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Complex bench operation in LDLT (inflow and outflow)

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Lecture :
The growing disparity between the number of liver transplant candidates and the supply of deceased donor organs has led the increase living donor liver transplantation (LDLT)

LDLT is technically complex procedure, and the key to success is a technically perfect operative procedure. The back table bench operation of the graft represents a very important component of the operative procedure. Adequate and meticulous preparation of the graft before implantation, and to ensure an optimal portal vein inflow and hepatic vein outflow are crucial factors in the technical success of the LDLT.
Outflow occlusion and congestion lead to suboptimal graft function, ascites, graft failure and, even death because of the small for size graft syndrome. Reported incidences of hepatic venous outflow obstruction after LDLT is between 1.5% to 16.6% in the literature. Commonly reported causes of hepatic venous outflow obstruction include tight suture line, twisting of the anastomosis due to inappropriate graft positioning or regeneration, size discrepancy between native venous orifice and graft hepatic vein opening, and peri-anastomotic fibrosis secondary to inflammation.
It is well known that not only the actual graft volume but also the uncongested graft volume is a very important for successful LDLT. Therefore, the congested area of the graft should be minimized as much as possible; thus it is necessary to obtain a wide ostium and sufficient length of the hepatic vein for anastomosis. And, become important to reconstruction the venous tributaries of caudate vein, middle hepatic vein, inferior right hepatic vein, and thick short hepatic veins (>5mm). However direct anastomosis of this vessels to the inferior vena cava is technically difficult and prolongs warm ischemia time. In this sense to overcome this problems vascular graft such an autologous (ie.great saphenous vein, explanted liver's; portal vein, umbilical vein, hepatic vein), cryopreserved vascular graft, and synthetic vascular grafts can be used.
Portal vein (PV) inflow is also critical in ensuring adequate perfusion, function, and hypertrophy of the liver graft.
In the preoperative evaluation of the donor, dynamic CT with three-dimensional reconstruction, and sometimes visceral angiography provide detailed information about portal vein anatomy. Producing an anastomosis that is tension-free with wide orifices is key determinant for successful portal vein anastomosis. Therefore, the portal vein on the recipient side should be dissected at the longest length possible during removal of the liver. On the donor side, a transverse portion of the portal vein has to have a long extrahepatic course to make it easier to obtain a longer portal vein in the left liver grafts than in the right liver grafts.
Portal venous thrombosis, sclerosis, and a size discrepancy between the graft and the recipient's portal vein are other issues that make it difficult or impossible to perform standard end-to-end anastomosis. These problems are usually over-come by use of an interposition vascular graft, vascular patch, or portal venoplasty.
A common anomaly that requires attention during the donor operation is trifucation. This anatomic

variation can be overcome by one of the three ways. First, venoplasty of these portal veins can be performed on the bench and anastomosed as one common orifice to the recipient's portal vein. Second, these branches can be separately anastomosed to the recipient's portal vein. Third, a cryopreserved vascular graft can be used.

In conclusion, meticulous back table preparation of the liver graft is a crucial of the operative procedure. The liver graft is prone to damage from imbalances between outflow and inflow, and the first step is obtaining the perfect inflow and outflow is adequate preparation of the graft prior to implantation.