Transpl Int (1994) 7 [Suppl 1]: S150–S151

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Preservation of the recipient inferior vena cava in liver transplantation

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Abstract Twenty piggy-back (PB) liver transplantations (LT) were compared with 20 LT performed by the standard technique in order to evaluate whether or not the theoretical haemodynamic advantages of the preservation of the inferior vena cava (IVC) have any impact on the final results of the LT. Statistically significant differences were observed in the duration of the hepatectomy, which was longer for PB LT (192 min vs. 146 min), and in the duration of the anhepatic phase, which was shorter in that group (52 min vs. 76 min). There were no differences in the duration of the complete surgical procedure, consumption of blood products, incidence of postoperative acute renal failure, number of reoperations or survival.

Key words Liver transplantation
Piggy-back

Introduction

Liver transplantation with preservation of the recipient inferior vena cava (IVC) maintains physiological flow through the IVC during the anhepatic phase (improving the venous return and renal perfusion pressure), with advantages over veno-venous bypass, and facilitates the mobilization of the graft to control bleeding from the retroperitoneal surface after reperfusion. However, the technique increases the duration of hepatectomy, which is technically more difficult. The aim of our study is to assess whether or not the advantages of the PB LT have any impact on the immediate postoperative period and final results of the LT.

Materials and methods

Between February 1990 and September 1992, we performed 88 LT in adult patients, 22 of them with preservation of the IVC (25%). In this study, we compared various intra- and postoperative parameters determined in 20 of these patients undergoing PB LT with those of 20 patients undergoing LT performed by the standard technique without veno-venous bypass in the same time period. We have excluded retransplants. Both groups were comparable in terms of age, sex, Child-Pugh status and preoperative diagnosis.

For the statistical comparison, we used the Mann-Whitney U-test except for the parameter "creatinine > 2 mg/100 cc in the first 7 postoperative days", which was tested with chi-square.

Results

Intraoperative data

The duration of the hepatectomy was clearly longer in PB LT with a mean of 192 min (range 90–240 min) in comparison with 146 min (range 90–240 min) in the standard LT ($P < 0.05$). The duration of the anhepatic phase was shorter in PB LT (mean 152 min, range 25–115 min) than in the standard LT (mean 76 min, range

50–120 min) ($P < 0.01$). The total duration of the LT did not differ between the groups, with a mean of 7 h 45 min in PB LT (range 3 h 45 min in 11 h) and 7 h 39 min in the standard LT (range 5–15 h). There was red blood cell no differences in the number of units transfused, with a mean of 15 units in the first group (range 0–58) and 17 units in the second group (range 5–54).

Postoperative data

The incidence of acute renal failure (defined as an elevation of the creatinine value over 2 mg/100 cc in the first 7 postoperative days) did not differ (20% in PB LT and 25% in standard LT). The number of reoperations was similar (15% in the first group and 20% in the second). Survival was 75% in both groups.

Discussion

During the anhepatic phase of LT, clamping of the portal and caval venous return induces dangerous haemodynamic modifications and alterations in the perfusion of the occluded areas, with the respective consequences in reperfusion and in postoperative renal function [1]. To overcome these complications the veno-venous bypass was designed [2], although several studies have demonstrated its lack of effectiveness in maintaining an adequate venous return to support the cardiac output and a proper vascular decompression of the abdomen and lower limbs [3].

PB LT allows the physiological flow through the IVC and, even with the occlusion of the portal venous return, maintains a much better haemodynamic situation in comparison with the standard procedure. Moreover, this technique has other advantages, as it shortens the anhepatic phase, facilitates the mobilization of the graft to control bleeding from the retroperitoneum and diminishes the bare area [4].

We have found no differences in total duration of the PB LT in comparison with the standard procedure (the reduction of the anhepatic and haemostatic phases probably compensates for the longer duration of the hepatectomy) nor in any of the intra- or postoperative factors analysed. Given its haemodynamic advantages and based on the personal impression that, when PB LT is performed in anatomically favourable cases, it does not excessively prolong the hepatectomy and facilitates posterior manoeuvres, we recommend applying the technique in those favourable cases.

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