguinal vertical incision was opened by the second vascular surgery team, and the femoral artery and vein were found and prepared. Saphenous vein

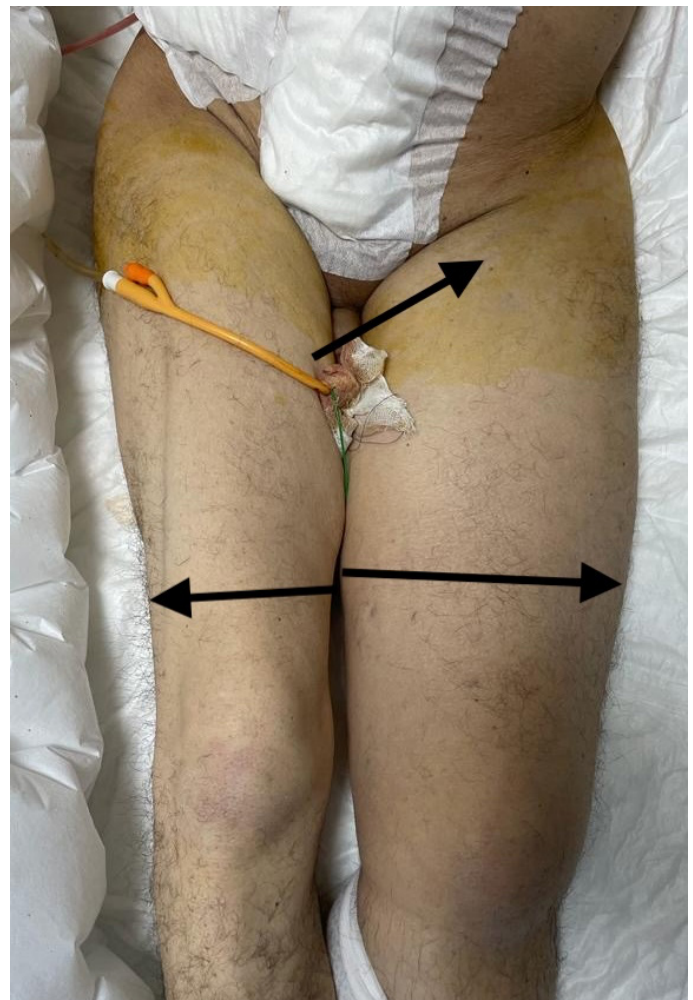


Figure 1. Comparison of both left and right legs before surgery, without the left inguinal operative scar of the vascular surgery team

diameter was found to be insufficient. A larger diameter synthetic graft was preferred to prevent occlusion caused by narrowing. An end-to-side anastomosis was performed between the femoral vein and the intact common iliac vein with a 6-0 prolene running suture (Figure 2). The skin and subcutaneous tissues were closed in the standard fashion after bleeding control was accomplished.

For anticoagulation, we used standard heparin intravenously on the first day and then low-molecular-weight heparin subcutaneously. Also, in the left leg, we observed a significant decrease in calf diameter after reoperation. Left calf diameter calculated 44 cm, right

calf diameter calculated 32 cm before interposition. After the venous interposition, the left calf diameter was calculated as 38 cm and the right calf diameter was 31 cm. Tension and swelling were noticeably reduced (Figure 3). Compression therapy with elastic bandage was applied routinely in the postoperative period. CT venography could not be performed because the patient had acute renal failure. Ultrasound imaging performed 1 week after the operation revealed that the graft was open, and no thrombus was detected. He was discharged as a mobilizable patient 2 weeks after the operation.

Discussion

As vascular surgeons, damage control and bleeding are important aspects of our lives. In some situations, elective operations also require vascular surgeons in

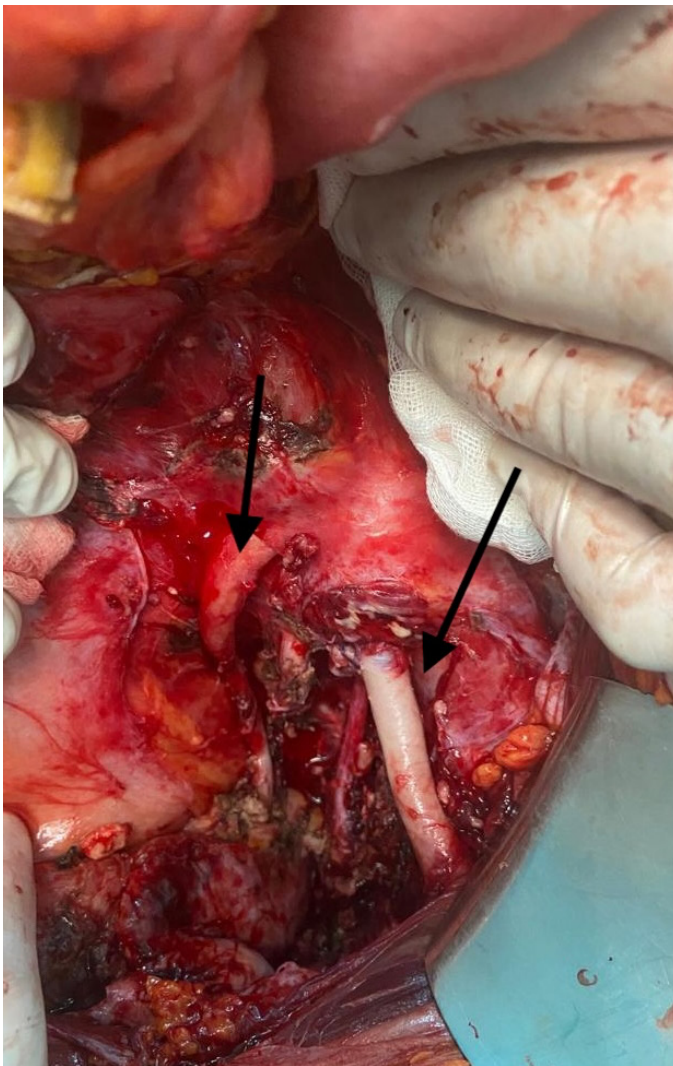


Figure 2. Intraoperative shoot of the interposition space



Figure 3. Comparison of both left and right legs after surgery with a surgical drain tube

cases of existing vascular injuries⁽³⁾. These injuries may cause life threatening complications, especially in vessels with low pressure and high flow such as inferior vena cava, portal vein, and internal iliac veins⁽³⁾. It is stated that owing to the development of cancer surgery and therapies, radical oncologic resections may result in more iatrogenic vascular injuries, which could be encountered more commonly⁽³⁾. Because the great vessels carry a large amount of blood, the amount of blood loss can create life-threatening causes such as hypotension and shock⁽³⁾. It also requires a large amount of transfusion even if bleeding is stopped. In addition, bleeding without a vascular surgeon results in more blood loss⁽³⁾. In addition, in severe or inoperable patients, there is an increased risk for the probability of a major vein injury due to radical surgical procedures⁽³⁾. Therefore, major vessel injuries should be repaired immediately, especially in hemodynamically unstable patients⁽⁴⁾. Oderich et al.⁽³⁾ reported that they applied vein ligation in only 1 of 44 studies. According to Oktar⁽⁴⁾, ligation should be the last option to stop active bleeding. In addition, after exsanguination is controlled in the acute period, venous reconstruction is recommended as soon as possible⁽⁴⁾. However, ligation of the common iliac vein is an option to life threatening exsanguination⁽²⁾. Furthermore, Timberlake et al.⁽⁵⁾ stated that they believe that edema after vein ligation is temporary and that postoperative leg elevation prevents long-term functional loss; venous hypertension has dramatic and life-lowering complications. In a recent study on the same subject, Matsumoto et al.⁽⁶⁾ compared ligation and repair. According to their study, the venous ligation group was associated with significantly higher rates of secondary amputation and longer hospital stay and fasciotomy than the venous repair group⁽⁵⁾. If a hemodynamically unstable situation exists, ligation is recommended^(5,6). On the other hand, in hemodynamically stable circumstances, repair and reconstruction are suggested^(5,6). Although there is an endovascular treatment option for iliac artery and vein injuries, this option is only possible if there is complete vascular integrity that can be accessed intravascularly⁽⁷⁾.

According to our opinion, to maintain venous flow, interposition with a wide-sized Dacron graft is one of the most important therapies. Demirdas et al.⁽⁸⁾ have declared in their study, which is about an interposition via 10 mm Dacron graft, similar to us, between the brachiocephalic vein to the atria. Their study is very similar to ours in terms of graft type, graft size, and the aim of interposition⁽⁸⁾.

It is clear that choosing the appropriate size and type of graft and suture is a multivariate equation that is possible with the surgeon's experience and profit-loss consideration. In our opinion, timely consultation with an experienced and competent vascular surgery team in iatrogenic vascular injuries is life-saving and the most beneficial approach to the patient. In venous injuries, interposition of grafts with appropriate sizes is a safe and effective treatment method, especially in complicated cases.

Ethics

Informed Consent: Informed consent was obtained.

Peer-reviewed: Externally peer-reviewed.

Authorship Contributions

All authors contributed equally to the article.

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