

Real-time navigation is a useful tool for liver cancer procedures, according to new study

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A University of Cincinnati Cancer Center study has found that real-time navigation is a useful tool for surgeons performing ablation procedures to destroy tumors in the liver.

The research, led by David A. Gerber, MD, is [published](#) in the journal *JAMA Network Open*.

Ablation, Gerber said, uses focused energy to kill [tumor cells](#) in a similar way that focused energy in a microwave heats up food.

"It is used for small- to medium-sized tumors because the energy can be targeted at the tumor without injuring the rest of the organ," said Gerber, the Christian R. Holmes professor of surgery and chair in the Department of Surgery in UC's College of Medicine.

Liver cancer is the fourth-leading cause of cancer-associated death in the world, and [ablation](#) is a promising, less invasive alternative to removing these tumors surgically for select patients.

However, there is a technical learning curve for surgeons to precisely locate the tumor and place the ablation device in the correct spot to completely destroy the tumor while minimizing damage to surrounding healthy tissue.

Traditionally, Gerber said surgeons have had a two-dimensional ultrasound as a guide, but the procedure is performed in three dimensions.

"It is similar to playing a three-dimensional game when you are only used to playing on a game board," he said. "Most people struggle to simultaneously visualize all three dimensions when they are looking at a video monitor, a current challenge with laparoscopic or minimally invasive surgery."

New technology provides navigation in three dimensions as a supplement to static ultrasound imaging. Using an electromagnetic field generator and spatial sensors, a [real-time](#) augmented reality image gives the

surgeon more detailed information on where the tumor is located.

In the retrospective study, Gerber and his colleagues compared outcomes of more than 750 ablation procedures performed by a single experienced surgeon with and without navigation between June 2011 and January 2021.

There were no statistically significant differences in [survival rates](#) or rates of incomplete ablations, or cases where the tumor was not completely destroyed, between the procedures completed with and without navigation. In the navigation group, there were significantly more patients with advanced disease and tumors in more challenging anatomic locations.

Gerber said the findings show real-time navigation is a helpful aid for surgeons performing ablations for [liver cancer](#) tumors, although the benefits may not be as pronounced for high-volume experienced surgeons.

"Incorporating ablation into [clinical practice](#) is still very new, and most surgeons will have little to no experience with intraoperative targeting," he said. "This clinical experience is one of the largest in North America, so it is likely that navigation will have a greater impact for the less experienced surgeon."

Technological innovations are key to helping a majority of [surgeons](#) adopt new treatments and procedures like ablation, Gerber said.

"This technology allowed me as an experienced provider to rapidly teach a less experienced provider, and the [navigation](#) accelerates their time to proficiency."

More information: Yoshiko Iwai et al, Integrating Navigation-

Assisted Ablation in the Locoregional Treatment of Hepatocellular Carcinoma, *JAMA Network Open* (2024). DOI: [10.1001/jamanetworkopen.2024.0694](https://doi.org/10.1001/jamanetworkopen.2024.0694)

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