

## **Intermediate Results of Laparoscopic Cryoablation in 59 Patients at the Medical College of Wisconsin**

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**Purpose:** We report our experience with LC for small renal tumors.

**Materials and Methods:** Patients who underwent LC at our institution between February 2000 and September 2004 were included in the study. A retrospective chart review was done for perioperative and postoperative parameters as well as clinical outcomes.

**Results:** A total of 65 LCs were performed in 59 patients during the period reviewed. Overall 81 renal tumors were cryoablated. Median patient age was 62 years. Median tumor size was 2.5 cm. Median operative time was 190 minutes. Median estimated blood loss was 50 ml. Median hospital stay was 2 days. Conversion to open surgery occurred in 2 patients. Nephrectomy for bleeding occurred in 1 patient. Median followup was 26.8 months. Two recurrences were identified after LC.

**Conclusions:** LC is an alternative modality to laparoscopic partial nephrectomy or open partial nephrectomy for small renal tumors. Tumor recurrence rates in the studies published to date are comparable to those of partial nephrectomy, although longer followup is needed.

### **Editorial Comment**

Laparoscopic cryoablation of small renal tumors is still in development. The new cryo probes have increased the efficiency of cytotoxic effects to treat the renal lesions and decreased the rate of complications. So far, the technology has demonstrated to be efficient to treat renal tumors. The authors concluded that laparoscopic cryoablation is a potential alternative modality to laparoscopic partial nephrectomy or open partial nephrectomy for small renal tumors but the cryoablation technique requires a basic skill set in laparoscopic surgery, which makes this technique appealing for less experienced laparoscopic surgeons. Moreover, laparoscopic cryoablation may be associated with decreased risks of bleeding and urine leakage in comparison to laparoscopic partial nephrectomy. Future comparative studies are needed to fully validate this technique but initial reports of oncological control are encouraging.

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## **IMAGING**

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### **Radiation Dose Associated with Unenhanced CT for Suspected Renal Colic: Impact of Repetitive Studies**

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**Objective:** The purpose of our study was to assess the dose of ionizing radiation delivered through the use of unenhanced CT for suspected renal colic by determining the incidence of repeated unenhanced CT examinations and the cumulative radiation dose delivered.

**Materials and Methods:** All unenhanced CT examinations for suspected renal colic performed at our institution over a 6-year period were included, and patient age, sex, and multiplicity of examinations were determined. For the adult patient, this protocol prescribes a fixed tube current of 200 mA, 140 kVp, and a nominal slice width of 5 mm. The dose-length product (DLP) was estimated for 15 randomly chosen single-detector CT (SDCT) and MDCT adult flank pain examinations using manufacturer's software. The mean DLPs for SDCT and MDCT were computed and converted to effective doses. Total effective doses were calculated for patients who underwent more than three examinations, and values were compared with established standards.

**Results:** A total of 5,564 examinations were performed on 4,562 patients. Of these patients, 2,795 (61%) were women (mean age, 45.5 +/- 16.2 [SD] years) and 1,731 (38%) were men (mean age, 44.7 +/- 16.4 years), with 144 patients (3%) of pediatric age. The mean effective doses for a single study were 6.5 mSv for SDCT and 8.5 mSv for MDCT. A subset of 176 patients (4%) had three or more examinations, with estimated effective doses ranging from 19.5 to 153.7 mSv. All patients with multiple examinations had a known history of nephrolithiasis.

**Conclusion:** Patients with a history of nephrolithiasis and flank pain are at increased risk for serial CT with potentially high cumulative effective doses.

### **Editorial Comment**

Recent studies have been shown that computed tomography (CT) contribute to 35-45% of total radiation dose to the patient population. Nowadays, radiologists' aim must be to decrease radiation dose to the patient and also check very carefully all indications and recommend alternative imaging methods. Recently several CT protocol imaging have been developed in order to decrease the total amount of radiation dose that a patient receives during abdominal CT. This is a very important study, which discusses all the issues and possibilities regarding those patients that are submitted to repetitive abdominal CT for the evaluation of acute flank pain. The authors showed that a small but significant subset of the patient population (4%) was estimated to receive from 20 to as high as 154 mSv, which is totally undesirable. In order to decrease the amount of radiation dose they suggested that sonography associated with abdominal radiography (KUB), should be used as a first imaging examination in patients known to have chronic stone formation who have a high pretest probability of nephrolithiasis and thus are less likely to have a missed alternative diagnosis. Another useful approach for these patients is to use the reduced radiation-dose technique. When using these optimized CT protocol, the tube current can be reduced to 70 mA in comparison with the higher tube current of multidetector conventional CT protocol (200 mA). By using this optimized low dose protocol, the estimated effective dose is reduced from 8.6 mSv to 1.5 mSv. This reduced radiation-dose protocol result in scans with high accuracy for detecting urinary calculi in patients evaluated for acute flank pain.

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### **Conventional MRI Capabilities in the Diagnosis of Prostate Cancer in the Transition Zone**

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**Objectives:** Our objectives were to evaluate the diagnostic capabilities of conventional MRI for the accurate detection of prostate cancer within the transition zone and to compare the results with histopathologic examination results.

**Materials and Methods:** One hundred sixteen prostate specimens with prostate cancer were consecutively obtained. Axial, sagittal, and coronal T2- and T1-weighted MR images with gadopentetate dimeglumine were independently reviewed by two radiologists. The diagnostic base criteria of the MR images were determined for detecting transition zone cancer as follows: lesions with A, uniform low intensity on T2-weighted images; B, homogeneous gadolinium enhancement; and C, irregular margins both on gadolinium-enhanced and T2-weighted images. Wilcoxon's rank sum and chi-square tests and receiver operating characteristic curves were used. Differences of less than 0.05 were considered significant.

**Results:** Eighty-six lesions in the transition zone were analyzed. Histopathologic analysis showed 53 cancers and 33 benign lesions. The diagnostic sensitivity, specificity, and accuracy for cancer were 50%, 51%, and 51%, respectively with criteria A; 68%, 75%, and 71% with criteria B; and 60%, 72%, and 65% with criteria C. When base criteria were combined into criteria A-B, A-C, and B-C and then further divided into three subgroups, accuracy was found to be highest when the lesion satisfied any two criteria from A, B, and C than those of base criteria, combination criteria, and the other two subgroups.

**Conclusion:** The addition of gadolinium-enhanced MRI to T2-weighted imaging provides better accuracy for detecting cancerous transition zone lesions than the use of T2-weighted imaging alone.

#### **Editorial Comment**

Radical prostatectomy studies have demonstrated that 75-85% of cancers arise in the peripheral zone, but up to 25% prostate cancer occurs within the transition zone. Endorectal MR imaging is a useful modality in the detection of the peripheral zone cancers. This technique is able to detect 67-76% of peripheral cancer demonstrated by step-section histopathologic studies but has limitations in the demonstration of cancer in the transition zone. This limitation occurs because the transition zone appears usually as a very heterogeneous region on T2-weighted images due to the presence of nodular hyperplastic changes. Previous studies have suggested some MR imaging features found in transition zone cancer: homogeneous hypointense lesion on T2-weighted images with ill-defined margins and lack of capsule. The authors of this study demonstrates that conventional MR imaging, without the use of an endorectal coil, can be useful for the detection of transition prostate cancer. They added new imaging criteria: homogeneous enhancement and presence of irregular margins. If these additional findings are used, the specificity rates for the detection of transition zone cancer could be increased from 51% to 82%. In the last 2 years, we have been using routinely, in our institution, endorectal MR imaging and spectroscopy for the detection of prostate cancer arising in the transition zone. We have found that diffusion weighted images and the evaluation of the kinetics of gadolinium enhancement by the lesion can be of further value. Thus the, presence of a nodule with ill-defined margins, homogeneous hypointensity on T2 weighted images, with hypointensity on diffusion weighted images and fast contrast enhancement ("wash-in") and fast contrast de-enhancement("wash-out"), is very suggestive of transition zone cancer. Spectroscopy shows only high levels of choline particularly in larger tumors and thus can also be of some value.

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