

Figure 1. Machine learning based segmentation of residual cancer burden.

Free Paper Session 11 - Liver

FP11.01

IMPLEMENTATION AND OUTCOME OF THE FIRST 100 ROBOTIC LIVER RESECTIONS IN AMSTERDAM

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Purpose: Robotic liver surgery (RLS) is becoming more popular as an alternative to laparoscopic liver surgery. Recently, several centers have started with RLS but data on both implementation and outcomes of RLS are still scarce. This study aims to report on the initial experience with RLS in two centers of the HPB-Amsterdam network.

Methods: Retrospective study in two sites of the HPB-Amsterdam network (Amsterdam UMC, location AMC and OLVG) on consecutive patients after elective RLS for all indications (December 2018 - January 2021). Selection criteria for RLS were tumors <10cm in size without contact with the central portal or caval veins. Primary outcome was the rate of major morbidity (Clavien–Dindo grade \geq III). Operative outcomes were stratified for the first and last 50 RLS procedures.

Results: Overall, 100 RLS procedures were performed by teams from four HPB-surgeons, including 52 minor, 40 technically major and 7 anatomically major RLS. Median operative time was 143 (IQR 101-210) minutes and median blood loss was 150 (IQR 50-400) mL. The conversion rate was 3.0% (n=3). The rate of major morbidity was 4.0% (n=4). Median length of hospital stay was 3 (IQR 2-4) days. The rate of R0 resection was 80.6% (n=58). The 30-day/in-hospital mortality was 1.0% (n=1).

Stratification into two groups of 50 procedures found no difference in blood loss and conversion rate with less major morbidity in the second 50 RLS procedures as compared to the first 50.

Conclusion: This initial experience of 100 robotic liver resections in the HPB-Amsterdam network demonstrates a safe implementation. Future studies need to determine the proficiency learning curve and determine the added value as compared to laparoscopic liver surgery.

FP11.02

INCREASED RESECTABILITY AFTER SIMULTANEOUS PORTAL AND HEPATIC VEIN EMBOLIZATION (PVE/HVE) COMPARED TO PVE ALONE IN PATIENTS WITH SMALL FLRS - A DRAGON GROUP ANALYSIS

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Introduction: Major liver resections in patients with a small Future Liver Remnant (FLR) can only be performed safely after induction of adequate FLR-hypertrophy to reduce the risk of post-hepatectomy liver failure (PHLF). Hypertrophy induced by Portal Vein Embolization (PVE) is slow and 20-30% of patients are not resected after this procedure. Combining Portal and Hepatic Vein Embolization (PVE/HVE) accelerates FLR hypertrophy, whether this increases resectability is studied in this analysis.

Methods: All participating centers in the DRAGON COLLABORATIVE that had already performed >5 PVE/HVE between 2016 and 2019 were asked to contribute cases of PVE/HVE or PVE. Osirix MD was used for volumetric assessment. Multivariable analysis was performed for the endpoints: resectability, FLR hypertrophy, and major complications (Clavien-Dindo >IIIA).

Results: From 7 DRAGON centers, 39 PVE/HVE and 160 PVE cases were included.

After PVE/HVE, resectability (90% vs. 68%, p=0.007) and FLR hypertrophy (59% vs. 48%, p=0.02) were higher than PVE alone. 90-day mortality (3% vs. 16%, p=0.15) and major complications (26% vs. 34%, p=0.55) did not significantly differ between groups.

PVE/HVE was not a significant risk factor for major complications, but it was an independent predictor for survival and hypertrophy. Results were confirmed via multivariable analysis.

Conclusion: PVE/HVE resulted in increased resectability and liver growth compared to PVE alone. Complications and mortality rate did not differ between PVE/HVE and PVE. Superiority of PVE/HVE over PVE will be investigated in the prospective DRAGON trials.

FP11.03

INDOCYANINE GREEN CLEARANCE AS A TOOL TO PREDICT POSTOPERATIVE LIVER FAILURE AND MAJOR COMPLICATIONS: FIRST SYSTEMATIC REVIEW OF CURRENT LITERATURE AND META-ANALYSIS

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Purpose: Perioperative liver function evaluation with indocyanine green (ICG) has been widely used in Asian countries. This study aims to review current strategies for postoperative liver failure (PLF) assessment with ICG in patients undergoing hepatectomy or liver transplant.

Method: A systematic review was performed according to PRISMA guidelines. PubMed, Scopus, WoS, and Cochrane Library were searched up to 2021. The primary outcome measure was PLF. As a secondary outcome, major postoperative complications defined by Clavien-Dindo III-V grades were assessed. Quantitative analysis by random-effects model was performed for studies reporting similar methods.

Results: This is the first systematic review to date. Out of 1674 studies, 40 were included in the review. Most were prospective studies (21/40) from Asia (23/40). Of the 31 studies including hepatectomies, only 15 reported PLF by ISGLS criteria. 94% of studies used ICG preoperatively, though some combined intraoperative and/or postoperative use. 77% of them obtained significant results and recommended its use. For liver resection, preoperative ICG-R15 >15% was the most frequent cut-off related to PLF. For liver transplant, early postoperative ICG-PDR <12%/min was generally related to worse outcomes. Meta-analysis was performed over 4 studies including 478 patients undergoing hepatectomy for hepatocarcinoma. The pooled MD of ICG-R15 between patients with and without PLF was 0.59 (95% CI: 0.16-1.03; I²=64%). Finally, 3 studies reporting complications after hepatectomy by ICG-R15 cut-off were assessed. No significant association between ICG-R15 and major complications (OR 0.8; 95% CI: 0.47 - 1.35; I²=83%) was found.

Conclusion: Literature suggests ICG clearance is a useful non-invasive method to predict PLF in liver surgery.

However, due to different parameters and variable usage methods across studies, a global consensus should be defined.

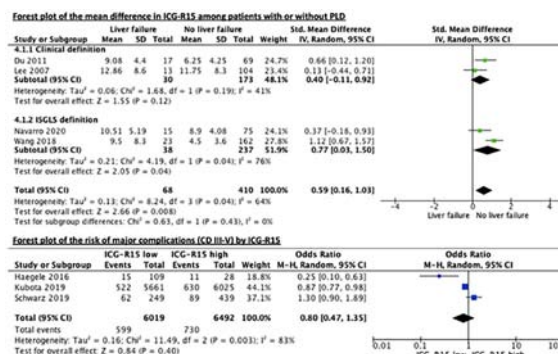


Figure 1. Forest plots.

FP11.04

INFLUENCE ON THE KINETIC GROWTH RATE AFTER PVE AND ALPPS

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Purpose: "Associating Liver Partition and Portal Vein Ligation for Staged Hepatectomy" (ALPPS) and "Portal Vein Embolization" (PVE) have an important role in the treatment of malignant liver tumors. Both procedures induce rapid and effective hypertrophy of the future liver remnant (FLR) to prevent postoperative liver failure. The aim of this study is to determine impact factors on the kinetic growth rate (KGR) and subsequently FLR, in terms of complications, posthepatectomy liver failure (PHLF) and survival.

Method: Patients undergoing ALPPS and PVE from 2010 until 2020 were included. KGR was defined as the quotient of hypertrophy and the time interval in weeks between intervention (PVE/ALPPS step 1) and resection.

Results: Overall, 90 patients underwent ALPPS and 82 patients received PVE. The association between KGR and PHLF indicates a significant nonlinear effect in PVE (p=0.009) and ALPPS (p=0.05). For ALPPS, the incidence of PHLF significantly decreased from 30% to 8% (p=0.032) at cutoff value of KGR of >7 %/week. Patients with a KGR of >7%/week had a higher preoperative skeletal muscle index (p=0,029), but the same body mass index (p=0,301). Tumor anemia showed an association with a reduction of KGR (p=0,159). However, the KGR had no effect on postoperative morbidity,