Right hepatectomy in living donors with previous abdominal surgery

Seong Hoon Kim, Seung Duk Lee, Young Kyu Kim and Sang-Jae Park

Goyang, Korea

BACKGROUND: Few studies have evaluated the impact of previous abdominal surgery (PAS) on living donor right hepatectomy (LDRH). The aim of this study was to investigate the outcomes of liver transplantation using right lobe grafts of living donors with PAS.

METHODS: Data were reviewed from LDRH patients at the authors' institution between March 2008 and November 2014. LDRH patients with PAS were divided into two groups according to upper PAS (group 1) or lower PAS (group 2), and they were compared to those without PAS (group 3) who were matched 1:1 based on age, gender, and body mass index. Perioperative data, complications by the Clavien classification, and the outcomes with more than 14 months follow-up were compared.

RESULTS: Twenty-three (4.9%) of a total of 471 LDRH donors had PAS. Eleven donors were assigned to group 1, 12 to group 2, and 23 to group 3. Intraperitoneal adhesions were found in 20 (87.0%) of 23 donors with PAS, of whom 5 (21.7%) had adhesiolysis-related injuries that happened more commonly in group 1 than in group 2 (P=0.025). LDRH was successfully completed under upper midline laparotomy in all donors. No donors received perioperative blood transfusion. The peak postoperative AST, ALT, INR, and total bilirubin levels made no difference between the three groups. Compared with group 3, groups 1 and 2 had a longer operative time (P=0.012) and a higher grade I complication rate (P=0.047). All donors recovered fully to their routine activities. The 23 recipients of grafts from donors with PAS showed good liver function with 1-year graft and patient survivals of 100%.

CONCLUSION: A history of PAS is not a contraindication to LDRH in the current era of advanced surgical techniques.

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KEY WORDS: living donor; liver transplantation; liver surgery; liver function

Introduction

Living donor liver transplantation (LDLT) is being performed worldwide to solve the problem of a great and ongoing shortage of organ donors, which ends up with increased waitlist mortality for patients who require liver transplants. Living donor right hepatectomy (LDRH) is currently the most common form of living donor surgery in adult-to-adult LDLT despite concerns about donor safety, an issue with no room for compromise. But, as surgical technique and management for living donor surgery get improved with time and experience, several steps to get closer to the cliff edge have been taken as the means to expand the living donor pools for LDLT in patients who have no other alternatives, which include the use of ABO incompatible grafts,[1] selection of living donors with liver remnants <30%,[2] obese donors,[3] elderly donors,[4] and donors with intra-abdominal adhesion.[5]

One of surgically unfavorable factors in selecting living donor candidates is previous abdominal surgery (PAS), which can develop postoperative adhesion intraperitoneally so that LDRH as repeat abdominal surgery is expected to be more technically demanding with a higher risk of complication. So PAS were regarded as a relative contraindication to donation.[6] With the focus on the intraoperative findings, the specific impact of intra-abdominal adhesion on the technical aspects and postoperative outcomes of LDRH was reported in a recent study.[5] But it is difficult to accurately predict intra-abdominal adhesion before surgery, even if the patient has a history of PAS. Furthermore, the correlation between PAS and intra-abdominal adhesion in LDRH has never been studied fully.

Therefore, this study aimed to assess the outcomes

Author Affiliations: Center for Liver Cancer, National Cancer Center, 111 Jungbalsan-ro, Ilsandong-gu, Goyang-si, Gyeonggi-do, 410-769, Korea (Kim SH, Lee SD, Kim YK and Park SJ)

Corresponding Author: Seong Hoon Kim, MD, PhD, Center for Liver Cancer, National Cancer Center, 111 Jungbalsan-ro, Ilsandong-gu, Goyang-si, Gyeonggi-do, 410-769, Korea (Tel: +82-31-920-1647; Fax: +82-31-920-2798; Email: kshlj@hanmail.net)

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of right lobe LDLT in both the donor and recipient by limiting the investigation only to living donors with a history of PAS, a preoperatively recognizable factor.

Methods

This retrospective study considered all living donors who underwent right hepatectomy at National Cancer Center, Korea between March 2008 and November 2014, and was approved by the institutional review board of National Cancer Center, Korea. A prospectively maintained database was used for reviewing donor characteristics, operative outcomes, and postoperative complications. To evaluate the effect of PAS on the outcomes of LDRH, the donors were divided into the following three groups: group 1, donors with upper PAS; group 2, donors with lower PAS; group 3, donors without PAS. The donors in group 3 were selected to match 1:1 on the basis of age, gender, and body mass index to donors in group 1 and group 2 in the same time period.

According to Beck et al,[7] the severity of adhesion was assessed as mild (grade 1: thin, filmy, and divided by blunt dissection; grade 2: thin, vascular, and easily divided by sharp dissection) or severe (grade 3: extensive, thick, and vascular, requiring division by sharp dissection; grade 4: dense, putting the bowel at risk of injury with division). Only adhesions that needed to be divided to complete the LDRH or to place the abdominal retractor were considered relevant. The primary outcome measure was postoperative complications graded according to the Clavien classification.[8] The secondary outcome measures included operative outcomes and postoperative peak serum levels of total bilirubin (TB), international normalized ratio (INR), alanine aminotransferase (ALT), and aspartate aminotransferase (AST). Postoperative liver failure was defined as prothrombin time <50% and TB >50 μmol/L on postoperative day 5 (the 50-50 criteria) on postoperative day 5.[9]

In recipients, early graft function was evaluated by the INR and TB levels checked on postoperative day 7. The recipient 30-day mortality rate and 1-year survival rate were compared between the three groups.

The selection criteria and evaluation for living donors have been specified previously.[10-12] Briefly, the informed consent was obtained from all voluntary living donors about the items deliberated by the Ethics Group of the Vancouver Forum,[13] and all LDLTs were approved by Korean Network for Organ Sharing. Donor candidates with PAS were not allowed to donate a part of their liver if they had any adhesion-related abdominal symptom within 6 months prior to LDRH. Potential donors with a malignancy history were denied from donation.

A single primary surgeon (KSH) performed all LDRH procedures following a standardized operative protocol. The detailed surgical technique and procedural refinements on LDRH have been described elsewhere.[11, 14, 15] In all donors even with a history of PAS, an upper midline incision above umbilicus was chosen (Fig.). Adhesions, if present under the incision, were carefully separated enough to make use of a self-retaining abdominal retractor. Adhesions were removed if they hindered surgical performance of LDRH or interfered with securing a surgical field. The right lobe of liver was completely mobilized and the sizable right inferior hepatic veins, if present, were saved for reconstruction. After cholecystectomy, careful dissection was made to encircle the right Glisson's pedicle by a tape.[15] By temporarily occluding the right Glisson's pedicle, the transection line was marked by electrocautery on the liver surface, and the inferior part of caudate lobe was divided along the surface marking up to the hepatic hilum. A tape for hanging was positioned along the anteromedian surface of inferior vena cava with its upper end between right hepatic vein and middle hepatic vein (MHV) and with its lower end between the right and left Glisson's pedicles. The liver parenchymal transection was done along the right side of the main trunk of MHV with hanging maneuver employed continuously until parenchymal transection was completed. Any MHV branch over 5 mm in diameter was preserved and reconstructed. After completion of parenchymal transection, the right hepatic artery, portal vein, and hepatic duct were dissected from the right Glisson's pedicle. Ligation of right hepatic duct was done just at the right side of the confluence under a direct view and a cut was made at the left side of ligature. Heparin (5 IU/kg) was injected intravenously. The right hepatic artery, portal vein, and hepatic vein were clamped sequentially and cut at each bifurcation. The graft was delivered to an iced basin and perfused with histidine-tryptophan-ketoglutarate solution. Then, the falciform

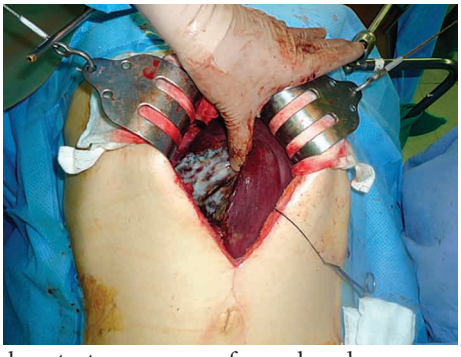

Fig. Right hepatectomy was performed under an upper midline incision above umbilicus in a living donor who had undergone laparotomy for ulcer perforation through a vertical midline incision extended far below umbilicus 5 years earlier.