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Mini Review

Associating Liver Partition and Portal Vein Ligation for Staged Hepatectomy in 2020

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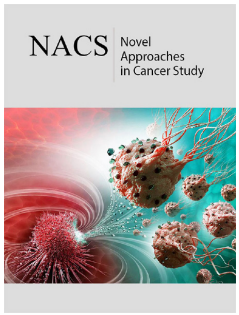

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Introduction

The surgical strategies in the treatment of advanced liver tumour in order to achieve respectability for patient with no other surgical option like failed portal vein embolization or extremely small Future Liver Remnant (FLR) are Two-Stage Hepatectomy (TSH) with or without Portal Vein Ligation (PVL) or Portal Vein Embolization (PVE) and associated liver partition and portal vein ligation for staged hepatectomy (ALPPS). TSH and ALPPS are in fact complementary strategies [1,2].

Timeline of ALPPS Technique

The history of ALPPS begins in 2007 when it was performed the first in-situ split. In 2012 was recorded the first ALPPS and in 2014 was performed the first Tourniquet ALPPS and Hybrid ALPPS. In 2015 partial ALPPS and ablation assisted ALPPS followed. In 2016 was recorded Robotic ALPPS and in 2017 partial TIPE ALPPS (ALPPS with trans ileocolic portal vein embolization), Laparoscopic TIPE and Mini ALPPS [3].

FLR Regeneration

Insufficient FLR predisposes to important post-hepatectomy liver failure and mortality. The rapid hypertrophy induced by ALPPS was attributed initially to the tissue oedema rather than expansion of hepatocytes but recently studies demonstrated the stimulatory effect on cellular proliferation [4]. The early stages present an accelerated liver regeneration and an activation of signaling pathways. Comparing standard hepatectomy with ALPPS surgery, Lang H et al. [5] demonstrates that 4h after the surgery the difference between the two techniques is quantitative and qualitative. ALPPS-specific signature marked by the suppression of the IFN Main Pathway, reflecting significant acceleration of liver regeneration which demarcates from standard hepatectomy. Tomassini F et al. [6] demonstrates that the regeneration process of the FLR after ALPPS is directly correlated to the increase of the liver portal perfusion, and a moderate hemodynamic stress (portal gradient <15mmHg or PVP <20mmHg) at the end of ALPPS stage 1. The same author found that a daily gain in volume percentage at hepatobiliary scintigraphy <4.1%/day and a volume of the future liver remnant <2.7%/min/m2 are at high risk of Post Hepatectomy Liver Failure (PHLF) in ALPPS and their second stage should be re-discussed [7]. The rapid induction of liver growth rate in the FLR makes ALPPS a very attractive treatment option [8].

ALPPS is criticize due high rates of operative morbidity and mortality, but also to the high recurrence rates. The most important concern is if the tumour respectability is translated into improved survival. Peng C et al. [9] retrospective study on 20 patients, concluded that ALPPS is a feasible treatment for HCC patients, and it provides a better long-term survival

than Trans Arterial Chemoembolization (TACE) and have similar long-term survival with resection [10,11]. Hahn Oszkár et al. [6] in a study on 20 patients conclude that the mortality and morbidity of ALPPS can be reduced by proper patient selection and 'no touch' surgical technique [12-14]. Jan Bednarsch et al. [15] in a study on 14 patients and 12 who completed the surgery, with intrahepatic cholangiocarcinoma conclude that ALPPS is feasible and shows a 3-year survival of 64%. In case of Klatskin tumour, Overall, Nagino M et al. [10] revealed that ALPPS may not generally be necessary, and the indication is limited [13].

Partial ALLPS

Concerning the partial ALPPS, Xukun Wu et al. [8] in a study on 124 patients found that FLR hypertrophy and time between stages are no different between partial ALPPS and complete ALPPS and the postoperative complications in partial ALPPS are lower than that in the complete ALPPS group. Also, mortality rate in the partial ALPPS group was markedly lower than in the complete ALPPS [14]. According to Stéphanie Truant, laparoscopic p-ALPPS is feasible and seems less aggressive than the original ALPPS and can be a feasible alternative to the classical Portal Vein Embolization (PVE) and two-stage hepatectomy strategy [15]. Kumar N et al. [16] in a study of 8 patients on p-ALPPS found it was obtained the adequate FLR hypertrophy at a median of 28 days. No mortality was found and the median increase in FLR was 38%.

Partial ALPPS in Cirrhosis

Lopez et al. [2] showed that ALPPS could induce FLR hypertrophy in cirrhotic livers within a short period of time. Complete split tended to induce a more rapid FLR hypertrophy than partial split in cirrhosis [17]. Huang HC et al. [18] in a systematic review and meta-analysis on ALPPS and p-ALPPS showed that p-ALPPS is safer than ALPPS in patients without cirrhosis and exhibits the same rate of FLR hypertrophy. In contrast, ALPPS seemed to have a better outcome in the cirrhotic group.

TSH and ALPPS

According to Huiskens J et al. [7] for older patients and those with a liver to body-weight-ratio of >0,4 a conventional two-stage hepatectomy with is preferable [19]. TSH approach continues to be a safe procedure in selected patients, associated with low operative risk and good oncologic results [20]. ALPPS is considered the last resort in patients with advanced tumours and no other surgical option, after failed PVE and insufficient FLR [21,22]. Less-invasive ALPPS modifications seems to decrease the mortality. We can notice a trend for minimal-invasive surgery and for partial ALPPS. A careful selection of the patients remains essential for the good outcomes.

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