

Team develops new tool to predict postoperative liver cancer recurrence after transplant

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UCLA transplantation researchers have developed a novel method that more accurately calculates the risk of disease recurrence in liver cancer patients who have undergone a liver transplant, providing a new tool to help physicians make treatment and surveillance decisions.

Dr. Ronald W. Busuttil, the William P. Longmire, Jr. Chair in Surgery and director of the Pflieger Liver Institute and Dumont-UCLA Transplant and Liver Cancer Centers, presented the study during the annual meeting of the Southern Surgical Association. The study appears in the early online edition of the peer-reviewed *Journal of the American College of Surgeons*.

The predictive calculator, also known as a nomogram, was developed after the research team analyzed data from UCLA's 30 years of experience with liver transplantation for [liver cancer](#). The retrospective study included 865 liver cancer patients who had transplants between 1984 and 2013, said study first author Dr. Vatche G. Agopian, an assistant professor of surgery in the division of liver transplantation at UCLA.

Prior to 1996, there were no criteria to guide which liver cancer patients might be good candidates for transplant, and patients with all sizes and numbers of tumors underwent transplantation, often times with early [recurrence](#) of disease. In 1996, radiologic criteria popularized as the

"Milan criteria" were introduced and recommended transplantation be limited to patients with a single tumor of five centimeters or less or up to three tumors with not any single tumor larger than three centimeters.

However, the criteria didn't take into account the aggressiveness of the tumor or other blood biomarkers that can help predict recurrence, Agopian said. UCLA's nomogram used three groups of factors to predict recurrence and was more accurate than the Milan criteria and the existing American Joint Committee on Cancer pathologic TNM staging system, giving transplant physicians and oncologists more information to work with in deciding how often to monitor for recurrence and whether or not adjuvant treatment is necessary.

"This novel nomogram includes three important groups of information that proved to be very accurate in predicting recurrence in liver cancer patients, better than any other system out there," Agopian said.

"Physicians can use our nomogram and have a meaningful discussion with transplant recipients regarding their post-transplant risk of cancer recurrence. It can help them decide how closely to follow their patient - a patient with a low risk of recurrence may not need screening as often - or whether a patient with a high risk of recurrence might need treatment following the transplant."

The three groups of factors that comprise the UCLA nomogram include pre-transplant radiologic information, or the number and size of tumors on MRI and CT scans, three pre-transplant blood biomarkers thought to be predictive for cancer recurrence and pathological characteristics of the explanted liver. The diseased liver is studied to determine the grade, or aggressiveness, of the tumor and whether the cancer has invaded the liver's blood vessels, factors that can't be determined before transplant.

For example, a patient with a 5 centimeter tumor who would have qualified for [liver transplant](#) under the Milan criteria might in fact have a

very aggressive tumor that is likely to recur after transplant, while a patient with a larger tumor might have a very low grade cancer and be at lower risk for recurrence. Physicians can utilize the UCLA nomogram with patient specific details and get individualized predicted risks of cancer recurrence, Agopian said.

"The Milan criteria presented a major step in improving the outcomes of liver [cancer patients](#) undergoing transplant," Agopian said. "However, there is now a growing consensus and body of evidence that these criteria are too conservative, and that incorporation of other factors may improve the ability to select for patients with favorable tumor biology, regardless of size, who stand to benefit from liver transplantation."

About 32,000 Americans will be diagnosed with liver cancer this year. Of those, 23,000 will die of their disease. Liver cancer is the sixth most common cause of cancer worldwide, and the third most common cause of cancer-related death. In the United States, the incidence of liver cancer has nearly doubled over the last two decades. For most patients who are diagnosed with liver cancer, it generally is too advanced to treat with surgery. For patients with underlying liver dysfunction who are unable to undergo surgery to remove the tumor, [liver transplantation](#) is the best way to treat the patient.

"In the largest single-institution experience with liver transplant for liver cancer, excellent long-term survival was achieved. Incorporation of routine pre-transplant biomarkers to existing radiographic size criteria significantly improves the ability to predict post-transplant recurrence, and should be considered in recipient selection," the study states. "A novel clinicopathologic prognostic nomogram accurately predicts liver [cancer recurrence](#) after liver transplant and may guide frequency of post-transplant surveillance and adjuvant therapy."

Provided by University of California, Los Angeles

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