Oral Presentation IV

IV-1

The Whole Changes That Took Place to Seek Surgically Safe and Feasible Renoportal Anastomosis in the Field of Living Donor Liver Transplantation

Asan Medical Center, University of Ulsan College of Medicine, Seoul, Korea

Deok-Bog Moon, Sung-Gyu Lee, Chul-Soo Ahn, Shin Hwang, Ki-Hun Kim, Tae-Yong Ha, Gi-Won Song, Gil-Chun Park, Dong-Hwan Jung, Jung-Man Namkoong, Chun-Soo Park, Hyeong-Woo Park, Yo-Han Park

Purpose: When End-stage liver disease patients have obliterated portal vein (PV) and large sponatenous splenorenal shunts (SRS), renoportal bypass is the best option as a reconstruction of portal inflow for successful liver transplantation. Once we used same method to Kato et al.'s report for adult-to-adult LDLT. However, after disastrous experience of E-to-E RPA related to very thin-walled LRV and its retraction to deep operative field following division, we have been sought more safe and feasible methods. From our experiences of RPA for LDLTs, we would like to present better approaches by introduction of the whole changes that took place in RPA at our institution.
Methods: RPA has been performed in 9 patients among 1621 adult-to-adult LDLTs from October 2005 to October 2011. We developed and reported technique of side-to-end (S-to-E) RPA without division of LRV to perform easy and secure anastomosis under better and more stable operation field. Cadaveric fresh vessel grafts were used for interposition graft to avoid possible complication following harvest of autogenous internal jugular vein. However, relative scarcity of organ donation in Korea hindered us to perform timely LDLT for recipients imminently requiring RPA. To overcome shortage fresh vessel graft, we first used externally stented polytetrafluoroethylene (PTFE) artificial graft and reported successful result. Recently we found E-to-E RPA is also surgical very safe and feasible method if we add additional dissection around inferior vena cava (IVC) and use IVC cuff having thick wall and wide opening for E-to-E RPA.
Results: S-to-E RPA were performed in 6 patients and all patients except 1 dead patient related to brain hemorrhage were alive without complication. E-to-E RPA was performed in 3 patients and alive. The first patient performed at early period, however, developed stenosis of RPA on posttransplant 1 day because of thin LRV wall and poor operation field after division of LRV related to retraction. However, the 2nd and 3rd patients were performed recently without difficulty because we used IVC cuff of LRV having thick wall and large opening. As an interposition graft, cadaveric fresh vessel graft were used for initial 5 patients including iliac vein in 3 and aorta in 2. Thereafter, artificial vascular graft including externally stented PTFE and Dacron graft were currently used in remaining 3 patients. All of interposed vascular graft were patent without complication.
Conclusions: As we describes above, End-to-End RPA using IVC cuff is also feasible and safe technique compared to Side-to-End RPA, and artificial vascular graft is a good alternative option in the absence of cadaveric fresh vessel graft.

IV-2

Portal Vein Pressure Monitoring Aided Direct Spleno-renal Shunt Ligation in a Patient with Big Spleno-renal Shunt

Department of Surgery, Seoul National University College of Medicine

Youngrok Choi, Kwang-Woong Lee, Hyeyoung Kim, Min-Su Park, Geun Hong, Shozo Mori, Nam-Joon Yi, Kyung-Suk Suh

Video: The patient with severe organizing thrombus in the main portal vein or narrowed main portal vein with big spleno-renal shunt is challenging. Portal vein thrombectomy is not enough to overcome this situation because of small sized portal vein and poor portal flow. Renal vein ligation is one of the methods to increase portal flow. Direct spleno-renal shunt ligation is an alternative straightforward method to solve this problem. However, severe portal hypertension can be developed and result in prolonged ascites and severe bowel edema after this procedure. In this video,

we introduced direct spleno-renal shunt ligation guided by portal vein pressure monitoring in a 54 year old female patient. Pressure catheter was inserted via a branch of inferior mesenteric vein. Before recipient's hepatectomy, PV pressure was 16 mmHg. After graft implantation, pressure was dropped to 11 mmHg. The pressure was increased up to 17 mmHg and no severe bowel edema after test-clamping of spleno-renal shunt. The spleno-renal shunt was ligated and portal pressure was 15 mmHg before abdominal wall closure. Follow-up CT showed narrowed main portal vein, but there was no portal hypertension related symptoms.

IV-3

Lowering Graft-to-recipient Weight Ratio Safely to 0.7% without Portal Pressure Modulation in Living Donor Liver Transplantation

Center for Liver Cancer, National Cancer Center, Korea

Seung Duk Lee, Seong Hoon Kim, Young-Kyu Kim, Sung-Sik Han, Sang-Jae Park

The low graft-to-recipient weight ratio (GRWR) in adult-to-adult living donor liver transplantation (LDLT) is one of the major risk factors affecting graft survival. Recently though, recently good graft survivals using small-for-size grafts (SFSGs) were reported. We compared the outcomes of LDLT recipients using the right lobe for 7 years according to GRWR, and evaluated the safe lower limit. From January 2005 to November 2011, 317 consecutive patients from a single institute underwent LDLT with right lobe grafts without portal pressure modulation. Of these, 23 had GRWR $<0.7\%$ (group A), 27 had GRWR 0.7%-0.8% (group B), and 267 had GRWR $\geq 0.8\%$ (group C). We reviewed medical records, including recipient, donor, operation factors, and complications. In addition, laboratory changes associated with liver functions were analyzed for one year after LDLT. The baseline demographics were similar except for recipient BMI and donor sex among groups. For small-for- size syndrome (SFSS), there were 3 (13.0%) in group A, 1 (3.7%) in group B, and 2 patients (0.7%) in group C ($P<0.001$). Hepatic artery thrombosis were more frequently observed in group A than in groups B and C (13.0% vs. 3.7% vs. 1.9%, P=0.008). However, among the three groups, graft survival rates at 1 year (100% vs. 96.3% vs. 93.6%) and 3 years (91.7% vs. 73.2% vs. 79.9%) were not different (P=0.539). In laboratory changes, there were no groups difference in total bilirubin and albumin. However, prothrombin time was higher in group A within postoperative 1 week and platelet count was observed to be lower in groups A and B within postoperative 1 month. In conclusion, a GRWR can be lowered to 0.7% safely without portal pressure modulation in adult-to-adult LDLT using the right lobe.

IV-4

Multivisceral Procurement: The First Case in Korea (Video Clip)

Division of HB Surgery and Liver Transplant, Deparment of Surgery, Ulsan University, Asan Medical Center, Korea

Ki-Hun Kim, Jung-Man Namkoong, Dae-Yeon Kim, Yong-Phil Cho, Yo-Han Park, Cheon-Soo Park, Hyung-Woo Park, Gil-Chun Park, Dong-Hwan Jung, Gi-Won Song, Tae-Yong Ha, Deok-Bog Moon, Chul-Soo Ahn, Shin Hwang, Sung-Gyu Lee

Multivisceral transplantation is defined as the transplantation of three or more organs en-bloc, namely the liver together with the pancreatodudenal complex, the stomach as well as the small bowel +/- right hemicolon. In some cases a kidney has been included. The first experimental multivisceral transplantations were performed by Starzl and Kraupp back in 1960. It was the same author who reported on the first clinical case carried out in 1983. Multivisceral transplantations are performing worldwide for patients with short bowel syndrome or gastrointestinal motility disorders like chronic intestinal pseudo-obstruction associated or not with irreversible total parenteral nutrition related liver failure. Other diseases are represented by massive splanchnic thrombosis involving the mesoportal axis or abdominal tumors like desmoids in Gardner syndrome or neurofibromatosis involving all abdominal structure. Sometimes previous extensive abdominal surgeries are indications to extend the transplant from an isolated small bowel to a multivisceral

one. Indications for transplant are TPN-related complications, like recurrent central line sepsis, loss of central venous access, and liver failure. Here, we report first successful mutivisceral procurement from a 9-year old female who suffered from the brain tumor as a video clip.

IV-5

Transverse Incisional Donor Right Hepatectomy Assisted by Laparoscopy

Department of Surgery, Seoul National University College of Medicine, Korea

Kyung-Suk Suh, Young Rok Choi, Hyeyoung Kim, Min-Su Park, Geun Hong, Shozo Mori, Nam-Joon Yi, Kwang-Woong Lee

Video: Living donor hepatectomy is now well established surgical procedure. However, it leaves a large scar in a donor's abdomen. This make some donors and even surgeons reluctant to undergo the procedure. We perfomed the transverse incisional donor right hepatectomy assisted by laparoscopy. After incision was made, laparoscopy was introduced through main incisional wound. With retraction of the liver to left side by assistant, the right liver was mobilized by ultrasonic shears or sometimes with cautery either by laparoscipic vision or sometimes by direct vision. Small hepatic veins draining to retrohepatec IVC were divided with clips or by shears. After finishing mobilization of the right liver Nelatone tube was introduced between right hepatic vein and middle hepatic vein. Hilar dissection, and parenchymal transection were performed under direct vision and middle hepatic vein branches were preserved using hem-o-lock clips. When deeper part of parenchyma was not seen well, laparoscopy was reintroduced. After finishing parenchymal dissection, division of hepatic artery and right portal vein, the right hepatic vein is retracted anteriorly with right angle clamp and TA was applied and divided. The graft was extracted through the mini-incisional site. On the back table, the MHV branches were reconstructed using an artificial vascular graft.

IV-6

Computational Simulation-Based Vessel Interposition Reconstruction Technique for Portal Vein Hypoplasia in Pediatric Liver Transplantation

Department of Surgery, Asan Medical Center, University of Ulsan College of Medicine, Seoul, Korea

Chun-Soo Park, Shin Hwang, Dae Yeon Kim, Ki-Hun Kim, Chul-Soo Ahn, Deok-Bog Moon, Tae-Yong Ha, Gi-Won Song, Dong-Hwan Jung, Gil-Chun Park, Jung-Man Namgoong, Hyeong-Woo Park, Yo-Han Park, Sung-Gyu Lee

Purpose: To enhance the technical feasibility of portal vein (PV) interposition grafting for pediatric PV hypoplasia, we performed a computational simulation study to establish a customized surgical technique to securely anastomose an iliac vein graft to the severely hypoplastic PV stump.

Materials and Methods: Based on the literature and on our own experience of reconstruction of PV hypoplasia, we devised three types of recipient PV stump preparations and three types of interposition vein graft ends, which gave five technically feasible combinations.

Results: The reconstruction models, featuring three types of recipient-side stump preparations and three types of vessel graft ends, are illustrated. After consideration of severe PV hypoplasia, 3 combinations of type B-2, type B-3, and type C-3 appeared to the feasible combinations. After performing analysis with computational simulation model, the combination of inverted-Y incision and transverse end with a longitudinal slit (type C-3) was the most promising method because it yielded the widest anastomotic area and a streamlined anastomotic configuration. During the artificial vessel model study, we recognized that the triangular vein wall at the confluence (at the joined portion of the inverted-Y) was over-sewn, leading to some loss of vein wall. With repeated trials, we found that sequentially adding small lateral incisions after suturing of the central portion is more feasible and gives rise to an inverted-T shape incision. Thus,

we concluded that the most feasible combination is a sequential inverted-T incision at the SMV-SV confluence and a transverse end with a longitudinal slit. This reconstruction model is compatible to sequential application of type C-2 and type C-3. The computational simulation model for PV reconstruction using an interposition vein graft revealed that the most feasible combination was a sequential inverted-T incision to the superior mesenteric vein-splenic vein confluence and a transverse vein graft end with a longitudinal slit. Its technical feasibility was also validated by subsequent artificial suture model study. This reconstruction model was clinically applied to treat a 7.2 Kg-weighing 10-month-old female patient with biliary atresia and a severely hypoplastic PV. The PV reconstruction was successful and the patient recovered uneventfully.

Conclusions: We present a simplified surgical technique for PV interposition reconstruction that is applicable to pediatric patients with severe PV hypoplasia. The technique was developed based on computational simulation analysis. By application of a tadpole-shaped anastomosis between the femoral vein allograft and the recipient SMV-SV confluence, a large PV conduit is effectively created that provides sufficient portal blood inflow. We think that this technique can be a surgical option for PV reconstruction in pediatric liver transplantation.