

# Outcomes of ALPPS Procedure for Perihilar Cholangiocellular Carcinoma

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## **Background:**

In Perihilar cholangiocellular carcinoma (PHC) treatment, surgery aiming for R0 resection is the only curative option. Resection for PHC is associated with a serious perioperative mortality of 5 to 18% even in experienced centers. In a recent analysis comparing matched patients who underwent resection for PHC with and without ALPPS procedure, a significant perioperative mortality and inferior overall survival for the ALPPS group compared with matched patients was reported. However, ALPPS is an evolving procedure with several variants defined, targeting technical challenges and decision-making processes regarding to patient selection, procedure selection and timing in different clinical scenarios. In experienced centers with ALPPS procedure, it has been shown that outcomes are now comparable to standard major hepatectomies published in the literature. In patients with PHC, there are now various reports that outcomes maybe better with technical modifications of ALPPS procedure. Therefore, we want to elucidate whether the reluctant attitude towards this procedure remains reasonable today. In addition, the impact of experience on outcomes for this cohort is not well known.

## **Objectives:**

The project will aim to analyze morbidity and mortality of ALPPS for PHC and to identify risk factors for poor outcomes as well as predictors for improved outcomes. We also will evaluate the impact of center experience with the procedure on the outcomes and the results of implementation of technical modifications with experience for this cohort. In addition, we aim to identify a subgroup with comparable morbidity, mortality, and overall survival with current standard of care.

## **Methods:**

All patients included in the ALPPS registry with the diagnosis of PHC will be analyzed, which also includes the previously published cohort. We further will contact other centers with experience in ALPPS surgery for PHC (mainly from Asia).

Outcomes will be identified and stratified according to below categories and the selected parameters will be evaluated using SPSS software for multivariate analysis:

- a) Patient related factors such as age, preoperative liver functions, future liver remnant, radiologic TNM stage, complications after each stage.
- b) Procedure related factors such as types of ALPPS procedure chosen for each stage, timing of surgical stages, preoperative biliary drainage status, timing of both lymphadenectomy and biliary reconstruction and vascular resection with reconstruction.
- c) Future liver remnant volumetric and functional evaluation.
- d) Tumor related factors such as tumor type, extent, vascular involvement, lymph node status.
- e) Furthermore, we will try to define an era reflecting technical improvements with ALPPS procedure and compare outcomes in different eras and experience levels.

**Impact of the findings:**

We aim to identify a cohort of PHC cases which underwent a certain technical variant of ALPPS procedure that have comparable/improved outcomes after the procedure. We want to elucidate whether the reluctant attitude towards ALPPS procedure for PHC is justified.