

## ENDOUROLOGY & LAPAROSCOPY

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### **Laparoscopic radical cystoprostatectomy with bilateral nephroureterectomy: initial report**

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*BJU Int.* 2006; 97: 37-41

**Objectives:** To present our experience with laparoscopic radical cystoprostatectomy and bilateral nephroureterectomy for organ-confined, muscle-invasive transitional cell carcinoma (TCC) of the bladder in two patients with dialysis-dependent end-stage renal disease (ESRD).

**Patients and Methods:** Two men aged 77 and 65 years with organ-confined, muscle-invasive TCC of the urinary bladder and pre-existing dialysis-dependent ESRD underwent laparoscopic bilateral pelvic lymphadenectomy, radical cystoprostatectomy and bilateral nephroureterectomy. Urine spillage was avoided and en bloc urothelial integrity between the bladder and the two renal specimens was maintained throughout the procedure. The intact, entrapped specimens were removed en bloc via a Pfannenstiel incision at the end of the procedure.

**Results:** The total operative duration was 573 and 660 min, respectively, including repositioning and re-draping between each major step. Blood loss was 350 and 1000 mL, respectively. Both patients tolerated the procedure well and there were no intraoperative complications. The first patient resumed oral intake 3 days after surgery and was discharged home after 5 days. The second patient's course after surgery was complicated by a prolonged adynamic ileus and infection of the catheter placed for continuous ambulatory peritoneal dialysis. He was discharged 28 days after surgery and died from unknown causes at 30 days.

**Conclusions:** To our knowledge, this is the first report of radical urotheliectomy, consisting of bilateral pelvic lymph node dissection, radical cystoprostatectomy, and bilateral nephroureterectomy, using entirely intracorporeal laparoscopic techniques.

### **Editorial Comment**

This paper demonstrates a new era of laparoscopic procedures, which are extremely complicated. The oncological steps were respected and blood loss diminished for complex combined procedures. Although the number of patients was small, I believe the authors should be congratulated for the pioneer work in the area of minimally invasive surgery.

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### **Haemostatic partial nephrectomy using bipolar radiofrequency ablation**

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*BJU Int.* 2005; 96: 1101-4

**Objective:** To determine whether an electrode array with a bipolar radiofrequency ablation (RFA) energy source can be used to perform a haemostatic partial nephrectomy by simultaneously ablating and coagulating renal tissue.

**Materials and Methods:** Lower-pole partial nephrectomy was performed in 12 porcine kidneys using a bipolar RFA system. Intraoperative ultrasonography was used to identify and avoid the collecting system. Tissues were positioned between opposing electrodes and tissue impedance monitored using a proprietary feedback and control algorithm. Ablation time and power, lesion width and length, and tissue thickness were recorded. The kidneys were assessed in vivo to show haemostasis of the remaining renal unit. Collecting system integrity was assessed with methylene blue injection, and the resected tissue analysed histologically.

**Results:** Partial nephrectomies were successful in all 12 porcine kidneys; the mean nephrectomy specimen was 3.2 x 2.6 cm. The total ablation time (sem) per lesion was 211 (15) s and the mean power was 23 W. Methylene blue injection showed an intact collecting system in 11 of the 12 kidneys, and haematoxylin and eosin staining showed a mean zone of necrosis of 9 mm at the resection margin. Ultrasonography revealed flow to the remaining kidneys after RFA and the in vivo assessment of haemostasis revealed no abnormal bleeding or haemorrhage from the kidneys.

**Conclusions:** Applying bipolar RF energy to an electrode array can enable transmural excision of renal parenchyma in vivo in a bloodless fashion without collecting system injury.

### **Editorial Comment**

Laparoscopic partial nephrectomy remains a complex and difficult procedure to be performed, particularly due to the challenges to achieve optimal hemostasis after renal mass excision. The authors demonstrated a new application of RFA energy facilitating the hemostatic control during partial nephrectomy. The remaining renal parenchyma preserved the flow measured by ultrasonography. Perhaps this new technology and application maybe used for a laparoscopic nephron-sparing surgery.

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### **Kidney displacement simulator for retroperitoneal laparoscopic nephrectomy**

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*J Urol. 2005; 174: 2111-4*

**Purpose:** We evaluated the efficacy of a renal displacement simulator originally developed at our department for retroperitoneal laparoscopic nephrectomy.

**Materials and Methods:** A total of 12 patients with a malignant localized renal (7) or ureteral (5) neoplasm underwent multidetector row computerized tomography. Imaging data were sent to a dedicated work station to create volume rendering and virtual laparoscopic images of the kidney, which was displaced ventral using a retroperitoneal balloon. These findings were compared with video images obtained during laparoscopy surgery.

**Results:** The kidney displacement simulator depicted all renal arteries (100% sensitivity) and 13 of 14 renal veins (93% sensitivity). Hilar anatomy, including the tumor, as well as major vessels and their relationships were visualized by the simulator in the laparoscopic views. The major vessel portions completely corresponded to those seen during surgery, and the left adrenal and gonadal veins were also synchronized quite well.

Conclusions: Our kidney displacement simulator was able to visualize the major vessel portions and branched small vessels, such as the adrenal and gonadal veins, prior to surgery. It is considered useful for providing guidance to surgeons and decreasing operative risks and possible complications.

### Editorial Comment

Due to new regulations and complexity of surgical procedures, new training tools are demanded for better understanding of surgical steps and schooling of dexterity for development of surgical skills. This study combines pre-operative imaging technique with the laparoscopic procedure allowing identifying several anatomical landmarks, particularly the vascular structures allowing surgeons to carefully plan the surgical steps minimizing possible complications. It is possible that in the future a software will allow pre-planned surgeries to be performed prior to the actual procedure, as well as for training purpose.

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## IMAGING

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### **MRI of prostate cancer at 1.5 and 3.0 T: comparison of image quality in tumor detection and staging**

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*AJR Am J Roentgenol. 2005; 185: 1214-20*

Objective: This prospective study was performed to compare the image quality, tumor delineation, and depiction of staging criteria on MRI of prostate cancer at 1.5 and 3.0 T.

Subjects and Methods: Twenty-four patients with prostate cancer underwent MRI at 1.5 T using the combined endorectal-body phased-array coil and at 3.0 T using the torso phased-array coil, among them 22 before undergoing radical prostatectomy. The prostate was imaged with T2-weighted sequences in axial and coronal orientations at both field strengths and, in addition, with an axial T1-weighted sequence at 1.5 T. Preoperative analysis of all MR images taken together was compared with the histologic findings to determine the accuracy of MRI for the local staging of prostate cancer. In a retroanalysis, the image quality, tumor delineation, and conspicuity of staging criteria were determined separately for both field strengths and compared. Statistical analysis was performed using Wilcoxon's and the McNemar tests.

Results: In the preoperative analysis, MRI (at both 1.5 and 3.0 T) had an accuracy of 73% for the local staging of prostate cancer. The retroanalysis yielded significantly better results for 1.5-T MRI with the endorectal-body phased-array coil in terms of image quality ( $p < 0.001$ ) and tumor delineation ( $p = 0.012$ ) than for 3.0-T MRI with the torso phased-array coil. Analysis of the individual staging criteria for extracapsular disease did not reveal a superiority of either of the two field strengths in the depiction of any of the criteria.

Conclusion: Intraindividual comparison shows that image quality and delineation of prostate cancer at 1.5 T with the use of an endorectal coil in a pelvic phased-array is superior to the higher field strength of 3.0 T with a torso phased-array coil alone. As long as no endorectal coil is available for 3-T imaging, imaging at 1.5 T using the combined endorectal-body phased-array coil will continue to be the gold standard for prostate imaging.