

Alan G Contreras: ILTS Prague Commentary

May 2017

Plenary Abstract Session (May 25, 2017)

0-1 Results of the Initial Phase of the Portable Organ Care System Liver PROTECT Pivotal Trial

The authors analyzed the results of a randomized (1:1) multicenter trial comparing outcomes of 11 livers that had been on the portable organ care system versus 15 controls. For this study, they included donors 40 years or older with CIT > 6 hrs. with macro steatosis < 40%. The total warm OCS perfusion time was 247 ± 75.6 minutes. The primary end point was to analyze the incidence of Early Allograft Dysfunction (EAD) or primary non-function. EAD was defined as AST > 2000 IU/L during the first 7 postoperative days, Bilirubin > 1mg/dl or INR > 1.6 on postop day #7 and Primary non-function that was defined as irreversible graft dysfunction requiring emergency liver retransplantation or dead in the absence of immunologic or surgical causes. The incidence of early allograft dysfunction was 18% in the OCS group vs 40% in controls. AST was lower in the OCS group. No difference in survival was seen. All patients were alive at 6 months of Follow up. Early trends are encouraging with no safety issues and the trial is now open for the full 300 pivotal trial.

0-2 The Final Histological Necrosis of the Target Hepatocellular Carcinoma as a Predictor of Tumor Recurrence after Liver Transplantation

This was a retrospective analysis of prospective data collected in 276 consecutive cirrhotic patients with HCC at different centers. The aim of this study was to quantify the actual remnant vital tissue (RVT) of the target HCC nodules in patients that received LRTs before LT and to define the prognosis role of RVT in relation to tumor recurrence after LT. 79.3% were inside Milan criteria. 67% underwent TACE, 29% RFA, 9% PEI and 19% a combination of LRTs. According to RECIST, 53% showed complete response after treatment, 23.3% partial response, 10% stable disease and 12.1% had progression of the disease. At the liver explant, 100% necrosis of the main nodule was seen in just 27.7%. Microvascular invasion and target nodule RVT were significant on prediction HCC recurrence with diagnostic odds ratio of 4.6 when the RVT was 2cm. AFP after LRT was significantly higher in patients with RVT > 2cm compared with patients with RVT < 2cm or no RVT (12.6 vs 9 vs 5). The authors concluded that RVT of the targeted lesion should always be measured and when is > 2cm is an independent predictor of tumor recurrence after LT even in patients that met Milan criteria.

0-3 Conversion to everolimus (EVL) after Liver Transplantation (LT) in the Real Life: Data from the Everoliver Multicenter Observational Registry

This multicenter observational study used a French national registry and included 920 liver transplant recipients from 9 main transplant centers who were converted to Everolimus

and aimed to analyze the reasons of conversion, the efficacy and the renal function in the long-term use. The major reason was the prevention or recurrence of HCC or other tumors in 38.7% (+ 24.6% De novo Cancer of prevention of De Novo Cancer) of the patients and the second most common reason in 36% of the patients was Chronic renal failure. The median time of conversion was 1.45 years. 43% converted within the first year of transplant and 57% after 1 year of transplant. The tacrolimus withdrawal rate was 62% six months after conversion and 76% after 12 months. BPAR was 9.8% prior to everolimus conversion and 6.6% after. The median eGFR after conversion was 77 ml/min/1.73m² when everolimus was introduced early (0-3 months) as compared with 66 ml/min/1.73m² when it was introduced later (4-12 months) and remained similar after 60 months of follow up. EVL preserved renal function in patients with eGFR>60 and demonstrated beneficial effect at 3 years in patients with eGFR≤60.

0-4 Comparison PTFE Grafts with Autologous Veins for Outflow Reconstruction in Right Lobe Living Donor Transplant

This is a retrospective analysis of a prospective collected data by the group in Fortis Hospital India, where the authors aimed to compare the patency, morbidity and mortality of the PTFE grafts and compared their results with the use of autologous grafts. Since December 2011 to July 2016 they performed 396 right lobes Living donor transplant, 341 with ePTFE and 55 with autologous vein. All the veins larger than 3mm were anastomosed to a non-ringed ePTFE (6-10mm graft) with a continuous running suture and were followed by Doppler. There were no demographic differences among both groups nor statistically significant difference between the number anastomosed veins. The authors showed a significant reduction in CIT and anhepatic time in the PTFE group and no significant difference between the patency rate (6 months 84.4% PTFE vs 78.1% autologous), LFT's, patient outcomes or mortality.

Surviving acute on chronic liver failure (May 25, 2017)

Chairs Faouzi Saliba, Geraldine Diaz

The concept and the challenge (Rajiv Jalan)

“acute deterioration of preexisting chronic liver disease usually related to a precipitating event and associated with increased mortality at three months due to multisystem organ failure”. Acute on Chronic liver failure is a dynamic stage and it needs to be evaluated in time. It is important to predict mortality in these patients. Age, Inflammation (measured with leucocyte count) and prior decompensations impact significantly in mortality. CLIF is a very good prognostic tool that performs better than CPT, MELD and MELD- Na in predicting mortality in this patient. A patient with an organ failure measured with the CLIF C score has an increase mortality at 28 days and even after recovery has an increased mortality at 90 days. MELD score underestimated the risk of death in around 20% of the patients when compared with CLIF- C (lower MELD patients with High Mortality rates) and the index C

score improves in the predictive ability with time). The CLIF diagnostic and prognostic criteria for ACLF are robust. The main issue with transplanting ACLF patients is timing and the use of the CLIF score could potentially help to differentiate which patients might be too sick for transplant.

Sepsis, an always present threat (Fuat Saner)

The incidence of sepsis has significantly increased over the last years along with a growing incidence of extensively drug resistance organisms. 20 to 40% of patients with chronic liver disease have SBP or pneumonia on admission. Some studies have demonstrated a good correlation between pretransplant colonization with MRSA and VRE and the significant risk increased of developing a post-transplant infection (OR 5.51, 7.93 respectively). Another study has shown that the presence of HCC, Roux-en-Y choledocojejunostomy and a bile leak significantly increase the risk of Carbapenem-Resistant *Klebsiella pneumoniae*. Peak procalcitonin and continuous follow up of its patients that had undergone transplantation have failed to be useful as an early marker for infection in ALF or to predict mortality. The incidence of Fungal infections varies from 5-40% and are associated with increased mortality and the most common fungal infections are from *Candida* spp (around 90%) and *Aspergillus* *Fusarium* (around 10%). The IDSA guidelines recommends prophylaxis for high risk patients, including patients with MELD >30, reoperation, Kidney failure and treatment of rejection with high doses of steroids and other appropriate recommendations include Fulminant liver failure and re-transplantation. Prophylaxis has decrease the incidence of Invasive fungal infection in these patients.

ICU Management (Constantine Karvellas)

ACLF patients end up in the ICU due to circulatory failure, septic shock, hepatic encephalopathy, respiratory failure, variceal bleeding and acute kidney injury and hepatorenal syndrome. Hyperdynamic state in cirrhotic patients may mask other issues like sepsis and cardiac dysfunction. Ventilatory, FiO₂ and PEEP have to be set to obtain SaO₂ goal of $\geq 88\%$, Tidal volume equals to predicted body weight x 6ml and plateau pressure ≤ 30 mmhg, and fluid restrictive strategy. Norepinephrine is the vasopressor of choice and the MAP should be kept above 65mmhg. Terlipressine or Octreotide are important part of the treatment for variceal bleeding. Transfusion of red blood cells should be done to avoid hemoglobin below 7 and the use of thromboelastography to guide the transfusion of coagulation factors has shown a reduction in transfusion with the same outcome. It is important to rule out adrenal insufficiency and to treat it if present (Hydrocortisone 200mg/d -50mg q 6hrs). A bedside Echocardiography it is a very useful tool to assess LR/LR function and the volume status and its response to fluid. Measuring central venous pressures could also help to assess the volume status and should be kept between 8-12, mixed venous saturation (ScvO₂ above 70%) and lactate may help to set the goals of perfusion. Patients with Hepatic encephalopathy grade III/IV should be intubated and treatment should be started (Rifaximin, Lactulose or PEG, the latest causes less distention than lactulose). Acute kidney injury due to HRS has a worst outcome. Terlipressine can be used (the addition of albumin to terlipressine has not shown change in mortality). Each

hour delay in appropriate antibiotics increased mortality by 1.86, therefore, appropriate and timely antimicrobial therapy in cirrhotic patients it is an important goal in the ICU.

When to transplant, When not to Transplant (Pavel Trunecka)

Dr. Trunecka started his talk mentioning a study performed at UCSF including patients with MELD score below 22 and pointing out that among 893 patients that met the inclusion criteria for the study, 282 were transplanted during the follow up and 237 died or were considered too sick for transplant. Among the causes of death, Infection was the most common, followed by Multiorgan system failure and hemorrhage. Cardiac diseases and extrahepatic malignancies were among the most common causes of delisting.

MELD allocation system was proven as useful tool to define mid-term survival in the waiting list, however, is a poor prognostic tool for defining post-transplant outcome. Under MELD allocation policy, Urgency is the main driver, urgency driver systems lead to higher resource utilization including donor organs, and decrease post-transplant survival. Utility driven systems lead to rationing practicing a “triage” and avoiding futile transplantation. Several scoring systems have been proposed to predict patient survival after LT. p-SOFT score and BAR Score are the more useful scores to predict mortality after LT. LivAs is a prognostic model for the prediction of 90-day mortality after transplantation that was validated in Germany and may improve German allocation policies whereas its validation failed in England due to profound differences in the selection criteria for liver transplantation. This difference suggests the need for national prognostic models. Identification and recognition of predictive factors beyond the MELD score influencing waiting list outcomes, mortality and perioperative risk, may allow for earlier transplant or revised allocation policies. Delisting is still one of the most demanding decision in transplantation.

Concurrent Abstract Session. Malignancies – Novel models for prediction and therapeutics

Intention to treat Survival Benefit of Liver Transplantation in Patients with Hepatocellular Cancer

A multicenter European collaborative project trying to identify the best variables able to discriminate high or low benefit patients using an innovative concept of Intention-to-treat survival benefit defined as the difference between the Median ITT survival with and without LT. MELD, alpha-fetoprotein Milan criteria Status and radiological response displayed a high effect in terms of delta benefit. The authors divided the populations in four groups according to the estimated months of survival benefit after LT. They proposed that patients with no benefit should be de-listed.

Predictors of Malignancies in Liver Transplantation as compared to other Solid Organ Transplantation

534,472 solid organ transplant recipients were analyzed using the scientific Registry of Transplant Recipients (SRTR) database between 2001 and 2011. 53,783 total de Novo malignancies were reported. Lung transplant showed the highest risk of presenting the Novo malignancies and liver transplantation the lowest across all solid Organ transplant recipients. Increased age, male gender, previous malignancy and Caucasian race are at higher risk.

Graft quality Integrated Models for predicting post-transplant Hepatocellular Carcinoma Recurrence: A national Registry Study

Using the China National Registry, the authors analyzed 1010 adults who underwent liver transplant recipients for HCC between 2010 to 2015. Recurrence was observed in 10.4% of the patients during a median follow up of 1.3 years. Cold ischemia time >12 hrs., tumor burden, differentiation and alpha-fetoprotein predicted HCC recurrence.

Liver transplantation for NASH-related Hepatocellular Carcinoma Offers Comparable Outcomes versus Non-NASH etiologies of Hepatocellular Carcinoma

60 patients with NASH and HCC were compared with 869 patients with HCC and other etiologies. There were no significant differences between the groups and Overall outcomes and recurrence rate were similar. Interestingly, the recurrence rate in the non-NASH group was 8.8% in those within Milan Criteria vs 29.2% in Beyond Milan and no differences in tumor recurrence were observed in patients within or beyond Milan in the NASH group.

Outcome of Live Donor Liver Transplant in Patients with Co-existent or Recently Treated Extrahepatic Malignancies.

13 patients with liver cirrhosis and extrahepatic malignancies were accepted for transplant if the extrahepatic malignancy was treated prior or at the moment of transplant or if it was in complete remission. 8 patients underwent an additional surgery for the extrahepatic malignancy with the LDLT. 12 patients are alive with good graft function without recurrence of their extrahepatic malignancy at mean follow up of 51±25 months.

Risk Assessment by Combining 18F-FDG-PET with serologic Markers of Tumor Biology Selects Suitable Liver Transplant Patients with Advanced Hepatocellular Carcinoma

Pretransplant 18F-FDG PET with no increased uptake have a better recurrence free survival rates (93% vs 43% 5 years in PET pos) and the PET status could help to increase the number of patients suitable for transplant even if they are outside Milan. PET positive plus AFP >400ng/dl or CPR > 1mg/dl were considered high-risk for recurrence with five years of recurrence free survival rate of 25.8%.

A Simple Prediction Model for Recurrence of Hepatocellular Carcinoma after Liver Transplantation in Patients without Microvascular Invasion.

414 patients without microvascular invasion were studied in a multicenter Latina American cohort. AFP > 1000ng/ml and beyond the Up-to-7 criteria were variables associated with

recurrence. Cumulative survival decreased progressively if either one or other risk was present or if both variables were present (survival 46% vs 14%)

Ethnicity and Underlying Disease Are Key Predictors off 10,844 de Novo Malignancies Following Transplantation

108,412 liver transplant recipients in United States between 1987 and 2015 were analyzed using the SRTR database. 10 to 15-year probability of the novo malignancy was 15.5% and 15.8%. Solid organ was the most common malignancy (44.7%) followed by skin (41.3%), and hematologic (14.0%). In addition to Age, male gender, multigrain transplant and previous malignancy, both, ethnicity (Caucasian) and underlying liver disease (Alcohol liver disease, autoimmune, NASH and PSC compared to HCV) were important predictors of malignancy.

Single-Center Experience of Long-Term Survival Outcome between Primary Liver Transplantation and Hepatic Resection with Consequent Salvage Transplantation for Hepatocellular Carcinoma within Milan Criteria

This is a retrospective study where authors analyzed 149 patients with HCC within Milan criteria that underwent liver transplantation and compared their outcomes against 26 patients that underwent first hepatic resection and then salvage liver transplantation. The median follow-up was 55 months and the tumor recurrence rate was significantly lower in the primary liver transplantation group 7.9% vs 26.9%.

Technical Progress in Liver Transplant

Impact of liver Reperfusion Sequences on Outcomes of liver transplantation

This is a retrospective study where the authors analyzed the outcomes of 56 patients that underwent liver transplantation where the liver was perfused from the hepatic artery first and compared them with 151 patients that were initially perfused from the portal vein. No differences in MELD score, age or gender were seen nor incidence of acute rejection, HA thrombosis, biliary leaks or strictures or portal vein thrombosis or stenosis or graft survival. HA initial reperfusion was associated with significantly less intraoperative PRBC transfusion.

Outcomes in Liver Transplantation of arterial reconstruction on the recipient's splenic artery due to the inadequacy of the Hepatic Artery Experience after 1500 Liver Transplants.

The authors analyzed the outcomes of 54 patients in whom arterial anastomosis were performed into the splenic artery and compared them against 1405 with standard hepatic artery anastomosis. Besides the requirement of more transfusions (more re transplant in the splenic artery group), there were no differences on arterial or biliary complications, nor in primary dysfunction, reoperation, postoperative mortality, or survival.

In Situ Split Liver Transplantation for two Adult Recipients: A Single Center Experience

The authors compared the outcomes of 16 liver transplant recipients that received a partial graft from a split liver from 8 donors and compared the outcomes with 393 recipients that received a whole liver transplantation and noticed no differences in patient and graft survival rate.

Domino Cross Auxiliary Liver transplantation between Different Metabolic Disorders Diseases of the Liver

4 pediatric patients with liver-based metabolic disorders (Ornithine Carbamyl Acyltransferase deficiency disease and 1 with Wilson disease) received a partial auxiliary liver graft with different metabolic deficits. 2 received an auxiliary graft from a donor with familial hypercholesterolemia donor and 2 from a donor with maple syrup disease.

A Simplified Multivisceral Transplantation Procedure for Patients with Combined End-Stage Liver Disease and Type 2 Diabetes Mellitus.

44 patients with type 2 DM and ESLD underwent a simplified multivisceral transplantation procedure SMT (Liver and Pancreas en bloc: 23 patients) or liver transplantation alone (21 patients). There were no significant differences in graft survival, however 22 of the 23 patients that received SMT became euglycemic after transplant while only 3 of the 23 in the LT alone group.

Salvage Living Donor Liver Transplantation for recurrent Hepatocellular carcinoma after Prior Laparoscopic hepatectomy in a Single Institute

43 patients underwent salvage LDLT after liver resection. 34 of them have had an open resection vs 9 that had laparoscopic resection. The prior laparoscopic resection had less operative time, blood loss and transfusion requirements at the moment of the transplant with comparable morbidity, mortality and oncological results.

Efficacy of Octreotide to Treat Massive Ascites after Living Donor Liver Transplantation

In this retrospective study, the authors analyzed the use of Octreotide (50-100ug IV q 6hrs) in 87 LDLT recipients that had massive ascites defined as >1000cc at postoperative day 7. The authors observed a significant amount in ascites quantification in 80% of the patients. Importantly, slow hepatic (n=5) and portal (n=1) flow was seen as a side effect.

Development and Validation of Nomogram to Predict Primary Non-Function in Liver Transplantation from Donation after Cardiac Death Donors

The Authors of this study used the SRTR database to search risk factors associated with PNF and constructed a nomogram to predict PNF in patients that received a liver transplant from donation after circulatory death. 3278 transplants were included and PNF occurred in 161 (4.9%). The AUC of the nomogram to predict PNF was 0.7034 (Higher than MEDL and DRI). The authors propose this model to help guide organ allocation and avoid PNF.

Fulminant Liver Failure

Managing the brain, William Bernal

The basic Neurological care includes adequate sedation, Intubation and ventilation with Co2 control, cardiovascular stability, glucose and sodium control, head elevation at 30°, fever avoidance and frequent neurological observations. Over the last decades, the mortality in ALF patients has decrease probably in part as a consequence of a better neurological management supported by the observation that fewer neurological complications are seen now in these patients. Sodium target must be 145-155 mmol. Increase in ammonia levels is related to cerebral edema. Extracorporeal removal with hemofiltration, lowering systemic production with specific diet, and lowering cerebral uptake and metabolism with good sedation are important elements of care. Hypothermia does not benefit cerebral edema or intracranial hypertension and the benefit in these patients has still to be defined.

ICU support: Beyond the brain, Catherine Paugam-Burtz

ICU support in ALF patients aim to optimize conditions for liver regeneration, restore organ functions, avoid MOF and optimize conditions for LT. Hemodynamic resuscitation with continuous monitoring is important to guide fluid administration and avoid excessive amount of fluids as well as appropriate use of vasopressors. Early use of renal replacement therapy is probably beneficial because of a better metabolic control (Amonemia). Widely use of N- Acetylcysteine (has a possible survival benefit in early stage of ALF in non-paracetamol liver injury). Antimicrobial prophylaxis did not have a significant effect on 21-day mortality, however, any delay in administration of antibiotics in infected severe patients is associated with increase mortality so a very high index of suspicion and early empirical treatment after microbiologic sampling should be started if needed. No liver assist devices have yet been shown to improve survival and high-volume plasma exchange in patients with ALF could improve transplant free survival but this has to be confirmed in other trials.

Transplant Options for FHF, Yaman Tokat

Liver transplantation in the only therapy of proven benefit but the rapidity of progression, the variable course of ALF with spontaneous survival in some patients represent a constant challenge. The currently available prognostic scoring systems do not adequately predict outcome and determine candidacy for liver transplantation. In the persistence of accepted criteria associated with poor prognosis and the absence of co-morbidities or complications of ALF associated with reduced survival we must proceed. In USA 66% of patients with FHF listed for transplantation received a graft with a median waiting time of 3 days as opposite as other geographical areas (Turkey, just 19% of patients with FHF listed in 2005 received a deceased donor graft). Emergency adult to adult living donor liver transplantation for acute liver failure is the only alternative in many places and must be considered. In centers with experience the survival rates are comparable to the DDLT results in the western countries and no difference in morbidity in donors has been seen when compared with living donation for cirrhosis.

Intraoperative Challenges, James Findlay

Intraoperative management start with a pre-operative assessment and planning for OR. In the acute setting, special attention should be taken to any pre-existing comorbidity. Ventilator settings must be taken in consideration for the transportation of the patient in to the OR and during the surgery. An acceptable mode should be planned according to the anesthesia ventilator in the OR. If the patient will continue renal replacement therapy or ICP monitoring, all the equipment must be available. The patient must be transported and positioned in a head-up position. Goal ICP must be $<20\text{mmHg}$, $\text{CPP} > 60$. Avoid volatile agents because they cause cerebral vasodilation, if used, limit to $<1\text{ MAC}$. IV anesthetic of preference is propofol. Hyperventilation may be an appropriate temporary tool (keep $\text{CO}_2 >25\text{mmHg}$). If hypothermia was used prior to OR, do not warm. Norepinephrine is the vasopressor of choice or phenylephrine and vasopressin or vasopressin analogue can be added. Regarding coagulation, thromboelastography may be a useful tool to guide transfusions in the setting of ALF. A patient may have INR elevation but all liver produced factors are affected, procoagulants and anticoagulants as well. If a ICP monitor will be placed, INR should be kept below <1.5 and $\text{PLT} > 50,000$ at the moment of placement but there is no evidence to guide therapy for this recommendation or after the insertion. VE testing is a useful tool to guide therapy. Prothrombin complex concentrate is better than Fresh frozen Plasma if volume is a concern. Lung protective ventilation should be kept ($\text{VT } 6\text{-}8\text{ml/kg IBW}$). The relation between PEEP and ICP has shown conflicting results, volume status is rather important CPP decreased if hypovolemic. Serum Osmolality goal is <320 . ICP elevations have been reported early post-transplant so continue all the measures and assessment after surgery.

Liver Transplantation for Malignancies

Nancy Kwan, Kevin Kim

LT for HCC-Modeling Criteria. Christian Toso

Several models have been used trying to identify the best candidates for LT. These models take the tumor Characteristics into consideration either Morphology (Milan, UCSF, Up-to-Seven, Total Tumor volume, ASAN) or Biology (AFP, DCP, FDG uptake, Microvascular invasion, HCC grade) or a combination of both, and capture well the incidence of recurrence. Besides the tumor characteristics, recipient characteristics (Gut-Liver axis, LPS-TLR4 pathway) and donor characteristics (BMI, age and history of diabetes increase the risk of recurrence) are important. Even when the impact remains marginal when compared to the impact of the HCC characteristics it raises the question if centers should avoid transplanting marginal liver grafts into high-risk recipients.

Neuroendocrine tumors an LT. Vincenzo Mazzaferro

40-80% of patients present at diagnosis with metastases being the liver the most involved organ. Rarity of NET and slow-growing nature of liver mets are limiting factors for assessing survival outcome. Synchronous primitive resection with LT and age > 55 yrs is associated with low overall survival. Also, patients presenting duodenum/pancreatic mets in

association with hepatomegaly are poor candidate. Waiting for disease to stabilize may be appropriate and excellent results can be obtained in highly selected patients. Dr. Mazafferro mentioned his study were 42 patients received a Liver Transplant and 46 with similar characteristics did not. After adjustment for propensity score, survival advantage of the transplant group was significant. Liver Transplantation for Metastatic NETs under restrictive criteria provides unprecedented positive long/term outcome. Transplant related survival benefit increases over time and maximizes after 10 years and long term survival is associated with and overt improvement in the quality of life and likely advantages in cost/effectiveness.

LT for Metastatic Colorectal Carcinoma. Rene Adam

Liver resection is the best treatment for hepatic metastases from colorectal cancer and the survival benefit is seen even in those patients that were considered initially non/resectable. The problem are those patients who improve considerable after chemotherapy but remain still with unresectable disease, the probability of those patients to be alive at 5 years is very small despite the good response with chemotherapy. Liver transplantation for colorectal cancer has been done in the past with unacceptable results. A further review of these transplants showed that experience of most of the centers have been anecdotal but also that graft loss was related to non tumoral causes in 44% of cases and 9 patients survived more than 5 years and 2 patients were alive with no evidence of disease at 9 and 21 years after transplant showing that long/term survival is possible. The improve expertise in the management of LT, the better knowledge of colorectal cancer (survival benefit in those patients that respond to chemotherapy; right vs left colon are two different entities with different prognosis, Ras and BRAF Mutation have worst outcome than wild type) the better imaging (PET/CT), the more effective chemotherapy and the use of immunotherapy and the more reductive immunosuppressant protocols we currently use in our liver transplant recipients led to the hypothesis that LT may significantly improve the results and offer long-term survival for very selected patients. That was tested in Norway because the short waiting time in the liver transplant list and the amount of livers donated for transplantation and they published their results in their first 21 patients showing 60% survival at 5years. The prior experience with liver transplantation for colorectal metastases is comparable with the poor outcomes observed in the past with patients transplanted for HCC or cholangiocarcinoma. The overall improvement in the latest two is due to a better selection of transplant candidates and better selection of patients with colorectal metastasis to be treated with LT will improve the outcomes in this population as well. The concept is partially validated by the Norwegian study and there are currently several clinical trials to definitely validate or invalidate this current contraindication for LT.

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