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Single Case

Renal Infarction during Anticoagulant Therapy after Living Donor Liver Transplantation

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Keywords
Renal infarction · Living donor liver transplantation · Anticoagulant therapy

Abstract
Introduction: Liver transplant recipients are at risk for complications of vascular thrombosis. The reconstructed hepatic artery and portal vein thrombosis potentially result in hepatic failure and graft loss. Renal infarction is a rare clinical condition, but in severe cases, it may lead to renal failure. We herein report a case of renal infarction after living donor liver transplantation (LDLT) during anticoagulant therapy. ***Case Presentation:*** A 60-year-old woman with end-stage liver disease due to primary biliary cholangitis underwent LDLT with splenectomy. Postoperatively, tacrolimus, mycophenolate mofetil, and steroid were used for initial immunosuppression therapy. On postoperative day (POD) 5, enhanced computed tomography (CT) revealed splenic vein thrombosis, and anticoagulant therapy with heparin followed by warfarin was given. Follow-up enhanced CT on POD 20 incidentally demonstrated right renal infarction. The patient's renal function was unchanged and the arterial flow was good, and the splenic vein thrombosis resolved. At 4 months postoperatively, warfarin was discontinued, but she developed recurrent splenic vein thrombosis 11 months later, and warfarin was resumed. As of 40 months after transplantation, she discontinued warfarin and remains well without recurrence of splenic vein thrombosis or renal infarction. ***Conclusion:*** Renal infarction is a rare complication of LDLT. In this case, renal infarction was incidentally diagnosed during anticoagulant therapy and was successfully treated.

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Introduction

Liver transplant recipients are at risk for various postoperative complications. One of the most important complications is vascular thrombosis of the reconstructed hepatic artery and portal vein, which potentially results in hepatic failure and graft loss [1–3]. Several other thromboembolic complications may occur, such as pulmonary emboli, intracardiac thrombosis, and peripheral arterial thrombosis [4, 5]. Renal infarction is a rare clinical condition most commonly occurring in patients with predisposing risk factors. In severe cases, it may lead to renal failure, but small infarction is often asymptomatic and is incidentally detected by computed tomography (CT). The recent development of imaging modalities has increased the detection rate of renal infarction and several cases have been reported in the English literature [6, 7]. However, to our knowledge, renal infarction after liver transplantation has not been reported. We herein report a case of acute renal infarction incidentally detected on CT in a patient on anticoagulant for splenic vein thrombosis after living donor liver transplantation (LDLT) with concomitant splenectomy.

Case Presentation

A 60-year-old woman with end-stage liver disease due to primary biliary cholangitis was admitted to our hospital to undergo LDLT. The patient was diagnosed with primary biliary cholangitis by liver biopsy at 50 years of age and started on treatment with ursodeoxycholic acid 900 mg/day. Two years before transplantation, she suffered from rupture of esophageal varices and underwent endoscopic variceal ligation. After treatment of esophageal varices, she developed massive ascites refractory to diuretics with furosemide, spironolactone, and trichlormethiazide. Prior to transplantation, she had chronic kidney disease of unknown cause but without a history of diabetes, thromboembolic diseases, or cardiovascular diseases including hypertension, arrhythmia, coronary artery disease, and aortic aneurysm/dissection. Preoperative hemoglobin was 8.8 g/dL, platelet count was 75,000/μL, prothrombin time-international normalized ratio (PT-INR) was 1.1, and serum creatinine was 1.26 mg/dL. Child-Pugh score was 8 and Model for End-Stage Liver Disease score was 11. She underwent LDLT and splenectomy using a left lobe graft of her ABO-compatible husband. The resected liver and spleen weights were 1,000 and 420 g, respectively. The actual graft weight was 456 g, which accounted for 45.7% of the standard liver volume of the recipient. The operation time was 705 min. Intraoperative blood loss was 1,750 mL, and 4 units of red blood cells and 5 units of fresh frozen plasm were transfused. Postoperatively, tacrolimus, mycophenolate mofetil, and steroids were used as initial immunosuppression therapy. Continuous intravenous prostaglandin E1 and nafamostat mesilate were administered for 5 and 2 days after transplantation, respectively. Antithrombin III (AT-III) concentrate was administered in order to maintain the AT-III level over 70%. On postoperative day (POD) 5, enhanced CT revealed splenic vein thrombosis (Fig. 1a), for which anticoagulation therapy with intravenous heparin was started with a target APTT of 40–60 s. Follow-up enhanced CT on POD 11 showed hemorrhage in the right renal cyst, but no evidence of renal infarction. On POD 16, warfarin was started to maintain PT-INR between 1.5 and 2.5, and intravenous heparin was discontinued once PT-INR had become therapeutic (Fig. 2). However, enhanced CT on POD 20 incidentally demonstrated right renal infarction (Fig. 1b). She denied any abdominal pain, nausea, or vomiting. Her urinalysis showed no proteinuria or hematuria, and renal function was unchanged. The serum levels of AST, LDH, and CPK were not elevated,

and PT-INR, APTT, and AT-III were 1.2, 44 s, and 79%, respectively. Echocardiography showed no vegetation. Doppler ultrasound on POD 27 demonstrated a normal flow pattern of the renal artery. She remained asymptomatic with no serious complications and was discharged on POD 36. Renal scintigraphy on POD 50 demonstrated normal flow and function of kidneys. Warfarin was continued for 4 months and then discontinued. However, at 11 months after transplantation, she developed recurrent splenic vein thrombosis and then warfarin was resumed, which was continued for another 12 months and the thrombus resolved, and it was then discontinued thereafter. As of 36 months after transplant, she remains well without recurrence of splenic vein thrombosis or renal infarction.

Discussion

Renal infarction is a rare condition, with an estimated incidence of 0.007% [6]. The two major causes of renal infarction are thromboemboli, which usually originate from thrombi in the heart or aorta, and in situ thrombosis, which may cause complete occlusion of the main renal artery or a segmental branch artery [8, 9]. The risk factors for renal infarction include atrial fibrillation, valvular or ischemic heart disease, endocarditis, hypercoagulable state, hematologic disease, and spontaneous renal artery dissection [6, 7, 10].

Thromboembolism during and after liver transplantation has a complex etiology and the initiation of a procoagulative process may be triggered by abnormal thrombin generation and platelet function, along with a lack of efficacy of the profibrinolytic system. Secondary to cirrhosis, pro- and anticoagulants make up an unstable balance, and several factors inherent to the procedure of transplantation can promote a hypercoagulable state [11]. Various transplantation-related triggers, such as surgical damage, the release of activators from the donor liver, stagnation of blood, and systemic inflammatory responses can activate coagulation or induce platelet activation. When a hemostatic balance is disturbed, thrombus may form at the anastomotic site, such as the hepatic artery and portal vein, or systemic thrombosis may develop. Peripheral arterial thrombosis is rare, and renal infarction after liver transplantation has not been reported in the English literature.

In the presented case, small asymptomatic renal infarction was diagnosed by CT on POD 20 during anticoagulant therapy in therapeutic range, and there was no other peripheral arterial thrombosis. The cause of renal infarction in this case was unclear.

Since the postoperative anticoagulant and/or antiplatelet prophylaxis may reduce the risk of reconstructed vascular thrombosis [12–14], several liver transplant centers provide prophylactic pharmacological therapy during the early period after liver transplantation. However, because of the lack of studies and guidelines on anticoagulant and antiplatelet prophylaxis and risk of post-transplant hemorrhage, prophylactic anticoagulant and antiplatelet therapy after liver transplantation in adults are not routinely performed, provided that follow-up of hepatic blood flow using Doppler ultrasonography and blood profile is performed.

In conclusion, renal infarction is a rare complication of LDLT, but potentially severe condition. In the case, renal infarction was incidentally diagnosed during anticoagulant therapy and was successfully treated.

Statement of Ethics

The authors have no ethical conflicts to disclose.

Disclosure Statement

The authors declare that they have no conflicts of interest.

References

1 Feltracco P, Barbieri S, Cillo U, Zanus G, Senzolo M, Ori C. Perioperative thrombotic complications in liver transplantation. World J Gastroenterol. 2015 Jul;21(26):8004–13.
2 Algarni AA, Mourad MM, Bramhall SR. Anticoagulation and antiplatelets as prophylaxis for hepatic artery thrombosis after liver transplantation. World J Hepatol. 2015 May;7(9):1238–43.
3 Duffy JP, Hong JC, Farmer DG, Ghobrial RM, Yersiz H, Hiatt JR et al. Vascular complications of orthotopic liver transplantation: experience in more than 4,200 patients. J Am Coll Surg. 2009 May;208(5):896–903.
4 Emuakhagbon V, Philips P, Agopian V, Kaldas FM, Jones CM. Incidence and risk factors for deep venous thrombosis and pulmonary embolus after liver transplantation. Am J Surg. 2016 Apr;211(4):768–71.
5 Sakai T, Matsusaki T, Dai F, Tanaka KA, Donaldson JB, Hilmi IA et al. Pulmonary thromboembolism during adult liver transplantation: incidence, clinical presentation, outcome, risk factors, and diagnostic predictors. Br J Anaesth. 2012 Mar;108(3):469–77.
6 Korzets Z, Plotkin E, Bernheim J, Zissin R. The clinical spectrum of acute renal infarction. Isr Med Assoc J. 2002 Oct;4(10):781–4.
7 Hazanov N, Somin M, Attali M, Beilinson N, Thaler M, Mouallem M et al. Acute renal embolism. Forty-four cases of renal infarction in patients with atrial fibrillation. Medicine (Baltimore). 2004 Sep;83(5):292–9.
8 Bourgault M, Grimbert P, Verret C, Pourrat J, Herody M, Halimi JM et al. Acute renal infarction: a case series. Clin J Am Soc Nephrol. 2013 Mar;8(3):392–8.
9 Paris B, Bobrie G, Rossignol P, Le Coz S, Chedid A, Plouin PF. Blood pressure and renal outcomes in patients with kidney infarction and hypertension. J Hypertens. 2006 Aug;24(8):1649–54.
10 Oh YK, Yang CW, Kim YL, Kang SW, Park CW, Kim YS et al. Clinical characteristics and outcomes of renal infarction. Am J Kidney Dis. 2016 Feb;67(2):243–50.
11 Lisman T, Caldwell SH, Burroughs AK, Northup PG, Senzolo M, Stravitz RT et al; Coagulation in Liver Disease Study Group. Hemostasis and thrombosis in patients with liver disease: the ups and downs. J Hepatol. 2010 Aug;53(2):362–71.
12 Vivarelli M, La Barba G, Cucchetti A, Lauro A, Del Gaudio M, Ravaioli M et al. Can antiplatelet prophylaxis reduce the incidence of hepatic artery thrombosis after liver transplantation? Liver Transpl. 2007 May;13(5):651–4.
13 Shay R, Taber D, Pilch N, Meadows H, Tischer S, McGillicuddy J et al. Early aspirin therapy may reduce hepatic artery thrombosis in liver transplantation. Transplant Proc. 2013 Jan-Feb;45(1):330–4.
14 Kaneko J, Sugawara Y, Tamura S, Togashi J, Matsui Y, Akamatsu N et al. Coagulation and fibrinolytic profiles and appropriate use of heparin after living-donor liver transplantation. Clin Transplant. 2005 Dec;19(6):804–9.

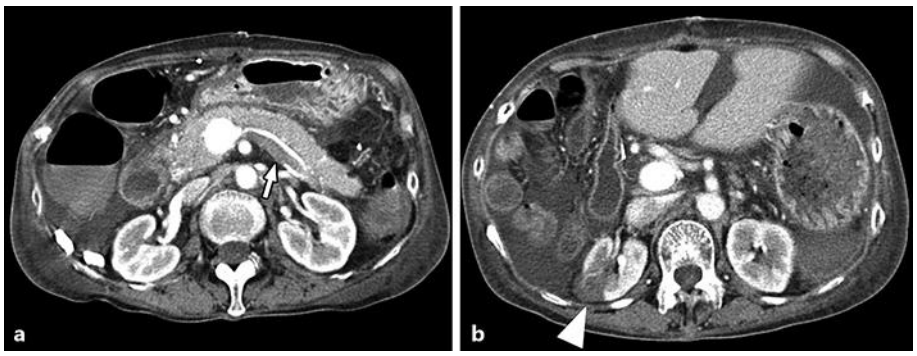

Fig. 1. Enhanced computed tomography revealed splenic vein thrombosis on postoperative day 5 (**a**; arrow). Right renal infarction was identified on postoperative day 20 (**b**; arrowhead).

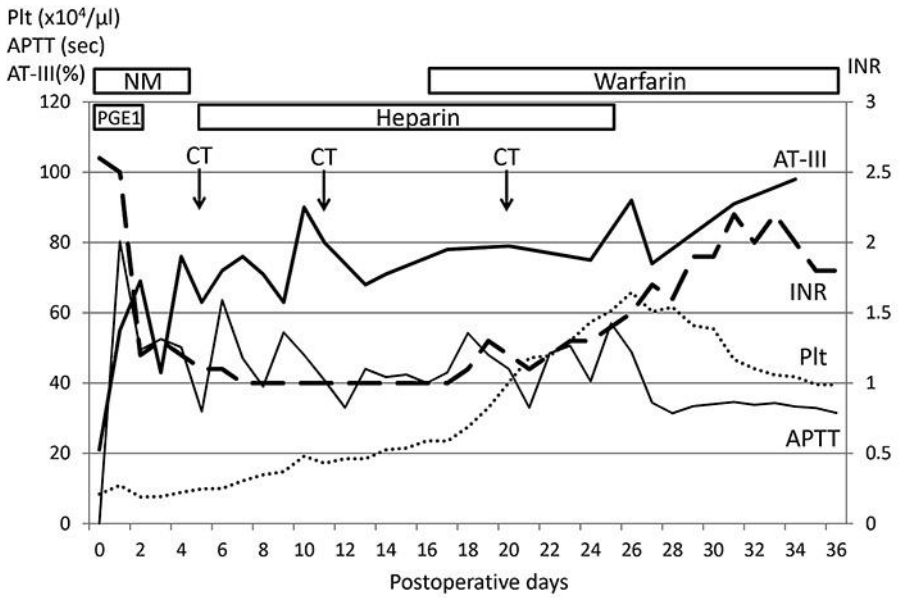

Fig. 2. The clinical course of the patient after liver transplantation. Anticoagulant therapy with heparin was started on postoperative day 5 and warfarin was started on postoperative day 16 to maintain a therapeutic prothrombin time-international normalized ratio (PT-INR) between 1.5 and 2.5. NM, nafamostat mesilate.