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Primary resection with/without vascular reconstruction

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Lecture : For patients with HCC submitted to major liver resection, the risk of liver failure is particularly relevant because of its frequent association with chronic liver disease. Major hepatectomy in patients with cirrhosis is considered feasible when the following criteria included: liver function is graded as Child-Pugh A, absence of portal hypertension, and a satisfactory FLR. Resection is considered safe when the FLR is $\geq 40\%$ for patients with cirrhosis and $\geq 30\%$ in patients with marked steatosis or fibrosis without cirrhosis and 20% in those with normal liver function. Major hepatectomy can be safely performed in the context of good patient selection and improvement in perioperative management. In this context, preoperative strategies to increase the future liver remnant (FLR) volume in order to reduce post-hepatectomy liver failure (PHLF) have been adopted. Preoperative portal vein embolization (PVE) or ligation (PVL), sequential transarterial chemoembolization (TACE) and PVE (TACE + PVE), associated liver partition and portal vein ligation for staged hepatectomy (ALPPS), and preoperative Yttrium-90 (90Y)-radioembolization (RE) are all current strategies with the aim of reducing the risk of PHLF and its related morbidity and mortality. PVE was the first strategy employed to increase FLR leading to less postoperative complications, especially liver failure. The sequential transarterial chemoembolization and portal vein embolization was designed to avoid tumor progression while waiting for hypertrophy after PVE. On the other hand, the ALPPS procedure was designed for patients with an estimated very small liver remnant, or PVE failure. RE has been considered in order to achieve HCC downstaging and improved resectability by inducing tumor shrinkage, atrophy of the embolized liver, and compensatory hypertrophy of non-embolized liver. The drawbacks of these volume manipulation strategies are the related morbidity and mortality, mainly in patients with chronic liver disease. Moreover, these strategies postpone definitive resection, increasing the risk for disease progression. HCC growth after PVE has a two-fold higher incidence than in patients with no preoperative embolization. Considering that HCC blood supply is mainly arterial, portal vein branch obliteration may induce a compensatory increase in hepatic arterial flow, leading to tumor growth. It became evident that the size of the liver cannot be considered the main variable in the development of liver dysfunction after extended hepatectomies. Additional characteristics should be taken into account, such as: the future liver remnant; the portal blood flow and pressure and the exploration of the potential effects of regeneration preconditioning are all promising strategies that could help to expand the indications and increase the safety of liver surgery.