Cryoablation

Cryoablation is a treatment option that destroys cancer cells by applying extremely cold temperatures at the location of the tumor. A small cut is made in the skin and a tiny needle called a cryoprobe is inserted. Using image-guidance—either by a computed tomography (CT) scan or by ultrasound—the interventional radiologist maneuvers the cryoprobe toward the location of the tumor.

Next, the cryoprobes are inserted into the tumor to begin freezing it with a gas called argon, creating an “ice ball” over the entire tumor to freeze it for about ten minutes. Nitrogen gas is then used to thaw the tumor for five minutes. This cycle is repeated two or three times depending on the tumor type and size.
Kidney Cancer

Kidney cancer, or renal cancer, is cancer that originates in the kidney. This cancer occurs most often in adults between the ages of 50 and 70, affecting men twice as often as women and is a rare cancer in children and young adults. There are two main types of kidney cancer, renal cell carcinoma (cancer that forms in the lining of the small kidney tubes that filter blood and remove waste) and renal pelvis carcinoma (cancer that forms in the center of the kidney where urine collects). Approximately 90% of adult kidney cancer is renal cell carcinoma (RCC).

Serious health problems occur when kidneys perform below 25% of full renal function. If function drops below 10-15%, some form of kidney replacement therapy is necessary to sustain life, such as dialysis or transplant. Therefore, preservation of maximum renal function is an important consideration in deciding the best treatment, especially if a patient’s kidney function is already below optimal.

Cryoablation Results
a. Patient Benefits
Minimally Invasive
An advantage of kidney cryoablation is that the procedure can be conducted percutaneously (directly through the skin), thus making it a minimally invasive procedure. The minimally invasive nature of the procedure means that it can be performed with minimal blood loss and without a large incision. A minimally invasive procedure, compared to an open surgical procedure, can mean significantly less pain, a shorter hospital stay, and more rapid recovery. As a minimally invasive procedure, cryoablation allows kidney cancer to be treated with much less disruption of patients’ lives. Patients usually are able to return to family, work, and routine activity in less than half the time that it takes to recover from an open surgical procedure.

Shorter Procedure with Fewer Complications
Patients who undergo cryoablation have less risk of experiencing some surgical complications, such as bleeding. The risk of excessive bleeding is decreased by not having to cut into the kidney as is typically done with a surgical procedure on the kidney, such as a partial or radical nephrectomy. Similarly, not cutting into the kidney minimizes the risk of disrupting the kidney’s collection system (the “plumbing” within the kidney which transports urine), which is a complication known as “urine leak.”

Preservation of Normal Kidney Tissue
Kidney cancer treatment that maintains adequate renal function is of the utmost importance to the patient's ongoing quality of life. Because only the cancer is destroyed during cryoablation and normal kidney tissue is spared, remaining renal function is maximized. This means that the kidneys can continue to perform their many jobs more efficiently than if the entire kidney, or a significant part of it, had been removed.
In addition, sparing a portion of the affected kidney creates more options should a new tumor develop in the patient’s second kidney, a risk confronting a small number of people with kidney cancer.

**Cryoablation is Repeatable**
In most cases, image-guided targeted ablation and real time temperature monitoring assure that only one session of cryoablation is necessary. Should the patient’s cancer recur, or if residual tumor is found on follow-up visits, renal cryoablation can be repeated with minimal trauma to the patient.

**b. Outcomes**

**Local Tumor Control**
Local tumor control describes how well the cancer has been destroyed or limited in the target tissue. A high number means more effective control at the time of follow-up. Numerous studies document cryoablation efficacy for local tumor control after a single treatment. Clinical evidence documents oncologic outcomes following cryoablation are comparable to the oncologic outcomes following partial nephrectomy.