DOI:10.1111/j.1477-2574.2009.00142.x HPB

ORIGINAL ARTICLE

Biliary complications including single-donor mortality: experience of 207 adult-to-adult living donor liver transplantations with right liver grafts

Mahmoud El-Meteini[1], Alaa Hamza[1], Amr Abdalaal[1], Mohamed Fathy[1], Mohamed Bahaa[1], Ahmed Mukhtar[2], Fawzia Abouelfetouh[2], Ibrahim Mostafa[3], Mohamed Shaker[4], Sameh Abdelwahab[4], Ahmed El-Dorry[4], Magda El-Monayeri[5], Ali Hobballah[3] & Hasan Sabry[3]

[1]Department of Surgery, Ain-Shams University, [2]Department of Anesthesia, Cairo University, [3]Wady EL-Neel Hospital, Liver Transplant Center, [4]Department of Radiology, Ain-Shams University, and [5]Department of Pathology, Ain-Shams University, Cairo, Egypt

Abstract

Background: After right lobe donation, biliary complication is the main cause of morbidity. Mortality after right lobe donation has been estimated to be less than 0.5%.

Patients and methods: Between November 2001 and December 2008, 207 adult-to-adult living donor liver transplantations (ALDLT) were undertaken using right lobe grafts. Donors included 173 men and 34 women with a mean age of 28.4 ± 5.2 years.

Results: Siblings comprised 144 (69.6%) cases whereas unrelated donors comprised 63 (30.4%) with a mean body mass index (BMI) of 25.2 ± 2.4. Single and multiple right hepatic ducts (RHD) were present in 82 (39.6%) and 125 (60.3%) donors, respectively. Mean operative time was 360 ± 50 min with an estimated blood loss of 950 ± 450 ml and returned cell-saver amount of 450 ± 334 ml. Mean donor remnant liver volume was 33.5 ± 3.2%. Mean intensive care unit (ICU) stay was 3 ± 0.7 days and mean hospital stay was 14 ± 3.5 days. Modified Clavien classifications were used to stratify all donor biliary complications The overall biliary complications occurred in 27 cases (13.0%). After modified Clavien classification, biliary complications were graded as grade I (n = 10), grade II (n = 2), grade III (n = 14) and grade V (n = 1). Grade I and II (n = 12) biliary complications were successfully managed conservatively. Grade III cases were treated using ultrasound-guided aspiration (USGA), endoscopic retrograde cholangiography (ERCP) and surgery in 10, 2 and 2 donors, respectively. Single donor mortality (Grade V) (0.4%) occurred after uncontrolled biliary leakage with peritonitis that necessitated exploration followed by ERCP with stent insertion but the donor died on day 43 as a result of ongoing sepsis.

Conclusion: Although the majority of biliary complications are minor and can be managed conservatively, uncontrolled biliary leakage is a serious morbidity that should be avoided as it could lead to mortality.

Keywords

biliary complications, donors, liver transplant

Received 17 September 2009; accepted 5 October 2009

Correspondence

Mahmoud El-Meteini, Ain Shams Center for Organ Transplant (ASCOT), Ain Shams University, Cairo, 11351, Egypt. Tel: +2022129686; Fax: +20226345888; E-mail: mmeteini@idsc.net.eg

Introduction

Since 2001, adult-to-adult living donor liver transplantation (ALDLT) has been the only available treatment with curative intent for patients with end-stage liver disease (ESLD) in Egypt.[1,2] There is an absence of a deceased donor transplant programme as a result of the ongoing debate around brain stem death and the issuing of a comprehensive transparent organ transplant law. The concerns that patients have only one chance with an equivalent graft and patient survivals together with the challenges of donor

Presented at the 9th Annual Meeting of the American Hepato-Pancreato-Biliary Association, 12–15 March 2009, Miami, FL, USA.

risk adds to the complexity of the situation. Biliary anomalies are more common in right liver (RLG) compared with left liver grafts (LLG).[3,4] Large stature Egyptian patients almost always impose the need for RLG harvesting compared with the Far East where LLG are often used.[5,6] Biliary complications are the main cause of morbidity after right-sided donation.[7] Unresolved biliary complications may lead to sepsis, multi-organ failure (MOF) and death. Mortality after right lobe donation has been estimated to be less than 0.5%. This report documents biliary complications including a single mortality in the first 207 RLG living donors.

Patients and methods

Study population

From November 2001 to December 2008, 207 ALDLT procedures were undertaken for patients with ESLD and/or hepatocellular carcinoma (HCC). RLG were harvested, in all donors, either with (n = 30) or without (n = 177) the middle hepatic vein (MHV). Demographic data of the study population included 173 males and 34 females with s age range between 18 and 50 years. The mean age of all donors was 28.4 ± 5.2 years. Only donors with a maximum body mass index (BMI) ≤ 28 was accepted and assessed for donation. The mean BMI was 25.2 ± 2. Accepted criteria of live donation were met within a family member in 144 (69.6%) donors whereas the remaining 63 (30.4%) cases could not identify a reasonable sibling for donation and received a RLG from an unrelated friend. The three-steps donor preparation protocol has been reported elsewhere.[2] Liver biopsy is a routine practice in donor preparation and macrovesicular steatosis is only accepted if it is between 0 and 15% with the total absence of any portal inflammation.

Psychosocial assessment by an experienced informed psychiatrist is an integral step in donor preparation to exclude any coercion and ensure altruism.

Informed consent was obtained from all donors after making sure that they fully understood the procedure details, possible risks and complications as well as all the short-term post-operative financial implications resulting from a period of sick leave of the order of 6–8 weeks.

Ethics

The hospital ethical committee has to review all patient and donor files and meet with either the donor or recipient before approving donation. A separate donor advocate team was instituted recently and has started to revise donor assessment and defend all donor rights of being fully informed at all times.

Operative technique

The detailed operative technique for RLG harvesting without inclusion of the MHV has been described elsewhere.[2] The Hong Kong technique[8] of harvesting RLG with MHV was adopted whenever the decision was to proceed with this technique (n = 30). All procedures were done and/or supervised by one of the first two authors. The technique of tackling the right hepatic duct (RHDs) included: routine intra-operative cholangiogram, keeping peri-ductal dissection to the minimum followed by sharp transection of RHDs before starting parenchymal transection. The hilar plate is divided and suture ligated using 5/0 prolene on both sides. RHDs stumps, kept at 2–3 mm from the junction between common hepatic duct (CHD) and left hepatic duct (LHD), are closed by interrupted 6/0 PDS. Biliary leakage from the closed stump or from the transection margin is tested twice by saline injection into the cystic duct catheter immediately after stump closure and after graft harvesting. Routine conclusion cholangiogram to visualize the left biliary system and document absence of any leakage or ductal stenosis is the last step in the donor operation.

Cell saver (Dedico, Electa; Sorin group, Mirandola, Italy) is routinely used in all donor operations. Prophylaxis against thromboembolism is offered to all donors when the prothrombin concentration reaches 50% and kept for 4 weeks on a single subcutaneous (s.c.) daily dose of enoxparine 40 mg /day.

In an effort to decrease the incidence of biliary complication, bilirubin content in drain effluent is routinely measured, if any doubt exists until bilirubin content is less than the serum bilirubin level. Minor bile leaks are monitored carefully as this usually settles spontaneously; however, if it becomes symptomatic by clinical and/or laboratory measures, an abdominal CT scan and/or MRC is immediately done. Having the full data of a given donor, an elaborate discussion is made between the experienced surgeon, endoscopist and an interventional radiologist aiming at reaching a consensus decision on what would be the appropriate intervention whether ultrasound-guided aspiration, endoscopic retrograde cholangiography (ERCP), percutaneous transhepatic dilatation (PTD) or surgery. Cases treated by ultrasound-guided aspiration and insertion of a pig-tail catheter were followed by abdominal ultrasound. The decision to remove the pig-tail was taken when the draining amount was less than 50 ml/day for 2 successive days with abdominal ultrasound documenting complete disappearance of any abdominal collection.

Follow-up plan

After discharge, all donors are followed at the out-patient clinic every week for 1 month to ensure a normal liver profile and to assess a comparative CT volumetry by a senior surgeon. Thereafter, donors are seen once every month or every 3 months for 2 years according to the presence or not of biliary complications. Donors are informed to return if they have any complaints or abnormalities at any point during the whole follow-up period.

Statistical analysis

Categorical variables were expressed as frequencies and percentages. Continuous data were expressed as mean (SD). To study the impact of the number of the right bile ducts on the incidence of biliary complications, Fisher's exact test was used. SPSS v. 15.0 for Windows (SPSS, Inc., Chicago, IL, USA) was used for data analysis.