

# Invasion of Artificial Vascular Graft into Duodenal Bulb after Living Donor Liver Transplantation

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## Abstract

Artificial vessel grafts are used for outflow reconstruction in living donor liver transplantation (LDLT). We report a very rare case of invasion of an artificial vascular graft into the duodenal bulb after LDLT. A 54-year-old man underwent LDLT in August 2012. A right hemiliver without a middle hepatic vein was used as a graft. The outflow of segment V was created by anastomosing an artificial graft to the inferior vena cava. During outpatient follow-up, the patient complained of acid regurgitation but did not experience abdominal pain. Panendoscopy was arranged and it revealed that the artificial graft had invaded the duodenal bulb. Operation was performed to remove the graft and the patient discharged after fourteen days of hospital stay. Invasion of artificial vascular grafts to adjacent organs is rare, but happens in living donor liver transplantation. It may be caused by inappropriate vessel graft length and adhesion between the graft and adjacent organs.

## Keywords

Living Donorliver Transplantation, Artificialgraft

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## 1. Introduction

Living donor liver transplantation (LDLT) is a treatment option for patients with end stage liver disease or

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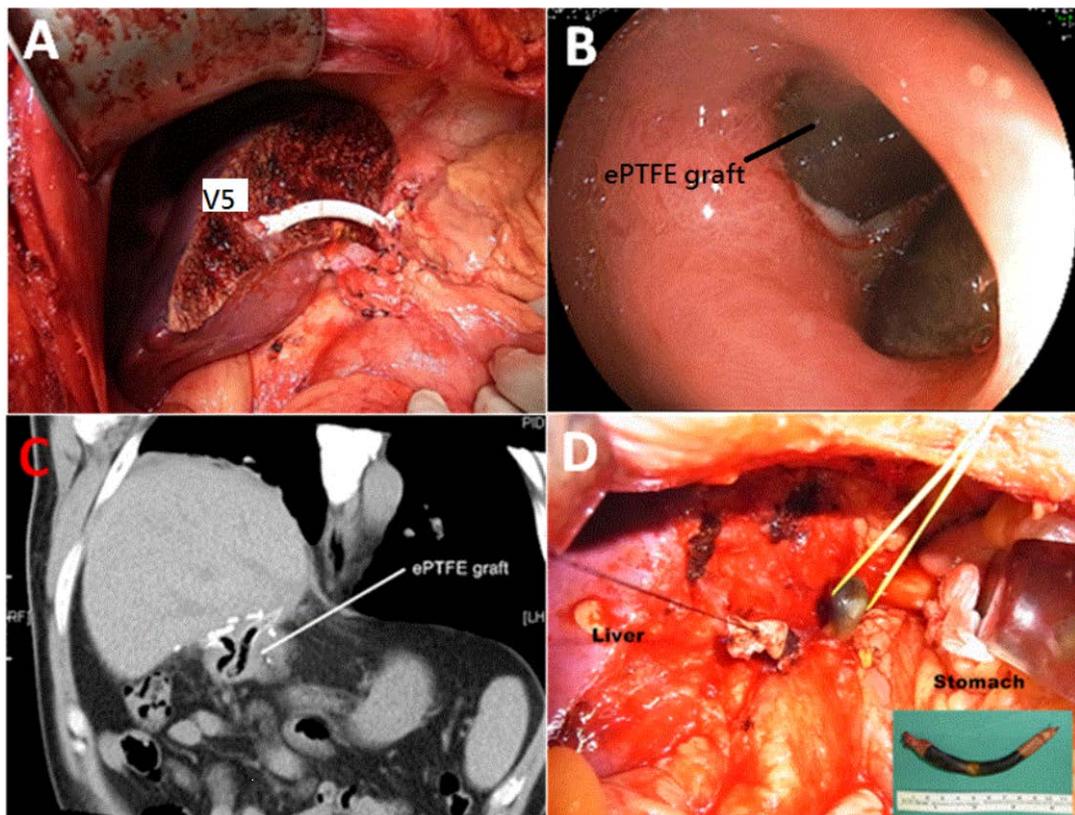
hepatocellular carcinoma when cadaveric donor organs are not available. One of the major technical challenges of LDLT is the outflow reconstruction of the right liver graft. Outflow obstruction may cause liver congestion and lead to graft failure [1] [2].

There are three types of venoplasty for outflow reconstruction in LDLT, which includes cryopreserved vascular grafts, autologous vein grafts and artificial vascular grafts. Among them, artificial vascular grafts are useful interpositional materials and are most frequently used [3]. These grafts are used in our institution for anterior section drainage because they are easier to prepare than cryopreserved vessels and autologous grafts. We report a very rare case of invasion of an artificial vascular graft (expanded polytetrafluoroethylene; ePTFE) into the duodenal bulb after LDLT.

## 2. Case Presentation

A 54-year-old man with hepatitis B and C as well as alcoholic liver cirrhosis underwent LDLT in August 2012. A right hemiliver without a middle hepatic vein was used as a graft. The segment V outflow was created by anastomosing an ePTFE artificial graft to the inferior vena cava (**Figure 1(A)**). Approximately one week after surgery, the patient presented with obstructive jaundice due to stricture at the site of the bile duct. Endoscopic retrograde biliary drainage was performed on the ninth postoperative day. Jaundice resolved shortly after the procedure and the patient was discharged two weeks after the operation.

During outpatient follow-up, the patient complained of acid regurgitation but did not experience abdominal pain. Routine panendoscopy to remove the biliary drainage stent about six months later revealed that the artificial graft had invaded the duodenal bulb (**Figure 1(B)**). Computed tomography (**Figure 1(C)**) revealed air in the graft but no other adjacent organ injury was noted. A duodenostomy was performed to excise the graft, which had migrated into the duodenal bulb (**Figure 1(D)**). The graft was no longer patent and was filled with debris. Low grade fever was noted post operatively and empiric antibiotics were administered for 2 weeks. Cultures of



**Figure 1.** (A): V5 was reconstructed by anastomosing an ePTFE graft to the inferior vena cava. (B): Endoscopic examination revealed invasion of the artificial graft into the duodenal bulb. (C) and (D): CT images and peri-operative surgical photograph revealed a non-patent ePTFE graft embedded in the duodenal bulb.

the artificial graft grew *Prevotella* spp. and *Candida tropicalis*. Blood culture was negative for bacterial growth. The patient was discharged on regular diet 14 days after surgery.

### 3. Discussion

Artificial vascular grafts are most frequently used for venous drainage of the liver graft in living donor liver transplantation because they are easy to prepare and may reduce the operation time, furthermore, the surgical results are comparable with autologous and cryopreserved grafts [4] [5]. But complication related to ePTFE grafts after LDLT was not well reviewed in the literature. Honda *et al.* [6] reported a rare case of migration of an artificial graft into the small intestine 6 months after coronary artery bypass surgery and mesenteric artery bypass surgery. Kim *et al.* [7] once reported that adjacent-organ injuries by ePTFE graft after LDLT were rare but present, the incidence was about 1.96%.

Adhesion of artificial vascular grafts to adjacent organs, such as the stomach, duodenum or extrahepatic bile duct, can result in vascular graft migration. It may be caused by long vessel graft length and adhesion between the grafts and adjacent organs. The length of the ePTFE graft was too long in this case which led to the invasion of the duodenum by the ePTFE graft. But there is no precise formula for vessel length calculation in LDLT. An omental flap was once suggested for prevention of adhesion [7], but the procedure was time-consuming. In our hospital, we apply surgical tissue adhesives (fibrin sealant; Tissucol Duo Quick, 2 ml/set) over the liver raw surface and vessel grafts for adhesion prevention in every recipient. In addition to adhesion prevention, we found out that the surgical tissue adhesives can keep vessels from twisting, so they can maintain good blood flow.

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### 5. Conclusion

Invasion of artificial vascular grafts to adjacent organs is rare, but happens in living donor liver transplantation. It may be caused by inappropriate vessel graft length and adhesion between the graft and adjacent organs.

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