LAPAROSCOPY


Purpose: We determined whether laparoscopic nephrectomy confers improved health related quality of life in the early postoperative period compared with open nephrectomy.

Materials and Methods: Patients undergoing open or laparoscopic nephrectomy were prospectively recruited. Patients completed the Comorbidity Symptom Scale preoperatively as well as the SF-36(R) quality of life health survey and pain visual analog scale preoperatively, and 2 days and 1 month postoperatively.

Results: A total of 100 patients were recruited, of whom 71 completed all questionnaires, including 38 in the laparoscopic group and 33 in the open group. In the 2 groups mean patient age was the same (56.8 years) and there was a similar sex distribution. The laparoscopic group had improved quality of life scores with significantly higher physical component scores 1 month postoperatively vs the open group (5.7% vs −22.2%, p = 0.009). The laparoscopic group also had significantly higher mental component scores 2 days postoperatively vs the open group compared to baseline (6.0% vs...
The laparoscopic group had significantly lower pain visual analog scale scores 1 month postoperatively compared to baseline. Patients with higher Comorbidities Symptom Scale scores were more likely to undergo a laparoscopic approach (p = 0.036). Despite this they had a significantly shorter hospital stay (4 vs 6 days, p < 0.001).

Conclusions: Quality of life benefits of laparoscopic over open nephrectomy were found in the early postoperative period despite more comorbidities in the laparoscopic group. This provides further evidence of the benefits of the laparoscopic approach over open surgery.

DOI: 10.1016/j.juro.2008.11.028

Commentary
During the last 15 years, laparoscopic kidney surgery has gained increasing popularity among urologic patients and their surgeons because of the apparent improved immediate postoperative course with respect to decreased narcotic and nursing requirements as well as shorter hospitalization, in comparison with the open surgical counterpart. Although intraoperative costs with laparoscopic intervention were initially documented as higher, the big savings was in the postoperative period. We also predicted in the 1990s that because of the more rapid recovery after laparoscopic renal surgery, the return to normal work and social life would be more rapid, along with the associated financial savings.


Howard N. Winfield, M.D.


Context: Single-port transumbilical laparoscopy, also known as embryonic natural orifice transumbilical endoscopic surgery (E-NOTES), has emerged as an attempt to further enhance cosmetic benefits and reduce morbidity of minimally invasive surgery. Within a short span, several clinical reports have emerged in the urologic literature. As this field is poised to move forward, a complete understanding of its evolution and current status is timely.

Objective: To summarize and review the history of E-NOTES across surgical disciplines. This review emphasizes nomenclature, surgical technique, instrumentation, and perioperative outcomes. Specific urological and nonurological applications of single-port surgery to date are summarized.

Evidence Acquisition: Using the National Library of Medicine database, the English-language literature was reviewed for the past 40 yr. Keyword searches included: scarless, scar free, single port/trocar/incision, intraumbilical, and transumbilical. Within the bibliography of selected references, additional sources were retrieved.

Evidence Synthesis: The gynecologic and general surgical literature includes approximately 19 papers fulfilling the search criteria, encompassing extirpative procedures only. The urologic literature contains eight published reports of single-trocar transumbilical procedures. These reports are summarized in a chronological manner and grouped by subject. No prospective studies comparing outcomes to standard laparoscopy have been reported. Technical feasibility has been demonstrated for a broad range of extirpative and reconstructive procedures on the upper and lower urinary tracts, including simple and radical nephrectomy, donor nephrectomy, renal cryotherapy, pyeloplasty, ileal ureteral replacement, sacrocolpopexy, and varicocelectomy.

Conclusions: E-NOTES has made its initial forays into laparoscopic surgery. Ongoing refinement in technique and instrumentation is likely to expand its future role.

Howard N. Winfield, M.D.
URETEROSCOPY

Percutaneous Surgery

Purpose: We assessed the impact of percutaneous renal surgery on renal function based on the modification of diet in renal disease estimated glomerular filtration rate in solitary renal units. We also determined the variables predictive of functional improvement or impairment following percutaneous surgery in solitary kidneys.

Materials and Methods: A prospective database was augmented by retrospective chart review. Between 1984 and 2007, 81 patients with a solitary kidney, which was anatomical in 61.7%, functional in 18.5%, a transplant allograft in 11.1% and unknown in 8.6%, underwent a total of 92 percutaneous procedures. Serum creatinine was measured preoperatively, postoperatively, at 1 month and at 1 year. The 4-variable modification of diet in renal disease equation was used to calculate estimated creatinine clearance. The study population was divided into 3 groups, including group 1-a change in the estimated glomerular filtration rate of 5% or less at 1 year, group 2-an increase of greater than 5% at 1 year and group 3-a decrease of greater than 5% at 1 year. Univariate and multivariate regression analysis was performed using the ordinal logistic fit model to assess the effects of variables on postoperative renal function at 1 year.

Results: Percutaneous intervention was performed for stone disease in 64 patients (69.6%), of whom 25 had staghorn calculi. Two patients required concomitant antegrade endopyelotomy for ureteropelvic junction obstruction. Percutaneous resection of transitional cell carcinoma was performed in 28 patients (30.4%). Of the patients 46% had baseline stage 3 chronic kidney disease. Complications developed in 8 patients (8.6%). In the entire cohort the modification of diet in renal disease estimated glomerular filtration rate was 44.7, 42.5, 55.4 (8.6%). In the entire cohort the modification of diet in renal disease estimated glomerular filtration rate was 44.7, 42.5, 55.4. The study was well-designed to investigate the functional effects of percutaneous surgery on renal function. While it is clear that early postoperative improvement in estimated glomerular filtration rate predicts improvement in renal function at one year on multivariate analysis, the protective effect on renal function postpercutaneous surgery in females is interesting and would need further investigation.

Conclusions: Percutaneous renal surgery in the solitary kidney is safe and it results in renal function preservation for up to 1 year of followup. Female gender and an immediate postoperative improvement in the modification of diet in renal disease estimated glomerular filtration rate are predictive of a sustained increase in that rate at 1 year.

DOI: 10.1016/j.juro.2008.09.023

EXTRACORPOREAL SHOCKWAVE LITHOTRIPSY

Effect of firing rate on the performance of shock wave lithotriptors. Pishchalnikov YA, McAteer JA, Williams JC Jr., Department of Anatomy and Cell Biology, Indiana University School of Medicine, Indianapolis, IN.


Objective: To determine the mechanism that underlies the effect of shock wave (SW) rate on the performance of clinical lithotriptors.

Materials and Methods: The effect of firing rate on the pressure characteristics of SWs was assessed using a fibre-optic probe hydrophone (FOPH 500, RP Acoustics, Leutenbach, Germany). Shock waves were fired at slow (5–27 SW/min) and fast (100–120 SW/min) rates using a conventional high-pressure lithotriptor (DoLi-50, Dornier MedTech America, Inc.)
Kennesaw, GA, USA), and a new low-pressure lithotripter (XX-ES, Xi Xin Medical Instruments Co. Ltd, Suzhou, PRC). A digital camcorder (HDR-HC3, Sony, Japan) was used to record cavitation fields, and an ultrafast multiframe high-speed camera (Imacon 200, DRS Data & Imaging Systems, Inc., Oakland, NJ, USA) was used to follow the evolution of bubbles throughout the cavitation cycle.

**Results:** Firing rate had little effect on the leading positive-pressure phase of the SWs with the DoLi lithotripter. A slight reduction (approximately 7%) of peak positive pressure ($P^+$) was detected only in the very dense cavitation fields (approximately 1000 bubbles/cm$^3$) generated at the fastest firing rate (120 SW/min) in nondegassed water. The negative pressure of the SWs, on the other hand, was dramatically affected by firing rate. At 120 SW/min the peak negative pressure was reduced by approximately 84%, the duration and area of the negative pressure component was reduced by approximately 80% and approximately 98%, respectively, and the energy density of negative pressure was reduced by >99%. Whereas cavitation bubbles proliferated at fast firing rates, HS-camera images showed the bubbles that persisted between SWs were very small (<10 microm). Similar results were obtained with the XX-ES lithotripter but only after recognizing a rate-dependent charging artefact with that machine.

**Conclusion:** Increasing the firing rate of a lithotripter can dramatically reduce the negative pressure component of the SWs, while the positive pressure remains virtually unaffected. Cavitation increases as the firing rate is increased but as the bubbles collapse, they break into numerous microbubbles that, because of their very small size, do not pose a barrier to the leading positive pressure of the next SW. These findings begin to explain why stone breakage in SWL becomes less efficient as the firing rate is increased.

DOI: 10.1111/j.1464-410X.2008.07896.x

**Commentary**

Although the management option of choice for most urinary calculi for nearly 30 years, the exact mode of action of shockwaves (SWs) on stones and surrounding tissues remains unclear. To improve treatment results and reduce complication rates, all aspects of SW administration should acquire a basic understanding of the physics of SW to improve treatment results and reduce complication rates.

**References**


Geert G. Tailly, M.D.
mean number of shockwaves required for complete fragmentation was 2977 and 6044 (P < .000) for the EH and EM groups, respectively.

Conclusions: Single center, single operator experience with two types of lithotriptor indicated that both are equally efficacious, with similar safety profiles. The only significant difference was that the EH lithotriptor required fewer shockwaves for fragmentation.

DOI: 10.1016/j.urology.2008.03.050

Commentary

This carefully executed single-center study demonstrates how extremely difficult it proves to be to compare performance of lithotriptors even in a single center, let alone between different lithotriptors in different centers. In this study, a “single operator” meant that all treatments were performed by the same person—urologist or other—operating the machine under supervision of an admitting urologist. The admitting urologist was not the same for all treatments; thus treatment strategies may have differed. Treatment strategies have an impact on treatment outcome, as measured by the Effectiveness Quotient (EQ).

This is already clear in the present study, because there was no definite and uniform protocol regarding stent placement before shockwave lithotripsy, because significantly more stents were placed in the electromagnetic (EM) group. The EQ is influenced, directly or indirectly, by a number of factors, including stone-free rate, re-treatment rate, auxiliary procedure rate, stone population, treatment strategies, experience and skill of the operator, and imaging modalities available. In this study, a number of these factors are variable, among them treatment strategies, auxiliary procedure rate, stone population, and others.

The stone population in the EM group contained significantly more ureteral stones. Most studies report poorer results for ureteral stones than for stones in the renal pelvis. Most studies also report “clinically insignificant residual fragments” (CIRF), but in this study, “residual fragments” are mentioned. What is the size of a CIRF? What size “rest fragment” qualifies as “clinically insignificant”? Less than 3 or 4 mm? Or less than 5 mm, as in this study? This study correctly identifies “stone-free” outcomes as absence of any evidence of stone on radiography of the kidneys, ureters, and bladder and ultrasonography, while some studies consider cases with CIRF as “successful.” What is the definition of success in these reports?

The reporting of treatment results and performance of lithotriptors is in sore need of standardization. For a start, we might try to agree on the definition of terms such as “success,” “CIRF,” and “stone-free.”

Geert G. Tailly, M.D.

TRANURETHRAL PROCEDURES


Objective: To compare the effectiveness and risk profile of minimally invasive interventions against the current standard of transurethral resection of the prostate.

Design: Systematic review and meta-analysis of randomised controlled trials.

Data Sources: Electronic and paper records up to March 2006.

Review Methods: We searched for all relevant randomised controlled trials. Two reviewers independently extracted data and assessed quality. Meta-analyses of prespecified outcomes were performed with fixed and random effects models and reported using relative risks or weighted mean difference.

Results: 3794 abstracts were identified; 22 randomised controlled trials met the inclusion criteria. These provided data on 2434 participants. The studies evaluated were of moderate to poor quality with small sample sizes. Minimally invasive interventions were less effective than transurethral resection of the prostate in terms of improvement in symptom scores and increase in urine flow rate, with most comparisons showing significance despite wide confidence intervals. Rates of reoperation were significantly higher for minimally invasive treatments. The risk profile of minimally invasive interventions was better than that of transurethral resection, with fewer adverse events. The results, however, showed significant heterogeneity.

Conclusion: Which minimally invasive intervention is the most promising remains unclear. Their place in the management of benign prostate enlargement will continue to remain controversial until well designed and well reported randomised controlled trials following CONSORT guidelines prove they are superior and more cost effective than drug treatment, or that strategies of sequential surgical treatments are preferred by patients and are more cost effective than the more invasive but more effective tissue ablative interventions such as transurethral resection.

DOI: 10.1136/bmj.a1662

Commentary

The management of lower urinary tract symptoms in men has traditionally been based on surgical removal of the prostatic obstructive component causing bladder outlet obstruction—transurethral resection of the prostate (TURP). Medical therapy is focused on replicating this mechanism of action. As a result, a plethora of alternatives to TURP have been developed.

In this systematic review, the lower efficacy of minimally invasive therapies is demonstrated. Overall, these therapies have lower 1-year efficacy with potential re-treatment rates as high as seven times that of TURP. Despite the poor outcomes, the study’s findings are tempered by the demonstration that these minimally invasive procedures have a superior safety profile, especially for patients with significant medical comorbidities that raise their overall surgical risk for severe complications that necessitate intensive care unit admission or for death. As a result, it is suggested that individual preference will influence choice of procedure and that some patients might trade the lower efficacy and higher risk of reoperation for the decreased morbidity seen with minimally invasive treatment options. At first, this seems to be a logical conclusion, and as a reference source, this article provides a comprehensive,
up-to-date review of the efficacy and complications of minimally invasive therapies compared with TURP.

The authors also emphasize the need for large, multicenter clinical trials to help demonstrate superiority and safety of these techniques in comparison with each other and with TURP. The overall ablative effect of heat treatment, however, is about 10% to 15%. Also, the limited debulking of these various size prostates and anatomies will vary more considerably, because these technologies as a whole do not allow a predictable and immediate method of debulking to effectively provide urodraulically defined prostatic obstruction relief.

What is lost is the message that benign prostatic hyperplasia (BPH) is a progressive disease, and in general, less than 10% of men with symptomatic BPH are surgically treated. Many do well with watchful waiting and medication. Our dilemma with these studies and even currently proposed studies is a need to further define and study the selection criteria for those who would best benefit. After all, despite the high re-treatment rate, there exists a population of patients who were treated with a safe, minimally invasive technique who did not need retreatment and whose quality of life was improved.

Aim: To prospectively evaluate the postoperative erectile function of the first 105 consecutive patients undergoing PVP at Texas A&M Health Sciences Center, Scott & White Memorial Hospital, using the Sexual Health Inventory for Men (SHIM) questionnaire.

Methods: Institutional Review Board approved this case series of 105 consecutive patients who underwent PVP. The men were divided into three groups depending on their preoperative bladder management: Group N-catheter free treatment and whose quality of life was improved. There was no statistically significant difference between preoperative and postoperative sexual function after PVP for men with either mild or no erectile dysfunction preoperatively.

Conclusions: Transurethral resection of the prostate not only proved to be clinically effective, but also improved patients’ QOL and bother symptoms. This was associated with long-term, high patient-rated satisfaction.

DOI: 10.1016/j.urology.2008.01.081
Commentary

Transurethral resection of the prostate is considered the gold standard to which surgical therapies for the management of symptomatic benign prostatic hyperplasia are compared. Long-term data using modern tools of symptom and quality of life assessments, however, are limited in the literature. This study is unique as a prospective study of 280 patients who were treated within the last 15 years that used what is now well-accepted outcome parameters of symptom and efficacy assessment, such as American Urological Association symptom scores, flow rates, quality-of-life, and bother and satisfaction assessment tools.

Alexis E. Te, M.D.

MEDICAL ASPECTS

Primary hyperparathyroidism: Is there an increased prevalence of renal stone disease? Suh JM, Cronan JJ, Monchik JM, Department of Diagnostic Imaging, The Warren Alpert Medical School of Brown University and Rhode Island Hospital, Providence, RI. AJR Am J Roentgenol 2008;191:908–911.

Objective: Parathyroid adenomas cause hypercalcemia and are culprits in the development of renal stone disease. With serum assays available, early detection of parathyroid tumors is possible. We performed this retrospective review to determine whether the prevalence of nephrocalcinosis and nephrolithiasis is still increased in patients with primary hyperparathyroidism compared with those not affected by the disorder in view of the early detection of parathyroid adenomas.

Materials and Methods: We retrospectively reviewed the renal sonograms of 271 patients with surgically proven primary hyperparathyroidism. All patients had undergone renal imaging within 6 months before parathyroid surgery. Our control group consisted of 500 age-matched subjects who had right upper quadrant sonograms obtained for various reasons.

Results: Nineteen (7.0%) of the 271 patients with primary hyperparathyroidism had renal stones, and eight (1.6%) of the 500 subjects in the control group had stones. Pearson’s chi-square analysis showed that this difference in prevalence is significant (p < 0.0001).

Conclusion: Our results showed a fourfold increased prevalence of asymptomatic renal stone disease in patients with surgically proven primary hyperparathyroidism compared with subjects not affected by the disorder. The National Institutes of Health consensus conference on asymptomatic primary hyperparathyroidism recommended that patients with renal stone disease undergo parathyroid surgery. These patients should undergo surgery even if they have minimal or no elevation of the total serum calcium value and no other metabolic manifestations of hyperparathyroidism. The finding of nephrocalcinosis or nephrolithiasis is, therefore, a significant finding in evaluating patients for parathyroid surgery. Routine imaging of the kidneys is necessary when primary hyperparathyroidism is documented.

DOI: 10.2214/AJR.07.3160

Commentary

Hyperparathyroidism is a risk factor for the development of calcium phosphate, calcium oxalate, or mixed calcium stones. The authors performed a retrospective study of patients with pathologically confirmed primary hyperparathyroidism and found that the prevalence of stones based on ultrasonography (7.0%) was significantly higher than that of their control group (1.6%). The latter group consisted mainly of patients who were undergoing ultrasonography for evaluation of abdominal pain. If primary hyperparathyroidism is diagnosed in a stone former, neck exploration and removal of the pathologic gland(s) is indicated. A randomized prospective study of parathyroid surgery vs observation in patients with kidney stones and primary hyperparathyroidism demonstrated that those who underwent parathyroidectomy did not have further stone activity while the latter cohort had stone recurrence.

Reference


Dean G. Assimos, M.D.


Ascorbic acid is frequently administered intravenously by alternative health practitioners and, occasionally, by mainstream physicians. Intravenous administration can greatly increase the amount of ascorbic acid that reaches the circulation, potentially increasing the risk of oxalate crystallization in the urinary space. To investigate this possibility, we developed gas chromatography mass spectrometry methodology and sampling and storage procedures for oxalic acid analysis without interference from ascorbic acid and measured urinary oxalic acid excretion in people administered intravenous ascorbic acid in doses ranging from 0.2 to 1.5 g/kg body weight. In vitro oxidation of ascorbic acid to oxalic acid did not occur when urine samples were brought immediately to pH 3 at 2 g and stored at –30°C within 6 hours. Even very high ascorbic acid concentrations did not interfere with the analysis when oxalic acid extraction was carried out at pH 1. As measured during and over the 6 hours after ascorbic acid infusions, urinary oxalic acid excretion increased with increasing doses, reaching approximately 80 mg at a dose of approximately 100 g. We conclude that, when studied using correct procedures for sample handling, storage, and analysis, less than 0.5% of a very large intravenous dose of ascorbic acid is recovered as urinary oxalic acid in people with normal renal function.

DOI: 10.1016/j.metabol.2008.09.023

Commentary

Urinary oxalate is primarily derived from endogenous synthesis mainly occurring in liver and dietary sources. A small component is thought to be derived from nonenzymatic
breakdown of ascorbic acid. Oral consumption of 1 to 2 g supplements of ascorbic acid has been demonstrated to increase oxalate excretion by 33% to 61% in calcium oxalate stone formers.\(^1\)\(^,\)\(^2\) Robitaille and colleagues demonstrated a dose-dependent increase in urinary oxalate excretion after the administration of intravenous ascorbic acid to normal subjects. Urinary oxalate excretion over 6 hours after the highest dose was 80 mg. This further demonstrates that ascorbic acid may contribute to the urinary oxalate pool. Hence, high doses should be avoided in stone formers. The authors downplay the potential harm of increased oxalate excretion after the administration of a high amount of ascorbic acid intravenously. The levels of oxalate excretion that they reported are similar to those of persons with primary hyperoxaluria and ethylene glycol toxicity. Therefore, there is some risk that this could perturb renal function.

DOI: 10.1016/j.metabol.2008.09.023

References


Dean G. Assimos, M.D.

INVESTIGATIVE ENDUROLOGY


Purpose: We determined the maximal renal tolerance of warm ischemia using renal cortical interstitial metabolic changes to identify a potential real-time marker of irreparable renal function.

Materials and Methods: Using a single kidney model 3 groups of 5 pigs each underwent 120, 150 and 180 minutes of warm ischemia, respectively. Microdialysis samples were collected before, during and after ischemia. Renal function assessments consisting of serum creatinine and GFR measurements were performed before ischemia and on post-ischemia days 1, 5, 9, 14 and 28. Kidneys exposed and not exposed to ischemia were collected for histological study.

Results: Interstitial glucose and pyruvate concentrations decreased, while lactate concentrations increased to stable levels during ischemia. Glutamate spiked at 30 minutes of ischemia and then tapered, while glycerol increased throughout warm ischemia time. Kidneys exposed to more than 120 minutes of warm ischemia developed irreversible deterioration of function. Warm ischemia had a direct linear relationship to interstitial glycerol levels with a maximal interstitial glycerol level of 167 \(\mu\)mol/l before unrecoverable kidney damage. Therefore, microdialysis provided a real-time marker of renal injury.

This study provides a much more reliable tool than serum creatinine levels and glomerular filtration rate that researchers can use to determine ischemia-induced renal damage. It gives us a framework for measuring the effect of various interventions to lessen renal damage. The real-time microdialysis technique has not yet been validated in humans; this technique would not be feasible in routine clinical practice. The findings, however, help us in searching for better scientific markers of renal damage during warm ischemia than depending on data from 1975.

References


David A. Duchene, M.D.


DOI: 10.1016/j.juro.2008.07.017

Commentary

The increasing use of laparoscopic and robot-assisted partial nephrectomy for renal masses has led to the reemergence of a debate on tolerable warm ischemia time. Unlike open partial nephrectomy, in which cold ischemia may be induced, no reliable and agreed-on method for establishing cold ischemia during laparoscopic or robot-assisted partial nephrectomy has been developed. Therefore, many authors have tried to determine the length of warm ischemia that is tolerable to prevent long-term kidney dysfunction. Surprisingly, the still generally accepted 30-minute threshold of warm ischemia is inferred from studies by Ward\(^1\) on renal hypothermia in a canine model in 1975.

Weld and associates studied a porcine model in an attempt to determine the maximal renal tolerance of warm ischemia. The authors used renal cortical interstitial metabolic changes to identify a potential real-time marker of irreparable renal function. The single kidney model underwent 120, 150, or 180 minutes of warm ischemia. Microdialysis samples to explore changes in renal interstitial fluid metabolite concentrations were collected before, during, and after ischemia. Renal function tests were assessed for up to 28 days postoperatively.

Interstitial glucose and pyruvate concentrations decreased, while lactate concentrations increased to stable levels during ischemia. Glutamate spiked at 30 minutes and then tapered, while glycerol increased throughout warm ischemia time. Kidneys exposed to more than 120 minutes of warm ischemia developed irreversible deterioration of function. Warm ischemia had a direct linear relationship to interstitial glycerol levels with a maximal interstitial glycerol level of 167 \(\mu\)mol/l before unrecoverable kidney damage. Therefore, microdialysis provided a real-time marker of renal injury.

This study provides a much more reliable tool than serum creatinine levels and glomerular filtration rate that researchers can use to determine ischemia-induced renal damage. It gives us a framework for measuring the effect of various interventions to lessen renal damage. The real-time microdialysis technique has not yet been validated in humans; this technique would not be feasible in routine clinical practice. The findings, however, help us in searching for better scientific markers of renal damage during warm ischemia than depending on data from 1975.
Robotic technologies have had a significant impact on surgery. We report what is to our knowledge the first use of microrobots to perform laparoscopic urological surgery in a canine model.

Materials and Methods: Nonsurvival laparoscopic radical prostatectomy and radical nephrectomy were performed using microrobotic camera assistance. Following the administration of general anesthesia, miniature camera robots were inserted in the insufflated abdomen via a 15-mm laparoscopic port. These microrobots were mobile, controlled remotely to desired locations and provided views of the abdominal cavity, assisting the laparoscopic procedures. Additional ports and laparoscopic instruments were placed in the abdomen using the views provided by these microrobots.

Results: One dog underwent laparoscopic prostatectomy and another underwent laparoscopic nephrectomy. The 2 procedures were completed successfully. Microrobots provided additional views from several angles, aiding in the performance of the procedures.

Conclusions: Miniature camera robots (microrobots) provide a mobile viewing platform. With added functionality these new robots have the potential to further evolve the robotic armamentarium for surgeons.

DOI: 10.1016/j.juro.2008.07.016


David A. Duchene, M.D.
Commentary

We all love exciting, scintillating news and here it is! Kaouk and colleagues have described an initial clinical experience of robotic single-port (RSP) surgery. It is a pilot study and an evaluation of a new technology point. Articulating, endowristed robotic instruments were inserted through a single umbilical incision: A robot 12-mm scope and 5-mm robotic grasper were introduced through a multichannel single port and an additional 5-mm or 8-mm robotic port was introduced through the same umbilical incision (2cm) alongside the multichannel port, in an effort to make a minimally invasive technique more minimally invasive, with better cosmesis. While a single umbilical incision can be masked easily, it needs a longer operative time, imparts ergonomic discomfort to surgeon and assistant, and is possible only in selected cases by selected surgeons. We also know that it mandates the need for inserting the R port with an open technique, besides placing an additional port by the side, and also needs an incision in the periumbilical area to retrieve the bagged specimen.

Are there any real advantages over conventional robot-assisted surgeries in terms of safety, efficacy, efficiency, and replicability by other surgeons? By reducing the number of trocar sites, does it make a huge difference or make it psychologically more appealing? This all remains to be determined. Economics and cost factors need to be evaluated separately. The precise role, potential benefits, and technology limitations, especially for its role in urologic surgery for large solid, vascular organs located at arduous angles, need to be evaluated. Other major problems are instrument collisions inside and arm clashing outside. Bottom line: This is possible, and, unquestionably, it is a great step forward in a long journey.

Ashok K. Hemal, M.S., M.Ch.


Purpose: Laparoscopic partial nephrectomy is an advanced surgical procedure requiring technical skill in minimally invasive techniques. Tumors located adjacent to the renal hilum pose an additional challenge. We report a multi-institutional study of robotic partial nephrectomy for renal hilar tumors and describe our results.

Materials and Methods: We evaluated patients from 2 institutions who underwent robotic partial nephrectomy for renal hilar tumors. Renal hilar tumors were defined as tumors abutting the renal artery and/or renal vein on preoperative imaging. After clamping the renal hilar vessels tumors were excised with fine dissection from the renal vessels followed by sutured renal reconstruction.

Results: Robotic partial nephrectomy was successfully performed on 11 patients (mean age 56.4 years, range 30 to 76). Mean tumor size was 3.8 cm (range 2.3 to 6.4). Mean warm ischemia time was 28.9 minutes (range 20 to 39) and mean operating time was 202 minutes (range 154 to 253). Mean blood loss was 220 ml (range 50 to 750). Mean hospital stay was 2.6 days (range 1 to 4). Histopathological evaluation confirmed 8 cases of clear cell renal cell carcinoma, 1 of papillary renal cell carcinoma and 2 of chromophobe renal cell carcinoma. Surgical margins were negative for malignancy in all cases.

Conclusions: Robotic partial nephrectomy is a safe and feasible approach for select patients with renal hilar tumors. Robotic assistance may facilitate tumor resection and renal reconstruction for challenging renal hilar tumors, offering a minimally invasive and nephron sparing surgical option for select patients who might otherwise require open surgery or total nephrectomy.

DOI: 10.1016/j.juro.2008.08.022

Commentary

This is a very interesting illustration of robot-assisted partial nephrectomy in selected patients with renal hilar tumors in a multicentric trial demonstrating safety and feasibility. Rogers and associates define hilar tumors as direct physical contact of tumor with hilar vessels, although in all of their cases, they could easily shell out the tumor from the hilar structure; thus, this was perhaps a less challenging feat had the tumor involved the perivascular structures or sheath. Long-term oncologic follow-up is needed in this subset of patients, along with evaluation of the risk of bleeding, arteriovenous malformation, renal function, hypertension, and recurrence. Robotic assistance does help in arduous dissections at awkward angles and in meticulous suturing with excellent hemostasis, which are daunting tasks in these kinds of cases when performed purely laparoscopically.

Ashok K. Hemal, M.S., M.Ch.

THERMAL/ABLATIVE TECHNOLOGY

Cryoaclnation or radiofrequency ablation of the small renal mass: A meta-analysis. Kunkle DA, Uzzo RG, Department of Urologic Oncology, Fox Chase Cancer Center, Temple University School of Medicine, Philadelphia, PA. Cancer 2008;113:2671–2680.

Background: The incidence of renal cell carcinoma is rising because of incidental detection of small renal masses (SRMs). Although surgical resection remains the standard of care, cryoaclnation and radiofrequency ablation (RFA) have emerged as minimally invasive treatment alternatives. The authors of this report performed a comparative meta-analysis evaluating cryoaclnation and RFA as primary treatment for SRMs.

Methods: A search of the MEDLINE database was performed reviewing the world literature for clinically localized renal masses treated by cryoaclnation or RFA. Results: Forty-seven studies representing 1375 kidney lesions treated by cryoaclnation or RFA were analyzed. No differences were detected between ablation modalities with regard to mean patient age (P = .17), tumor size (P = .12), or duration of follow-up (P = .53). Pretreatment biopsy was performed more often for cryoaclinated lesions (82.3%) than for RFA (62.2%; P < .0001). Unknown pathology occurred at a significantly higher rate for SRMs that underwent RFA (40.4%) versus cryoaclnation (24.5%; P < .0001). Repeat ablation was performed more often after RFA (8.5% vs 1.3%; P < .0001), and the rates of local tumor progression were significantly higher for RFA (12.9% vs 5.2%; P < .0001) compared with cryoaclnation. The higher incidence of local tumor

Objective: The goal of this study was to compare the outcome, complications, and charges of percutaneous renal cryoablation and laparoscopic cryoablation of solid renal masses.

Materials and Methods: A total of 30 percutaneous renal cryoablations (mean tumor size, 2.1 cm) in 30 patients (mean age, 67.0 years) and 60 laparoscopic renal cryoablations (mean tumor size, 2.5 cm) in 46 patients (mean age, 67.4 years) were compared. The size of the tumor, procedural complications, hospital charges, length of hospital stay, and tumor follow-up parameters were recorded. Monitoring after ablation was performed every 3 months using contrast-enhanced MRI or CT.

Results: Both percutaneous cryoablation and laparoscopic cryoablation of solid renal masses had a high technical success rate (30/30 [100%] and 59/60 [98.3%]). There was no significant difference in the rate of residual disease (3/30 [10%] and 4/60 [6.7%], p = 0.68), and the secondary effectiveness rate is 100% for both groups to date. One renal mass treated using laparoscopic cryoablation had a local recurrence, but none of the masses treated using percutaneous cryoablation had a recurrence. The disease-specific survival is 100% in both groups with no significant difference in the mean follow-up time (14.5 vs 14.6 months, p = 1.0) or major complication rate (0/30 [0%] vs 3/60 [5.0%], p = 0.55). For the treatment of solid renal masses, percutaneous cryoablation was associated with 40% lower hospital charges (mean, $14,175 vs $23,618, p < 0.00001) and a shorter hospital stay (mean ± SD, 1.1 ± 0.3 vs 2.4 ± 2.1 days; p < 0.0001) than laparoscopic cryoablation.

Conclusion: Although certain tumors require laparoscopic intervention because of the location or size of the tumor, percutaneous renal cryoablation is safe and effective and is associated with lower charges when used for the treatment of small renal tumors.

DOI: 10.1002/cncr.23896

Commentary

In the past 6 months, the urologic and radiologic literature has seen a flurry of articles regarding the different approaches and technologies available for ablative therapy. Of most interest has been three articles that tried to address the questions: “Is cryoablation better than radiofrequency ablation (RFA)?” and “is the laparoscopic route better than the percutaneous route”?

Kunkle and Uzzo’s meta-analysis that evaluates cryoablation and RFA of small renal masses included 47 studies and 1375 kidney lesions. The authors showed that despite similar patient age, tumor size, and duration of follow-up, there was a significantly higher rate of local tumor progression after RFA than after cryoablation (12.9% vs 5.2%). Metastasis was reported less frequently in patients who underwent cryoablation (1% vs 2.5%), but this association was not significant. Notably, the majority of cryoablation procedures were performed laparoscopically (65%), whereas RFA was overwhelmingly performed percutaneously (94%). The authors concluded that although ablation is a viable strategy, based on short-term oncologic outcomes, the current data suggest that cryoablation yields better local tumor control.

In the editorial comment after this article, Cadeddu and Raman1 highlight the limitations of a meta-analysis, which relies on the inherent weaknesses of the articles from which the data are analyzed. Nearly all of the studies in the analysis were retrospective, with significant selection biases and high degrees of variance in how the procedures were performed, how the technology was used, the type of anesthesia used, biopsy rates, and follow-up criteria.

Cadeddu and Raman also argue that there is a technology bias in favor of laparoscopic cryoablation therapy, which is associated with a higher re-treatment rate than percutaneous RFA. According to these authors, this is not because of a failure of RFA, but because percutaneous therapy is more easily repeatable. Laparoscopic therapy, usually performed for cryoablation, is much more difficult to repeat, because of postoperative scarring, and is more invasive; thus, the surgeon at the time of treatment will be much more thorough and least likely to encounter the need for re-treatment.

In addition, Cadeddu and Raman argue that the type of anesthesia used plays a significant role in outcomes, because general anesthesia optimizes the patients’ tolerance and allows for greater control of respiratory motion, thereby improving the overall accuracy of targeting as opposed to local sedation. Because the more difficult procedures may take longer, the tolerability improves when general anesthesia is used. Although the two publications summarized here did not provide definitive answers to the questions posed at the beginning of the article, the authors did agree that prospective randomized trials are needed.

An interesting article in the radiologic literature by Hinshaw and colleagues compared the percutaneous and laparoscopic routes of cryoablation for the management of solid renal masses. While this was also a retrospective study, there was some attempt at achieving homogeneity in the selection of patients; all patients treated before 2003 were treated with laparoscopic cryoablation, and starting in 2003, more patients were treated with percutaneous cryoablation as smaller cryoprobes became available.

These authors compared 30 patients in the percutaneous group to 60 in the laparoscopic group and noted no difference in the rate of residual disease (10% and 6.7%, respectively; P = 0.68). There was one local recurrence in the laparoscopic cryoablation group and none in the percutaneous group.
While the disease-specific survival rate was 100% at a mean follow-up time of less than 15 months, several patients died of other conditions. These authors also evaluated the costs of the procedures, showing that percutaneous cryoablation was associated with a 40% lower hospital charge than laparoscopic cryoablation, as well as a shorter hospital stay.

While still subject to the limitations of a retrospective study, this article appears to have fewer selection biases than most previously published ablation studies and provides the first reasonable data evaluating the percutaneous and laparoscopic approaches for a single ablative modality. It suggested that, at least with cryoablation, the percutaneous route appears to be efficacious and not subject to inferior outcomes. Of course, this will need to be corroborated by a larger number of patients and by other institutions, and other trials will need to evaluate RFA similarly. Or, we could do a whole lot better and design a randomized study.

Reference

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