

Renal cell carcinoma accounts for approximately 3% of adult malignancies and 90-95% of cancers arising from the kidney. The age-adjusted incidence of renal cell carcinoma has been rising by 3% per year. According to the American Cancer Society, in 2007 there were about 52,000 cases of malignant tumors of the kidney diagnosed in the United States. While there have been significant strides in treatment options for patients, renal cell carcinoma remains the eighth or ninth leading cause of cancer death in the United States. The 5-year survival rates initially reported by Robson in 1969 were 66% for stage I renal carcinoma, 64% for stage II, 42% for stage III, and only 11% for stage IV have been substantially improved for stage 1 and 2 disease. By 2000, survival for stage 1 disease was greater than 90%, and approaching 85% for stage 2. Lesser improvements have been realized for stage 3 and 4 disease, but new chemotherapy agents and treatment regimen show promise. Renal cell carcinoma is characterized by a lack of early warning signs and diverse clinical manifestations as well as varied response to treatment. As such, imaging plays a very large role in surveillance, initial workup of known or suspected tumor and staging as well as followup to treatment.

Imaging has proven invaluable to patients' survival diagnosed with renal cell carcinoma. Early detection of tumors is associated with much higher survival. While renal cell carcinoma has been associated with hematuria and flank pain, these symptoms are present less than 40% of the time. Other symptoms are much more inconsistent. Because of this, small tumors of the kidney are often detected incidentally on routine imaging studies. In fact, the expansion of imaging procedures overall have helped to increase the percentage of stage 1 cases diagnosed from 43% in 1993 to 57.1% in 2004; during the same period, the percentage of stage 4 cases diagnosed decreased from 27.4% to 18.7.

Computed tomography and ultrasound are also very useful in evaluating symptomatic patients. Judicious use of CT "urogram" protocols (thin multiphase images using a 64 row scanner) at Saddleback Memorial, greatly aid in detecting small tumors in patients with hematuria. Ultrasound helps in finding atypical cysts or potentially suspicious masses.

Once found, a renal abnormality must be fully characterized. Determining whether a renal "mass" is benign or malignant can be difficult.

At Saddleback, radiologic studies are tailored to enable further characterization of renal masses, so that nonmalignant tumors or cysts can be differentiated from malignant masses as accurately as possible. State-of-the-art computed tomography protocols, ultrasound and the use of MRI help in this task. If needed, image-guided biopsies can also be performed in the department of radiology.

In the staging workup of more advanced tumors, contrast-enhanced CT scanning has become the imaging procedure of choice and has virtually replaced excretory urography and renal ultrasound. In most cases, CT imaging can define the relationship of solid masses to the kidney or surrounding structures and supplies information about lymph node, renal vein, and inferior vena cava involvement. Bone scans also may be required in the evaluation of more distant spread.

If renal cell carcinoma spreads, one of the most common sites is the lung (75%). Saddleback Memorial uses computer-aided detection (CAD) in the evaluation of chest CT to help the radiologists detect and measure even very small metastases. While positron emission tomography (PET) utility in renal cell carcinoma is perhaps controversial, there are many patients who value from it. Saddleback offers this service 5 days a week.

One of the most value-added step in any patient's diagnosis and treatment is communication, both between the patient and his or her physicians as well as between all of the treating physicians. A comprehensive Picture Archiving and Communication System (PACS) at Saddleback Memorial is a web-based product helping to accomplish this task. It is available to physicians at the bedside, during clinical rounds, in tumor board sessions and in their offices. At Saddleback, imaging is integral to the overall team of physicians and staff who work to further improve the outcomes of its patients with renal cell carcinoma.