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Scientific Letters

Surgical Alternatives in the Treatment of Portal Vein Thrombosis in Liver Transplantation☆

Alternativas quirúrgicas para el tratamiento de la trombosis venosa portal en el trasplante hepático

Portal vein thrombosis (PVT) is a common complication in terminal-stage liver disease. Its incidence in liver transplantation (LT) ranges from 2.1% to 26%; in cirrhotic patients, however, it can be as high as 64%,[1] depending on the diagnostic method used. In the past, PVT was considered an absolute contraindication for LT, especially due to the technical difficulty involved.[1,2] Nonetheless, since the mid-1980s, with the introduction of new surgical techniques, PVT is no longer considered an absolute contraindication in a larger percentage of patients.[3] In spite of the frequent appearance of PVT in terminal liver disease, and, consequently, in an important number of patients who are candidates for LT, there are no clinical guidelines for its treatment before transplantation.

Several surgical techniques have been proposed to ensure adequate portal flow during LT. Below, we present cases of patients with PVT treated by LT at our hospital and the different surgical techniques used.

Case 1

The patient is a 48-year-old male with Child B alcoholic cirrhosis, a MELD score of 9 and Yerdel grade II portal thrombosis.[4] LT was conducted with a cadaveric donor organ, and we proceeded with thrombectomy, end-to-end portaportal anastomosis and placement of a stent by the Interventional Radiology Department. During the immediate post-op period, the patient presented with graft failure secondary to complete PVT, and reoperation was therefore necessary after 24 h for attempted portal recanalization by means of side-to-end transposition of the cava, which was not successful. The patient received another transplant, 48 h after the initial transplantation, involving end-to-end anastomosis of the left renal vein to the portal vein with cadaveric donor vein graft and associated end-to-side anastomosis of a gastric varix to the portal vein with another venous graft (Fig. 1). The postoperative period was satisfactory, with no complications. Today, 8 years after transplantation, the graft continues to function correctly.

Case 2

The patient is a 62-year-old male with hepatocarcinoma in an alcoholic cirrhotic liver, Child B7 and MELD 13, associated with grade IVportal thrombosis,[4] with several hospitalizations for hydropic decompensation. LT was performed, which entailed a very laborious surgery that lasted 8 h, with multiple transfusions, portal thrombectomy and end-to-end portaportal anastomosis and stent placement. Nonetheless, optimal portal flow was not achieved, so we decided to create an end-to-end anastomosis of the left renal vein to the portal vein. During post-op, the patient presented persistent ascites, so an angiography was performed, which demonstrated stenosis of the portal anastomosis that was treated with a stent (Fig. 2). Afterwards, the patient presented biliary fistula secondary to ischemia of the bile duct, with multiple organ failure. The patient died 40 days after surgery.

Case 3

The patient is a 50-year-old male with alcoholic cirrhosis, Child C and MELD 22, with a history of alcoholic pancreatitis and portal hypertension due to grade IV PVT, which resulted in

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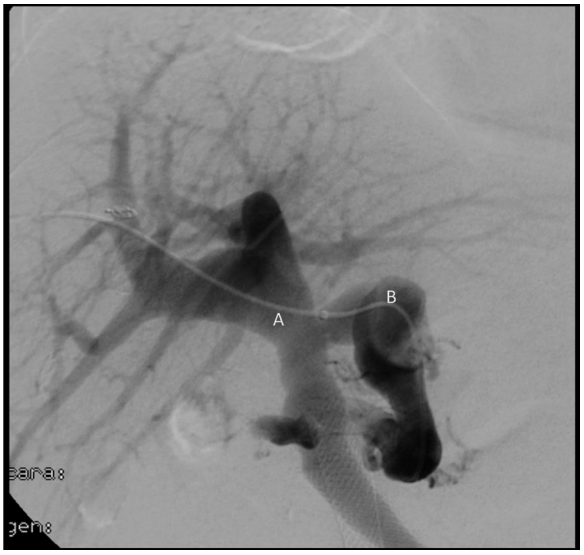

Fig. 1 – (A) Transposition of the cava and (B) anastomosis to a gastric varix.

several surgeries, including bilioenteric bypass and splenorenal shunt. The LT was quite laborious due to an inflammatory magma in the hepatic hilum that impeded dissection of the elements and led to multiple intraoperative transfusions. End-to-end transposition of the cava provided adequate portal flow and deferred hepaticojejunostomy after 48 h. As complications, he presented a bile leak on the 7th day post-op, at which time a reoperation was performed and the hepaticojejunal anastomosis was repaired. Two months later, the patient developed stenosis of the right bile duct with recurrent cholangitis, the last of which was 3 months after transplantation, causing sepsis and death.

Case 4

The patient is a 49-year-old male with alcoholic cirrhosis and grade II portal thrombosis. LT was carried out with attempted portomesenteric thrombectomy and failed recanalization of the superior mesenteric vein. We decided to perform side-to-end transposition of the cava with partial closure of the retrohepatic vena cava, leading to prolonged warm ischemia of the graft. In the postoperative period, low portal flow was detected, with secondary failure of the graft. The patient was retransplanted after 48 h; we dissected the collateral vein that drained into the superior mesenteric vein and provided an access for radioguided thrombectomy and later mesenteric-portal anastomosis with venous graft and stent placement.

Thrombosis of the portal-mesenteric axis was initially an absolute contraindication for LT in the context of terminal liver disease. The pathophysiology of PVT seems to be related with the increased intrahepatic resistance to portal flow as a consequence of cirrhosis, vascular damage induced by elevated portal pressure and coagulation disorders.[5] Patients with terminal-stage liver disease present a wavering hemostatic balance; therefore, they can go from states of hypercoagulability with hemorrhage to situations of hypercoagulability and thrombosis.

PVT is more frequent in men with alcoholic cirrhosis, advanced hepatic disease (Child C), severe portal hypertension, hepatocarcinoma and patients with treatment for bleeding due to portal hypertension (sclerotherapy, portosystemic shunt, TIPS, splenectomy, *etc.*).[2,4] According to Yerdel et al.,[4] the presence of at least one of these risk factors increases the risk for portal vein thrombosis from 6.6% to 12.5%.

PVT is defined as the occupation of the portal lumen by a thrombus of variable extension. Several authors have classified PVT according to its extension and severity.[6] The most extensively used is the classification by Yerdel et al.[4]:

- Grade I: minimal or partial thrombosis of the portal vein (<50% portal lumen) with minimal or limited extension to the superior mesenteric vein
- Grade II: obstruction of the portal vein >50%, including complete obstruction, with minimal extension or without extension to the superior mesenteric vein
- Grade III: complete thrombosis of the portal vein and proximal superior mesenteric vein

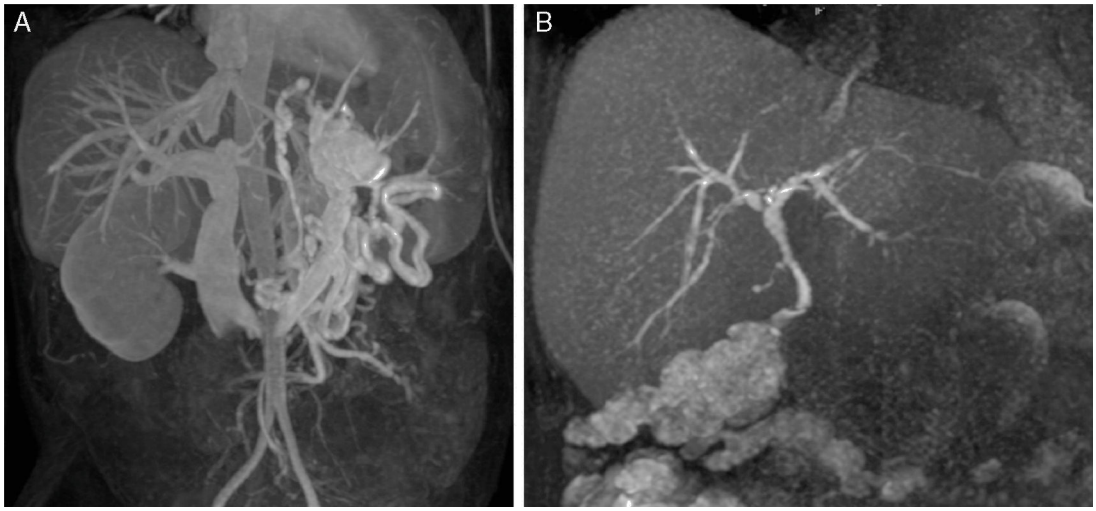

Fig. 2 – (A) Transposition of the cava and (B) bile duct stenosis.

- Grade IV: complete thrombosis of the portal vein, associated with proximal and distal thrombosis of the superior mesenteric vein

The presence of PVT significantly increases surgical complications and requires a greatly experienced and skilled surgical team. In this context, several surgical alternatives have been developed, with the fundamental aim to reestablish adequate portal flow for the new graft and to ensure the best possible splanchnic venous drainage in order to diminish portal hypertension. The most widely used surgical technique is thrombectomy with end-to-end portal anastomosis.[3] Other surgical techniques are: interposition of venous grafts between the portal vein of the donor and recipient, both end-to-end and side-to-end transposition of the vena cava, extra-anatomical reconstructions such as renoportal anastomosis and portal vein arterialization. The decision of the surgical technique fundamentally depends on the characteristics and extension of the thrombosis. In case of incomplete venous thrombosis, thrombectomy can usually be done with standard portal-portal anastomosis. In cases of grades II or III thrombosis, conventional portal anastomosis can be attempted and, if not possible, anastomosis should be done to a collateral vein, the coronary vein or inferior mesenteric vein, with or without interposition of a donor vein graft. In cases of grade IV portal thrombosis, another option is also anastomosis to a collateral vein and, if not possible, portacaval transposition or anastomosis to the left renal vein.[3]

Another surgical option is the arterialization of the portal vein and, as a last resort in patients with diffuse thrombosis of the mesenteric axis, surgeons may opt for combined liver and intestinal transplantation.[7] In cases of portal arterialization and transposition of the cava, the problem of the portal flow for the new graft will be resolved. However, it will not resolve the portal hypertension, which, in fact, could worsen and lead to bleeding of the varices, persistent ascites and renal dysfunction.

In our experience, most cases of portal thrombosis allow for thrombectomy with standard portal anastomosis, which may occasionally require stent placement and, in few cases, other techniques will be necessary. However, we consider it essential for LT surgeons to be versed in the different surgical options, as portal thrombosis is often diagnosed intraoperatively and the delay in reestablishing adequate portal flow can cause organ failure.

In addition to the technical difficulty involved in PVT during liver transplantation, there is great concern about postoperative complications and the survival of these patients. According to the systematic review by Rodríguez-Castro et al.,[2] survival within the first 30 days and first year post-transplantation is shorter in patients with associated PVT. In another meta-analysis, no statistically significant differences were found in intra-hospital or one-month survival; however, a slightly shorter one-year survival was detected in patients with PVT.[1] Nonetheless, cirrhotic patients with PVT who do not receive transplants present a mortality rate that is 2.6 times greater than those without thrombosis. Furthermore, in cases of extensive PVT, the post-transplantation quality of life of these patients is compromised by residual portal hypertension in some 50% of cases.[2,8]

The incidence of rethrombosis is variable according to whether post-transplantation prophylaxis is used, such as low molecular weight heparin, vitamin K antagonists or *in situ* infusion of fibrinolytic agents. Rodriguez-Castro et al.[2] found 6.1% rethrombosis using different prevention methods, compared to 10.3% in those without any prevention treatment.

Last of all, another question that has yet to be answered is the proper treatment of PVT in patients who are on the waiting list for transplantation. Currently, there are no clear clinical guidelines for pre-transplantation treatment of PVT. There is evidence, however, in favor of anticoagulation of patients on the waiting list for LT, which, in a high percentage of patients, achieves portal vein repermeabilization or avoids progression of the thrombosis.[9,10]

In conclusion, PVT is common in patients with cirrhosis who are candidates for LT. This condition causes great technical difficulties during LT surgery and reduces mid-term survival. Therefore, and although PVT is currently not an absolute contraindication for transplantation, the procedure should be done by an expert surgical team who is adept at the different possible techniques that could reestablish adequate portal flow to the new graft. Further studies should be done and clinical guidelines should be created to define the preoperative treatment of PVT and proper prophylaxis in order to avoid rethrombosis.

Authorship/collaborators

Alejandra García Novoa: study design, data collection, analysis and interpretation of results, composition of the article, critical review.

Nicolasa Fernández Soria: data collection, analysis and interpretation of results.

Sergio Builes Ramírez: study design, analysis and interpretation, data collection and approval of final version.

Namibia Sanluis Verdes and Manuel Gómez Gutiérrez: data collection, critical review.

Conflict of Interests

The authors have no conflicts of interests.

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Autoimmune Pancreatitis or Pancreatic Cancer?☆

¿Pancreatitis autoinmune o cáncer de páncreas?

Autoimmune pancreatitis (AIP)[1] is a benign fibroinflammatory disease that frequently presents as obstructive jaundice, which may or may not be associated with a pancreatic mass. It shows characteristic histological changes, and there is excellent response to corticosteroid therapy, as published in the 2011 International Consensus on AIP.[2]

We report the case of a 59-year-old male with no prior history of interest who was transferred to the general surgery department due to symptoms compatible with post-ERCP acute cholecystitis after having been admitted to the Gastrointestinal Department because of obstructive jaundice secondary to a mass in the head of the pancreas. CT scan showed evidence of increased pancreatic gland size, related with acute pancreatitis vs a neoformation, as well as dilatation of the intra and extrahepatic bile duct (Fig. 1). Endoscopic ultrasound showed that the entire pancreatic gland was increased in size, with a neoformation in the head measuring 43×32 mm, which was in contact with the superior mesenteric vein by 12 mm. The Wirsung duct had a beaded appearance with a clear caliber throughout. The extrahepatic bile duct was dilated and had defined walls, with no interior content, but the distal section was displaced by the previously described mass. ERCP revealed irregular stenosis of the proximal intrapancreatic common bile duct and dilatation of the main bile duct. Lab analyses showed elevated total bilirubin, at the expense of direct bilirubin (3.2 mg/dL), normal tumor markers and slightly elevated immunoglobulin G4 169 mg/dL (adults: 9–104 mg/dL). The pancreatic biopsy taken during endoscopic ultrasound was not conclusive for malignancy.

Given the poor evolution of the acute clinical symptoms and the uncertain pancreatic diagnosis, we decided to

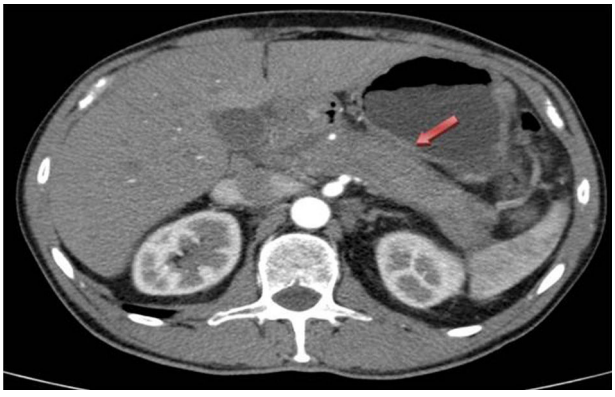

Figure 1 – CT image showing the pancreatic gland that is increased in size.

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