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Introduction: Everolimus is often used as an immunosuppressant drug in solid organ transplantation. Pulmonary side effects also known and can be progress in life threating clinical presentation. This side effect has been reported in liver transplantation patients much rare than in other transplantation patients.

Method: We present 19-year-old liver transplant patient who admitted with coughing and dyspnea. Everolimus was added beside tacrolimus therapy 6 months ago. Her chest imaging's were coherent with pneumonia. Infections parameters and cultures were all negative. After discontinuation of the everolimus, symptoms and radiological signs were recovered.

Result: There is not a consensus in management of these patients. Discontinuation of everolimus is the main approach. Corticosteroids had been recommended in some reports depended on severity of disease. In our case, pulmonary symptoms started to regress after 15 days of cessation of everolimus treatment. It is debatable that we may have taken risks by not starting empirical antimicrobial therapy in our organ transplant patient receiving immunosuppression therapy.

Conclusion: We would like to remind that drug toxicities should be kept in mind while considering possible infectious agents in liver transplant patients who are prone to opportunistic infections.

Machine learning improves the accuracy of graft weight prediction in living donor liver transplantation

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Introduction: Precise graft weight (GW) estimation is essential in living donor liver transplantation to select grafts of adequate size for the recipient. We investigated whether using a supervised machine-learning (ML) model could improve the accuracy of GW estimation compared to currently available methods.

Method: Data from 872 living liver donors were used to train 10 ML algorithms to predict GW using the following information: donor's age, sex, height, weight, and BMI, graft type (left, right, or left lateral lobe), estimated graft and total liver volume. Algorithms were trained using 10 times 10-fold cross-validation in a training set (80% of donors) and validated in a random independent test set (20% of donors).

Result: At validation, the best performing ML model showed a mean absolute error of 50 ± 62 grams and a mean absolute percentage error of 10.3%. ML prediction errors $\geq$ 15% were observed in 18.4% of the cases, compared to the 34.6% of the predictions made by the best method currently available (p<0.001). The ML model is available as a web application (http://graftweight.shinyapps.io/prediction).

Conclusion: This study shows that ML can significantly improve preoperative GW estimation over current methods by coupling anthropometric variables to the estimated graft volume.

Learning curve of graft bench operation in living donor liver transplantation: A cumulative sum analysis

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Introduction: The middle hepatic vein (MHV) reconstruction is a critical issue for successful living donor liver transplantation. we analyzed the learning curve of MHV reconstruction and described the factors affecting the learning curve, and the postoperative outcomes

Method: Data from donors undergoing bench surgery between January 2019 to May 2020 retrospectively reviewed. To overcome operator-dependent bias, data from procedures performed by only a single surgeon (Jeong-Moo Lee) were included. The learning curve was evaluated using the cumulative sum (CUSUM) method based on operative time.

Result: A total of 111 bench surgery were evaluated. The mean operative time was 64.0 ± 15.8 minutes, and the reconstructed MHV graft patency rate was 88.3% in recipient CT taken 7 days after liver transplantation. Portal vein stenosis occurred in 3 cases (2.7%). Hepatic artery complications were 4 (3.6%) and biliary complications were 18.1%, and no graft failure occurred during the study period. Univariable analysis showed that portal vein variation, presence of more than 2 factors of contributing difficulty were associated with a significantly higher risk of prolonged operative time. These factors are also significantly associated with prolonged operative time in multivariable analysis.

Conclusion: At least 10 cases of learning curve are required for successful bench surgery in routine cases of LDLT. Multiple portal vein orifice is related to longer operative time and learning curve for the bench operation.

Cost-effective and time-saving three-dimensional (3-D) printing protocol of intra-abdominal cavity of liver transplantation recipient to minimize risk of large-for-size syndrome: The initial experience

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Introduction: The application of 3-D printing has been increasing and we invented a protocol for a cost-effective and time-saving 3-D model of intra-abdominal cavity to prevent large-for-size syndrome during liver transplantation.

Method: 3-D printing of the intra-abdominal cavity were performed on potential adult recipients with small cavity and pediatric patients scheduled for transplantation during the period of July 2020 to September 2021. To reduce time and cost, boundaries of intra-abdominal cavity were outlined based on computed tomography of the potential transplantation recipient with a 1 to 3cm distances. The printed pieces were reassembled with a pillar and footing. The printed models of adult patients were used for comparing the size to the graft during deceased donor operation while models of pediatric patients were used for directly comparing the size to the 3-D printed graft of living donors.

Result: During the study period, nine adults and five pediatric patients were included. Median time for model production was 600 minutes and estimated median cost for the filament used was 1.6 dollars. Transplantation of reduction graft (n=1), whole liver transplantation after giving up the previous donor match (n=2), whole liver transplantation from the first matched donor (n=4), living donor transplantation using right hemiliver (n=1) and transplantation from a living donot after giving up first matched donor in a patient with contracture of right liver fossa (n=1) were resulted using 3-D printed model in adult patients. Among pediatric patients, two cases were resulted in reduction graft as planned during preoperative planning and three cases resulted in extended left lateral graft transplantation. All the cases ended up with successful closure of the abdomen with no large-for-size syndrome.

Conclusion: Our cost-effective and time-saving 3-D printed model of intra-abdominal cavity was feasible and proved to be useful for preventing large-for-size syndrome in small adult recipients and pediatric patients.

Respiratory syncytial virus pneumonia in a LDLT recipient transplanted for COVID 19 precipitated ACLF: Treated with ribavirin and IVIg

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Introduction: RSV causes severe respiratory illness inchildren and immuno-compromised elderly persons but it rarely causes severe illness in adult liver recipients. We report the case of a LDLT recipient who presented with RSV pneumonitis following urgent LDLT for ACLF.

Method: 63 yr NASH cirrhosis with IDDM, prior CABG 10 yrs ago (MELD Na15) listed for DDLT after evaluation. He contracted COVID 19 during second wave in India requiring hospitalisation. Developed ACLF with SBP, AKI and HE; advised early LDLT during Evaluation of related ABO Compatible donor done. Pre op COVID PCR negative for both.

Result: Right lobe (630 gm) LDLT & Splenic artery ligation (GRWR 0.84, portal flow 310ml/100gm) done. Received Basiliximab 20mg intra op. Steroid tapered to 20 mg by D5; Tacrolimus started D4 (level 4-6). Immediate Post operative - Hypo active delirium. Shifted to room on D14. Recovered & planned for discharge. Developed CMV viremia with thrombocytopenia. Managed with oral therapeutic Valganciclovir for 2 weeks then prophylactic valganciclovir. D22 developed worsening cough &febrile illness: Antibiotics and antifungal restarted. CMV PCR and cultures were negative. Developed chest infiltrates with hypoxemia. Intubated and ventilated. Serum/ BAL galactomannan &staining for Pneumocystis were negative. Respiratory Panel (PCR based) + for RSV. Started on IVIg 0.4 gm /kg (4 days) & Ribavirin 15 mg/kg (4 wk) and Tracheostomy done. Afebrile after 3 days, gradual improvement in cimaging and respiratory parameters. After 3 weeks RSV -ve. Discharged on D 65.

Conclusion: Our patient had multiple predisposing factors for RSV - age, DM, Immunosuppression and CMV & potentially prior COVID 19. We recommend Respiratory panel / RSV PCR in elderly Liver recipients in order to identify RSV pneumonia in patients not responding to antibiotics and antifungals. Ribavirin along with IVIG may help in salvaging these patients. RSV vaccine once available should be considered in pretransplant vaccine protocol in elderly recipients.

Clinical and immunological features of the patients who underwent liver transplantation for cryptogenic cirrhosis

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Introduction: The aim of this study was to compare clinical and immunological features of the patients who underwent liver transplantation with the diagnosis of cryptogenic cirrhosis to those who underwent liver transplantation for other reasons.

Method: All patients who underwent liver transplantation at our liver transplantation institute between March 2019 and March 2020 were included. Patients were retrospectively identified from a prospectively kept database. Clinical, demographic, and laboratory data included age, gender, body mass index (BMI), graft source (living and deceased donor transplants), MELD scores, liver tests, immunoglobulins levels (IgG1, IgG2, IgG3, Anti- gliadin IgA, Anti-gliadin IgA), levels of autoantibodies (ANA, ASMA, anti-dsDNA), post-transplant pathological findings and early survival data were investigated.

Result: Of the total 201 patients, 67% (n=132) were male and the mean age was 49,9±13 years-old. Preoperatively, 63 patients (31,3%) were diagnosed as cryptogenic cirrhosis. In 14 of them, the etiology of cirrhosis could be revealed in the pathological examination. As a result, a total of 49 (24,4%) patients were included in the cryptogenic group. Patients with cryptogenic cirrhosis were significantly older (54,83 ±10, 18 vs 48,28±13,47, p=0,002) and had higher BMI than those with determined etiologies (27,25±4,38 vs. 25,70±4,70, p=0,045). The other parameters were not significantly different between the groups.

Conclusion: We have found 1) Immunological biomarkers in patients with cryptogenic cirrhosis did not differ from other patients. 2) Mean BMI was significantly higher in cryptogenic patients than in other patients. 3) Autoimmune hepatitis was the most frequently differentiated diagnosis in pathological studies of clinically cryptogenic patients. 4) In our series, the ratio of cryptogenic

patients was found higher than western countries and less than some eastern countries.

Large venous outflow reconstruction using Daron Y graft as common orifice of middle hepatic vein and graft right hepatic vein for modified right liver graft

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Introduction: The reconstruction of the vascular outflow tract of partial liver grafts has received considerable attention in the past, especially in the setting of right liver grafts with undrained segments. Hepatic venous outflow reconstruction is an important factor for successful living donor liver transplantation outcome. The aim of this report was to introduce Large Venous Outflow Reconstruction technique using Daron Y graft as common orifice of Middle hepatic vein and graft right hepatic vein.

Method: We compared clinical outcomes with two reconstruction techniques through retrospective review of 46 LDLTs using right lobe grafts at our institution from Nov 2013 to Nov 2019; group I (n = 29) received separate venous outflow anastomosis between MHV reconstructed using various materials and RHV, group II (n = 16) received Large Venous Outflow Reconstruction using Daron Y graft as common orifice of MHV and RHV.

Result: The MELD, GRWR and graft volume were 13, 1.1, 723g in group I, 17.4, 1.0, 969g in group II. The 1, 3, 6-month patency rates of MHV in both groups were 100, 89.3% (p>0.24), 93.8, 51.9% (P>0.004), 66.7, 24.0% (P>0.01) respectively. The cold ischemic and warm ischemic time (min) in both groups were 56.2, 40.0 respectively. RHV stent insertion in both groups occurred 2, 0 cases. Especially, MHV stent insertion did not occur in both groups during follow-up period.

Conclusion: Although small cases, our Large Venous Outflow Reconstruction technique using Daron Y graft as common orifice of Middle hepatic vein and graft right hepatic vein could be an effective method of overcoming technical difficulties and the outflow disturbance in right lobe LDLT without complex bench work to create large outflow.

Pediatric liver transplant in a specialized center in Mexico

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Introduction: In México, from the total liver transplants done each year in pediatric population, patients 2 years or younger represents 50% of the liver transplants, 33% from age 2 to 1 year old and the rest of them are done at adolescence.

Method: We analyzed liver transplant between January 2015 to august 2021, where 130 patients received a liver transplant, from those, 7 patients on pediatric age. We analyzed sex, age, diagnosis, weight, height, MELD score, length in wait list, induction and maintenance immunosuppression cold and warm ischemia.

Result: Seven patients received a liver transplant, which represents 5% overall liver transplant in our center, median age 15 years (range 12 to 15 years), 2 male and 5 female, all of them received orthotopic liver transplant, waiting list time was from 5 days to 9 months, MELD-Na score median 18 points (range 10 to 40), cold ischemia 6 hours 45 minutes (range 5 hours to 10hrs 8 minutes), warm ischemia 38 minutes (range 25 to 66 minutes). Indications were autoimmune hepatitis for two patients, sclerosing cholangitis for one patient, one more for hepatic sarcoma, and the other two for acute liver failure. Four patients developed acute rejection, with steroid response, and two of them developed bile duct stenosis.

Conclusion: Liver transplant for pediatric patients in Mexico is limited to pediatric donors, but, for adolescent patients, an adult liver can be suitable, being