



Biliary Complications after Living Donor Liver Transplantation Differ from Those after Deceased Donor Liver Transplantation

Sung Ill Jang and Dong Ki Lee

Department of Internal Medicine, Gangnam Severance Hospital, Yonsei University College of Medicine, Seoul, Korea

Corresponding Author

Dong Ki Lee

ORCID <https://orcid.org/0000-0002-0048-9112>

E-mail dklee@yuhs.ac

See “Endoscopic and Percutaneous Biliary Interventions after Liver Transplantation: Nationwide Data in Korea” by Seung Bae Yoon, et al. on page 300, Vol. 16, No. 2, 2022

Yoon *et al.*¹ analyzed 3,481 Korean patients who underwent liver transplantation (LT) between 2012 and 2014, followed by endoscopic and radiological biliary interventions. This paper was meaningful as it was a national survey using Korea Health Insurance Review and Assessment data.² However, the codes reflected only the procedures performed; the reasons, methods, and results were lacking. Also, it was unclear whether surgery featured duct-to-duct anastomosis or hepaticojejunostomy in patients undergoing living donor LT (LDLT).

LT in Korea differs markedly from that in Western countries. The LDLT rate is more than 2-fold higher than that of deceased donor LT (DDLT).³ Lee *et al.*³ established right-lobe LDLT in Korea. Accordingly, in recent years, Korea has become a leading country in LDLT. In Korea's family-centered culture, this surgery has become a source of hope for end-stage liver-disease patients. However, compared to DDLT, LDLT is more difficult and is associated with a higher incidence of biliary complications.⁴ Duct-to-duct anastomosis is preferred to hepaticojejunostomy in LDLT for various reasons. When duct-to-duct anastomosis is performed, the bile duct anastomosis site is higher (at the hilum) than in DDLT. In LDLT, the angle between the bile duct of the new liver and the extrahepatic bile duct is acute, which is associated with risks of ischemia and traction in surrounding tissues. If the transplanted liver becomes hypertrophic, an anastomotic stricture is possible.⁵⁻⁸ Also, anastomotic stricture sometimes accompanies bile leakage.

Yoon *et al.*¹ reported that the average number of biliary interventions in LDLT patients was 3.4±2.0, of which the

first was required at 7.7 months after surgery. However, biliary complications persist for a long time after LDLT. Several interventions are required due to the underlying tissue ischemia and the consequent traction trigger repeated strictures.⁷ Benign biliary stricture (BBS) treatment seeks to achieve tissue distension without inducing (irreversible) fibrosis. BBS treatment is thus time-consuming. Recently, a modified, removable, fully-covered self-expandable metal stent has been used instead of multiple plastic stents (aggressive endoscopic treatment) to reduce the treatment time of BBS.⁵⁻⁹ Even when this affords complete stricture resolution, re-stricture often occurs. Yoon *et al.*¹ enrolled patients who underwent LT between 2012 and 2014, and followed up until 2015. The median follow-up period was 30.7 months (range, 21.2 to 39.6 months). Some follow-up periods were <2 years, which is relatively short. Endoscopists and interventional radiologists who encounter BBS in clinical practice agree that anastomotic strictures of LDLT patients are challenging to treat and frequently recur.⁷ In some patients with BBSs after LDLT, the anastomotic strictures are totally occluded. Such patients have recently been treated via magnetic compression anastomosis.¹⁰ A percutaneous tract is required for magnet delivery; several biliary interventions are needed to prepare and maintain a new anastomotic fistula. The treatment period is extended. In Korea, where LDLT accounts for >70% of all LT, the number of biliary complications will be higher than in patients undergoing DDLT.³ Yoon *et al.*¹ found that the frequency of biliary intervention after LT in Korea was similar to that of previous studies. However, longer follow-up and more precise data are required to evaluate the actual fre-



quency of biliary intervention in LDLT patients accurately.

In the future, most LT will be LDLT; DDLT is becoming rarer worldwide, not only in Korea. As LDLT experience increases and the surgical techniques improve, the incidence of biliary tract complications after LDLT may decrease. However, some biliary complications are inevitable. Korea must develop an effective intervention strategy based on accurate complication data.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

ORCID

Sung Ill Jang <https://orcid.org/0000-0003-4937-6167>
Dong Ki Lee <https://orcid.org/0000-0002-0048-9112>

REFERENCES

1. Yoon SB, Kim J, Paik CN, et al. Endoscopic and percutaneous biliary interventions after liver transplantation: nationwide data in Korea. *Gut Liver* 2022;16:300-307.
2. Kim JA, Yoon S, Kim LY, Kim DS. Towards actualizing the value potential of Korea Health Insurance Review and Assessment (HIRA) data as a resource for health research: strengths, limitations, applications, and strategies for optimal use of HIRA data. *J Korean Med Sci* 2017;32:718-728.
3. Lee SG, Moon DB, Hwang S, et al. Liver transplantation in Korea: past, present, and future. *Transplant Proc* 2015;47:705-708.
4. Yoo S, Jang EJ, Yi NJ, et al. Effect of institutional case volume on in-hospital mortality after living donor liver transplantation: analysis of 7073 cases between 2007 and 2016 in Korea. *Transplantation* 2019;103:952-958.
5. Jang SI, Lee DK. Anastomotic stricture after liver transplantation: It is not Achilles' heel anymore! *Int J Gastrointest Interv* 2018;7:57-66.
6. Balderramo D, Navasa M, Cardenas A. Current management of biliary complications after liver transplantation: emphasis on endoscopic therapy. *Gastroenterol Hepatol* 2011;34:107-115.
7. Park JK, Yang JI, Lee JK, et al. Long-term outcome of endoscopic retrograde biliary drainage of biliary stricture following living donor liver transplantation. *Gut Liver* 2020;14:125-134.
8. You MS, Paik WH, Choi YH, et al. Optimal biliary drainage for patients with biliary anastomotic strictures after right lobe living donor liver transplantation. *Liver Transpl* 2019;25:1209-1219.
9. Çağın YF, Erdoğan MA, Sağlam O, et al. Optimal endoscopic management of anastomotic strictures after double-biliary reconstruction in right lobe living-donor liver transplantation. *Balkan Med J* 2021;38:348-356.
10. Jang SI, Cho JH, Lee DK. Magnetic compression anastomosis for the treatment of post-transplant biliary stricture. *Clin Endosc* 2020;53:266-275.