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Right and Ventral Margins of Paracaval Portion of Caudate Lobe: Studies from Cadaveric Dissection and 3D Reconstruction Analysis Using Synapse 3D Software

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Introduction: As the hilar cholangiocarcinoma holds the possibility of metastasis via minute bile duct branches to caudate lobe, total caudate lobectomy along with hepatic resection is necessary. This study was designed to figure out the utility of using Synapse 3D in the right and ventral margins of caudate lobe before caudate lobectomy.

Methods : 18 cadaveric liver specimens were dissected and by calculating the distance from the right side of inferior vena cava (IVC) and height from the hilar plate of a rightmost branch, we figured out the right margin and ventral margin of paracaval portion, respectively. 39 preoperative liver computed tomography images were obtained from donors and reconstructed by Synapse 3D software.

Results : In the respect of right margin, the mean length in Synapse 3D group was 1.7cm, greater than 1.2cm of cadaveric dissection group meaningfully (P<0.05). Synapse 3D showed 4 types of ventral margin. Type 1: the ventral margin of paracaval portion is restricted to the dome-like area between the middle hepatic vein (MHV) and right hepatic vein (RHV) insertion to the IVC (30 cases, 76.9%); Type 2: ventral margin extends beyond this dome-like area (7 cases, 17.9%); Type 3: ventral margin extends beyond the RHV (1 case, 2.6%); Type 4: ventral margin extends beyond both RHV and MHV-RHV dome-like area (1 case, 2.6%).

Conclusions : The image of the right margin and ventral margin of the paracaval portion can be reconstructed and measured by Synapse 3D, we think it is beneficial for more precise caudate lobectomy clinically.

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