ETP599

Tips for segment identification by intraoperative echography in laparoscopic hepatectomy

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Background

Advanced imaging systems based on AI and XR technology are under development, but there is no device other than ultrasound that can truly track liver deformation and blood flow evaluation in real time.

The “direct echo method” is a method in which the same resection line as negative staining is drawn using only an echo prior to the start of liver transection.

Aim

We present tips for identifying liver segment boundaries using direct echo method and verify how accurately the boundaries can be identified by ultrasonography alone.

1

Overview of intraoperative ultrasonography

3D imaging software such as SYNAPSE VINCENT sets the midline of each Glissonean branch as a boundary, and this principle is widely accepted.

To apply this principle to intraoperative ultrasonography, it is necessary to detect two Glissonean branches at the same time. To do this, the echo probe should be applied perpendicular to the expected dissection line.

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Tips for drawing quickly

1. Detailed VINCENT images help quickly visualize the relevant Gleason branches with intraoperative ultrasound.
2. The hepatic vein is only for reference, and it is important to determine the border between the two Glisson branches.

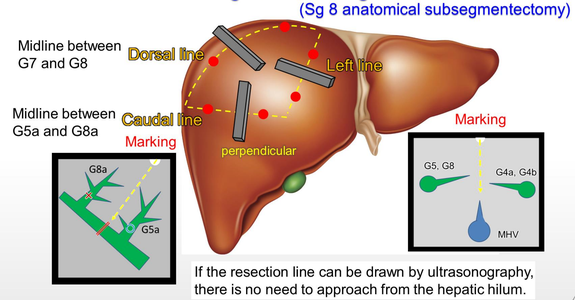
Tips for keeping the correct dissection plane

During hepatic dissection, the direction of the hepatic dissection can be easily confirmed by drawing the first Key echo image each time.

3

Procedure for determining cut line using direct echo method

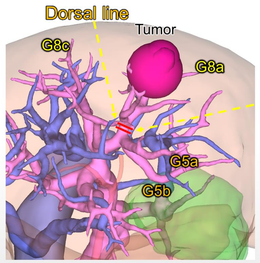
(Sg 8 anatomical subsegmentectomy)



If the resection line can be drawn by ultrasonography, there is no need to approach from the hepatic hilum.

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Case 1: Sg 8 Ventral Anatomical Subsegmentectomy



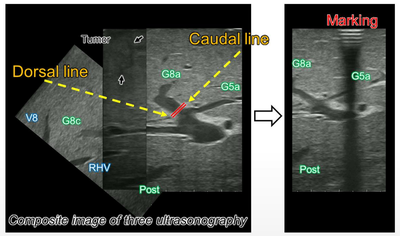
3D images by SYNAPSE VINCENT

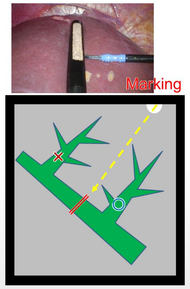
Intrahepatic cholangiocarcinoma

Operation time: 295 min
Blood loss: 90ml
Specimen weight: 114 g
Discharged POD3

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How to determine the accurate dissection line by ultrasonography

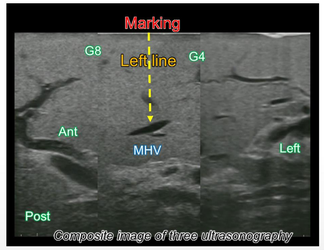


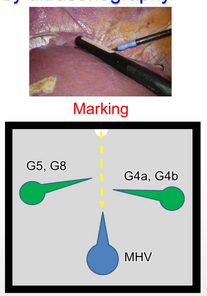


The midline between G5a and G8a was set as the caudal line and marked liver surface.
The dorsal line was determined in the same way.

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How to determine the Rex-Cantlie line by ultrasonography

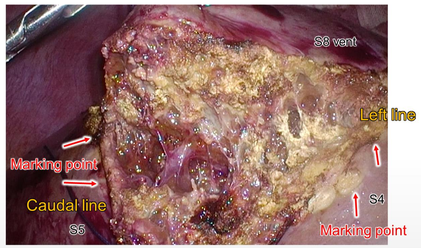




The midline between G4 and G8 was set as the left cutting line and marked the liver surface.

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Intraoperative view



The dissection line was set by connecting several marking points determined only by ultrasonography.

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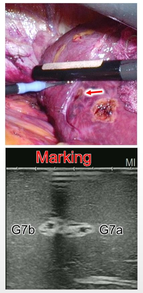
Verification of dissection line determined by ultrasonography using ICG fluorescence method

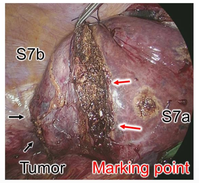


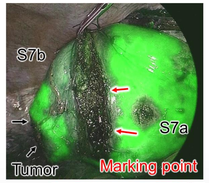
It was confirmed by ICG negative staining that the dissection line can be drawn very accurately by intraoperative ultrasonography alone.

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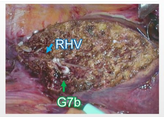
Case 2: S7b cone unit resection







The direct echo method can also be applied to cone unit resection.



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Conclusions

- Accurate liver segment identification is possible with intraoperative ultrasound alone.
- Even with the development of the most advanced imaging devices, the importance of echo will not diminish, and the liver surgeon should be well versed in echo techniques.

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SAGES 2024 Annual Meeting

COI Disclosure

Lead Speaker	Hiromi Ohtani
Co-Speakers (ALL)	Jota Watanabe, Yukako Takehara, Atsushi Takata, Takeshi Utsunomiya, Kazunori Tokuda, Yoshitomo Ueno, Jun Hanaoka

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