

Received: 2008.12.19
Accepted: 2009.02.08
Published: 2009.03.16

Successful endoscopic and surgical management of non-anastomotic biliary strictures after liver transplantation – Case report

Dennis Eurich¹, Daniel Seehofer¹, Winfried Veltzke-Schlieker², Ruth Neuhaus¹, Ulf Neumann¹, Peter Neuhaus¹

¹ Department of General, Visceral and Transplantation Surgery, Charité Campus Virchow, Berlin, Germany

² Department of Internal Medicine, Division of Hepatology, Gastroenterology, Endocrinology and Metabolism, Charité Campus Virchow, Berlin, Germany

Summary

Background:

One of the most relevant biliary complications after liver transplantation are non-anastomotic strictures which occur in about 10-15%. Untreated they lead to cholestasis, severe graft dysfunction, septic complications, secondary cirrhosis and even death. To date they are usually treated by endoscopic or percutaneous placement of stents and balloon dilatation. A significant amount of patients with non-anastomotic strictures require a liver retransplantation.

Case Report:

A 64 year old patient suffering from HCV induced liver cirrhosis underwent liver transplantation at our hospital. Two months after transplantation due to elevated parameters of cholestasis the patient underwent an endoscopic retrograde cholangiography. Multiple strictures of the bile duct were observed and treated by endoscopic and percutaneous methods until a significant amelioration of the pathological finding in the right liver lobe was achieved. Unfortunately biliary strictures remained in the left liver lobe being resistant to the previous method of treatment. We thus decided to perform a left hemihepatectomy. The postoperative course was unremarkable.

Conclusions:

The treatment of our patient consisted of over 25 endoscopic and percutaneous interventions and a left hemihepatectomy. The patient was followed up for two years, during which he had no further complaints being in good health. We demonstrated an example of a successful management of one of the most severe late biliary complications after liver transplantation – the non-anastomotic strictures – avoiding a retransplantation of the organ by endoscopic, percutaneous and surgical intervention. Thus a graft resection seems to be possible.

Key words

ITBL • transplant resection • endoscopic intervention

Full-text PDF:

<http://www.annalsoftransplantation.com/fulltxt.php?ICID=880647>

Word count:

1308

Tables:

–

Figures:

3

References:

18

Author's address:

Dennis Eurich, Charite Campus Virchow-Klinikum, Department of General, Visceral and Transplant Surgery, Augustenburger Platz1, 13353 Berlin, Germany, e-mail: dennis.eurich@charite.de

BACKGROUND

One of the most relevant complications after transplantation are biliary complications, which occur in 10–20% of all full size orthotopic liver transplantations (OLTs). Non-anastomotic strictures of the bile duct develop in about 2–20% of all OLTs [1–4]. In the presence of a macroscopically obviously undisturbed perfusion they are described as so-called ischemic type biliary lesions (ITBL) and occur in about 10–15% of all OLTs. Untreated they lead to cholestasis, severe graft dysfunction, septic complications, secondary cirrhosis and even death. To date they are usually treated by endoscopic or percutaneous placement of stents and balloon dilatation [5–7]. A significant amount of patients with non-anastomotic strictures require a liver retransplantation [8]. A surgical approach may be necessary in patients who are refractory to endoscopic or percutaneous treatment of the biliary strictures or in patients with stricture formation localized on a resectable part of the biliary tract [9]. This report concentrates on the successful management of non-anastomotic strictures by endoscopic and surgical means, including balloon dilatation, stenting and anatomic left hemihepatectomy of the transplant liver.

CASE REPORT

A 64 year old woman suffering from HCV induced liver cirrhosis underwent liver transplantation at our hospital. The donor organ had a right accessory hepatic artery that had to be connected to the main hepatic artery and was then anastomosed with the aorta by arterial interposition in a supracoeliac position. Portal vein and vena cava were connected in the standard end-to-end technique, and the bile ducts were anastomosed side-to-side. The direct postoperative course was unremarkable. Seven days after transplantation the routine ultrasound examination revealed a thrombosis of the right hepatic artery which led to an emergent successful thrombectomy. The first routine cholangiography on the 5th day via the intraoperatively placed T-tube showed no abnormalities. The second cholangiography 6 weeks later showed a functionally insignificant anastomotic stenosis, after which the T-tube was then removed. Two months after transplantation due to abdominal discomfort, elevated alkaline phosphatase (AP) and gamma-glutamyl-transferase (g-GT), the patient underwent an endoscopic retrograde cholangiography (ERC). Multiple strictures of the extrahepatic bile duct were observed and treated by balloon dilatation of the strictures.

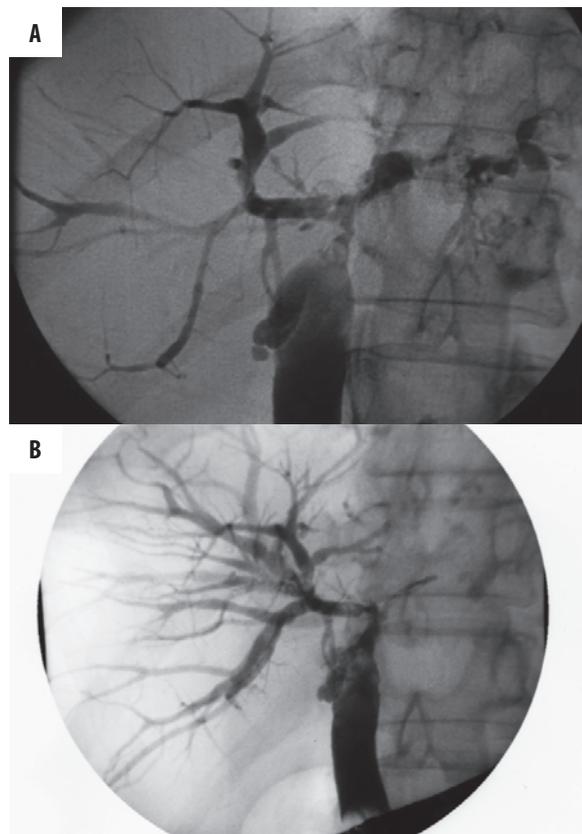


Figure 1. ERC before (A) and after (B) left hemihepatectomy.

In the presence of an ultrasonographically normal arterial perfusion the diagnosis ITBL was made. Following cholangiography also revealed intrahepatic strictures and dilatations predominantly in the left anatomic liver lobe which was found to be atrophic (Figure 1). Thus we then decided to perform a left hemihepatectomy. The left lobe showed a remarkable fibrosis of the periductal tissue (Figure 2).

The postoperative course was complicated by a bile leak from the resection surface leading to the placement of a percutaneous drain in the bilioma and irrigation. Finally the patient recovered and was discharged from hospital with an adequately functioning resected transplant. Endoscopic treatment of the right biliary tree was continued until it was impossible to overcome a significant stricture of the common hepatic duct, so that the decision was made to place a percutaneous drainage (PTCD) in the remaining right system.

Later the PTCD was replaced by a Yamakawa-tube, draining the bile out of the body and also into the duodenum (Figure 3). Finally the drain was extracted and the dominant stricture was treated by endoscopic stenting. Due to a general deterioration of the biliary tree accompanied by

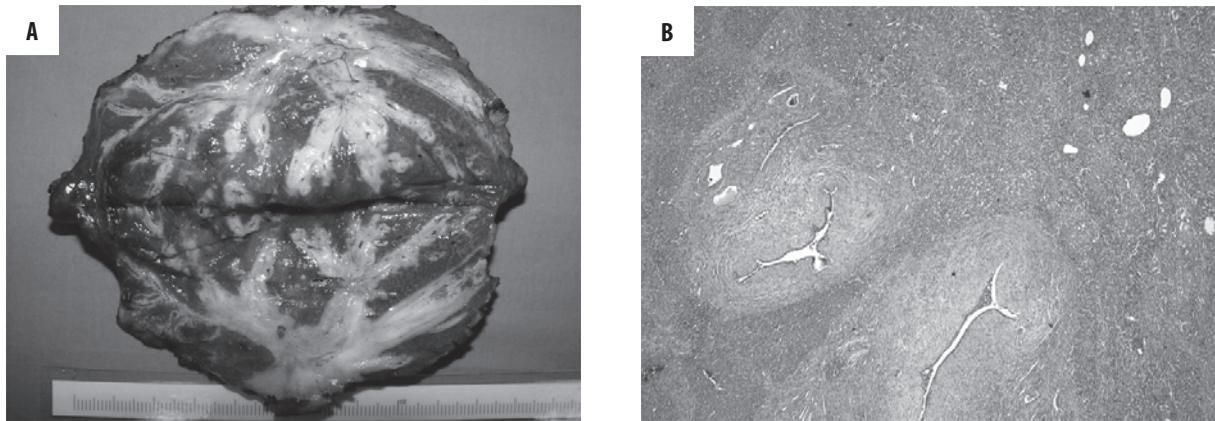


Figure 2. Macroscopic (A) and histological view (B) of the resected transplant liver.

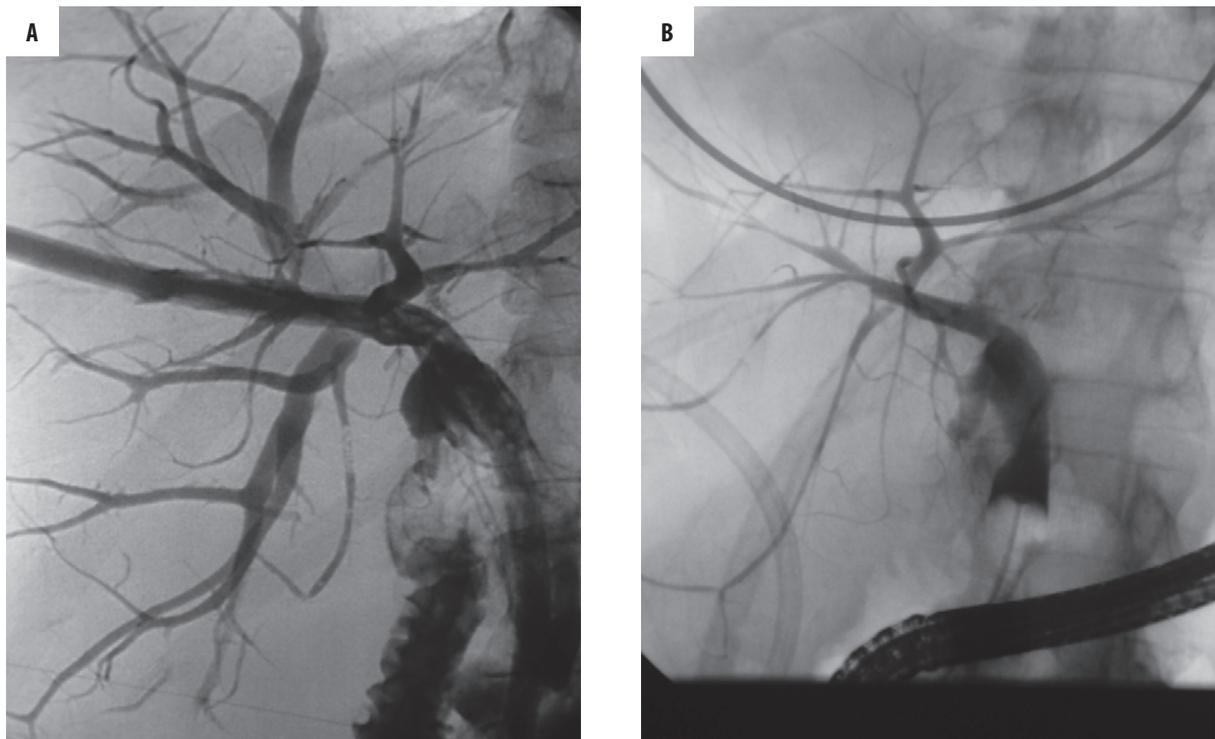


Figure 3. Yamakawa-drain of the right transplant lobe after hemihepatectomy (A) and ERC performed at last demonstrating a restored right biliary tree (B).

several septic episodes an evaluation for retransplantation was suggested. The endoscopic stenting program was still continued until the main strictures resolved leading to the stent extraction and endoscopic control with a lower frequency. The last ERC showed a significant amelioration of the cholangiographic image including a normalized bile flow and a clear decline of g-GT and AP (Figure 3).

The patient was followed up for several months, during which she had no further complaints and was in good health. The laboratory findings did not show any significant alterations in the biliary tract.

This example shows the successful management of one of the most severe late biliary complications after liver transplantation – the non-anastomotic strictures – avoiding a retransplantation of the organ by surgical and endoscopic intervention.

DISCUSSION

The diagnosis of non-anastomotic lesions or ITBL is made by clinical presentation, exclusion of evident vascular complications, histological pattern and cholangiography as gold standard either by ERC or by PTC [5,9]. Eventually up to 50% of the patients with non-anastomotic strictures will still require a retransplantation or die because of sep-

tic complications or deterioration of graft function. Thus the metaphoric comparison of biliary reconstruction and biliary complications after liver transplantation to Achilles foot is more than justified [10]. It is of a high importance to classify the non-anastomotic strictures into strictures occurring due to vascular complications, such as hepatic artery thrombosis as ischemic biliary lesions (IBL), strictures occurring after a managed vascular complication after thrombectomy of the hepatic artery and strictures occurring in the absence of vascular complications as ischemic type of biliary lesions *per se*. It is also important to know the risk factors in order to prevent the disease and to extend the spectrum of therapy regimen. Some risk factors for the development of the ITBL/IBL have already been identified, which basically focus on three major columns in the pathogenesis of the disease. Ischemic injury seems to be the most important including cold and warm ischemia during transplantation, disturbed blood flow in the peribiliary plexus resulting from an inappropriate preparation during explantation of the donor liver with little periductal tissue, and hypoxemia during the postoperative period [4, 11]. Immunological injury including ABO-incompatibility, rejection, pre-existing disease with autoimmune component, CMV-infection and chronic rejection also seem to play a role in the development of the non-anastomotic strictures [4,8]. Finally the toxicity of the bile fluid has been shown to be relevant in the pathogenesis of ITBL [12].

In most cases treatment of strictures is performed conservatively by endoscopic or transhepatic dilatation. However, surgical intervention may be required if the main manifestation of the non-anastomotic strictures is well localized in the extrahepatic biliary tree (Type I of ITBL) [7,13]. Further surgical options besides retransplantation have not yet been described.

In our case cold and warm ischemia was 9 hours for an ABO-system compatible donor organ from a previously healthy young person involved in a road accident. As mentioned above the postoperative course was complicated by the thrombosis of the right hepatic artery, which led to a successful emergent thrombectomy. The thrombosis of the right hepatic artery underlines the importance of adequate oxygenation of the biliary epithelium and ischemia being a relevant risk factor for non-anastomotic strictures or/and ITBL. At this point the need for further classification of non-anastomotic biliary structures emerges.

Formally the vascular perfusion was restored but no one can deny the fact of a supplementary second ischemic hit on the biliary epithelium. According to published data on vascular complications after OLT hepatic artery thrombosis occurring in about 10% may lead to the reported differences in the incidence of ITBL [14,15]. After exclusion of all managed post-transplant vascular complications the incidence of ITBL is supposed to be much lower than 20% which explains the wide range of the ITBL incidence reported in the literature [6,8,16,17].

CMV-infection was not observed in our patient but only an episode of acute cellular rejection. The role of HCV re-infection still remains unclear although the pre-transplant liver disease is also important in the pathogenesis of the ITBL especially those with pre-existing autoimmune component [8,18]. Our patient had at least two risk factors for the development of ITBL basically focusing on the ischemic and immunologic components. Her treatment consisted of over 25 endoscopic and transhepatic interventions and a left hemihepatectomy due to a localized loss of graft function in the left liver lobe diagnosed as localized atrophy of the organ.

CONCLUSIONS

We have demonstrated that the treatment of the non-anastomotic strictures can be managed by organ resection in case of localized intrahepatic manifestation and endoscopic interventions as interdisciplinary cooperation between the departments of internal medicine, radiology and hepatobiliary surgery.

REFERENCES:

1. Greif F et al: The incidence, timing, and management of biliary tract complications after orthotopic liver transplantation. *Ann Surg*, 1994; 219(1): 40-45
2. Porayko MK, Kondo M, Steers JL: Liver transplantation: late complications of the biliary tract and their management. *Semin Liver Dis*, 1995; 15(2): 139-55
3. Lewis WD, Jenkins RL: Biliary strictures after liver transplantation. *Surg Clin North Am*, 1994; 74(4): 967-78
4. Guichelaar MM et al: Risk factors for and clinical course of non-anastomotic biliary strictures after liver transplantation. *Am J Transplant*, 2003; 3(7): 885-90

5. Zoepf T et al: Diagnosis of biliary strictures after liver transplantation: which is the best tool? *World J Gastroenterol*, 2005; 11(19): 2945-48
6. Rizk RS et al: Endoscopic management of biliary strictures in liver transplant recipients: effect on patient and graft survival. *Gastrointest Endosc*, 1998; 47(2): 128-35
7. Pfau PR, Kochman ML: Endoscopic management of biliary tract disease. *Curr Opin Gastroenterol*, 1999; 15(5): 448-53
8. Rull R et al: Intrahepatic biliary lesions after orthotopic liver transplantation. *Transpl Int*, 2001; 14(3): 129-34
9. Pascher A, Neuhaus P: Bile duct complications after liver transplantation. *Transpl Int*, 2005; 18(6): 627-42
10. Abt P et al: Liver transplantation from controlled non-heart-beating donors: an increased incidence of biliary complications. *Transplantation*, 2003; 75(10): 1659-63
11. Buis CI et al: Causes and consequences of ischemic-type biliary lesions after liver transplantation. *J Hepatobiliary Pancreat Surg*, 2006; 13(6): 517-24
12. Yska MJ et al: The role of bile salt toxicity in the pathogenesis of bile duct injury after non-heart-beating porcine liver transplantation. *Transplantation*, 2008; 85(11): 1625-31
13. Schlitt HJ et al: Reconstructive surgery for ischemic-type lesions at the bile duct bifurcation after liver transplantation. *Ann Surg*, 1999; 229(1): 137-45
14. Neuhaus RP: Aktuelle Aspekte der Lebertransplantation, in *Aktuelle Aspekte der Lebertransplantation*. Bremen, London, Boston, 2005; 39-40
15. Sanchez-Bueno F et al: Hepatic artery complications after liver transplantation. *Clin Transplant*, 1994; 8(4): 399-404
16. Thethy S et al: Management of biliary tract complications after orthotopic liver transplantation. *Clin Transplant*, 2004; 18(6): 647-53
17. Feller RB et al: Biliary strictures after liver transplantation: clinical picture, correlates and outcomes. *J Gastroenterol Hepatol*, 1996; 11(1): 21-25
18. Li S et al: Diffuse biliary tract injury after orthotopic liver transplantation. *Am J Surg*, 1992; 164(5): 536-40