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Side-to-side caval anastomosis in a patient receiving a liver graft from a marginal donor with situs inversus totalis



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ABSTRACT

INTRODUCTION: The donor situs inversus totalis status was considered an absolute contraindication to liver transplantation due to the technical difficulties involved. Only in recent years has a very young deceased donor with situs inversus totalis been considered as a potential donor.

PRESENTATION OF CASE: We herein report a single case of 57-year-old male patient with hepatocellular carcinoma who received a liver transplantation from a 73-year-old woman with situs inversus totalis. Liver was implanted using a 1992-Belghiti piggyback technique positioning the larger hemiliver in the left upper quadrant and the left in the liver fossa. We assisted a good graft reperfusion without surgical or anesthetic problems. His hospital stay was relatively uneventful and he was discharged from hospital on postoperative day 7. At 8 months of follow-up the patient is alive and in good clinical condition.

DISCUSSION: The donor situs inversus totalis does not require any modification of transplant procedure if the donor-recipient size match permits a comfortable placement of the graft in a standard anatomical position. To the best of our knowledge, this is the first case of liver transplantation with a graft from a "marginal" donor with situs inversus totalis using a 1992-Belghiti piggyback technique.

CONCLUSION: The donor situs inversus totalis status should not be considered a contraindication for LT and the piggyback technique should be considered the surgery of choice.

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1. Introduction

"Situs inversus" is a congenital condition characterized by a symmetric "mirror-image" orientation of all organs with respect to the midline. This malformation is defined "totalis" when the anomaly includes both the thoracic (dextrocardia) and abdominal viscera. Situs inversus totalis (SIT) occurs with an incidence of 0.1% in the general population and often coexists with cardiac and visceral malformations, including pre-duodenal position of the portal vein, underdevelopment of the vena porta and vena cava, polysplenia, congenital biliary atresia, or midgut volvulus.

In the past, situs inversus malformation was considered an absolute contraindication to LT for the technical complexity, due to the vascular anomalies and the difficulties in achieving an adequate graft position in the recipient's abdomen. However, during the last years, there have been several cases of successful transplants in recipients with situs inversus totalis,¹ but until now only

seven cases of deceased donors with situs inversus totalis have been reported in literature.

Herein we present a case of LT with a graft from a deceased SIT donor, using a large side-to-side vena cava anastomosis for graft implantation.

The study was approved by the Local Ethical Committee and the patient's signed consent form was obtained.

2. Case report

A 73-year-old woman was referred to our institution as a potential deceased liver donor. Routine chest X-ray and ultrasound examination demonstrated dextrocardia and "mirror image liver". A status of SIT was confirmed after donor laparotomy. Liver and kidney were recovered using standard techniques and preservation solution. No technical difficulties were encountered during organ procurement. A 57-year-old male with Hepatitis C-related end stage liver disease and 5 cm max. diameter hepatocellular carcinoma lesion was selected as recipient. His tumor had previously been treated by trans-arterial chemoembolization. The adjusted and unadjusted Mayo End-Stage Liver Disease scores were 18 and 10, respectively. The waiting list time was 6 months. During backbench procedure, the hepatic artery was located on the right side and the common bile duct on the left, the portal vein

Abbreviations: SIT, situs inversus totalis; LT, liver transplantation.

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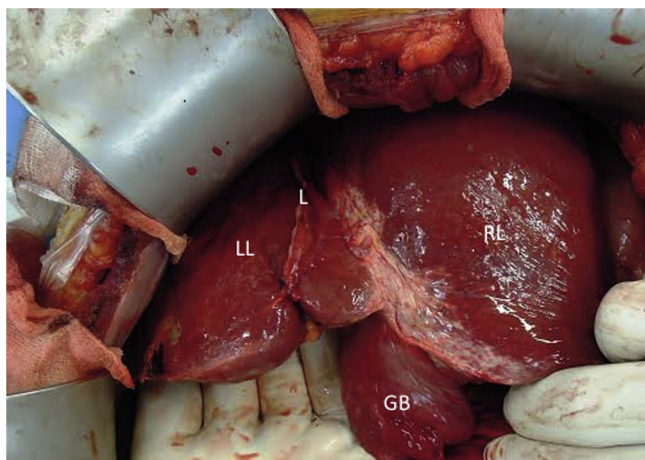


Fig. 1. The graft status after the artery reconstruction. The left hemiliver was placed in the liver fossa and the right over the stomach. The donor vena cava was anastomosed with the recipient vena cava using a large side-to-side 3–0 prolene running suture. RL: right hemiliver; LL: left hemiliver; GB: gallbladder; L: falciform ligament.

being behind the common bile duct. The liver weight was 1300 g. In order to perform a 1992–Belghiti piggyback technique the supra and infra hepatic vena cava were sutured. On the recipient, a right subcostal incision was made with preservation of the left rectus muscle. Hepatectomy was performed with the preservation of the vena cava and the suture ligation of right, middle and left hepatic veins. A large Satinsky clamp was placed on the recipient vena cava with about 2 cm open for the venous flow. The donor liver was placed with the larger hemiliver in the left upper quadrant and the left in the liver fossa (Fig. 1). The liver implantation was made by a large side-to-side cavo-cava anastomosis using a running 3/0 prolene suture. Once portal vein anastomosis was performed, the preservation solution was flushed away by 1000cc glucoate 5% from a cannula inserted into the donor vena cava. For artery reconstruction, the cut-off of the coeliac axis of the donor was anastomosed with the cut-off right–left hepatic junction of the recipient. Biliary reconstruction was performed by duct-to-duct anastomosis without placement of a “T” type drainage tube (Fig. 2).

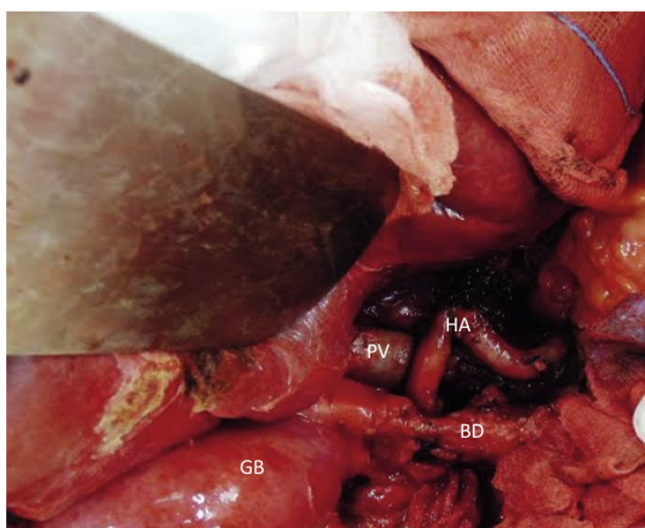


Fig. 2. The hepatic pedicle after transplantation. The portal vein was reconstructed using a 5–0 prolene running suture and the recipient hepatic with a 6–0 prolene suture on the cut-off of the donor coeliac axis. The donor bile duct was precisely on the same axis as the recipient duct. PV: portal vein; HA: hepatic artery; BD: bile duct; GB: gallbladder.

Table 1
Liver transplantations from donors with situs inversus.

Authors (Year)	Donor age (years)	Recipient age (years)	Primary disease	Technique	Vascular reconstruction	Biliary reconstruction	Outcome
Asfar (1995)	23	63	Post-alcoholic cirrhosis	Counterclockwise 90° rotation	Vena cava end-to-side anastomosis	Roux en-Y choledochojejunostomy	Died on postoperative day 20 for ARDS, bile leak, sepsis
Herrera (1996)	43	40	Cirrhosis non-defined	Orthotopic, piggyback	Vena cava end-to-side anastomosis	End-to-end choledochocholecholeostomy with T-tube stent	Alive, 30 months
Braun [6]	19	56	Post-alcoholic cirrhosis	Orthotopic, piggyback	Vena cava end-to-side anastomosis	End-to-end choledochocholecholeostomy with T-tube stent	Alive, 17 months
Sugawara (2001)	34	2	Biliary atresia	Living related donor graft	Vena cava end-to-end anastomosis	Roux en-Y choledochojejunostomy with T-tube stent	Alive, 17 months
Pomposelli (2007)	41	49	HCV-end stage liver disease	Retroversus implant (180° rotation), piggyback	Vena cava end-to-end anastomosis	Roux en-Y choledochojejunostomy	Non-occlusive clot in vena cava on 9 postoperative day, no follow-up reported
Dou (2010)	NA	50	End-stage Budd–Chiari syndrome	Clockwise 15° rotation, temporary water balloons	Vena cava end-to-end anastomosis	End-to-end choledochocholecholeostomy	Alive, 10 months
Sun [7]	23	58	HBV-end stage liver disease	Orthotopic, piggyback	Vena cava end-to-end anastomosis	End-to-end choledochocholecholeostomy	Alive, 36 months
Manzia (2014) [present case]	73	57	Hepatocellular carcinoma	Orthotopic, piggyback	Vena cava side-to-side anastomosis	End-to-end choledochocholecholeostomy	Alive, 6 months

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