Response to the Reviewer's Comments

Dear Editor,

We would like to thank the Reviewers for taking the time and effort necessary to review the manuscript. We sincerely appreciate all valuable comments and suggestions, which helped us to improve the quality of the manuscript. Here is a point-by-point response to the reviewers' comments and concerns.

Reviewer #1:

1.How to control and regulate the variability of different individual liver samples. This may lead to changes in conclusions?

Response: Thank you for your comments and suggestions that allowed us to greatly improve the quality of the manuscript. At donor preoperative evaluation, contrast-enhanced CT of the liver was performed for initial vascular and biliary evaluation, and subsequently, the donor was re-evaluated based on a three-dimensional visualization model. If the donor has significant portal vein variation, split liver transplantation is not recommended to ensure the safety of both recipients. Only donors with good liver function and no significant anatomical variation were included in the split liver transplantation cohort. We have modified the manuscript accordingly in the second paragraph of the Discussion section.

2. It would be better to provide the detail of the 3D visualization technology. After all, the quality of the imaging method directly determines the reliability of the later evaluation.

Response: We would like to thank the Reviewer for the comments. A pre-operative 3D visualization model of the liver was constructed for each case. The model was acquired by importing high-quality THIN-layer enhanced CT DICOM data into the medical 3D reconstruction software: 1) for organ reconstruction: the region-growing method was used to perform a 3D reconstruction of the liver, tumor, pancreas and spleen; 2) for vascular reconstruction: the segmentation based on threshold method was used to perform a 3D reconstruction of the portal vein, hepatic artery and hepatic vein. We have modified the manuscript accordingly in the second paragraph of the Methods section.

3. As we all know, 3D visualization technology has been used in liver transplantation. Such as following paper I came across (Harms J, Bartels M, Bourquain H, Peitgen HO, Schulz T, Kahn T, Hauss J, Fangmann J. Computerized CT-based 3D visualization technique in living related liver transplantation. InTransplantation proceedings 2005 Mar 1 (Vol. 37, No. 2, pp. 1059-1062)). Can the authors highlight the uniqueness of your research?

Response: Thank you for your comments. As you said, 3D visualization technology has been used in liver transplantation. I have read the article you recommended carefully, and the authors used the 3D CT-based visualization technique to guide the pre-operative planning of living donor liver

transplantation (LDLT). They found that 3D CT-based visualization in LDLT could facilitate diagnostic workup with high accuracy for analyses of vascular and bile duct variants, volumetry, and assessment of the optimal surgical splitting line of the living donor liver. In our study, we want to investigate the application of the topological approach of liver segmentation based on 3D visualization technology in the surgical planning of split liver transplantation. To our best knowledge, there are no relevant publications worldwide.

Reviewer #2:

Response: We would like to thank the Reviewer for the comments. The reviewer raised several questions regarding the article:

(1) There was no control group in the study because the number of liver transplants that could be split was limited. Due to the shortage of donor livers and the limited number of donor livers that could be split, there were only 5 cases of split donor livers in our center from January 2020 to January 2021. We will set up a control group in our further study.

(2) To improve the expression of relevant professional terms, we will refer to relevant literature.

(3) Hepatic ischemia of segment 4 is a common clinical challenge. There are no evaluation criteria for direct resection in split liver transplantation, and no relevant studies have been reported. This study attempts to provide a range of methods to evaluate hepatic ischemia of segment 4. Nevertheless, further studies are needed due to the small number of cases.