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UROLOGICAL SURVEY

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STONE DISEASE

Impact of real-time visualization of cystoscopy findings on procedural pain in female patients

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Background and Purpose: We have previously shown that men tolerate office flexible cystoscopy better when they simultaneously view the monitor during their procedure. We sought to demonstrate similar effects of distraction on women undergoing rigid office cystoscopy.

Patients and Methods: 100 consecutive women underwent diagnostic office based rigid cystoscopy. All patients consented to inclusion in the study. Patients were randomized to two groups. The study group consisted of patients who were allowed to view their procedure real-time on the video monitor. The control group patients had the video screen positioned such that only the surgeon could visualize the procedure. Patients underwent rigid cystoscopy using a 17F cystoscope introduced with an obturator. Water-soluble lubricant was liberally applied to all cystoscopes immediately before the procedure. Patients who needed additional procedures, including cystodiathermy or stent extraction, were excluded from the study groups. Postprocedure, patients were asked to record their experience on a 100-mm visual analog pain scale as soon as the surgeon left the room.

Results: Women who were able to view their cystoscopy findings simultaneously during the procedure did not demonstrate lower pain scores compared with those who did not view the screen (median pain score of 19 v 10; P = 0.16, based on Wilcoxon rank sum test).

Conclusions: In contrast to the decreased pain scores demonstrated when tested in men, use of distraction by allowing patients to simultaneous view their procedure may not affect procedure tolerance for women undergoing office-based rigid cystoscopy.

Editorial Comment

The authors present a well-designed and conducted randomized prospective clinical trial to evaluate the impact of video-endoscopic visualization on procedural pain during rigid cystoscopy in females. They do not report if a power analysis was conducted - it is possible that a Type 2 error may be encountered due to small sample size.

The authors have previously reported decreased pain scores in men undergoing flexible cystoscopy when the patients are allowed to visualize the cystoscopic findings on the video tower. As the authors note, the lack of a difference in pain scores in women may be related to the use of rigid cystoscope or positioning in a lithotomy as opposed to supine position.

It would be helpful to document at what point during the procedure did the women report the most discomfort - if during insertion, this would support the hypothesis that the use of an obturator during blind insertion of the cystoscope eliminates the value of visualization during the procedure. Alternatively, if discomfort was reported during filling with irrigant, was this more common in women with voiding dysfunction and did it correlate with the volume of irrigant instilled or patient's bladder capacity?

It would be important to exclude patients who have previously undergone cystoscopy - as pre-procedural anxiety has been reported to correlate with procedural pain. It would be interesting to repeat the study in men using a television show as a sham control - is it distraction that diminishes pain, or is it "visual feedback" that facilitates relaxation as the scope is passed through the bulbar, membranous and prostatic urethra?

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Retrograde, antegrade, and laparoscopic approaches for the management of large, proximal ureteral stones: a randomized clinical trial

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Background and Purpose: Multiple procedures have been introduced for the management of urinary stones in the upper ureter. In this randomized clinical trial, we compared three surgical options in this regard.
Patients and Methods: From September 2004 to May 2006, we enrolled in the study 150 patients with upper ureteral stones who were referred to our center. We included patients with a stone size ≥ 1.5 cm in the greatest diameter. Using the random table, patients were divided into three 50-patient groups by treatment: Group A, retrograde ureteroscopic lithotripsy using a semirigid ureteroscope; group B, transperitoneal laparoscopic ureterolithotomy; and group C, percutaneous nephrolithotripsy. All procedures were performed in a training program.
Results: The stone-free rates for patients in groups A, B, and C, at discharge and 3 weeks later, were 56%, 88% and 64% and 76%, 90% and 86%, respectively. Conversion to open surgery and repeated laparoscopy was necessary for two and one patients in group B. Urinary leakage continued more than 3 days in eight (16%) and nine (18%) patients in groups B and C after operation, respectively (P = 0.7). Conclusions: Although the success rate of ureteroscopy was not significantly lower than the two other options, the complications seen with this technique were negligible. Consequently, the procedure of choice for large proximal ureteral stones seems to depend on surgeon expertise and availability of equipment.

Editorial Comment

The authors are to be commended for conducting a randomized prospective study of a difficult clinical situation. Indeed, it is note-worthy that they were able to recruit 150 patients with > 1.5 cm proximal ureteral calculi in less than 2 years. Similarly, it is a challenge to consent patients to be randomized to procedures that vary greatly in the degree of invasiveness and risk.

The authors concluded that ureteroscopy is a reasonable first alternative as the severity of potential complications is lower than the other procedures tested. Indeed, patients would tend to agree with this assessment, and if given the alternative of shockwave lithotripsy (not tested in the current study due to concerns of efficacy) would often select SWL over more effective procedures.

The study is somewhat limited by the choice of technology. The authors did not utilize flexible endoscopy - either flexible ureteroscopy as an adjunct to the ureteroscopic approach, or flexible cystoscopy/ureteroscopy as an adjunct to the antegrade percutaneous approach. One would anticipate that these modalities would significantly improve the initial post-procedural stone-free rates. Pneumatic lithotripsy has been demonstrated to lead to greater stone migration and larger stone fragments. Intraoperative ultrasound may have facilitated identification of the "missed stone" in the laparoscopic group.

The authors did not stratify results based on the severity of hydronephrosis - it is our practice to consider the antegrade approach if we anticipate that the severity of hydronephrosis will preclude manipulation of the flexible ureteroscope for stone retrieval. The authors report a high secondary procedure rate in all groups in this study (10-20%); underscoring the challenge of the large ureteral calculus. Most importantly, it tempers the enthusiasm of prior reports of laparoscopic ureterolithotomy.

In summary, the addition of a flexible ureteroscope and decreased reliance on pneumatic lithotripsy may have placed ureteroscopy more solidly as the front-runner for large proximal ureteral stones.

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ENDOUROLOGY & LAPAROSCOPY

Robot assisted laparoscopic partial nephrectomy: a viable and safe option in children

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Purpose: The safety, benefits and usefulness of laparoscopic partial nephrectomy have been demonstrated in the pediatric population. We describe our technique, and determine the safety and feasibility of robot assisted laparoscopic partial nephrectomy based on our initial experience.
Materials and Methods: We retrospectively reviewed robot assisted laparoscopic partial nephrectomy performed at our institution between 2002 and 2005. The technique was conducted via a transperitoneal approach with the da Vinci Surgical System using standard laparoscopic procedural steps. Clinical indicators of outcomes included estimated blood loss, complications, in hospital narcotic use and length of stay.
Results: Robot assisted laparoscopic partial nephrectomy was completed successfully in 9 cases. Mean patient age was 7.2 years and mean follow-up was 6 months. Mean operative time was 275 minutes and mean estimated blood loss was 49 mL. Operative times improved significantly with experience. Overall patients had a mean hospitalization of 2.9 days and required 1.3 mg morphine per kg. All patients had a normal remaining renal moiety confirmed on Doppler ultrasound. The only complication was an asymptomatic urinoma discovered on ultrasound, which was treated with percutaneous drainage and ultimately resolved.
Conclusions: Our initial experience shows the safety and feasibility of robot assisted laparoscopic partial nephrectomy in children. Operative time decreases with experience. The enhanced visualization and dexterity of a robotic system potentially offer improved efficiency and safety over standard laparoscopy. Robot assisted laparoscopy is an option for partial nephrectomy and may become the minimally invasive treatment of choice.

Editorial Comment

This report on robotic assisted laparoscopic partial nephrectomy in the pediatric population is another pioneering manuscript that raises the everlasting question of minimally invasive surgery in children and the true benefits that this treatment modality offers. Another similar major query is the advantage of robotic surgery versus standard laparoscopic procedure.

The later would allow the surgeon to reach the lowest more distal ureteral cuff when performing the ureterectomy to prevent stump infection and other complications, with ease without docking and docking the robot to re-position the patient. Cost is also a major consideration since the economics of health care has been influencing somewhat how we practice medicine today. These issues do not take any merit from the authors that developed a very nice minimally invasive approach to a common pediatric dilemma with minimal complications.

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Histological evaluation of cold versus hot cutting: clinical impact on margin status for laparoscopic partial nephrectomy

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Purpose: While most laparoscopic nephron sparing surgery is performed using cold scissors, energy based devices may also be used. A criticism of this approach has been the potential thermal destruction of the cellular architecture at the tumor margin, precluding the ability to accurately determine whether tumor cells are present. We clinically characterized the histological appearance of tumor margins excised with cold scissors, and bipolar and ultrasonic shears.
Materials and Methods: We evaluated 40 renal mass excisions performed by a total of 3 urologists at our institution between February 2003 and March 2007. There were 10 bipolar (5 mm LigaSure), 20 ultrasonic (Harmonic Scalpel) and 10 cold excisions. All slides were randomly evaluated twice by a single pathologist blinded to surgeon and excision method. Histological interpretation of the margin was scored as clear vs. indeterminate. Variables, including margin fragmentation, artifact, extravascular blood clot, parenchymal hemorrhage, capillary congestion and vessel sealing, were assessed and scored on a scale of 0 to 3, that is 0--none, 1-1% to 25%, 2-26% to 50% and 3--greater than 50%.
Results: The pathologist was able to confidently identify cells at the margin as being malignant or benign in all cases. Histologically the ultrasonic scalpel demonstrated increased fragmentation and extravascular blood clotting compared with those of the other cutting methods ($p < 0.025$ and < 0.026, respectively). The ultrasonic scalpel also showed increased artifact depth compared to that of cold cutting ($p < 0.001$). There were no statistical differences between the groups regarding margin artifact, parenchymal hemorrhage or capillary congestion. No statistical significance was observed in any variables between bipolar and cold cutting.
Conclusions: Despite some degree of cellular damage the ability to determine whether cells at the margin were benign or malignant was not affected by using an energy based bipolar or ultrasonic device.

Editorial Comment

Laparoscopic partial nephrectomy remains to be challenging technically due to reconstructive steps but also oncological principles should be maintained.

The optimal laparoscopic instrument to excise the renal mass during laparoscopic partial nephrectomy would be the one that not only precisely removes the mass but also performs coagulation of renal parenchymal vessels so bleeding would not be relevant during this procedure.

The dilemma is whether energy could also destroy possible cancer cells during the excision of the mass, allowing coagulation but not disturbing the histology so the pathological examination is well evaluated to accurately grade and stage the tumor and it surgical margins. The authors examined the preference of 3 surgeons and although the possible artifacts maybe increased with the harmonic scalpel when compared to “cold” cut (no energy) and Ligasure, the ultrasonic device did not distorted the histological sample to evaluate its margin status.

Finally, renal hilar clamping may decrease margin positivity due to better visualization compared to excision of renal masses with no vascular control.

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IMAGING

Prostate cancer: apparent diffusion coefficient map with T2-weighted images for detection - a multireader study

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Purpose: To retrospectively assess the incremental value of an apparent diffusion coefficient (ADC) map combined with T2-weighted magnetic resonance (MR) images compared with T2-weighted images alone for prostate cancer detection by using a pathologic map as the reference standard.

Materials and Methods: This retrospective study was approved by the institutional review board; informed consent was waived. The study included 52 patients (mean age, 65 years +/- 5 [standard deviation]; range, 48-76 years) who underwent endorectal MR imaging and step-section histologic examination. Three readers with varying experience levels reviewed T2-weighted images alone, the ADC map alone, and T2-weighted images and ADC maps. The prostate was divided into 12 segments. The probability of prostate cancer in each segment on MR images was recorded with a five-point scale. Areas under the receiver operating characteristic curve (AUCs) were compared by using the Z test; sensitivity and specificity were determined with the Z test after adjusting for data clustering.

Results: AUC of T2-weighted and ADC data (reader 1, 0.90; reader 2, 0.88; reader 3, 0.76) was greater than that of T2-weighted images (reader 1, 0.79; reader 2, 0.75; reader 3, 0.66) for all readers ($P < .0001$ in all comparisons). AUC of T2-weighted and ADC data was greater for readers 1 and 2 than for reader 3 ($P < .001$). Sensitivity of T2-weighted and ADC data (reader 1, 88%; reader 2, 81%; and reader 3, 78%) was greater than that of T2-weighted images (reader 1, 74%; reader 2, 67%; reader 3, 67%) for all readers ($P = .01$ for reader 1; $P = .02$ for readers 2 and 3). Specificity of T2-weighted and ADC data was greater than that of T2-weighted images for reader 1 (88% vs. 79%, $P = .03$) and reader 2 (89% vs. 77%, $P < .001$).

Conclusion: The addition of an ADC map to T2-weighted images can improve the diagnostic performance of MR imaging in prostate cancer detection. (c) RSNA, 2008.

Editorial Comment

Nowadays there is a worldwide tendency to perform a multiparametric endorectal magnetic resonance imaging evaluation of patients suspected or having prostate cancer. On multiparametric MRI evaluation, prostate cancer appears as an area with reduced T2 signal intensity on conventional T2-weighted images, increased choline and decreased citrate and polyamines on magnetic resonance spectroscopic imaging, decreased diffusivity on diffusion weighted-imaging (DWI), and increased uptake on dynamic contrast enhanced (DCE) imaging. All techniques are accomplished in a complete, one-stop shop examination that takes place in about 60-min. Each complementary method has inherent advantages and disadvantages; therefore, they should be combined. The best way to combine these techniques however still needs to be determined. The authors found that the addition of DWI (which is quantified by the apparent diffusion coefficient map-ADC) to the conventional T2-weighted images further improves the performance of MRI in prostate cancer detection.

The results of this work support that the best characterization of prostate cancer in individual patients will most like result from a multiparametric examination that combines conventional MRI, spectroscopy, diffusion-weighted images and dynamic contrast enhanced technique.

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Angiomyolipoma with minimal fat on MDCT: can counts of negative-attenuation pixels aid diagnosis?

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Objective: The purpose of this study was to determine whether counts of pixels with subzero attenuation on CT scans can aid in the diagnosis of renal angiomyolipoma with minimal fat.
Materials and Methods: Of 33 angiomyolipomas identified among 719 renal masses resected from 702 patients over 4 years, 15 masses in 15 patients were prospectively diagnosed on the basis of the presence of fat at MDCT. The 18 patients with minimal-fat angiomyolipoma and a matched (age, sex, tumor size) cohort of patients with renal cell carcinoma were included in this study. Three radiologists independently counted the number of pixels with attenuation less than -10, -20, and -30 HU. Receiver operating characteristic analysis of the number of pixels at each cutoff was used to calculate sensitivity, specificity, and positive predictive value with the following criteria: 1, more than 10 pixels less than -20 HU; 2, more than 20 pixels less than -20 HU; 3, more than 5 pixels less than -30 HU.
Results: Using criterion 1, reader A identified six angiomyolipomas; reader B, five; and reader C, two. The combined sensitivity was 24%; specificity, 98%; and positive predictive value, 69%. Using criterion 2, reader A identified three angiomyolipomas; reader B, four; and reader C, two. The combined sensitivity was 17%; specificity, 100%; and positive predictive value, 100%. Using criterion 3, reader A identified four angiomyolipomas; reader B, four; and reader C, two. The combined sensitivity was 18%; specificity, 100%; and positive predictive value, 100%.
Conclusion: CT findings of more than 20 pixels with attenuation less than -20 HU and more than 5 pixels with attenuation less than -30 HU have a positive predictive value of 100% in detection of angiomyolipoma, but most angiomyolipomas with minimal fat cannot be reliably identified on the basis of an absolute pixel count.

Editorial Comment

Adequate preoperative imaging characterization of small angiomyolipoma (AML) is essential since 3-7% of suspicious renal masses resected are found to be AML. AML is characterized by the presence of variable amount of fat within a renal mass. From the practical point of view (evidence based medicine), all renal mass containing fat are considered AML. The use of thin-section (2-5 mm) unenhanced CT is the best method for detecting even small amounts of fat. Previous reports have been shown that if fat within a mass is not visually obvious, pixel mapping can be performed, which may reveal the fat as clustered pixels with negative CT numbers (defined as at least 3 adjacent pixels with attenuation -20 HU) (1). The drawbacks of these previous reports are lack of pathologic confirmation and absence of a control group. The authors of this manuscript found that in a study with pathologic correlation the CT findings of more than 20 pixels with attenuation less than -20 HU and more than 5 pixels with attenuation less than -30 HU have a positive predictive value of 100% in detection of angiomyolipoma. These AMLs presented at pathologic examination more than 10% of fat.

AMLs containing less than 10% of fat at pathologic examination could not be characterized on the basis of an absolute pixel count. Perhaps, for the sake of clarity, we should call AMLs with minimal fat those with tiny amount of visible fat and those in which only CT pixel mapping is able to demonstrate negative attenuation. AMLs with less than 10% of fat should be called AMLs without radiologic evidence of fat. The latter category is indistinguishable from renal cell carcinoma and for this reason, imaging guided percutaneous biopsy is indicated.

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PATHOLOGY

Gleason grading of prostatic adenocarcinoma with glomeruloid features on needle biopsy

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Glomerulations in prostatic adenocarcinoma are characterized by dilated glands containing intraluminal cribriform structures with a single point of attachment, resembling a renal glomerulus. On prostate biopsy, glomerulations are exclusively associated with carcinoma and not associated with benign mimickers. However, the Gleason grading of carcinoma with glomerulations on needle biopsy remains controversial. We prospectively collected 45 prostate needle biopsies containing carcinoma with glomeruloid features from our consult files for a 9-month period and examined the association between glomerulations and the presence of concurrent high-grade carcinoma. Glomerulations were overwhelmingly associated with high-grade cancer on the same core, composed of either Gleason pattern 4 (n = 36, 80% of cases) or Gleason pattern 5 (n = 2, 4% of cases). Only a minority of glomerulations were surrounded exclusively by pattern 3 cancer (n = 7, 16% of cases) on the same core. Most of the cases with surrounding pattern 4 cancer were scored as 3 + 4 = 7 (n = 24, 66%), whereas a smaller fraction were scored as 4 + 3 = 7 (n = 9, 26%), and only a minority were 4 + 4 = 8 (n = 3, 9%). In most cases, glomeruloid change was present on the same core as the highest Gleason score carcinoma of the case. None of the pattern 3 cases and only a minority of the pattern 4 cancers had higher Gleason score carcinoma on additional cores (n = 5, 14%). Glomeruloid structures are a rare but diagnostic feature of prostatic carcinoma on needle biopsy. Our data indicate that glomerulations are overwhelmingly associated with concurrent Gleason pattern 4 or higher-grade carcinoma. In several cases, transition could be seen among small glomerulations, large glomeruloid structures, and cribriform pattern 4 cancer. These data suggest that glomerulations represent an early stage of cribriform pattern 4 cancer and, until follow-up data are available, are best graded as Gleason pattern 4.

Editorial Comment

The grading of prostatic adenocarcinoma with glomeruloid structures is controversial (1-3). Some urological pathologists do not assign a grade to this pattern and just grade the surrounding tumor. Other experts in the field feel that all glomeruloid structures should be assigned a Gleason pattern 4.

The glomeruloid feature in adenocarcinoma of the prostate refers to an architectural pattern of growth that mimics the renal glomerulus (1,3,4). Glomeruloid structures have been described in Wilm's tumor (5) probably representing differentiation of neoplastic cells toward a primitive form of renal glomerulus and are sometimes present in gliomas (6). In a rare case of adenoma (hamartoma) of bladder in siblings, spaces, often

cystic, lined with neoplastic epithelial cells with hyperchromatic nuclei were crowded at one of the poles which strikingly resembled primitive glomeruli (7).

This distinctive pattern of prostate cancer was first described in 1995 by Epstein in his book Prostate biopsy interpretation and called the lesion glomerulations (8). In 1998, Pacelli et al. (1) published a series of prostatic adenocarcinoma with glomeruloid features in biopsies and radical prostatectomies. The frequency of adenocarcinoma with glomeruloid features in 100 needle prostatic biopsies was 3% in Pacelli's series.

Glomeruloid structures appear to be a specific but uncommon finding in prostate cancer. They are not seen in benign prostatic tissue, nodular hyperplasia, basal cell hyperplasia, atypical adenomatous hyperplasia, or prostatic intraepithelial neoplasia (3,4).

In Lotan and Epstein's study glomeruloid structures were associated to Gleason pattern 4 or 5 in more than 80% of the cases. In only 16% of the cases were associated exclusively to Gleason pattern 3. The authors suggest that glomerulations represent an early stage of cribriform pattern 4 cancer and, until follow-up data are available, are best graded as Gleason pattern 4.

In a similar study based on 264 needle biopsies, we found 28/264 (10.6%) biopsies showing glomeruloid structures; 9/28 (32.14%) biopsies the glomeruloid structures were surrounded by Gleason low-grade tumor and in 19/28 (67.85%) biopsies surrounded by Gleason high-grade tumor (9). All patients in our study were submitted to radical prostatectomy. Comparing the findings for several clinicopathologic variables between patients with and without glomeruloid structures, no statistical significance was found and at 5 years, the PSA progression-free survival rates were 57% and 52% for patients without and with glomeruloid structures (log-rank, $p = 0.26$). Glomeruloid structures were associated more frequently with Gleason high-grade surrounding tumor, however, the presence of this architectural pattern was not associated to any other adverse clinicopathologic findings. It seems in our study that glomeruloid feature per se should not interfere in the grading of a tumor.

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Precursor lesions to prostatic adenocarcinoma

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High-grade prostatic intraepithelial neoplasia (PIN) is the one well-documented precursor to adenocarcinoma of the prostate. This review article defines both low- and high-grade PIN. Unusual variants of high-grade PIN are illustrated. Benign lesions that may be confused with high-grade PIN, including central zone histology, clear cell cribriform hyperplasia, and basal cell hyperplasia are described and illustrated. High-grade PIN is also differentiated from invasive acinar (usual) and ductal adenocarcinoma. The incidence of high-grade PIN, its relationship to carcinoma (including molecular findings), and risk of cancer on rebiopsy are covered in detail. Finally, intraductal carcinoma of the prostate, a controversial entity, is discussed and differentiated from high-grade PIN.

Editorial Comment

This is a nice review on precursor lesions to prostatic carcinoma. High-grade prostatic intraepithelial neoplasia (PIN) (Figure-1) was previously described by many authors using such terms as atypical epithelial proliferation, atypical glandular hyperplasia, atypical glandular proliferation, atypical hyperplasia, dysplastic lesions, dysplastic hyperplasia, cribriform hyperplasia, and atypical primary hyperplasia (1-6). These lesions were of interest for German authors and in the 80s studied by American authors. Bostwick described 3 grades for the lesion: low, intermediate and high-grade - grades 1, 2, and 3 (7). In 1989 during an international workshop in Bethesda, USA, sponsored by the American Cancer Society in an attempt to unify nomenclature it was introduced the term prostatic intraepithelial neoplasia (PIN) (8). In the same workshop it was suggested to refer in the pathology reports only to high-grade PIN (grades 2 or 3) due to the fact that low-grade PIN (grade 1) lesions have poor reproducibility among pathologists and lack any significant association with concomitant cancer.

The presence of PIN in a biopsy means a high frequency for finding cancer in a second biopsy. This frequency varies in the literature between 26% and 53%, however, with the advent of extended biopsies this frequency today is 27%-31% (9). In a study by Herawi et al. (10) the risk of cancer on biopsy within 1 year following a diagnosis of high-grade PIN in extended biopsies was very low (13.3%). Herawi et al. concluded that for patients diagnosed with high-grade PIN on extended initial core sample, a repeat biopsy within the first year is unnecessary in the absence of other clinical indicators of cancer.

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BASIC AND TRANSLATIONAL UROLOGY

Botulinum toxin-A to improve urethral wound healing: an experimental study in a rat model

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Urology. 2009; 73: 405-9

Objectives: Tensile distracting forces caused by elements such as a muscle pull can cause widening of scars in the tissue during the wound healing process. The aim of the present study was to investigate whether induced immobilization of the urethral muscle using botulinum toxin-A (BTX-A) enhances wound healing and also reduces the amount of scar formation in an experimentally induced urethral injury in a male rat model.
Methods: Prepubertal male albino rats were divided into 2 groups: 20 rats in the BTX-A group received BTX-A injection treatment during surgery and 10 rats in the control group received 0.9% saline solution injection. The penile skin was incised circumferentially and degloved. To make the urethral injury at a location approximately 15 mm proximal to the external meatus, the urethra was cut transversally with scissors, from the 2-o'clock to the 10-o'clock position and then sutured by a single suture at the 6-o'clock position. To evaluate chronic inflammation and fibrosis, the rats were killed, and the injured portions of the urethras were harvested for histopathologic examination after a follow-up period of 21 days.
Results: On histopathologic evaluation, the control group rats had a more severe fibrotic change in the urethral tissue compared with the BTX-A injected rats, which showed a mild fibrotic change. The mean +/- SD and median fibrosis score was 2.4 +/- 0.5 and 2 in the control group and 1.5 +/- 0.5 and 1 in the BTX-A group, respectively ($P < .01$ and $P < .01$, respectively).
Conclusions: The results of our study have shown that BTX-A prevented increases in collagen content during urethral wound healing.

Editorial Comment

This is a very interesting and inventive study that certainly will open new avenue for treatment of urethral stricture disease. In fact, using biochemical and stereological methods, we have recently found that, when compared to age-matched controls, there is no fibrosis and no collagen increase in the urethral edges of

male patients submitted to end-to-end anastomosis for treating bulbar urethra stenosis (1). Therefore, in well conducted cases, with anastomosis of fibrosis-free urethral edges, the fibrosis that could compromise the results may be a consequence of tensile forces in the anastomic area and probably BTX-A would help in avoiding it.

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Comparisons of the responses of anterior and posterior human adult male bladder neck smooth muscle to in vitro stimulation

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BJU Int. 2008; 102: 1737-42

Objective: To evaluate differing methods of stimulation on strips of human bladder neck smooth muscle and compare muscle taken from the anterior and posterior aspects.
Materials and Methods: Samples of adult human male bladder neck muscle were obtained from patients undergoing open radical prostatectomy. Muscle was taken from either the anterior or posterior (nine and six patients, respectively) aspects of the bladder neck. Muscle strips dissected from these samples were suspended in the Brading-Sibley organ bath. The strips were superfused with 100 mm KCl-enriched Krebs' solution for 4 min to determine viability. This allowed experimentation on 17 strips from the anterior aspect of the bladder neck and 13 from the posterior bladder neck. These remaining strips were then superfused either with various concentrations (x10(-7) to x10(-3)m) of carbachol or noradrenaline in Krebs' solution, for 15 s. A further set of strips (eight from anterior, six from posterior) was suspended and responses to electrical field stimulation (EFS) with varying parameters were measured. Each EFS experiment was repeated after a 15 min exposure to 10(-3)m atropine, and again after a 15 min exposure 10(-7)m tetrodotoxin (TTX). Tension responses produced in these series of experiments were measured using strain gauges and analysed using data acquisition software. Student's t-test was used for the statistical analysis.
Results: All muscle strips included in the study responded to EFS. The magnitude of this contraction is frequency dependent. The contractions were abolished by superfusion of the muscle strips with atropine. There was no further suppression of the contractile response on addition of TTX. Posterior bladder neck samples had a greater mean contractile response per unit mass than anterior strips at all frequencies of >1 Hz, and significantly more at 20 and 30 Hz. There was a concentration-dependent response in bladder neck contraction to carbachol but only in the strips from the anterior bladder neck at concentrations of <10(-3)m. Posterior bladder neck strips did not significantly contract upon application of carbachol. Similarly, there was a concentration-dependent response to noradrenaline. Responses to noradrenaline were not uniform around the bladder neck, but not significantly different. Carbachol was the more 'potent' stimulator in anterior smooth muscle strips, but again the differences between agonists were not statistically significant.

Conclusion: These experiments show physiological variability around the circumference of the human male bladder neck. The posterior bladder neck shows significantly stronger contraction to alpha-adrenergic agonists compared with cholinergic agonists; the anterior bladder neck does not have a similarly significant differential response. The uniform response to noradrenaline may underlie the bladder neck's role in the prevention of retrograde ejaculation. The differential responses to carbachol may reflect differences in the embryological derivation of the anterior and posterior bladder neck fibres or in their innervation. Some of these differences may have clinical importance through the action of therapeutic agents.

Editorial Comment

The authors of this elegant in vitro study show by the first time, in the best of my knowledge, that exist important physiological variability in the human male bladder neck. They found that the posterior bladder neck presented significantly stronger contraction to alpha-adrenergic agonists when compared with cholinergic agonists. On the other hand, the anterior bladder neck did not have a similarly significant differential response. The authors also found a uniform response to noradrenaline and this might underlie the role of bladder neck in avoiding retrograde ejaculation. Also, the authors speculated that differential responses to carbachol may reflect differences in the embryological origin of anterior and posterior bladder neck fibers or in their innervation.

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RECONSTRUCTIVE UROLOGY

A new suture material for hypospadias surgery: a comparative study

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Purpose: We compared the results of hypospadias repair using polyglytone versus polydioxanone to evaluate the potential benefit of using a suture with a rapid absorption time.
Materials and Methods: A total of 100 patients 8 to 24 months old affected by distal isolated penile hypospadias were considered for this study. Patients were randomized and assigned to 2 different groups according to the suture material used during the surgical procedure (tubularized incised plate repair with or without preputial reconstruction). Polyglytone was used in group A and polydioxanone was used in group B. All patients were evaluated at 4 intervals (1 week, 1 month, 6 months and 2 years postoperatively). Persistence of sutures on penile skin, urethral fistulas, skin dehiscence, infection and skin tracks were recorded. Statistical analysis was performed using chi-square test.
Results: Follow-up data documented the absence of significant differences in terms of urethral fistula rate, skin dehiscence and acute skin infection. Persistence of sutures and multiple skin tracks at long-term follow-up were significantly greater in patients in group B.
Conclusions: Both sutures are adequate for hypospadias surgery in small children. The use of a rapid absorption monofilament may allow much more rapid disappearance of the skin sutures. In the long term this outcome means almost complete absence of suture tracks. No statistically significant difference in terms of urethrocutaneous fistula was observed, suggesting that the tensile strength of polyglytone is adequate.

Editorial Comment

The suture material used in reconstructive surgery has always been problematic where durability, fineness and effect to the tissue are critical, especially for use in infants. A significant improvement was attained with the introduction of microsurgical instruments and sutures used with magnification (1).

Guarino et al. compared monofilament sutures (polyglytone vs. polydioxanone) with different strengths (6/0 vs. 7/0) (2). The authors observed an increased risk in knot breakdown; however, the most important difference noted was the duration time: 56d for polyclytone vs. 120-180d for polydioxanone. Polyglytone's long duration time might explain the higher proportion of granuloma, fistula and dehiscence when compared with polydioxanone.

Recently we reported our experiences in hypospadia reconstruction where the MEMO technique was used (3). Although only one suture material (plated polyglytone 7/0) was used in our study, the outcome was similar to the report by Guarino using monofilament polyglytone 6/0. The polyglytone 7/0 material we used is thinner but we did not experience knot break down nor did we note inflammatory reaction substantial developments such as granuloma, fistula or dehiscence.

A long-lasting (120-180d) suture material is not required to facilitate healing at the reconstructed glans location. With the reported experience in our patient group, we also noted, but we did not report in the MEMO paper (3), that monofilamet sutures cause discomfort and irritation for the child and the parent because the monofilament suture tip snags easily against the child's diaper.

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Recovery of erectile function after unilateral and bilateral cavernous nerve interposition grafting during radical pelvic surgery

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Purpose: The use of cavernous nerve interposition grafting to preserve erectile function in men who require neurovascular bundle resection for cancer control is controversial. We report outcomes and predictors of cavernous nerve interposition grafting in men undergoing unilateral grafting during radical prostatectomy or bilateral grafting during radical cystectomy and prostatectomy with autologous nerve grafts.

Materials and Methods: We retrospectively reviewed the electronic records of 36 patients who underwent cavernous nerve interposition grafting between 2003 and 2006. Postoperatively erectile function was assessed with the International Index of Erectile Function 15-item questionnaire. Predictors of potency, including age at surgery, time since surgery and prostate specific antigen at surgery, were assessed by univariate analysis.
Results: A total of 33 patients (92% response rate) were followed for a median of 32, 25 and 11 months after bilateral grafting during radical cystectomy (10), unilateral grafting during radical prostatectomy (20), and bilateral grafting during radical cystectomy and prostatectomy (3), respectively. The rate of potency, defined as the ability to attain and maintain erection sufficient for penetration at least 50% of the time with or without phosphodiesterase-5 inhibitors, was 31% (5 of 13 men) for unilateral grafts, 38% (5 of 16) for bilateral grafts and 30% (3 of 10) for bilateral grafts during radical cystectomy. Age at surgery was the only significant determinant of potency and it showed an inverse relationship in the bilateral nerve graft group ($p = 0.02$).
Conclusions: Cavernous nerve interposition grafting appears to have a role in the recovery of erectile function. To our knowledge this study represents the largest series of cavernous nerve interposition grafting during cystectomy and it suggests that this should be considered during bilateral neurovascular bundle resection.

Editorial Comment

The reconstructive intraoperative approach of the cavernous nerve during radical prostatectomy or even cysto-prostatectomy represents a challenge for the surgeon. Satkunasivam et al. report in this paper their experience with unilateral and bilateral nerve grafting for the cavernous nerve reconstruction.

Although it might still be a point of discussion which material is the best for the graft to re-establish erectile function; sural nerve, genitofemoral nerve or other sources (1,2). The authors used the genitofemoral nerve in 94% of the cases and in the remaining cases, the sural nerve. In a comparison of all cases with a bilateral graft, those patients that received the sural nerve graft were potent; whereas, using the author's definition of potency, only 27.3% of the genitofemoral nerve graft patients were able to successfully maintain erection with a sufficient penetration rate of at least 50%.

Satkunasivam et al. reported on the largest group of radical cystectomy patients who underwent intraoperative nerve grafting. Their findings are consistent with Anastasiadis's report of a 30% success rate after bilateral nerve grafting subsequent to radical cystectomy (3). These reports underline that nerve grafting can be successfully achieved and should be performed if the morbidity of the patient is not endangered by the procedure. Perhaps with the further detailed knowledge about the peripheral nerves concourses on the prostate surface (4-6) and around the bladder, the successful outcome of nerve grafting can be further improved and nerve harvesting can be avoided with the use of regenerated acellular nerve grafts (7).

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UROLOGICAL ONCOLOGY

Secondary cancer after radiotherapy for prostate cancer: should we be more aware of the risk?

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Objectives: As the number of prostate cancer survivors is increasing, the long-term health of prostate cancer patients has become a significant health issue. Radiation is known to induce malignant transformation, and prostate cancer radiotherapy is suggested to induce secondary malignancies. This report reviews the available data regarding the risk of secondary cancer after radiation for prostate cancer.
Methods: Epidemiological studies of the secondary cancer risk in patients with a history of prostate cancer radiation and the literature regarding radiation-induced carcinogenesis were reviewed.
Results: Prostate cancer is not associated with an increased number of additional malignancies. The data suggests a modest increase in secondary cancers associated with radiation for prostate cancer, as approximately one in 70 patients undergoing radiation and surviving more than 10 yr will develop secondary cancer. The most common sites for secondary cancers are bladder and rectum. In addition to the cancers adjacent to the radiation field, there is also an increase of cancers in distant sites, such as lung. The increased risk for secondary cancers is reported after external radiation, not after brachytherapy. The available data originated from studies of patients undergoing conventional radiotherapy. New treatment methods, such as intensity-modulated radiotherapy, may be associated with a higher risk of secondary cancers.
Conclusion: Although the incidence of secondary cancers after prostate cancer radiotherapy is not dramatically different from the overall population, patients should be informed about this risk. Other treatment modalities should be considered for patients with long life expectancy and for patients with additional risk factors.

Editorial Comment

Long-term survival after radiotherapy for prostate cancer is not uncommon. The risk of secondary cancers contributable to radiotherapy was analyzed in this review of the literature.

First, the authors analyzed the association of prostate cancer with secondary cancers. In 7 reports on roughly 90,000 patients, no elevation of risk for secondary cancers was obvious. The next analysis involved

roughly 32,000 patients who had received radiation therapy for prostate cancer. In this cohort, the authors found a slight increase of the risk to develop a secondary cancer in areas involving the radiation field, specifically the bladder and rectum with a risk ratio of approximately 1:5. Interestingly, an increased risk was also seen for lung cancer. These data mandate long-term follow-up examinations of the specific sites, that are bladder, rectum and lung, after radiotherapy for prostate cancer.

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Outcome of prostate cancer patients with initial PSA> or =20 ng/ml undergoing radical prostatectomy

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Objectives: To retrospectively assess the outcome of patients with initial PSA of 20 ng/ml or higher undergoing radical prostatectomy (RP) for prostate cancer (pCA).
Methods: Between January 1986 and June 2005, 275 patients with preoperative PSA> or =20 ng/ml underwent RP for pCA at our institution. Overall, disease-specific and biochemical progression-free survival rates for the entire cohort and for particular subgroups were determined.
Results: Median patient age at time of surgery was 64 yr (range: 44-75). Fifty-seven patients (20.7%) had pT2 stage, 206 (74.9%) pT3, and 10 (3.7%) pT4; 78 (28.4%) presented with local nodal metastases (pN+). To date, 40 patients have died (14.5%), 22 of pCA and 18 of other causes. Biochemical progression occurred in 92 patients (33.5%). Overall (and disease-specific) survivals at 5, 10, and 15 yr were 87% (93%), 70% (83%), and 58% (71%), respectively. These survival rates did not significantly differ between patients receiving immediate versus deferred hormonal therapy (in case of progression). Five-year PSA progression-free survival in patients on surveillance (receiving deferred hormonal treatment at the onset of rising PSA values) was 53%. For patients on immediate hormonal treatment following RP, the 5-yr hormone-refractory PSA progression rate was 76%.
Conclusions: According to long-term follow-up results in this high-risk cohort of patients with preoperative PSA > or = 20 ng/ml, RP can be considered a viable therapeutic option. With regard to combining immediate hormonal therapy with surgery, the optimal treatment following RP remains to be defined.

Editorial Comment

The authors report on a series of 275 prostate cancer patients who received radical prostatectomy (RP) with a preoperative PSA of > 20 ng/ml. The patients had bone scans preoperatively, but MRI or CT was offered only in case of clinically suspected metastatic disease. Only 20.7% of patients had organ-confined disease, whereas 74.9 % had pT3 cancer (with pT3b in 43.9%). Only 7.6% had Gleason sum score of 5 and 6 whereas Gleason 7 was seen in 43,3% and Gleason 9 in 28.1 %. Interestingly, even in this high-risk group of patients, cancer-specific survival after 5, 10 and 15 years was 93%, 83% and 71%, respectively. No difference was

seen between cohorts receiving immediate versus deferred hormon-ablative therapy. These data support active therapy in patients with high-risk cancer.

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NEUROUROLOGY & FEMALE UROLOGY

Correlation of morphological alterations and functional impairment of the tension-free vaginal tape obturator procedure

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J Urol. 2009; 181: 211-8

Purpose: We explored the morphological features associated with functional impairment in patients undergoing the tension-free vaginal tape obturator procedure. Materials and Methods: We retrospectively reviewed the records of 98 women who underwent the tension-free vaginal tape obturator procedure alone or with concomitant pelvic surgery. Postoperative assessment included a symptom questionnaire, ultrasound cystourethrography and a cough stress test. During followup the measures of postoperative functional impairment included a positive cough stress test, new onset voiding dysfunction and the worsening or progression of urge symptoms.
Results: Median follow-up was 22 months. During follow-up 11 women had a positive cough stress test, 22 had voiding dysfunction and 12 had worsening or new onset urge symptoms. Failure was associated with 4 variables on multiple logistic regression analysis, including absent urethral encroachment at rest (OR 16.63, 95% CI 1.87-147.85, $p = 0.01$), bladder neck funneling (OR 8.27, 95% CI 1.99-34.26, $p < 0.01$), a urethral location of less than the 50th percentile (OR 6.01, 95% CI 1.43-25.25, $p = 0.01$) and a resting tape angle of less than 165 degrees (OR 5.21, 95% CI 1.15-23.54, $p = 0.03$). A resting tape distance of less than 12.0 mm (OR 3.00, 95% CI 1.44-6.26, $p < 0.01$) and urethral encroachment at rest (OR 2.86, 95% CI 1.30-6.30, $p < 0.01$) were the variables predictive of postoperative voiding dysfunction. Bladder neck funneling was the only risk factor for postoperative urge symptoms ($p < 0.01$).
Conclusions: The tension-free vaginal tape obturator procedure achieves its effectiveness in a process of biological reaction and mechanical interaction between the tape and urethra. When this mechanical interaction is too great or too little, there is functional impairment after the procedure.

Editorial Comment

The authors describe their experience and findings when examining a patient population who has undergone a transobturator tape procedure. Postoperative follow-up included questionnaire analysis, physical examination and ultrasound cystourethrography. The surgeons used transvaginal ultrasound at the time of surgery to assure that there was not indentation of the urethra on initial placement. Postoperatively, their success rate for stress urinary incontinence was approximately 90% with approximately 75% having resolved their urinary urge incontinence with a 3% de novo development of urinary urge incontinence. They found that urethral encroachment at rest and a distance between the tape and the symphisis pubis of < 12 mm were associated with obstructive voiding symptoms in their patient population.

The authors publish an excellent manuscript describing their observations of the dynamic forces and reaction of the transobturator suburethral tape during Valhalla maneuvers. They further break down the movement of the tape and its' effect on the urethra into 5 types. That they were able to identify urethral encroachment while the tape at rest as being significantly associated with obstructive voiding phenomenon definitely lends support to the consideration of using transvaginal ultrasound when evaluating for post-procedure urinary obstruction. We currently utilize fluorourodynamics as well temporal association of symptoms to diagnose postoperative urethral obstruction but will consider strongly the incorporation of transvaginal ultrasound in an effort to assist in this sometimes challenging patient population.

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Pubo-urethral ligament injury causes long-term stress urinary incontinence in female rats: an animal model of the integral theory

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J Urol. 2009; 181: 397-400

Purpose: We examined the long-term effects of pubo-urethral ligament deficiency as a potential model of stress urinary incontinence compared to an established model of stress urinary incontinence.
Materials and Methods: A total of 21 female Sprague-Dawley rats were randomly assigned to 1 of 3 groups, including pubo-urethral ligament transection, sham pubo-urethral ligament transection and bilateral pudendal nerve transection. Leak point pressure was measured 28 days later via an implanted suprapubic catheter. After leak point pressure measurement all animals were sacrificed. The pubic arch and pelvic organs were harvested for histological examination. The Wilcoxon rank sum test was used to evaluate differences in leak point pressure among the experimental groups. Results: At 28 days after pubo-urethral ligament transection mean +/- SD leak point pressure was significantly decreased when comparing pubo-urethral ligament transection and pudendal nerve transection to sham treatment (15.75 +/- 6.46 and 15.10 +/- 4.98 cm H(2)O, respectively, vs. 42.56 +/- 11.58, $p < 0.001$). No difference was noted when comparing pubo-urethral ligament transection to pudendal nerve transection ($p = 0.76$), indicating the long-term durability of pubo-urethral ligament transection on inducing stress urinary incontinence in the female rat. Histological examination of en bloc suprapubic areas demonstrated an absent pubo-urethral ligament in the pubo-urethral ligament transection group, and an intact pubo-urethral ligament in the sham treated and pudendal nerve transection groups.
Conclusions: Our results show that pubo-urethral ligament deficiency in the female rat induces long-term stress urinary incontinence that is comparable to that in the established stress urinary incontinence model via pudendal nerve transection. Our novel rat model could be used to investigate mechanisms of stress urinary incontinence in females, including the role of urethral hypermobility and potential therapeutic interventions for stress urinary incontinence.

Editorial Comment

An interesting look into the development of a laboratory model to analyze and evaluate stress urinary incontinence. The authors noted that pubo-urethral ligament transection was very similar to pudendal nerve

transection in Sprague-Dawley rats in developing a model for stress urinary incontinence in the female rat. It is pointed out in the discussion that developing a model of stress urinary incontinence that avoids the use of pudendal nerve injury may help analyze nulliparous women who suffer with stress urinary incontinence. Much appreciation should go to the researchers in our field who help develop the models upon which to expand our ability to treat affected patients. Of note is that the support of structures of the female urethra including the pubo-urethral ligament had been reviewed in this journal in the past with some anatomic researchers noting that the pubo-urethral ligament may not be a ligament but instead mostly tissue containing smooth muscle cells (1). This is food for thought especially when quoting continence rates after suprameatal transvaginal urethrolysis which takes down the attachments of the urethra to the underside of the pubic bone (2). In a contrary view, this may also explain the rate of incontinence that is noted in patients after therapeutic pubectomy (3).

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PEDIATRIC UROLOGY

Long-term follow up of enteric bladder augmentations: the risk for malignancy

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Objective: To determine the risk of bladder cancer following enteric bladder augmentation.
Materials and Methods: Patients followed for care after an enteric bladder augmentation have been entered into a registry; individuals followed for a minimum of 10 years were evaluated.
Results: The study criteria were met by 153 patients. Indications for bladder augmentation were neurogenic bladder in 97, exstrophy in 38 and posterior urethral valves in 18. There was a median follow-up interval of 27 years (range 10-53). A total of seven cases of malignancy developed. Median time to tumor development following augmentation was 32 years (range 22-52). Two patients with neurogenic bladder developed transitional cell carcinoma; both were heavy smokers (> 50 pack per year history). Two patients with a history of posterior urethral valves and renal transplantation developed adenocarcinoma of the enteric augment. Three patients with bladder exstrophy developed multifocal adenocarcinoma of the augmented bladder. Two patients remain alive, 5 and 6 years following radical cystoprostatectomy; five died of cancer-specific causes.
Conclusions: Malignancy following enteric bladder augmentation arose in 4.5% (7/153) of our patients and was associated with coexisting carcinogenic stimuli (prolonged tobacco/chronic immunosuppressive exposure), or alternatively with the inherent risk of malignancy existing with bladder exstrophy.

Editorial Comment

From 1986 to 2007, 153 patients who had greater than 10 years follow up for enterocystoplasties were studied. No patient in the study had a mixture of feces and urine prior to the enterocystoplasty, only patients who were augmented due to neurogenic bladder, exstrophy/epispadias complex or posterior urethral valves were included. The mean follow up was 27 years with a range of 10-53. Seven cases of malignancy occurred. There was no correlation with malignancy and recurrent urinary tract infections. There was no difference in cancer in the ilia or colonic segments. The incidence of asymptomatic bacteriuria did not reach statistical significance. 2 patients who developed cancer had heavy smoking histories. 2 patients developed cancer after prolonged immunosuppression after renal transplantation, and 3 patients in the exstrophy/epispadias group developed multi-focal adenocarcinoma involving the bladder and enteric segments. The study points out that in other countries where schistosomiasis or tuberculosis are common, enterocystoplasty cancers are found frequently. Most of the previous studies do not have a long enough follow up to have any tobacco use history be a significant risk factor. The cancer risk demonstrated in this paper is 4.5%, which is greater than the previous series of 0.6%-2.8%.

This paper reminds us that these patients need continual follow up throughout their adult lives. It was cancer risk in this same range that discouraged urologists from performing ureterosigmoidostomies and I believe this same risk will produce new solutions to the bladder dysfunction that has been an indication for enterocystoplasties in the past.

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Risk assessment of incidentally detected complex renal cysts in children: potential role for a modification of the Bosniak classification

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Purpose: Incidentally detected complex renal cysts in children are a rare but worrisome occurrence due to the perceived potential risk of malignancy. We examined the natural history of such cysts in a cohort of children.
Materials and Methods: We obtained access to a database containing all radiology reports generated at a single institution from 1996 to 2004. We used key words to limit our search, subsequently reviewing charts and images to confirm the diagnosis of a complex renal cyst and to collect clinical data. Cases were categorized according to a modification of the Bosniak classification, using ultrasound in most patients and computerized tomography or magnetic resonance imaging when available.
Results: Complex renal cysts were identified in 39 children. Mean patient age at presentation was 7 years. Mean cyst size was 1.6 cm. A total of 18 cases diagnosed by ultrasound only were observed with serial imaging. Additional contrast enhanced computerized tomography or magnetic resonance imaging was performed in 21 of 39 patients (54%). Surgical resection was performed in 5 patients and pathological evaluation revealed benign cyst in 3 (modified Bosniak class II in 2 patients and class III in 1) and renal cell carcinoma in 2 (III in 1 and IV in 1). All other patients had modified Bosniak class II cysts, which remained essentially unchanged during a mean follow-up of 26.8 months (range 9 to 70).

Conclusions: While not validated in children, our data suggest the modified Bosniak classification appears useful as a guideline to direct the management of complex renal cysts in the pediatric population.

Editorial Comment

At Hospital for Sick Children in Toronto, radiology reports from 1996 to 2004 were reviewed looking for renal cysts, including those that were complex and septated. Patients were excluded if they had evidence of cystic kidney disease, prior renal trauma, previous kidney surgery or insufficient data. A minimum of six months follow up was required for inclusion. 39 patients with complex renal cysts were identified with the average age of 7 years and range of 4 months to 14 years, with a mean cystic size of 1.6 cm and a range of 0.4 to 5 cm.

Initial diagnosis was made in 36 patients by ultrasound and 3 patients were discovered by CT scan. Of the 36 cases discovered by ultrasound half had a CT or MRI scanning, while 18 only had ultrasound follow up. Interestingly in these children 7 simple cysts on CT scan clearly had septations on sonographic imaging, some of which even had Doppler flow in the septations on the ultrasound.

Five patients had surgical resection and 2 of these patients had renal cell carcinoma in the specimen. All the patients had follow up with a mean of 26.8 months and a range of 9 to 70 months. The cysts were classified according to the adult Bosniak classification.

Even though these numbers don't reach statistical significance, the authors recommend for patients with Class II cysts on the Bosniak scale, 3-6 month follow up with ultrasound for the first year and annual ultrasounds thereafter. They did not have a recommendation for how long the annual studies should continue once the cyst has stabilized.

There is no data in children correlating the predictability of risk factors in the Bosniak classification. However in this study of 39 patients, the worrisome cyst with enhancing margins or septa on CT scan, were the 2 that had renal cell carcinoma found in the specimen. The authors suggest that if there is a concern about an ultrasound cyst, a CT scan should be obtained with contrast to help in classification.

Bosniak risk classifications are based on renal cell carcinoma incidence in adults. In children, renal cell carcinoma is not the most common tumor and so it's hard to know how one should think about complex cysts in children. This manuscript suggests that similar concerns of the adult Bosniak classification may very well be worthwhile and that children with cysts certainly should have follow up until the cysts have stabilized, and perhaps for years after that.

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