

Dear Reviewers

Thank you very much for your precious time and your pertinent opinion.

We have revised the text one by one according to your comments as follows.

Reviewer #1:

**Scientific Quality:** Grade C (Good)

**Language Quality:** Grade B (Minor language polishing)

**Conclusion:** Accept (General priority)

**Specific Comments to Authors:** In general liver resection, the remnant functioning liver volume is one of the important indicators to determine the scope of liver resection, and it is also one of the important indicators to evaluate whether the patient can undergo surgical resection. It is closely related to the patient's basic liver disease, the degree of liver cirrhosis, the degree of liver fibrosis, the location of the liver segment where the liver tumor is located, the amount of intraoperative blood loss, the operation time, and the time of the first porta hepatectomy. As for the type of energy instrument used to remove liver tissue during surgery, the loss of liver tissue caused by it is almost negligible in clinical work, and has little effect on the remaining functional liver volume. The significance of this article for the guidance of clinical work is not significant.

Response:

Thank you for your comment.

As you pointed out, the establishment of residual liver capacity and the prediction of residual liver function are essential steps in liver surgery and are indispensable for safe perioperative management. I am sure that many liver surgeons have noticed the degeneration of the detached section of the liver and our observations. Indeed, we are aware that elevated liver enzymes are not directly linked to the problem of residual liver volume.

It is known that the elevation of liver enzymes is greatly influenced by the fibrosis of the background liver, inflammation status, operation time, and the time of hilar blockade by the Pringle maneuver. In addition to these factors, the weak but significant positive correlation of the denaturation area of the dissection plane of the liver is the first point to be emphasized in this paper. In addition, the Water Jet liver dissection showed less degeneration of the dissected liver plane on postoperative day 7 ( $\pm 2$  days) CT with a low denaturation index (DI) value. This is the second point I would like to emphasize. To the best of our knowledge, there is no previous report that quantitatively evaluated the denaturation thickness and area of the dissected section of the liver.

As described in the limitation section of the discussion in the manuscript, a prospective comparative study of a large group of patients with massive hepatic resection would be required to demonstrate that this less degeneration contributes to the avoidance of postoperative liver failure. In practice, this is unlikely to be feasible.

Reviewer #2:

**Scientific Quality:** Grade D (Fair)

**Language Quality:** Grade A (Priority publishing)

**Conclusion:** Rejection

**Specific Comments to Authors:**

1. The authors included patients who had CE-CT scan with portal phase study on postoperative day 7 ( $\pm 2$  days). The intrahepatic blood flow was in dynamic changes within a few weeks after the operation and was very unstable, even there were huge differences every day. When studying CT-enhanced images within 5-9 days after the operation, there is a huge intra-system bias, and it is difficult to ensure the consistency of the collected data.

Response :

Thank you very much for your suggestion.

We believe that the areas of decreased blood flow in the liver resection section, which can be seen on CT, reflect necrosis due to thermal denaturation. Therefore, they are not absorbed within a few days. As mentioned above, elevated liver enzymes (AST, ALT) can also be caused by factors other than degeneration, so we do not consider this to be the only cause of elevated AST and ALT...However, since the elevated AST and ALT are not without the influence of thermal denaturation, a comparative study of AST/ALT Peak and denaturing area was conducted for the present study.

2. For the patients inclusion, parenchymal dissection of the liver was performed using CUSA before November 2019. Then, the water jet is used as the primary technique for liver dissection. The two groups of patients underwent operation in different periods. In different periods, surgical techniques, anesthesia techniques, and imaging evaluation techniques may have changed over time, thus, affecting the patient's rehabilitation process and imaging evaluation results. The comparability of the findings is called into question.

Response :

Thank you for your inquiry.

Although the liver resection method has changed at Tottori University Hospital since around November 2019, we believe there is little difference between surgeons, as surgeons who performed liver resection by CUSA and Water Jet are fixed to TaH or TerS, while other surgeons did not perform liver resection. In addition, the environment surrounding the liver team has not changed significantly in just two years, so we do not expect any significant differences in perioperative results or evaluation, which you are concerned about.

3. The rate of laparotomy in the WJ group was significantly higher, which was contrary to the current popularization of laparoscopic hepatectomy technology. Compared with laparoscopic surgery, laparotomy increased the surgical trauma significantly. The intraoperative blood loss in the WJ group also increased significantly. It was mentioned in the discussion that the volume of saline used in WJ was calculated together with the volume of blood loss. Considering that CUSA also uses saline during the operation, this explanation is far-fetched. Therefore, WJ lack sufficient surgical advantages in terms of trauma and blood loss.

Response :

Thank you for your inquiry.

Water Jet is used to dissect the liver parenchyma by applying the jet from various directions to the vessels embedded in the liver parenchyma, and it is known that the parenchyma dissection does not proceed efficiently when there is a directional restriction. Therefore, we do not use Water Jet in laparoscopic liver surgery. In addition, the percentage of laparoscopic surgeries is increasing in our hospital as well as worldwide.

During hepatic parenchymal dissection with CUSA, the liver section plane is not flooded with saline, but during hepatic dissection with Water Jet, the liver section plane will be wet enough to drip water. This is a difference depending on the instrument and is a specification: when using CUSA, the assistant's suction is valid only for bleeding, but during liver dissection with Water Jet, it is difficult to see the surgical field unless constant suction is attempted during the jet injection. We believe that the apparent amount of bleeding has increased because of this suction saline count. Although we were not able to present scientific data, the blood loss in the WJ group was clearly lower

than that in the CUSA group, and we considered the fact that the Water Jet group counted the saline solution as the blood loss while the CUSA group was able to count the blood loss almost accurately as a cause of the apparent increase in blood loss. The reason for this is that the Water Jet group counts the saline solution as a bleed volume. Therefore, although there is an apparent increase in blood loss, the rate of blood transfusion in the perioperative period is not affected, and the non-inferiority of Water Jet is sufficient.

4. The highest postoperative AST/ALT indicated the severity of liver injury, which was correlated with the extent of liver wound, liver ischemia time, intraoperative blood loss and other factors. In addition, the area of denaturation was strongly correlated not only with thermal damage, but also with anatomic resection. The causal relationship between postoperative AST/ALT and area of denaturation cannot be simply determined. In addition, although the highest postoperative AST/ALT showed the severity of liver injury, surgeons are more concerned about the mid- and long-term effects of surgical operations on liver function, such as liver function status within 1 week or 1 month, and postoperative complications rate and severity.

Response :

Thank you for your comment.

As you pointed out, we also believe that the highest AST/ALT value indicates the degree of liver injury, and the medical focus is not on the degree of AST/ALT elevation, but on the medium-term or long-term prognosis of the patient after hepatectomy.

In the present study, the number of patients was not large, so we were not able to examine significant differences in the frequency of complications, however we would like to emphasize that liver dissection by Water Jet may contribute to preservation of residual liver volume, which is the main point of this paper.

***(1) Science editor:***

The manuscript compared the effects of WJ method and CUSA method on the section of residual liver. Nevertheless, there are a number of points that may deserve some revisions. Table 1 is a picture, not an editable table, which needs to be modified by the author. The surgical advantage of WJ group is not obvious. The author should pay more attention to the long-term follow-up comparison, which has insufficient clinical

significance.

Language Quality: Grade C (A great deal of language polishing)

Scientific Quality: Grade D (Fair)

Response: Thank you to the editors for their comments.

We have sent you editable Table 1, 2 as Excel data.

*(2) Company editor-in-chief:*

I recommend the manuscript to be published in the World Journal of Clinical Cases.

Response: Thank you.