Figure 1: **Technical aspects of the HOPE-Split procedure.** Vessel dissection and hilar plate division were facilitated by the "star exposure" (1A) and performed during static cold storage. Then, parenchymal transection was performed with simultaneous HOPE using a "split hanging manoeuvre" (1B). The left hepatic vein was divided and the defect on the vena cava was closed with a transverse running suture or a venous patch (1C). Both partial grafts remained perfused through the main portal trunk until hepatectomies in both recipients were carried out.

FP04.05
FAST-TRACK LIVER TRANSPLANTATION: RESULTS OF OUR FULL-FLEDGED ERAS PROTOCOL AFTER 100 MONTHS

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Purpose: Enhanced recovery after surgery (ERAS) has been shown to facilitate discharge, decrease length of stay (LOS), improve outcomes and reduce costs. We used this concept to design a comprehensive fast-track pathway (OR-to-discharge) before starting our liver transplant activity and then applied this protocol prospectively to every single patient undergoing liver transplantation at our institution, monitoring the results periodically. We now report our results after 100 months of activity.

Patients and Methods: Prospective cohort study of all the liver transplants performed since we started our program 100 months ago. Balanced general anesthesia, fluid restriction, thromboelastometry, inferior vena cava preservation and temporary portocaval shunt were strategies common to all cases. Our standard protocol for immunosuppression included steroids, tacrolimus (delayed in the setting of renal impairment, with basiliximab induction added) and mycophenolate mofetil. Tacrolimus dosing was adjusted using a Bayesian estimation methodology. Oral intake and ambulation were started very early.

Results: A total of 316 liver transplants were performed in 302 patients (241M/61F) over 100 months, mean age 57.1±9.4 years, raw MELD score 15.2±7.8 (MELD-Na 17.2±8). Predominant etiologies were alcohol (n = 178) and HCV (n = 99), with hepatocellular carcinoma present in 166 (55%). Twenty-two of the 316 transplants were URGENT (7%) and thirteen of them were performed for Fulminant Hepatic Failure. Fourteen patients underwent combined liver and kidney transplants. The median operating time was 309min (range 167-546) with median cold ischemia time of 267min (130-628). We transfused PRBCs in the OR in 45 cases (14.2%) at an average of 2.4±1.2 units per case. Median ICU LOS was 12.7 hours, and median post-transplant hospital LOS was 4 days (2-82) with 43 patients (15.1%) going home by the 2nd postransplant day, 115 (40.5%) by the 3rd, and 167 (58.8%) by the 4th day, which defines the LOS of our fast-track group (2-4 days). Overall thirty-day-readmission rate was 35.6%, and it was significantly lower (28.7% vs. 45.3% p=0.0041) in the fast-track group. Patient survival was 87.5% at 1 year and 78.9% at five years for the entire series.

Conclusion: Fast-Tracking of Liver Transplant patients is feasible and can be applied as the standard of care.

FP04.06
LIVERCOLOR: AN ALGORITHM QUANTIFICATION OF LIVER GRAFT STEATOSIS USING MACHINE LEARNING AND COLOR IMAGE PROCESSING

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Background: The use of liver donors with significant macrosteatosis is associated with a worse outcome and this is one of the major reasons to decline liver grafts for liver transplantation. Deceased liver donor acceptance is mostly based in subjective surgeon criterion of liver aspect, due to macrosteatosic livers acquire a yellowness feature.

Aim: To develop a machine learning model using a color mobile calibrated images for the determination of macrosteatosis in liver grafts.

Methods: The algorithm has been developed in a University Department for New Medical Technologies.

For each deceased donor a total of 5 pictures were taken. The photography was carried out using mobile telephony systems with a 12-megapixel camera. The surgeon had to place a previously sterilized flat grey plastic checker card next to the liver to be photographed, oriented toward the direction of the incident light of the mobile camera and all the images were taken at a distance of 10 cm from the liver.

All the grafts underwent two separate tru-cut needle biopsies, one for the left lobe and the other for the right one. Steatosis was assessed based on the percentage of hepatocytes with macrovesicular steatosis as mild ($< 30\%$) or moderate-severe ($\geq 30\%$).

All liver images were color calibrated and segmented and a feature extraction based on L*a*b* color space (L* represents luminescence layer, a* chromatic layer for the red-green edge and b* chromatic layer for the yellow-blue edge) and Local Binary Pattern was performed.

Results: Forty-two donors were included for training and testing cohorts and 73 liver images were retained. Eleven images were excluded due to slow-quality image resolution. Sixty-hundred and forty-five liver patches were performed (344 from the right liver and 301 from the left liver). The best learning model was obtained with the a* chromatic as predictor. It has an accuracy of 85,3% and the specificity for the moderate-severe grades is of 98%.

Conclusions: LiverColor machine learning has an excellent accuracy and specificity to determine liver macrosteatosis.

Image Legend: flowchart of the study

FP04.07

RENOPORTAL ANASTOMOSIS DURING LIVER TRANSPLANTATION IN PATIENTS WITH PORTAL VEIN THROMBOSIS: FIRST LONG-TERM RESULTS FROM A MULTICENTER STUDY

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Purpose: To evaluate the short- and long-term outcomes of renoportal anastomosis (RPA) in a large multicentric series.

Summary Background: The current knowledge on RPA for portal reconstruction during liver transplantation (LT) in patients with diffuse portal vein thrombosis (PVT) and a large splenorenal shunt (SRS) is poor and limited to case reports and small case series.

Method: All consecutive LTs with RPA performed in 5 centers between 1998 and 2020 were included. RPA was physiological provided it drained the splanchnic venous return through a large SRS ($\geq$1 cm diameter). Complications of portal hypertension (PHT), long-term RPA patency, and patient and graft survival were assessed. RPA success was achieved provided the 3 following criteria were all fulfilled: patients were alive with patent RPA and without clinical PHT.

Results: RPA was attempted and feasible in 57 consecutive patients and was physiological in 51 patients (89.5%). Ninety-day mortality occurred in 5 (8.5%) patients, and PHT-related complications occurred in 42.9% of patients. With a median follow-up of 63 months, the 1-, 3- and 5-year patient and graft survival rates were 87%, 83%, and 76% and 82%, 80%, and 73%, respectively. The primary and primary-assisted patency rates at 5 years were 84.5% and 94.3%, respectively. Success was achieved in 90% (27/30) of patients with a follow-up $\geq$ 5 years.

Conclusions: Despite a high rate of PHT-related complications, excellent long-term patient and graft survival could be achieved. RPA could be considered successful in the vast majority of patients. The expanded use of RPA is warranted.

FP04.08

SAFETY AND OUTCOME OF 248 CONSECUTIVE ROBOTIC DONOR HEPATECTOMY, SINGLE CENTER EXPERIENCE

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Introduction: The first robotic living donor right hepatectomy was reported by Giulianotti et al. in Chicago, USA in 2011. Since then, only few centers successfully introduced robotic living donor hepatectomy programs (Taiwan, Saudi Arabia, Korea, and China).

The robotic surgical system and instruments have multiple advantages over the available conventional laparoscopic devices; it offers better visualization, the best ergonomics, a better range of movements, and reduced physiological tremors. Moreover, the amplified 3-D view with steady instrumental movements ensured meticulous tissue handling, precise parenchymal dissection, and easier suturing abilities.

Methods & results:

Robotic Living Donor Hepatectomy Post Operative In-hospital Donor Morbidities 21 Nov 2018 – 30 Dec 2020

	Robotic = 248
Post Operative Follow up time: mean, range (min-max), days	383.0, 770 (25-795)
Morbidity rate (n,%)	18 (7.2%)
Hematoma, CL II	7 (2.8%)
Biliary leak, CL II	5 (2%)
Pancreatitis	1 (0.4%)
Allergic reaction, CL II	1 (0.4%)
Abdominal collection treated with antibiotics, CL II	1 (0.4%)
Local controlled DVT	1 (0.4%)
Pulmonary embolism	2 (0.8%)
Death	0

King Faisal Specialist Hospital and Research Center is considered the largest single center Living Donor Liver Transplant (LDLT) program in the region with >150 LDLT per year.

A proctored program of Robotic donor hepatectomy has been started in our center since November 2018. Since November 2018 until December 2020 , 248 robotic donor hepatectomies have been performed with only 2 donors (0.8%) converted to an open approach. Ninety three grafts were left lateral segments for pediatric liver transplant, 51 were left lobes and 104 were right lobes. During the same time period, only 6 right lobe donors were performed with open approach due to logistic reasons and no anatomical variations were considered as a reason for open approach. All left lateral segments and left lobe grafts in our center since the beginning of the robotic program (November 2018) were performed robotically.