Early onset hepatic venous outflow obstruction after pediatric split liver transplantation: Liver salvage using cardiopulmonary bypass

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Abstract

We read with great interest the Letter from the Frontline by Chung et al., reporting on the successful surgical rescue of an early-onset hepatic venous outflow obstruction after pediatric living donor liver transplantation (LT). Reports describing procedures for hepatic vein thrombosis after LT in children are extremely sparse, and an urgent re-LT is typically recommended. We herein share a previously unreported type of salvage procedure for this rare but severe complication.

Reference

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Early onset hepatic venous outflow obstruction after pediatric split liver transplantation: Liver salvage using cardiopulmonary bypass

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Abbreviations: LT, liver transplantation; CPB, cardiopulmonary bypass
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To the Editor
We read with great interest the Letter from the Frontline by Chung et al., reporting on the successful surgical rescue of an early-onset hepatic venous outflow obstruction after pediatric living donor liver transplantation (LT).(1) Reports describing procedures for hepatic vein thrombosis after LT in children are extremely sparse, and an urgent re-LT is typically recommended. We herein share a previously unreported type of salvage procedure for this rare but severe complication.

A 5-year old boy (20 kg) underwent split LT for biliary cirrhosis after hepatoporto-enterostomy for syndromic biliary atresia, using a left lateral segment from an adult deceased donor. The patient presented with the anatomical variation called “interrupted inferior vena cava azygos continuation” where the hepatic veins drain directly into the right atrium. During LT, the recipient’s left and middle hepatic veins were sutured to the graft’s left hepatic vein performing a triangular anastomosis, the recipient’s right vein was oversewn; the ostium of the anastomosis measuring 1.5 cm seemed sufficient. On day-one after LT, ultrasound assessments showed a sub-occlusive thrombosis of the hepatic vein with reversed portal venous flow. Heparin was started immediately. After six days of treatment, the thrombosis was still observed with hepatofugal portal flow and massive ascites. The arterial flow was normal, hepatic function preserved, and the patient clinically stable. One week after LT we performed re-laparotomy and sternotomy, and aorto-superior caval vacuum assisted cardiopulmonary bypass (CPB) was initiated. The right atrium was opened towards the hepatic anastomosis and the diaphragm was split completely. The anterior portion of the anastomosis was opened. A 5 cm long thrombus was aspirated from the hepatic vein and allowing for the splanchnic blood to flow freely out of the liver, and being aspirated and continuously reinjected into the CPB. The anterior part of the anastomosis was reconstructed using a 2cm patch of the donor’s iliac vein, significantly enlarging the outflow tract. The patient was hemodynamically stable, CPB easily weaned. Intra-operative Doppler ultrasound showed triphasic hepatofugal flow in the hepatic vein as well as a hepatopetal flow in the portal vein.
Because of persistent bilateral pleural effusions, an angiography was performed five weeks after reoperation: the effusions dissolved after simple balloon dilatation of the suprahepatic anastomosis. One year after LT, the patient is asymptomatic and thriving.

Hepatic vein thrombosis unquestionably increases mortality in pediatric LT\(^2\) and must be quickly corrected. Untreated patients may need re-LT with its associated risks. It is thus of upmost importance to develop techniques which salvage the graft. Our technique, in contrast to the one described by Chung et al.,\(^1\) avoids total vascular re-clamping of the liver, thus avoiding further graft injury potentially leading to the need for re-LT. Vacuum-assisted normothermic CPB is well tolerated and simplifies access to the anastomosis without significant blood loss. Our strategy using CPB and patch enlargement of the hepatic anastomosis undeniably represents one of the treatments of early hepatic venous outflow obstruction after pediatric LT.

References