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## **Evaluation for the Anatomical Correctness of Fusion Image of 3-Dimensional Hilar Structure Including Portal Vein, Hepatic Artery and Bile duct**

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**Introduction:** Understanding of the hilar anatomy is essential for donor surgeons and 3-dimensional image can enhance the understanding. As we started to perform fusion image of vascular structures from computed tomography and bile duct from magnetic resonance cholangiopancreatography, we evaluated the anatomical correctness of these images compared to actual anatomy based on surgical videos.

**Methods:** Donors who underwent 3-D image fusion during the period of March 2023 to July 2023 were evaluated for the anatomical correctness. 3D modeling and fusion procedure was performed using Mimics medical and 3-matic software. The anatomical correctness was evaluated based on the anatomical relationship between right hepatic artery and common hepatic duct. Based on the fusion image, right hepatic artery was categorized to be posterior, mixed with, or anterior to the common hepatic duct. After reviewing the surgical videos, the actual relationship was evaluated.

**Results:** During the period, 58 living donor liver transplantations were performed and 47 cases were eligible for the study. Fusion images indicated: 34 cases (group 1) with the right hepatic artery posterior to the bile duct; 6 cases (group 3) anterior to the bile duct; and 7 cases (group 2) exhibiting mixed positions. Among these cases, 5 cases showed right hepatic artery anterior to the bile duct. While there was no case of hepatic artery anterior to the bile duct in donors in group 1, there was one donor (14.3%) and four donors (66.7%) who had hepatic artery anterior to the bile duct in group 2 and 3, respectively. There was a statistically significant tendency of right hepatic artery to be anterior to the bile duct.

**Conclusion:** Fusion image of hilar structure showed reasonable correctness when evaluated by the relationship of right hepatic artery and bile duct. However, due to the inevitable error during fusion, the correctness is not 100% which needs further improvement.