



Original Research

Surgical procedures in liver transplant patients: A monocentric retrospective cohort study



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HIGHLIGHTS

- This study presents comprehensively the epidemiology of the surgical history in 1211 liver recipients who require further surgical procedures.
- Surgical procedures on liver transplanted patients are associated with a significantly high risk of complications, irrespective of the time elapsed since transplantation.

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ABSTRACT

Background: Pre-existing chronic liver diseases and the complexity of the transplant surgery procedures lead to a greater risk of further surgery in transplanted patients compared to the general population. The aim of this monocentric retrospective cohort study was to assess the epidemiology of surgical complications in liver transplanted patients who require further surgical procedures and to characterize their post-operative risk of complications to enhance their medical care.

Patients and methods: From January 1997 to December 2011, 1211 patients underwent orthotopic liver transplantation in our center. A retrospective analysis of prospectively collected data was performed considering patients who underwent surgical procedures more than three months after transplantation. We recorded liver transplantation technique, type of surgery, post-operative complications, time since the liver transplant and immunosuppressive regimens.

Results: Among these, 161 patients (15%) underwent a further 183 surgical procedures for conditions both related and unrelated to the transplant. The most common surgical procedure was for an incisional hernia repair (n = 101), followed by bilioenteric anastomosis (n = 44), intestinal surgery (n = 23), liver surgery (n = 8) and other surgical procedures (n = 7). Emergency surgery was required in 19 procedures (10%), while 162 procedures (90%) were performed electively. Post-operative mortality and morbidity were 1% and 30%, respectively. According to the Dindo-Clavien classification, the most common grade of morbidity was grade III (46%), followed by grade II (40%).

Conclusion: Surgical procedures on liver transplanted patients are associated with a significantly high risk of complications, irrespective of the time elapsed since transplantation.

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1. Introduction

In recent decades, there has been impressive progress in the management of liver transplantation (LT), resulting in a constantly growing liver transplant recipient population, as reported by the last annual reports of the French Biomedicine Agency (2014) [1] and the OPTN (2012) [2–4]. Pre-existing chronic liver diseases

Abbreviation: LT, liver transplantation; OLT, orthotopic liver transplantation.

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and an initially aggressive surgical procedure using a large abdominal approach with vascular and biliary anastomosis, as well as the consequences of long-term immunosuppression can lead to subsequent surgical procedures for liver transplant recipients at a higher rate than in the general population [5–8]. Moreover, it is now well-known that the altered physiology and immunosuppression of these patients explain their increased exposure to post-operative complications. In this setting, it is safe to state that the progressively growing prevalence of the liver transplant target population has led to an increased rate of common surgical diseases. Taking into account the expected rise in live transplant survivors in coming years, an increase in further surgical procedures in this population is likely to lead significant problems for transplantation centers in terms of the allocation of beds, operating room availability and the use of hospital resources [5]. While most transplantation centers are already overburdened by transplantation activity alone, carrying out further general surgical procedures within these specialized units may also imply longer waiting periods, higher hospital costs and inconvenience to patients who may not live close to a transplantation centers. In this sense, non-transplantation surgical units will have to perform more general procedures on the liver transplant recipients, which would necessarily require close coordination with transplantation centers. Therefore, it is important that non-liver transplant surgeons are aware of the specific complications that they may have to manage when they encounter these specific patients. In this sense, epidemiological data about the incidence, type of surgery, post-operative complications and mortality are required for this specific patient population to managed them regarding medical and surgical care. The literature on the subject is very weak and insufficient, as only one benchmark study published in the past ten years ago has reported this specific aspect [6]. Therefore, an update on the epidemiology of post-LT surgical procedures seems relevant.

The aim of this monocentric retrospective cohort study was to assess the epidemiology of surgical procedures and their complications in the liver transplant recipient population to enhance their medical care.

2. Patients and methods

2.1. Patients

From January 1997 to December 2011, 1211 patients underwent orthotopic liver transplantation (OLT) in our center.

2.2. Transplantation technique

A Mercedes abdominal incision and cavo-caval anastomosis was performed in each case. Portal reconstruction was carried out by means of an end-to-end anastomosis. Arterial anastomosis was done, whenever possible, between the donor celiac artery and the recipient hepatic artery. If the native hepatic artery was not suitable, anastomosis was done between the donor celiac artery and the recipient splenic artery or an arterial allograft conduit was interposed between the donor celiac artery and the recipient infrarenal aorta or splenic artery. In the presence of an accessory right hepatic artery, the graft was revascularized via the donor superior mesenteric artery (using the Carrel patch technique). Usually, a bilio-biliary anastomosis was done, but in cases of liver re-transplantation or primary sclerosing cholangitis, a bilioenteric anastomosis was performed. Grafts were invariably stored in University of Wisconsin solution. Immunosuppression was achieved using FK 506 (Astellas, Tokyo, Japan).

2.3. Data collection and post-operative follow-up

A retrospective analysis of prospectively collected data was performed.

2.4. Inclusion criteria

All general surgical procedures performed on liver transplant recipients more than three months after the date of transplantation were included in the study. For each patient we recorded the general profile and demographic data, indication for LT, the type of transplant, type of surgical procedure, time period between transplantation and subsequent surgical procedures, intraoperative and post-operative course, and immunosuppression regimen. Patient follow-up was performed at our outpatient clinic on a weekly basis for the first three months and then twice per month for six months. Patients were then seen on a bimonthly schedule for two years and on a six-month schedule thereafter. Abdominal ultrasound or CT scan was performed every three months during the first year, every six months for the next two years and annually thereafter.

2.5. Exclusion criteria

Procedures done at the same admission as the transplantation and re-transplantations or surgical procedures for the treatment of hepatic artery thrombosis and pseudoaneurysms were excluded from the study.

2.6. Definitions

All surgical procedures were classified into elective or emergency and major or minor procedures. All procedures limited to the abdominal wall were categorized as minor procedures while all those involving opening the peritoneal cavity with a visceral surgical procedure (digestive resection and/or anastomosis) categorized as major procedures. Post-operative morbidity was graded according to the Dindo-Clavien classification [9]. Renal insufficiency was defined as plasma creatinine >150 µg/L [10]. Sepsis was defined by the presence or suspicion of an infection, in addition to evidence of increased levels of circulating inflammatory mediators, thus resulting in a systemic inflammatory response syndrome [11]. Rejection was defined on the basis of liver biopsy performed in suspected cases [12].

2.7. Statistical methods

Chi-squared analysis and the Fisher exact test were used for statistical analysis. P values < 0.05 were considered statistically significant.

3. Results

3.1. Incidence and characteristics of surgical procedures

Overall, of the 1211 patients who underwent liver transplantation, 161 patients underwent 183 further surgical procedures (15%) for conditions both related and unrelated to the transplant (Table 1). Among these, 154 were patients with liver transplants only, six had both liver and kidney transplants and one patient had both liver and lung transplants. Among the 183 procedures, post-operative morbidity was noticed after 54 procedures (30%) and mortality after two procedures (1%) secondary to sepsis and renal failure after emergency intestinal surgeries. Emergency surgery was required in 19 procedures (10%), while 162 (90%) were elective

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