

ALPPS with associated intra-abdominal resection procedures:

Can we perform concomitant procedure with acceptable mortality and complication rate?

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Background:

ALPPS is an extensive, complex, and physiologically demanding surgical procedure and there are concerns about performing additional procedures which may have more or less significant impact on complication and mortality rates. Better understanding of physiological processes during and after ALPPS, improvement of surgical technique, pre- and postoperative management will decrease these negative rates and further studies on ALPPS will help us to bring consensus about safety, indications and optimal surgical technique.

ALPPS is a novel procedure indicated in selected group of patients with inadequate future liver volume in whom other conventional methods are not feasible due to too small FLR that would lead to "small for size" syndrome. Generally, these are patients with a large or multiple primary or secondary liver malignancies, which cannot be safely removed without risking postoperative liver failure.

In many cases, operative candidates are individuals in advanced age or with associated comorbidities. These include liver disorders due to tumors, diffuse liver lesions or previous chemotherapy which are both affecting functional liver reserve, but also heart, lungs and kidney disorders. Patients with secondary liver lesions also have difficulties due to primary tumor, which is most commonly colorectal carcinoma, and in such cases, additional procedures must be performed to achieve R0 resection.

Relatively high mortality, morbidity and complication rates were expected so first studies of ALPPS were mainly focused on defining these rates. There are an increasing number of scientific reports, but studies about ALPPS are still limited due to the small number of cases and narrow indications. Recent studies reported a 12-15% mortality rate and a 50-70% morbidity rate so safety of ALPPS require further discussion.

These mortality and morbidity rates are the main criteria of ALPPS and therefore indications for this type of surgical strategy are debatable, but for the majority of HPB surgeons, these rates are acceptable due to several reasons; patients with unresectable malignant liver tumor have a very poor prognosis despite various non-surgical palliative procedures; second, ALPPS is performed in patients when no other curative treatment modality is possible so we can therefore state that ALPPS has no alternative. Third, results are undoubtedly showing significantly higher hypertrophy rate comparing to conventional methods.

Also, when comparing mortality and morbidity rates in ALPPS with conventional methods, we need to be aware that indications for ALPPS (although still not official) and conventional methods are not the same. ALPPS is generally performed in patients with larger, more progressed primary and secondary tumors and consequently lower initial functional liver reserve.

Objectives:

First studies of ALPPS safety on larger series are done and the next step in evaluation of outcome should be the analysis of safety, morbidity and complication rates for concomitant procedures during ALLPS compared to ALPPS alone and major liver resections so we propose using an registry for this purpose. Most hemicolectomies are performed during the first stage of ALPPS since in conventional major hepatic resections it is accepted that hemicolectomy can be performed synchronously without affecting outcome. In ALPPS, the optimal time for hemicolectomy, gastrectomy, splenectomy, rectal resection, or pancreatectomy (including Whipple resection) still must be investigated, and its effect on complication rate, morbidity and mortality rates would be the main endpoint of our study. Another endpoint would be the comparison of liver hypertrophy rate between ALPPS alone and ALPPS+ concomitant procedure.

Methods:

In patients with recorded 90 days follow-up in whom concomittant major intraabdominal resection was performed, we plan to use multivariate analysis to evaluate all complications using the Clavien-Dindo system with focus on main ALPPS complications: intraabdominal sepsis, bile leakage and postoperative liver failure. Liver hypertrophy rate will be analysed in all these patients where II stage and second liver volumetry is recorded.

Impact of the findings:

Results will show us which concomitant procedure can be performed safely without affecting outcome and hypertrophy rate. It may help us to bring guidelines for optimal timing of additional procedures in ALPPS which are necessary for radical primary tumor resection.