**Living Donor Liver Transplantation**

**By Gökhan Kabaçam and Prashant Bhangui**

With the number of LDLT’s performed around the world showing an exponential increase in numbers, several quality abstracts from high volume centers, as well as initial experience by new centers were presented at the Congress this year.

**O-060 - Five thousands living donor liver transplantation in single center**

***G.W. Song, Ulsan University College of Medicine/Asan Medical Center, Division of LT and HB Surgery, Seoul, Republic of Korea***

Song et al. presented results of their series of 5,183 LDLT cases performed between December 1994 and August 2018. In their series, mean age of the recipients was 48 ± 13.9. Donors had an age distribution of 16 – 72 years, with male dominance (67%). Leading etiologies for the underlying cirrhosis were HBV in 67%, and Alcoholic Liver Disease (ALD) in 12 % of the adults. Mean MELD was 17. Biliary atresia was most common in pediatric cases (Mean PELD 19). In the recent years, they noted a decrease in the incidence of HBV CLD, with a rise in ALD.

In donors acceptable RLV/TLV was ≥ 30%. If recipient MELD was < 20, GRWR cut off was ≥ 0.7; on the other hand in patients with higher MELD ≥ 30, GRWR cut off was ≥ 0.8. Dual lobe LDLT comprised 10 % of the cases. In hospital mortality was 4.2%. Ten years graft-survival was 83.3%, patient-survival was 87%. Biliary complications were seen in 7% of cases. Donor complications were encountered in 1.4 % of the cases, with no major donor morbidity or mortality.

**O-061 - Risk factors for long-term mortality in live liver donors**

***Hong S.K. Seoul National University College of Medicine, Seoul, Republic of Korea***

A database search was performed among 10,116 liver donors who had donor hepatectomy from 2010–15. Of them 66% were males, mean age was 30.7 years. There were 53 deaths over 15 years (1.2 %). Suicide was the most common reason seen in 36.5% of the cases. In multivariate analysis, factors affecting mortality included being divorced ((HR 7.075, 95% CI 2.57- 19.51, P< 0.001), and unemployment (HR 6.969, 95% CI 1.73- 28.1, P=0.006). Interestingly, cancer related deaths were more common in liver donors compared to the general population.

Careful psychosocial evaluation, and post donor hepatectomy health check up should be continued in the long term with adequate risk counseling.

**O-062 - Pure laparoscopic donor hepatectomy: Korean multicenter experience**

***Hong S.K*, *Seoul National University College of Medicine, Surgery, Seoul, Republic of Korea***

Hong et al. presented data from 5 centers of 511 pure laparoscopic donor hepatectomy between 2010-18. Of these, 481 were right lobe donor hepatectomies. Mean age was 31 years; mean duration of surgery was 340 min. Mean GRWR was 1.1, and transfusion requirement was 2.2 units. Open conversion was required in 10 cases (1.9%). Clavien Grade 3 complications were seen in 23 cases, whereas Clavien Grade 4 in only 1 patient. Operative duration decreased with experience. 5-year recipient survival was 73.8%. The authors concluded that pure laparoscopic donor hepatectomy is feasible, and could represent a new gold standard of practice.

**O-063 -** **Donor right hepatectomy: Is robotic approach the way forward?**

***Binoj S.T. , Amrita Institute of Medical Sciences, Ernakulam, India***

A prospective comparative study of robotic vs. open right hepatectomy was presented by Binoj et al. from India. 62 donors undergoing open hepatectomy were compared to 20 in whom pure robotic hepatectomy was performed. Emergency cases, donors with multiple bile ducts, issues of robotic slot availability, and cases with financial constraints were excluded. Operative duration was longer in robotic cases (579.00±61.81 vs. 458.23±99.16 min, p< 0.001). Peak bilirubin, AST, ALT levels were lower in donors undergoing robotic surgery. Day7 INR was lower in the open surgery group. Recipient mortality and morbidity were similar in both groups. There was no donor mortality, but ICU and total hospital stay was shorter in robotic cases (3.6 vs. 3.1, and 10 vs. 7.5 days, respectively).

Further studies are required to address the long term safety issues, however outcomes were similar in both groups, and robotic surgery was feasible in most.

**O-064 - Is portal inflow modulation always necessary for successful utilization of small volume live donor liver grafts?**

***Yadav S.K., Medanta The Medicity, Medanta Institute of Liver Transplantation and Regenerative Medicine, Gurugram, India***

Yadav et al. presented their strategy and outcomes of portal inflow modulation during LDLT using right lobe grafts with GRWR < 0.8. Of 1321 LDLT cases, 21.7% had expected GRWR <0.8. Depending on the GRWR, >0.8: no inflow modulation; 0.75 – 0.79: splenic artery ligation (SAL); 0.70 – 0.74: splenic artery ligation or hemiportocaval shunt; <0.70: hemiportocaval shunt (HPCS) was performed. No portal inflow modulation was performed if portal pressure was below 16 mmHg. Lowest GRWR was 0.54%. HPCS was performed in 57 cases, HPCS + SAL was done in one case. Cold ischemia time was more in patients with lower GRWR. Portal pressure dropped from mean 26 to 15 with inflow modulation. There was no effect on immediate post operative outcomes using low GRWR grafts with inflow modulation. The authors concluded that low GRWR grafts can be utilized using appropriate portal inflow modulation techniques.

**O-065 - Left lobe living donor liver transplantation - evolving paradigm for the double equipoise**

***Ma K.W, The University of Hong Kong, Department of Surgery, Hong Kong, China***

This was a retrospective analysis (using propensity score matching) of 1478 consecutive cases of adult – to – adult LDLT from 1994 – 2017, with a median follow up for the donor of 124 months, and for the recipient of 92 months. After PSM, left lobe donors had significantly lower peak post–op bilirubin (30 vs. 55 mmol/l), and INR (1.3 vs. 1.5; p<0.001). Also LL donors had shorter hospital length of stay (7.4 vs. 8.9 days, p=0.046). Although small for size graft were more common in LL transplants, (83 % vs. 23 %), there was no significant difference in terms of SFSS and in–hospital mortality (15.4 % vs. 5.6 %, p=0.08; 7.1% vs. 1.6%, p=0.1 respectively). 5yr graft survival for LL vs. RL recipients were 81% vs. 83% (p=0.3) respectively.

The authors thus concluded that if matched for size to right lobe grafts, LL graft is safe for both the donor and the recipient.

**O-066 - Outcomes after robotic donor hepatectomy in 46 consecutive live donors**

***Choi G.H Yonsei University College of Medicine, Department of Surgery, Seoul, Republic of Korea***

In their prospective series of 46 robotic hepatectomies from Korea, Choi et al. presented short term outcomes. From April 2016 to October 2018, 43 right, 2 left, 1 left – lateral donor hepatectomies were performed robotically.

Mean operative time was 503 min’s. There were 3 events due to hem–o–lok dislodgement from right bile duct, inferior hepatic vein and right hepatic artery. Emergency conversion was needed to control bleeding in the case with bleed from RHA. There was another open conversion in the very first case due to left bile duct injury. Post operative complications occurred in 11 (24.4%) patients. Clavien Grade 2-4 complications occurred 1.9% each. Mean hospital stay was 9 days. Robotic hepatectomy is feasible and safe at expert hands. Hem–o–lok clips should be used cautiously.

**O-067 - A proposal of indication for splenectomy in living donor liver transplantation**

***Kawamura N Hokkaido University Graduate School of Medicine, Department of Transplant Surgery, Sapporo, Japan.***

The aim of Kawamura and colleagues was to identify the indications for performing splenectomy during LDLT to prevent SFSS at their center, over a 20 year period. In 139 patients, multivariate analysis showed that Graft Volume/Standard Liver Volume (GV/SV) ratio <40%, Portal Vein Flow volume/Graft Volume (PVF/GV) >250ml/min/100g, and donor age >35 were the independent risk factors for SFSS. According to the subgroup analyses; splenectomy was indicated in those patients with GV/SV ratio <40%, and PVF/GV more than 250ml/min/100g to prevent SFSS.

**O-068 - Inferior graft and patient survival following offspring to parent living donor liver transplantation**

***Choudhury R, University of Colorado, Surgery, Division of Transplant, Aurora, United States***

A UNOS database analysis by Choudhury et al, analysed survival outcomes of LDLT’s performed from 1990–2018. In this time period, 282 offspring to parent, and 251 non–offspring donors were encountered. Male offspring donor – to female recipient was associated with graft failure (HR=2.99, P=0.02), and mortality (HR=3.54, P0.03). This association was not seen in male recipients or non – offspring donors. Similar findings were seen at renal transplant cases due to similar mechanism of proposed fetal alloimmunization during pregnancy.

The authors claimed, that if possible, non–offspring to recipient LDLT should be preferred.

**ILTS – TTS Joint Symposium on Living Donation**

**Global activity around the world**

***Nancy L. Ascher, San Francisco, United States***

Dr. Ascher stated that, in 2016, 30,352 liver transplants were performed, this accounted for only 10 % of the real need for LT. Among these transplants, 19.8 % were live donor liver transplants. Some countries like Korea and India have episodic gaps in data entry to the system so the numbers are not complete for every year. There are efforts to increase the documentation of data for more precise planning. More effort is needed to increase the activity of liver transplantation around the globe to satisfy patient needs.

**Multimodal analgesia for living donors**

***Tetsuro Sakai, Pittsburgh, United States***

Dr. Sakai gave an elegant talk on pain management in post – transplant cases. According to A2ALL study, 40% of the donors have complications. Among these 12.8% have pain up to 3 months, and 7.9% up to 2 years after surgery (total 1/5th of cases). Multimodal analgesia is an effective system to prevent and treat pain related issues in these patients. Epidural PCA is better than IV PCA with accelerated GI functional recovery, lower pain scores and length of hospital stay. This method enhances the recovery after surgery. Regional + adjuvant analgesics have synergistic actions. Meta analysis revealed lower rate of complications, length of hospital stay and time to flatus. Midline or hybrid LAP + Midline incision is also better for pain control.

**Decision making in marginal living donors**

***Yaman Tokat, Istanbul, Turkey***

Dr.Tokat stated that there are maginal donors, recipients and surgeons in the field of LDLT. Donors >50years of age, steatotic donors, those with Gilbert’s syndrome, diabetic, hyperlipidemic donors, those with BMI >30, and with viral hepatitis should be considered as marginal donors. Surgically, the risk of extended right hepatectomy in donors with future liver remnant < 35 % does not increase if the donor is <50 years of age, and the incidence of complications does not change. If age >50 years, the surgeon must not take MHV in the graft, and residual liver volume should be >35 %. Male donors with high BMI (>25 kg/m2) are at a higher risk. Procoagulant mutation carriers are not at risky if appropriate precautions are taken. Donors with viral hepatitis may not be at an additional risk with novel therapies. Anatomical variations are not a problem in experienced hands as well.

**Donor vs. recipient surgeons: united or divided?**

***Elizabeth Pomfret, Denver, United States***

Dr.Pomfret proposed the double equipoise model for separating the donor surgeons from recipient surgeons.

**Long – term psychosocial donor outcomes**

***Kelvin KC Ng, Pokfulam, Hong Kong***

Dr.Kelvin addressed the long term psychosocial outcomes in live liver donors. Live donor hepatectomy may be considered the biggest possible mode of surgery in a healthy human being. Most of the donors suffer from long – term effects. Of these donors, 21.4% do not do some physical activities anymore, and 33 % have some concerns of future wellbeing. Suicidal tendency is seen in the donors with low social support and those without a job, family, or house. More thorough psychosocial workup is needed to prevent and treat these complications.

**State of the Art Lecture**

**The revolution of LDLT in Asia**

***Chao-Long Chen, Kaohsiung, Taiwan, Republic of China***

Dr.Chen outlined the revolutionary developments in the routine daily practice of LDLT in Asia. This talk dealt with many aspects of transplantation.

Portal vein metallic stenting from P4 stump in LDLT gives perfect results. For the HCC cases downstaging to fit to Milan criteria increases the success, and decreases the relapse rates after LDLT. Portal vein thrombosis does effect post – transplant survival. Nine-year survival after LDLT in PVT vs. Non-PVT is equal and 87 %. Shunt type does not matter in these cases. Ligation of >10mm shunts are recommended to prevent portal vein steal syndrome. Staged shunt ligation is a doable option to prevent Small for Size Syndrome. ABO incompatible LDLT yields results comparable to ABO compatible cases. Pure laparoscopic or recently robotic donor hepatectomy are the next advances in the pipeline of LDLT.