Intra-operative Ultrasound Vs multiparametric Magnetic Resonance Imaging for assessment of resectability of Liver tumors: Prospective Comparative Study.

Mostafa M. Sayed, MD, Gehan S Seifeldein, MD, Mohamed Zidan, MD, and Mohamed G. Taher, Murad A Jabir, MD

Abstract:

Intra-operative ultrasound (IOUS) provides real-time tagging of liver lesions, especially those that lie deep within the liver during surgery. It also, detects relation of liver lesion(s) to major hepatic vessels and bile ducts and their segmental distribution according to Couinaud's liver segmentation. Thus, it is very useful during liver surgery. Additionally, it may detect occult lesions, not identified by pre-operative imaging, thus it may change the decision of completing the liver resection. However, IOUS is operator dependent. It should have high sensitivity and specificity to liver lesions at least similar to those offered by advanced preoperative imaging like dynamic MRI with DWI. Otherwise, its use could cause false safety and adequacy of liver resection. Purpose: Comparison between intra-operative ultrasound (IOUS) and pre-operative dynamic magnetic resonance imaging (MRI) with diffusion-weighted imaging (DWI) for assessment of liver tumors resectability. Materials and Methods: This study included 74 patients (43 females and 31 males; mean age 47.2±12.66 years (19-70 years) who have been explored for liver resection with curative intent for liver tumors. All patients had pre-operative dynamic MRI with DWI, done within 2 weeks of planned surgery, to assess resectability. IOUS of the liver was performed by the surgeon, supervised by a radiologist with interest in hepatobiliary imaging. Ultrasound was done by a T-shape 7.5-MHz linear-array transducer. All focal hepatic tumors identified in preoperative MRI or IOUS were resected. The gold standard for final diagnosis was histopathological analysis. Results: The sensitivity of pre-operative dynamic MRI with DWI on one hand and the IOUS on the other hand for liver lesion depiction were 81.6% and 94.4%, respectively. Of the 74 patients considered to have resectable liver tumor(s) on pre-operative dynamic MRI, IOUS helped change the decision in 4 (5.4%). Two (2.7%) patients deemed to have irresectable liver tumors after the use of IOUS. These patients were saved potentially hazardous, non-beneficial liver resections. In the other 2 (2.7%) patients, IOUS helped modify the planned resection by adding more segments to be resected to achieve potentially curative liver resection. Conclusion: The use of IOUS before proceeding into liver resection for liver tumors is beneficial. It can detect new lesions and major vessel invasion that, in some cases preclude proceeding into non-beneficial liver resection. Moreover, it may change the designed hepatectomy, by either more or less segments to be involved into the resection process. Meanwhile, IOUS carries no harm and doesn't add much to the time of surgery.

Keywords:

IOUS, MRI-DWI, pathology, hepatic focal lesion

Published In:

Cancer Biology, NULL, NULL