Baishideng Publishing Group

7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA
Telephone: +1-925-399-1568
E-mail: bpgoffice@wjgnet.com
https://www.wjgnet.com

PEER-REVIEW REPORT

Name of journal: *World Journal of Gastrointestinal Surgery*

Manuscript NO: 79467

Title: A Topological Approach of Liver Segmentation Based on 3D Visualization Technology in Surgical Planning for Split Liver Transplantation

Provenance and peer review: Unsolicited Manuscript; Externally peer reviewed

Peer-review model: Single blind

Reviewer's code: 02440467
Position: Editorial Board
Academic degree: MD

Professional title: Academic Research, Adjunct Professor, Doctor

Reviewer's Country/Territory: Italy

Author's Country/Territory: China

Manuscript submission date: 2022-08-23

Reviewer chosen by: AI Technique

Reviewer accepted review: 2022-08-23 18:01

Reviewer performed review: 2022-08-24 21:20

Review time: 1 Day and 3 Hours

Scientific quality	[ ] Grade A: Excellent [ ] Grade B: Very good [ ] Grade C: Good [Y] Grade D: Fair [ ] Grade E: Do not publish
Language quality	[ ] Grade A: Priority publishing [Y] Grade B: Minor language polishing [ ] Grade C: A great deal of language polishing [ ] Grade D: Rejection
Conclusion	[ ] Accept (High priority) [ ] Accept (General priority) [ ] Minor revision [ ] Major revision [Y] Rejection
Re-review	[ ] Yes [Y] No

Baishideng Publishing Group

7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA
Telephone: +1-925-399-1568
E-mail: bpgoffice@wjgnet.com
https://www.wjgnet.com

Peer-reviewer statements	Peer-Review: [Y] Anonymous [ ] Onymous Conflicts-of-Interest: [ ] Yes [Y] No

SPECIFIC COMMENTS TO AUTHORS

This paper entitled " A Topological Approach of Liver Segmentation Based on 3D Visualization Technology in Surgical Planning for Split Liver Transplantation "tries to show possible advantages of 3D preoperative Liver visualization for Split Liver procedures for transplantation. The study was conducted in a very small cohort of 10 recipients and 5 donors using a 3D reoperative topological approach. One major concern with the study is the lack of a comparison group. In addition, the study also raises a number of serious concerns. Abstract 1. you wrote: "the left-lateral segment and right tri-segment splits which is implemented based on the theory of Couinaud liver segmentation. However, the right tri-segment liver surface may have different degrees of ischemic changes after operation" -Your terminology is inaccurate and should be revised. According to Couinaud liver segmentation, still the most widely used system to describe functional liver anatomy, the liver is divided into eight independent functional units, termed segments. For this reason, the term tri-segments is incorrect. However, the more widely accepted terminology for the split liver procedures provides the following two terminologies, independently from small technical variations: a) "a left lateral and a right extended liver graft" to be transplanted into one child and one adult or b) "Full right/full left splitting" which provides two graft for two adults. Introduction 1. "The Couinaud liver segmentation is based on the distribution of the Glisson system." -Glisson described a capsule and HPB surgeons usually refer to "glissonean pedicle", "glissonean system" is inaccurate. 2. "Three hepatic veins are used as vertical planes to form the main longitudinal fissure, and the liver is divided into different liver segments by the left and right branches of the portal vein. This segmentation method

7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA
Telephone: +1-925-399-1568
E-mail: bpgoffice@wjgnet.com
https://www.wjgnet.com

provides an anatomical basis for the clinical imaging diagnosis of liver diseases and has been widely used in clinical practice" -The statement sounds like a lesson in surgical liver anatomy for the audience, which is usually represented also by experienced HPB surgeons. 3. The blood flow topology segmentation method is based on the blood flow topology of the hepatic portal vein. - I understand what you mean, but the discrepancy between Coinaud segmentation planes and true portal perfusion zones requires a more detailed explanation. Methods 1. 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 and was utilized to evaluate the vascular pattern and hepatectomy simulation. - Question: How do you have evaluate the 3D images, by special oculus or virtual reality or just by viewing them on a PC radiological representation? 2. (1) The SLT procedure was simulated on a 3D visualization model and included the segmentation of the hepatic artery, portal vein, and hepatic vein and the disconnection of the liver parenchyma. (2) The SLT procedure was simulated according to the Couinaud liver segmentation and blood flow topology liver segmentation methods, respectively. - Question: What methodology did you use to simulate the procedure? Do you use a surgical simulator program to create virtual 3D images? The surgical simulation process is not described accurately. References 1 and 2 do not explain the purpose of the surgical simulation. Is there already a surgical simulation validation plan in your lab? 3. The classification of hepatic vasculatures were (was) based on 3D visualization technology, the hepatic volume, the ischemic range (volume) by the simulated surgery, and hepatic ischemia during the actual surgery. - Question: Could you please specify how you can obtain segmental and ischemic range volumes; there is no mention about the software used for volume calculation? - Results 1.Actual surgical results. In practice, in-situ and ex-vivo splitting were all performed successfully according to the pre-operative plan.

Baishideng Publishing Group

7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA
Telephone: +1-925-399-1568
E-mail: bpgoffice@wjgnet.com
https://www.wjgnet.com

- Question: What is the scientific evidence that supports the success of 3D preoperative visualization of the splitting procedure in the absence of a control group?

Discussion Many questions: There is no sufficient mention of several surgical pitfalls of the liver splitting procedures which are not only those reported by authors. The segment IV ischemia is only a very small part of more complex problems related to the adequate venous outflow, anatomical variability of vasculo-biliary pattern and the adequate volume. How the Authors have managed the complex variability of biliary drainage and the volume problems to avoid a possible “small for size” syndrome are not discussed. There are other problems about split liver procedures in deceased donors related to the impossibility to evaluate preoperatively biliary tree anatomical variations. Biliary anatomy can be hypothesized on the portal pattern but cannot be visualized by 3D reconstruction from a CT scan. Preoperative biliary anatomy is detectable only by MR studies which is almost impossible to obtain id a deceased donor. Nevertheless, biliary variability can play a role in the incidence of post-operative complications. If you have not a comparison group, you can say nothing about the real value of your preoperative simulation. In conclusion there is an over-simplification in this study of a possible benefit of the 3D preoperative visualization for split liver procedures.

Baishideng Publishing Group

7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA
Telephone: +1-925-399-1568
E-mail: bpgoffice@wjgnet.com
https://www.wjgnet.com

PEER-REVIEW REPORT

Name of journal: *World Journal of Gastrointestinal Surgery*

Manuscript NO: 79467

Title: A Topological Approach of Liver Segmentation Based on 3D Visualization Technology in Surgical Planning for Split Liver Transplantation

Provenance and peer review: Unsolicited Manuscript; Externally peer reviewed

Peer-review model: Single blind

Reviewer's code: 06236838
Position: Peer Reviewer
Academic degree: MD

Professional title: Doctor

Reviewer's Country/Territory: China

Author's Country/Territory: China

Manuscript submission date: 2022-08-23

Reviewer chosen by: AI Technique

Reviewer accepted review: 2022-09-01 04:04

Reviewer performed review: 2022-09-03 17:27

Review time: 2 Days and 13 Hours

Scientific quality	[ ] Grade A: Excellent [ ] Grade B: Very good [Y] Grade C: Good [ ] Grade D: Fair [ ] Grade E: Do not publish
Language quality	[ ] Grade A: Priority publishing [Y] Grade B: Minor language polishing [ ] Grade C: A great deal of language polishing [ ] Grade D: Rejection
Conclusion	[ ] Accept (High priority) [ ] Accept (General priority) [Y] Minor revision [ ] Major revision [ ] Rejection
Re-review	[Y] Yes [ ] No

Baishideng Publishing Group

7041 Koll Center Parkway, Suite 160, Pleasanton, CA 94566, USA
Telephone: +1-925-399-1568
E-mail: bpgoffice@wjgnet.com
https://www.wjgnet.com

Peer-reviewer statements	Peer-Review: [Y] Anonymous [ ] Onymous Conflicts-of-Interest: [ ] Yes [Y] No

SPECIFIC COMMENTS TO AUTHORS

Comments: The authors reported an interesting and innovative strategy for developing a 3D visualization topological approach of liver segmentation. The 3D visualization technology enables predict the range of ischemia in the liver section and provide a basis for determining whether the ischemic liver tissue should be removed during the surgery. This work is very interesting and valuable, and could be published after some minor revisions. 1. How to control and regulate the variability of different individual liver samples. This may lead to changes in conclusions? 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. 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?