

Laparoscopic Microwave Liver Ablation and Portal Vein Ligation: An Alternative Approach to the Conventional ALPPS Procedure in Hilar Cholangiocarcinoma

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ABSTRACT

Background. Associating liver partition and portal vein ligation for staged hepatectomy (ALPPS) is a new procedure aimed at promoting the overgrowth of small future liver remnants (FLR). The role of ALPPS in hilar cholangiocarcinoma (h-CCA) is currently considered marginal because liver split in the presence of bile duct obstruction increases postoperative morbidity and mortality (Schadde et al. in *Ann Surg* 260:829–836, 2014; Nadalin et al. in *Z Gastroenterol* 52:35–42, 2014). Virtual liver split (Gall et al. in *Ann Surg* 261:e45–e46, 2015) could improve the outcome of ALPPS in h-CCA.

Methods. A 64-year-old woman with a type IIIA h-CCA without evidence of vascular involvement had a small FLR (FLR/body weight: 0.47 cm³/kg). After bilateral percutaneous biliary drainage (PBD) and bilirubin normalization, the patient was planned for laparoscopic step 1 ALPPS using microwave ablation (MWA). Because of possible challenge in hilar dissection in this tumor type, robotic assistance was preferred to conventional laparoscopy for step 1.

Results. The patient recovered promptly from step 1, with a 68 % increase in the volume of FLR by postoperative day (POD) 10 (FLR/body weight of 0.79 cm³/kg). On POD 15, the patient underwent open right hepatectomy with en bloc

resection of the caudate lobe, bile duct bifurcation, and extrahepatic biliary duct (T2N1M0R0). Estimated blood loss was negligible during step 1 and 150 mL during step 2. The patient recovered well. Chemotherapy was started 6 weeks after ALPPS stage 2, and was well tolerated and full course. Twenty months after resection the patient is alive, well, and disease-free.

Conclusions. Laparoscopic ALPPS (Machado et al. in *Ann Surg* 256:e13, 2012) and MWA on the intended split line (Gringeri and Boetto in *Ann Surg* 261:e42–e43, 2015) have been recently described. The combination of these techniques with PBD allowed successful ALPPS in a patient with h-CCA.

DISCLOSURES Ugo Boggi, Niccolò Napoli, Emanuele F. Kauffmann, Giuseppe Lo Presti, and Andrea Moglia have no conflicts of interest or financial ties to disclose.

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