New model predicts whether patients will be free of renal cancer 12 years after initial treatment

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A UT Southwestern Medical Center physician and other researchers have developed a unique statistical model that predicts the probability of a patient being cancer free 12 years after initial surgical treatment.

The model, known as a nomogram, uses tumor and patient characteristics to maximize predictive accuracy. Scientists said that knowing the likelihood of the cancer's return can help clinicians counsel patients and to customize treatment recommendations for individual patients.

The researchers built the predictive model using data from more than 2,500 renal cancer patients in databases at Memorial Sloan-Kettering Cancer Center and the Mayo Clinic. The model is described in June's edition of the *Journal of Urology*.

"It is our hope that the nomogram will help physicians identify and counsel patients at high risk for cancer recurrence," said Dr. Ganesh Raj, assistant professor of urology and lead author of the published study.

"If the cancer appears only in the kidneys, it can often be treated with a partial or radical nephrectomy," he said. "This nomogram is designed for use in the initial counseling session after diagnosis and enables patients to have a clearer understanding of their cancer outcomes with surgery."

Renal cancer is the most common form of kidney cancer. A nephrectomy, or surgical removal of the kidney, is often the initial treatment. Kidney cancer is notoriously resistant to radiation therapy and chemotherapy, although some cases respond to immunotherapy. Recently developed molecular therapies have also shown great promise for treatment.

A history of smoking greatly increases the risk for developing kidney cancer. Blood in the urine, flank pain and a mass in the abdomen are classic signs of renal cancer. Unfortunately, by the time a patient displays these symptoms, the disease is often advanced beyond a curative stage.

In 2007, more than 51,000 new cases of renal cancer were diagnosed in the U.S. A majority of the tumors were discovered incidentally in patients who had no symptoms. Because imaging techniques such as computerized tomography (CT) are now being used more often for a variety of conditions, early diagnosis of renal cancer is more common.

"Historically renal cancer was associated with a tremendously poor diagnosis," Dr. Raj said. "However, more and more cases are being diagnosed incidentally and earlier thanks to the increased usage of imaging techniques. A patient will have a CT scan to evaluate unrelated symptoms and be told he or she has a mass in the kidney."

The nomogram relies on patient characteristics to make a statistical prediction. Gender, the presence or absence of symptoms, and the mass's size are among the input data. For example, a woman with an incidentally discovered, 3-centimeter renal mass has a 96 percent chance of being cancer free 12 years after surgery alone, Dr. Raj said.

In comparison, a man with a 4-centimeter renal mass found as a result of seeing his physician after having flank pain, and with imaging tests showing the lymph nodes are enlarged, has less than a 40 percent chance of being cancer free 12 years after surgery.

"This model allows us to better predict a patient's chances of reoccurrence even before surgery," Dr. Raj said. "The nomogram is a prognostic tool physicians can use to better counsel patients on how curable their cancer may be with just surgery, or if alternative treatments will likely be needed. In the examples of the two patients with similar sized renal masses, I might consider using a more aggressive treatment course and follow-up schedule for the man than the woman based on their nomogram results."

Source: UT Southwestern Medical Center