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Surgical results of left lobectomy and left hepatectomy in 70 noncirrhotic patients

A preliminary evaluation before performing liver transplantation from living related donors

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Abstract. As a preliminary step before performing liver transplantation using living related donors, a comparative study was undertaken to determine the specific operative risk of left lobectomy ($n = 54$) compared to left hepatectomy ($n = 16$) in noncirrhotic patients. No postoperative death was observed in either group and no patients required reoperation. The mean hospital stay was longer after left hepatectomy than after left lobectomy (23 ± 15 days vs 10 ± 3 days, $P < 0.05$). The postoperative course was uneventful in 94% of the patients after left lobectomy and in 44% after left hepatectomy ($P < 0.001$). The peroperative transfusion rate was higher after left hepatectomy than after left lobectomy (38% vs 4%, $P = 0.001$). The postoperative collection rate was higher after left hepatectomy than after left lobectomy (25% vs 6%, NS). No biliary fistulas or subphrenic abscesses were noted after left lobectomy; however, these were observed in 19% and 12% of the cases, respectively, after left hepatectomy. Although conventional liver resection is quite different from graft harvesting in living related transplantation, our study demonstrates that the morbidity rate is significantly higher after left hepatectomy than after left lobectomy.

Key words: Liver transplantation, surgery – Living related donation, liver surgery – Lobectomy, liver – Hepatectomy, left, liver

Introduction

The increasing shortage of cadaveric donors for orthotopic liver transplantation has prompted some surgeons to propose an alternative approach, namely, liver transplantation from living related donors (LRT) [1, 3, 8, 9]. Until now, more than 70 LRT have been performed. The reported cases were carried out in children and utilized the left lobe of the liver (segments II and III) [1, 3, 4, 8] or, less frequently, the entire left liver (segments II, III, and IV) [1, 9]. The clinical use of LRT has benefited from recent advances in liver surgery, with a very low operative risk after partial hepatectomy in noncirrhotic patients [2, 5]. However, the operative risks of left lobetomy compared to those of left hepatectomy are not well established. Although the technical procedure of conventional liver resection is different from graft harvesting in LRT, the aim of the present study was to assess postoperative morbidity and mortality following left lobectomy and left hepatectomy.

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Patients and methods

Patients

Of 486 patients who underwent hepatectomy in Beaujon Hospital from 1983 to 1991, 70 patients with noncirrhotic livers underwent a left lobectomy (resection of segments II and III of Couinaud's classification; $n = 54$) or a left hepatectomy (resection of segments II, III, and IV; $n = 16$). All patients with bilioenteric anastomosis, associated resection of the caudate lobe, or wedge resection in the right liver were excluded from this study.

Left lobectomy group ($n = 54$)

This group included 33 women and 21 men, aged 19–73 years (mean 44 ± 15 years). Indications for resection were: liver metastases ($n = 11$), hepatocellular carcinoma without cirrhosis ($n = 2$), benign liver tumor ($n = 11$), hemangioma ($n = 5$), hydatid cyst ($n = 10$), unilobar Caroli's disease ($n = 6$), solitary cyst ($n = 4$), and other ($n = 5$).

Left hepatectomy group ($n = 16$)

This group included eight women and eight men, aged 21–71 years (mean 56 ± 15 years). Indications for resection were: liver metastases ($n = 2$), hepatocellular carcinoma without cirrhosis ($n = 2$), benign liver tumor ($n = 4$), hydatid cyst ($n = 4$), and intrahepatic cholangiocarcinoma ($n = 4$).

Table 1. Postoperative morbidity after left hepatectomy and left lobectomy in 70 noncirrhotic patients. * $P < 0.05$; ** $P < 0.001$; *** $P < 0.02$

Mean hospital stay (days ± SD)	10 ± 3*	23 ± 15*
Patients transfused (%)	2 (4%)**	6 (38%)**
Operative mortality	0	0
Morbidity[a]		
None (%)	51 (94%)**	7 (44%)**
Collections (%)	3 (6%)	4 (25%)
Biliary fistula (%)	0***	3 (19%)***
Subphrenic abscess (%)	0	2 (12%)
Pleural effusion (%)	0	2 (12%)
Deep venous thrombosis (%)	0	1 (6%)

[a] Some patients presented one or more complications

Operative procedure

Left lobectomy was performed through a midline incision in 37/54 patients (69%) and through a subcostal incision in 17/54 (31%). Left hepatectomy was performed through a subcostal incision in 16/16 patients (100%). Temporary inflow occlusion of the liver was used during left lobectomy in 9 patients (17%; mean time 15 ± 6 min) and in 51 patients during left hepatectomy (94%, mean time 28 ± 13 min). In all 70 cases, extraparenchymal control of both arterial and portal pedicles and of the left hepatic vein was achieved prior to resection. Liver transection was performed using a Kelly artery forceps and ultrasonic dissector; hemostasis was secured by sutures and clips. Biological glue was applied to the liver resection margin.

Biliary drainage (i.e., transcystic drainage) was not used after left lobectomy and was used in 8/16 left hepatectomies (50%). Closed drainage was established by means of a suction drain. In all patients, prophylactic antibiotics (cefotaxime 3 g/24 h) were given for 48 h intravenously.

This study takes into account every complication related to the surgical procedure that occurred during the hospital stay and after discharge.

Statistical analysis

All data are presented as mean ± the standard error of the mean. Student's *t*-test or the chi-square test were used with Yates' correction when appropriate for comparison. A *P* value less than 0.05 was considered significant.

Results

Results are listed in Table 1. No postoperative death was observed in either group and none of the patients required reoperation. The postoperative course was uneventful in 94% of the patients after left lobectomy and in only 44% after left hepatectomy ($P < 0.001$).

The intraoperative blood requirement rate was significantly higher after left hepatectomy. Two patients with left lobectomies (4%) received two units of packed red cells while six patients with left hepatectomies (38%) received 7 ± 5 units of packed red cells (range 2–18 units).

The postoperative collection rate was higher after left hepatectomy than after left lobectomy. Subphrenic abscesses were observed in two patients after left hepatectomy and were treated by ultrasound-guided percutaneous drainage. Biliary fistulas were observed in three patients after left hepatectomy; two had persistent biliary leakage by suction drainage until day 15 and one had a biliary collection on the liver stump, revealing a fistula, and was treated by ultrasound-guided percutaneous drainage. No biliary fistulas or subphrenic abscesses occurred after left lobectomy.

Discussion

In liver, kidney, or pancreas transplantation from living related donors, the risk for the donor is a major priority, so a minimal surgical trauma must be proposed to a healthy donor [6]. Left lobectomy has some technical particularities that account for the very low rate of associated morbidity reported in this series: (a) only 20%–25% of the liver mass is removed, without risk of postoperative liver failure in the case of a normal residual liver; (b) vascular pedicles of the right liver can easily be left intact; (c) unlike left hepatectomy, left lobectomy does not require dissection of the bile duct confluence. The expected benefit of left hepatectomy compared with left lobectomy in LRT is the transplantation of a greater liver mass. The addition of segment IV in the graft represents approximately 20% of additional liver mass [7].

In the Chicago experience with LRT (20 reported cases), donor complications were encountered in the three left hepatectomies – one splenectomy, two bile leakages, and one collection – but in none of the 17 left lobectomies [1]. Our data confirm that left hepatectomy represents a more aggressive liver resection than left lobectomy since (a) it often requires an extensive hilar dissection with the risk of biliary injury and (b) the resection plane is close to the middle hepatic vein and the liver stump is larger than after left lobectomy, increasing the risk of per- and postoperative hemorrhage and biliary fistula. Clinical experience with LRT has clearly demonstrated that, in children, transplantation of the left lobe is sufficient in terms of liver volume [1, 3, 4, 8]. Only experience in adult LRT will help us determine the minimal volume that needs to be transplanted.

Both left hepatectomy and left lobectomy can be performed with a very low mortality rate, but the use of living related donors requires ensuring the lowest possible risk in the donor. Our retrospective study demonstrates that left lobectomy has a significantly lower morbidity than left hepatectomy.

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