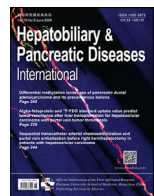




Contents lists available at ScienceDirect

Hepatobiliary & Pancreatic Diseases International

journal homepage: www.elsevier.com/locate/hbpd

Editorial

Living donor liver transplantation: A complex but worthwhile undertaking

Jan Lerut*

Institute for Experimental and Clinical Research (IREC), Université catholique Louvain (UCL), Avenue Hippocrate 55 1200 Brussels, Belgium



Prof. Jan Lerut, Deputy chief editor, *Hepatobiliary & Pancreatic Diseases International*

Since its' first applications in clinical pediatric and adult liver transplantation practice by Strong et al. and Makuuchi in 1989 [1,2], living donor liver transplantation (LDLT) has been an ever increasing part of the today's practice of liver transplantation.

Based on different donor demographics (living donation vs. deceased donation) and on much larger experiences with partial liver resection (aggressive resection in cirrhotic patients versus non-surgical, locoregional treatments), LDLT merely developed in Asian countries. Indeed nowadays, this technique accounts for more than 90% of the transplantation activity in the Eastern hemisphere, whereas it accounts only for 5% of activities in the Western one [3,4].

LDLT implies high ethical, medical and surgical standards. To be successful in both donor and recipient operations surgical and medical skills are required in the setting of a "real" multidisciplinary collaboration [5-7].

In this special issue of *Hepatobiliary & Pancreatic Diseases International*, several world experts were invited to share their experiences in relation to the surgical and medical care of LDLT.

Different "technical papers" address the importance of surgical perfection and proficiency when dealing with the arterial, venous and biliary structures of the graft both at procurement and at implantation. Feng et al. from the Shanghai Jiao Tong University School of Medicine show, in a series of children, that small caliber arterial reconstructions do not any longer hinder allograft implantation [8]. Precisely, microsurgical techniques and routine

post-operative Doppler flow monitoring almost eliminated (0.4%) arterial thrombosis. A compromised portal venous status seriously affects the graft implantation. The more extended the congenital or acquired, splanchnic venous anomaly, the more inventive the surgical solution should be as nicely documented by the SNUH team (Lee JM and Lee KW) [9]. Guaranteeing an optimal venous outflow is the last important feature to overcome successfully the early post-transplant period. The Ankara team (Balci et al.) developed a precise, computerized cartography of hepatic veins and their respective parenchymal territories. This knowledge is fundamental to plan perfectly donor and recipient surgeries [10].

Similar to postmortem liver transplantation, biliary complications are the Achilles' heel of LDLT. This problem has been tackled in a systematic way by the Kaohsiung team (Lin et al.) [11]. The surgical technique consisting of routine microsurgical anastomosis and ductoplasty reduced the incidence to a remarkable low of 10%. When occurring, endoscopic treatment is the preferred management. This detailed analysis based on a large experience generated an "LDLT biliary tract algorithm". The proposed classification of biliary complications, anatomic biliary tract variations and management strategies will undoubtedly influence the practice of biliary tract handling not only in both donor and recipient surgeries but also in complex liver surgery.

LDLT is evidently more than just technical skills. To be successful, optimal pre-, peri- and postoperative care are of paramount importance. The Kyoto group (Kaido et al.) looked at eliminating donor and recipient risk factors [12]. Precise studies of portal vein hemodynamics, quality of partial liver grafts, including the recipient's splenic volume and, finally, both donor and recipient's muscle mass and nutritional status allow to implant safely very small for size liver grafts (up to 0.6% graft body weight ratio). Minimal donor morbidity and an exceptional 99% one-year recipient survival are the reward of this longstanding project. The "high-risk, high-return" LDLT procedure has now been turned into a "low-risk, high-return" endeavor.

The surgical experiences, gained during three decades, provide resolutions for almost all technical problems of the procedure [13]. The spectacular evolution of LDLT triggered the interest of many teams to look at possibilities allowing to widen the access of this therapy. Reducing the volume of the liver graft to a minimum but covering the metabolic demands of the recipient represents one aspect of this research. Soejima's team has focused on the small

* Corresponding author.
E-mail address: Jan.Lerut@uclouvain.be

for size grafting (SFSG) and syndrome (SFSS) for many years. Too small liver grafts indeed compromise graft and patient outcome. Masuda et al. give an excellent and concise overview of the actual status of SFSG and of the different therapeutic options to overcome the SFSS [14]. Overruling the barrier of ABO-blood groups is another, but complex, means to widen the access to transplantation. Egawa (Tokyo) and the Japanese liver transplantation community are on the way to unravel the complex immunological process of antibody-mediated rejection using a strategy combining “rituximab-desensitization” and plasmapheresis [15].

This issue aims at further fostering the interest of the liver transplantation community, especially the Western one, for LDLT. Indeed LDLT is the only possibility to enlarge substantially the liver allograft pool [13]. Every effort should be undertaken to make it safe and successful for both liver donor and recipient! To quote SG Lee, LDLT is indeed a very good and useful operation! [13].

CRedit authorship contribution statement

Jan Lerut: Conceptualization, Writing - original draft, Writing - review & editing.

Funding

None.

Ethical approval

Not needed.

Competing interest

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

References

- [1] Strong RW, Lynch SV, Ong TH, Matsunami H, Koido Y, Balderson GA. Successful liver transplantation from a living donor to her son. *N Engl J Med* 1990;322:1505–1507.
- [2] Makuuchi M. Living donor liver transplantation: looking back at my 30 years of experience. *Surg Today* 2019;49:288–294.
- [3] Chen CL, Kabilig CS, Concejero AM. Why does living donor liver transplantation flourish in Asia? *Nat Rev Gastroenterol Hepatol* 2013;10:746–751.
- [4] Nadalin S, Capobianco I, Panaro F, Di Francesco F, Troisi R, Sainz-Barriga M, et al. Living donor liver transplantation in Europe. *Hepatobiliary Surg Nutr* 2016;5:159–175.
- [5] Cheah YL, Simpson MA, Pomposelli JJ, Pomfret EA. Incidence of death and potentially life-threatening near-miss events in living donor hepatic lobectomy: a world-wide survey. *Liver Trans* 2013;19:499–506.
- [6] Miller C, Smith ML, Fujiki M, Uso TD, Quintini C. Preparing for the inevitable: the death of a living liver donor. *Liver Trans* 2013;19:656–660.
- [7] Rössler F, Sapisochin G, Song G, Lin YH, Simpson MA, Hasegawa K, et al. Defining benchmarks for major liver surgery: a multicenter analysis of 5202 living liver donors. *Ann Surg* 2016;264:492–500.
- [8] Feng MX, Zhang JX, Wan P, Qiu BJ, Gu LH, Zhang JJ, et al. Hepatic artery reconstruction in pediatric liver transplantation: experience from 259 consecutive cases in a single center. *Hepatobiliary Pancreat Dis Int* 2020;19.
- [9] Lee JM, Lee KW. Techniques for overcoming atretic changes of the portal vein in living donor liver transplantation. *Hepatobiliary Pancreat Dis Int* 2020;19.
- [10] Balci D, Kirimker EO. Hepatic vein in living donor liver transplantation.. *Hepatobiliary Pancreat Dis Int* 2020;19.
- [11] Lin TS, Co JS, Chen CL, Ong AD. Optimizing biliary outcomes in living donor liver transplantation: evolution towards standardization in a high-volume center. *Hepatobiliary Pancreat Dis Int* 2020;19.
- [12] Kaido T. Recent evolution of living donor liver transplantation at Kyoto University: how to achieve a one-year overall survival rate of 99%? *Hepatobiliary Pancreat Dis Int* 2020;19.
- [13] Lee SG. A complete treatment of adult living donor liver transplantation: a review of surgical technique and current challenges to expand indication of patients. *Am J Transplant* 2015;15:17–38.
- [14] Masuda Y, Yoshizawa K, Ohno Y, Mita A, Shimizu A, Soejima Y. Small-for-size syndrome in liver transplantation: definition, pathophysiology, and management. *Hepatobiliary Pancreat Dis Int* 2020;19.
- [15] Egawa H. Challenge to ABO blood type barrier in living donor liver transplantation. *Hepatobiliary Pancreat Dis Int* 2020;19.

Received 18 June 2020

Accepted 22 June 2020

Available online xxx