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Original Article

Analysis and management of liver retransplantation following adult-to-adult living donor liver transplantation

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Abstract: The aim of this study was to analyze clinical characteristics in liver transplantation following adult-to-adult living donor liver transplantation. Six patients who had undergone ALDLT at other hospitals were performed retransplantations. The causes of graft failure included biliary complication (n = 2) associated with hepatic artery thrombosis, vascular complication (n = 2), chronic rejection (n = 1) and hepatitis recurrence (n = 1). Liver re-transplantation was performed on 6 patients through modified piggyback liver transplantation. Vascular anastomosis was performed between the hepatic arteries of donor livers and receptor abdominal aorta in 1 case, and the rest were subjected to end-to-end homonymic vascular anastomosis. No operative death occurred. Due to primary non-function, 1 died after the operation. During the follow-up period, 1 patient had arsastornotic stricture of hepatic artery after the operation and was cured by percutaneous venoplasty. The survival of the rest patients was 12, 9, 6, 4 and 3 months respectively. It is very important that the indications and time of retransplantation are carefully selected. Peritoneal adhesion and exploration of importantant anatomical structure is the operative difficulty for liver retransplantation following adult-to-adult living donor liver transplantation.

Keywords: Liver retransplantation, ALDLT

Introduction

The discrepancy between the availability of organs and the number of patients awaiting a liver transplant (OLT) has dramatically increased in the last years. In response to the organ shortage adult-to-adult living donor liver transplantation (ALDLT) is a viable, technical demanding [1].

In living donor liver transplantation (LDLT), there are many complications, such as vascular complications are more frequently seen than in deceased donor transplantation. Those complications can lead to graft loss and patient death [2]. Retransplantation (re-TX) is the only available therapy for irreversible liver graft dysfunction [3-6]. Obviously, retransplantation still has high risk and low survival rates compared with primary transplantation [7, 8]. In the era of organ shortage, every case of retransplantation denies an organ to a first time recipient, therefore, how to evaluate the risk of retransplantation and the chance of long-term survival is of great importance [9-11]. In the present report, we evaluated the clinical data of 6 ALDLT patients experienced liver retransplantation and presented our experience, and we aimed to analyze clinical characteristics in liver transplantation following adult-to-adult living donor liver transplantation.

Materials and methods

Subjects

In the period between April 2005 and April 2007, 6 adult patients who had undergone ALDLT at Korea hospital were performed retransplantations in Beijing Chaoyang Hospital. All are men, the mean age was 41.22 years (range from 35 to 48 years). All grafts were right lobe hepatectomy; in all cases but one the middle hepatic vein was left in the donor remnant liver. Recipient hepatectomy was performed without venovenous bypass. Donor and recipient right hepatic venous anastomosis was performed according to size matching with caval extension. The main reasons for the retransplantations were biliary complication (n = 2)

associated with ischemic-type biliary lesions, vascular complication (n = 2), chronic rejection (n = 1) and hepatitis recurrence (n = 1). All adult patients received deceased donor organ and orthotopic liver retransplantations in my center. This study was conducted in accordance with the declaration of Helsinki. This study was conducted with approval from the Ethics Committee of Beijing Chaoyang Hospital. Written informed consent was obtained from all participants.

Surgical technique

A standard subcostal approach was used. We have used the Modified piggyback technique with side-to-side cavo-cavoplasty between the donor and recipient retro-hepatic inferior vena cava without bypass [12, 13]. Following completion of caval and portal anastomoses, the graft was flushed with dextrose to prevent reperfusion injury. The hepatic artery was reconstructed using an end-to-end anastomosis. Biliary reconstruction involved choledocho-choledochostomy.

Immunosuppression

A standard triple therapy with prednisolone, mycophenolate mofetil (MMF) and tacrolimus has been used since 2004 [14].

Results

There was no intraoperative mortality in this series. Mean operation time was 9.8 ± 1.2 hours, cold ischemia time was 9.0 ± 3.08 hours, and mean blood loss was 2051.5 ± 242 mL. Due to primary non-function, 1 died after the operation. During the follow-up period, 1 had anastomotic stricture of hepatic artery after the operation and was cured by pereutaneous venoplasty. The other 4 patients recovered after retransplantation and discharsed from the hospital. The survival of the rest patients was 24, 18, 12, 8 and 6 months, respectively.

Discussion

Adult living donor liver transplantation (ALDLT) is an accepted procedure to overcome the organ shortage and a viable, technical demanding [1, 15-17]. Because of the complexity of this operation, a considerable proportion of adult living donor liver transplantation (ALDLT) recipients experience long-term complications and irreversible liver graft dysfunction finally [18]. Re-OLT is the only therapeutic option for patients with irreversible failure of hepatic graft [5, 19, 20]. Retransplantation can be controversial from the medical, economic, and ethical points of view. Higher costs are involved. The procedure implies, in the context of organ shortage, denial of organs to first-time recipients. At present, there is no universally accepted practice guideline to facilitate decision making for patients needing Re-OLT [11]. Several studies [21-24] report that retransplantation should be performed before deterioration of more than three organs (renal failure, ventilatory requirements, cerebrovascular stroke, liver failure with severe cholestasis, progressive encephelopathy, coagulopathy, and so on). Based on our experience, once retransplantation has become a necessity, it should be performed without delay to minimize postoperative complications and maximize patient survival.

Vascular problems such as thrombosis and stenosis of the hepatic artery, portal vein, and hepatic vein are more frequently seen among recipients of adult living donor liver transplantations (ALDLT) [25]. These complications can lead to graft loss and retransplantation. The risk of vascular complications is relatively high in ALDLT when compared with whole graft transplantation [26, 27]. In our series, Hepatic artery thrombosis (HAT) was identified in 1 patient whose artery embolism occured, and thrombolysis failed, then retransplantation was implemented immediately. Owing to the anastomotic stenoses, portal vein thrombosis (PVT) occurred in 1 patient who underwent 2 unsuccessful attempts at portal vein anastomosis and retransplantation was implemented finally.

Ischemic-type biliary lesions (ITBL) is the most common type of biliary complications after OLT in China [18, 28, 29]. It is characterized by nonanastomotic strictures and dilations involving the biliary tree of the graft, and may be associated with the formation of sludge or stones. Starting at the bifurcation of the bile duct and progressing to the intrahepatic bile ducts, ITBL is caused by failure of the microcirculation around the bile duct. In our series, ITBL were identified in 2 patients who expericed some unsuccessful interventional therapies, such as choledochoscopy through a T-tube,

ERCP, ENBD, stenting, or PTCD, and received retransplantation finally.

In our series, the one patient with chronic rejection, illustrated the other danger of waiting too long for retransplantation and received retransplantation finally. In general, chronic rejection as a cause of hepatic allograft failure has decreased notably in recent years [30, 31], due to advances in immunosuppressive therapy and to more sensitive means of detecting and diagnosing rejection [29]. The increasing incidence of recurrent viral disease, in china primarily HBV, as an indication for ReLT. In our series, the one patient with recurrent cirrhosis, who do not respond to antiviral drugs, received Re-LT.

In our series, the operative technical difficulties include: 1) The usefulness of vascular grafts procured at the time of the donor hepatectomy. This proves to be even more important in cases of retransplantation resulting from a vascular thrombosis, since an alternate method of arterial or portal venous reconstruction may be required. 2) The success of biliary reconstruction during a retransplantation depends on careful assessment of the suitability of the recipient tissue to which the new bile duct is to be sewn. If a duct-to-duct anastomosis is planned, this means making certain that all tissue from the previous donor duct be removed and that the remaining recipient bile duct is viable and still long enough to allow connection to the new donor duct without tension.

In general, the difficulty of the recipient operation may vary greatly, depending on the time interval since the previous transplant, the cause of retransplantation, and on whatever might be responsible for the density and extent of adhesion formation. As a rule, care should be taken to avoid overly aggressive blunt dissection, since the walls of blood vessels or suture lines often prove to be the weakest points in the areas being stressed.

In conclusion, the first attempt to reduce transplantation associated mortality and morbidity is to minimize the possibility of liver retransplantation. The choice of liver grafts, detailed pretransplantation evaluation, meticulous operative procedures, and cautious postoperative management for first transplantations are therefore critical. Once retransplantation has become a necessity, it should be performed without delay to minimize postoperative complications and maximize patient survival.

Disclosure of conflict of interest

None.

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