

## Answering Reviewers

Thank you for reviewing my article. Moreover, I appreciated for your comments to authors. I and co-authors carefully reviewed and modified articles according to your comments. I hope it would be acceptable to reviewers. Again, thank you very much.

### *Reviewed by 02438650*

1. How about the cold storage time in both Group 1 and Group 2. Why the authors wouldn't list the cold storage time as a patient baseline characteristic in Table 1.

Thank you for your comments. Unfortunately, we only have a total ischemic time including warm and cold. However, cold ischemic time was very short during LDLT. Total ischemic time was added in Table 1. There was no difference between Group 1 and Group 2 ( $P=0.529$ ).

**Table 1. ~~B~~Patient baseline characteristics of the patients.**

| Variable                                   |                           |
|--------------------------------------------|---------------------------|
| Recipient age (yr) *                       | 49.7 ± 10.1 (13–68)       |
| Older age patients (>65 yr)                | 6 (3.1%)                  |
| Recipient sex (M/F)                        | 138 (70.0%)/58 (30.0%)    |
| Donor age (yr) *                           | 34.0 ± 10.9 (16–64)       |
| Older donor age (>60 yr)                   | 2 (1.0%)                  |
| Donor sex (M/F)                            | 114 (58.2%) / 82 (41.8%)  |
| Age difference (recipient age – donor age) | 15.7 ± 14.4 (-22 to 42)   |
| MELD score $\mathcal{f}$                   | 17.4 ± 10.4 (2.1 to 58.1) |
| High score patients (>35)                  | 13 (6.6%)                 |
| Cause                                      |                           |
| LC-B†                                      | 51 (26.0%)                |
| LC-C†                                      | 4 (2.0%)                  |
| Alcohol                                    | 27 (13.8%)                |

|                                                     |                      |
|-----------------------------------------------------|----------------------|
| Hepatocellular carcinoma                            | 80 (40.8%)           |
| Combined                                            | 5 (2.6%)             |
| Hepatitis A                                         | 9 (4.6%)             |
| Other (drug, autoimmune, unknown)                   | 20 (10.2%)           |
| Total ischemic time                                 | 91.5 ± 16.0 (60–145) |
| Group 1 ‡                                           | 93.7 ± 17.9          |
| Group 2 ‡                                           | 88.8 ± 15.1          |
| Number of patients with biliary intervention        | 89 (45.4%)           |
| ERCP                                                | 38                   |
| PTBD ¶                                              | 12                   |
| Both (ERCP and PTBD)                                | 38                   |
| Re-operative intervention                           | 0                    |
| Mean duration without biliary intervention (months) | 33.5 ± 28.6 (1–89)   |

\* Mean age

† LC, liver cirrhosis

‡ The groups were categorized according to the anastomosis site angle (median angle = 113.3°); group 1, angle > 113.3°; group 2, angle ≤ 113.3°

§ MELD, model for end-stage liver disease

|| Endoscopic retrograde cholangiopancreatography

¶ Percutaneous transhepatic biliary drainage

2. Before biliary anastomosis, how many cases (both donors and recipients ) with biliary variation in both Group 1 and Group 2.

First, in donors, Group 1 had 28 patients with biliary variation and Group 2 had 22 patients with biliary variation. Plasty or double duct to duct anastomosis was done in these patients with biliary variation.

However, in recipients, lacking of data we had, we couldn't find biliary variation exactly. Except donor variation is existed, recipient's common hepatic duct was used for biliary anastomosis in almost cases.

3. Biliary intervention was defined as procedures involving ERCP and PTBD in your manuscript. Whether some biliary complications need re-operative intervention?

89 patients underwent biliary procedures including ERCP and PTBD; 38 patients with both ERCP and PTBD, 12 patients with only PTBD and 38 patients with only ERCP. Performing PTBD and ERCP both in appropriate cases, there were no re-operative interventions in whole 89 patients.

*Reviewed by 02540061*

Major concerns:

1. MRCP was performed on a routine base as standard operative procedure? What was the proportion of asymptomatic patients at time of MRCP?

Thank you for your comments. In our transplant clinic, MRCP on 1 month after LDLT is a standard procedure to check postoperative biliary system and possible complications. Patients included in this study didn't show symptoms at that time.

2. Moreover, information concerning clinical status, lab examination, treatment modality of the biliary complication (which intervention, number of interventions, surgical treatment with bilio-digestive anastomosis or others) is mandatory.

In table 1, Intervention method and number were added.

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|                                                                                                                                                 |                           |
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| Older donor age (>60 yr)                                                                                                                        | 2 (1.0%)                  |
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| Age difference (recipient age – donor age)                                                                                                      | 15.7 ± 14.4 (-22 to 42)   |
| MELD score §                                                                                                                                    | 17.4 ± 10.4 (2.1 to 58.1) |
| High score patients (>35)                                                                                                                       | 13 (6.6%)                 |
| Cause                                                                                                                                           |                           |
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| Hepatocellular carcinoma                                                                                                                        | 80 (40.8%)                |
| Combined                                                                                                                                        | 5 (2.6%)                  |
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| Group 1 ‡                                                                                                                                       | 93.7 ± 17.9               |
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| Number of patients with biliary intervention                                                                                                    | 89 (45.4%)                |
| ERCP                                                                                                                                            | 38                        |
| PTBD ¶                                                                                                                                          | 12                        |
| Both (ERCP and PTBD)                                                                                                                            | 38                        |
| Re-operative intervention                                                                                                                       | 0                         |
| Mean duration without biliary intervention (months)                                                                                             | 33.5 ± 28.6 (1–89)        |
| * Mean age                                                                                                                                      |                           |
| † LC, liver cirrhosis                                                                                                                           |                           |
| ‡ The groups were categorized according to the anastomosis site angle (median angle = 113.3°); group 1, angle > 113.3°; group 2, angle ≤ 113.3° |                           |
| § MELD, model for end-stage liver disease                                                                                                       |                           |
| Endoscopic retrograde cholangiopancreatography                                                                                                  |                           |
| ¶ Percutaneous transhepatic biliary drainage                                                                                                    |                           |

Clinical status and lab examinations were written after first paragraph of patient characteristics section in result.

“At the time of biliary intervention, jaundice (80.5%) and itching sensation (33.3%) were the main manifestations. In laboratory findings, mean total bilirubin was 5.2 (1.7 - 32.4); mean alkaline phosphatase was 433.1 (130 - 1465); and mean  $\gamma$ -glutamyl transpeptidase was 502.7 (92.9 - 2000.0).”

3. In my opinion the 2 patients found with choledocholithiasis should not be excluded. Stones in the common bile duct are also a biliary complication.

I appreciate for your opinion. We included the patients with choledocholithiasis as you proposed. Although the patients were included, the results didn't change. Filling defect on a MIP image, biliary leakage and anastomosis site angle were significant risk factors.

4. How did the authors define the cut-off for the anastomosis site angle of 113.3°?

As this article is the first article demonstrating that decrease in the anastomosis site angle on MRCP after LDLT could be a risk factor for future biliary interventions, there was no reference value for cut-off. Therefore, we choose median value of anastomosis site angle, which was a useful method to document our purpose; whether anastomosis site angle on MRCP after LDLT is a risk factor of future biliary intervention.

Minor concerns:

1. The Title is misleading and should be reconsidered.

We agree with your comments and we did our best to change the title. However, the title couldn't be made longer due to word limitation to 12 words.

The title was changed from "Risk factors of biliary intervention in MRCP after living donor liver transplantation" to "Risk factors of biliary intervention by imaging after living donor liver transplantation".

2. Abstract: "Biliary anastomosis was performed ..." This statement is confusing and should be changed in something like "direct duct-to-duct biliary anastomosis ...".

I agree to your comments and changed sentence in abstract from "Biliary anastomosis was performed ..." to "Direct duct-to-duct biliary anastomosis was performed ...".

3. The perioperative mortality (<1month) is high (7%)! The authors should comment on this, listing the reasons of death, etc.

In Materials and methods, we add the cause of death.

"18 died < 1 month after LDLT (bleeding, 4; sepsis, 11; graft failure, 3)."