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SCIENTIFIC LETTER

First two cases of domino liver transplantation in Mexico☆

Primeros dos casos de trasplante hepático dominó en México

Given the scarcity of organs worldwide, the medical community has developed different measures for increasing the number of donors,[1–3] one of which is domino liver transplantation (DLT). The first DLT was performed in 1995 in Portugal by Furtado et al.,[4] who transplanted a liver from a deceased donor into a patient with familial amyloidotic polyneuropathy (FAP), and the liver from the patient with FAP was assigned to another patient, 56 years of age, that presented with cirrhosis and hepatocellular carcinoma (HCC).

FAP is an autosomal-dominant inherited disorder caused by the mutation of the transthyretin (TTR) gene that codes for the TTR protein and is located on chromosome 18q. More than 100 mutations are known, any of which lead to instability of the corresponding protein and to the extracellular deposit of amyloid in several tissues (autonomous and peripheral nerves, wall of the gastrointestinal tract, heart, etc.). Symptom onset is between 25 and 35 years of age and the most common are peripheral neuropathy of the lower limbs, diarrhea, and diverse arrhythmias.[5] TTR amyloid is predominantly produced in the liver and only 5% is produced in the retina and the choroid plexus. Thus, liver transplantation (LT) is the treatment of choice when systemic involvement begins, and before the appearance of incapacitating symptoms.[6,7] Despite the presence of the genetic alteration, the morphology and function of the liver of a patient with FAP are completely normal and can therefore be transplanted into a patient with cirrhosis, with or without HCC, and with a certain urgency for LT (Fig. 1). We describe below the first two DLTs performed in Mexico.

The first DLT was performed on a 41-year-old man, diagnosed in 2012 with FAP due to the TRR Ser50Arg mutation. He presented with segmental neuropathy in both median nerves, polyneuropathy disability (PND) scoring system stage 1, New York Heart Association (NYHA) class 1 amyloid infiltrative cardiomyopathy, ventricular extrasystoles, and a left ventricular ejection fraction (LEVF) of 61%. In 2013, the patient was the recipient of a liver from a 20-year-old deceased donor. The hepatectomy of the patient with FAP was performed with the total exclusion technique, in the usual manner, with the exception of the following differences: the biliary tract, portal vein, and suprahepatic and infrahepatic vena cava were divided at an equidistant point and the hepatic artery was divided at the bifurcation with the gastroduodenal artery. The explanted liver from the patient with FAP was perfused with 2 L of Custodiol® (Germany) via the portal vein and 2 L via the hepatic artery. To be able to utilize the liver from the FAP patient, complete reconstruction of the suprahepatic veins and the retrohepatic cava, with vessels from the deceased donor, was required (Fig. 2A, B).

The recipient of the FAP graft was a 60-year-old woman diagnosed with primary biliary cholangitis (PBC) and severe hemorrhagic portal hypertension, with TIPS placement for refractory ascites, and a model for end-stage liver disease (MELD) score of 15. The LT was performed in the usual manner, with the classic total exclusion technique.

The second DLT was performed in 2014, on a 31-year-old woman, diagnosed in 2012 with FAP, with the TTR Ser52Pro mutation. She presented with paresthesia in her upper limbs, with PND stage 1, mild infiltration in the left ventricle of the heart, revealed by magnetic resonance imaging, as well as perirectal fat, confirmed by biopsy. The brain-dead organ donor was a 41-year-old woman. The FAP patient underwent hepatectomy, in the same manner as the patient in the first DLT described above. There was no need for vascular reconstruction and only perfusion with Custodiol® was carried out. LT was then performed on a 59-year-old woman with cryptogenic cirrhosis and HCC, within the Milan criteria.

The 4 patients progressed adequately and were discharged with no complications.

The recipient of a liver with FAB should be around 60 years of age, because normally the estimated time interval after LT in which FAP can develop is between 10 and 15 years,[8] albeit some authors report the appearance of symptoms taking place within a shorter period of time.[9] Regarding our patients with FAP, they did not have the Val30Met mutation. More than 100 non-Val30Met mutations are known to exist and they present a higher risk for disease progression, with a mean survival of 7.1 years after transplantation. Heart complications are greater in those cases and are the main cause of death, if heart transplantation is not performed.[10]

The evolution of our patients with FAP, who had similar time intervals from diagnosis to transplantation and the same disease stage, was different. The male patient with the Ser50Arg mutation presented with severe heart disease progression at five years and died while waiting for a heart transplant. In the female patient with the Ser52Pro mutation, within the same period of time, the amyloid disease has remained stable. The first recipient of the liver with FAP has

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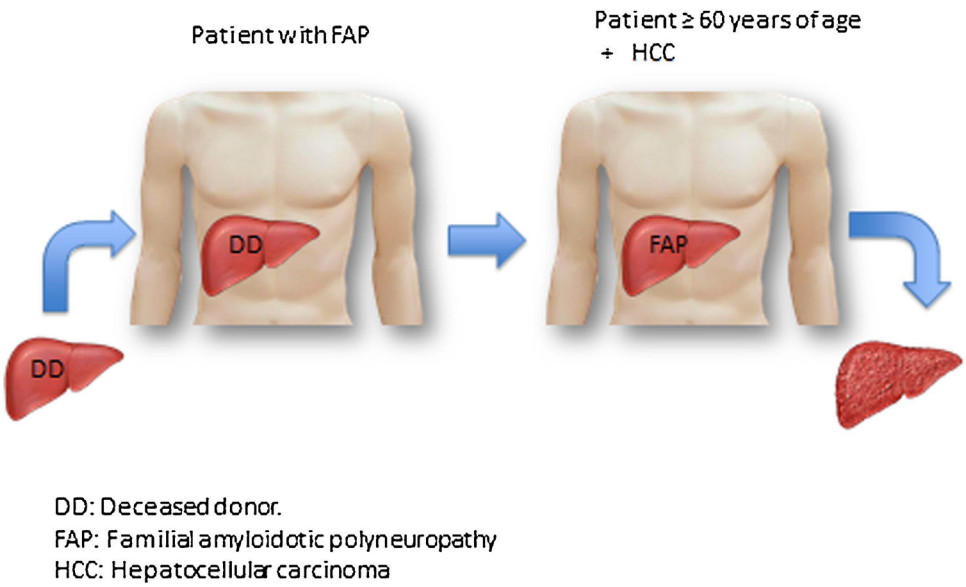

Figure 1 A patient with familial amyloidotic polyneuropathy (FAP) received a liver from a deceased donor. In turn, the liver from the patient with FAP was transplanted into a patient around 60 years of age that had relative transplantation urgency.

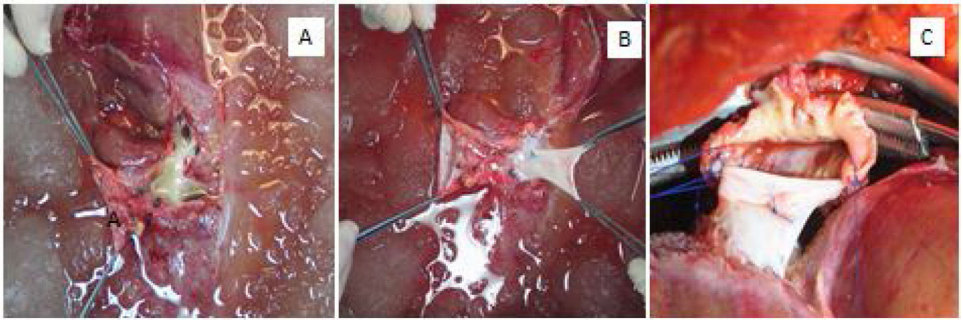

Figure 2 A) Posterior view of the liver of the patient with FAP, after perfusion during the bench surgery. Significant loss of the retrohepatic and suprahepatic vena cava can be seen, as well as the ostium of the suprahepatic veins. B) Reconstruction of the retrohepatic cava with the inferior cava of the deceased donor. C) Anastomosis of the vascular repair with the suprahepatic cava in the first recipient.

presented no manifestations of the disease, but the second recipient currently presents with mild amyloid infiltration of the heart.

Ethical considerations

In this research informed consent was requested from the patients to review the case records. The work meets the current bioethics research regulations and does not require approval by the ethics committee, given that only the case records were reviewed, and patient privacy was not affected at any time. Neither of the patients can be identified in the images presented herein.

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Conflict of interest

The authors declare that there is no conflict of interest.

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Indocyanine green-guided laparoendoscopic treatment of walled-off pancreatic necrosis☆

Tratamiento laparoendoscópico de necrosis pancreática encapsulada, guiado con verde de indocianina

It has been reported that approximately 25% of the patients with acute pancreatitis (AP) will present with the severe form of the disease, which is associated with local complications, such as infected pancreatic necrosis (IPN), whose mortality rate is 30%[1].

Walled-off pancreatic necrosis (WOPN) is a mature collection of pancreatic and/or peripancreatic necrosis and has a well-defined inflammatory wall; said maturation usually occurs more than 4 weeks after the onset of necrotizing pancreatitis[2].

Computed tomography (CT) cannot easily distinguish solid content from liquid content, thus pancreatic and peripancreatic necroses can be misdiagnosed as pancreatic pseudocyst, resulting in the possible need for magnetic resonance imaging, transabdominal ultrasonography, and endoscopic ultrasonography[2]. The indications for intervention in WOPN are infection or clinical deterioration following conservative management, the persistence of symptoms of gastric, intestinal, or biliary obstruction, or pain due to the mass effect[3].

Late necrosectomy (after 4 weeks) has shown fewer complications and less mortality than early necrosectomy, because that amount of time is needed for the demarcation of the necrotic tissue to occur. However, open necrosectomy is associated with significant morbidity, especially with a high rate of pancreatic fistulas (40%), enteric fistulas (20%), and incisional hernias (25%), as well as with a mortality rate that ranges from 9 to 25%[1,4].

In recent years, different minimally invasive techniques have been described for pancreatic drainage, such as percutaneous drainage, endoscopic transgastric drainage, laparoscopic drainage, and video-assisted retroperitoneal drainage (VARD). The failure rate of percutaneous drainage varies from 20 to 50%, requiring formal necrosectomy. Laparoscopic transgastric necrosectomy (LTN) enables efficacious debridement of the necrotic tissue in a single intervention and creates a controlled communication that enables the continuous drainage of the pancreatic necrosis, in addition to reducing the risk for enterocutaneous fistulas, pancreatic fistulas, and incisional hernias[4].

Indocyanine green has a 2 to 3-minute half-life, with tissue penetration of up to 5 mm. It is eliminated in the bile, without metabolizing, after 15-20 minutes, there is no enterohepatic recirculation, and its toxicity is low (0.005% complications)[5].

Fluorescent cholangiography with indocyanine green is radiation-free and enables real-time intraoperative visualization of the extrahepatic bile ducts in 72 to 96% of cases, although whether it reduces operating time for identifying the critical view of safety (CVS), compared with the conventional method, has not been demonstrated[6,7]. There are few studies on the use of indocyanine green in pancreatic resection, due to cancer of the pancreas, and we found no articles on its use in pancreatic necrosectomy.

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