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HAVE YOU READ?

COVID-19 and Its Impact on Urology



Todd A. Carrick, MBA
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Project Manager
Linthicum, Maryland

As the impact of the COVID-19 pandemic is felt around the world its effect on the specialty of urology has been significant. As a way to better assess its true impact on urology the AUA conducted a global online member survey. This 22-question survey was fielded in late April and early May of 2020. A total of 2,052 members completed the survey, including 1,390 from the United States and 662 international members. Responses were captured from 87 countries and all 50 states.

The impact of COVID-19 on the clinical practice of AUA members has been significant. Nearly 9 out of 10

(86%) AUA members indicated that because of the pandemic they have decreased the number of urological surgeries and a similar number (84%) have decreased their urology clinic hours. Additionally, some AUA members (13%) indicated that they have been transitioned to a COVID-19 caseload at their hospital or institution, the percentage of whom varied significantly by geographic location (fig. 1).

Members also indicated that the COVID-19 pandemic has had a significant financial impact on their practices. More than half (54%) indicated their practices or institutions have reduced urological staff and two-fifths are receiving reduced compensation while 14% are not currently receiving a paycheck. Significantly fewer have been laid off (4%), have filed for unemployment (3%), plan to retire (3%) or work in a practice that is

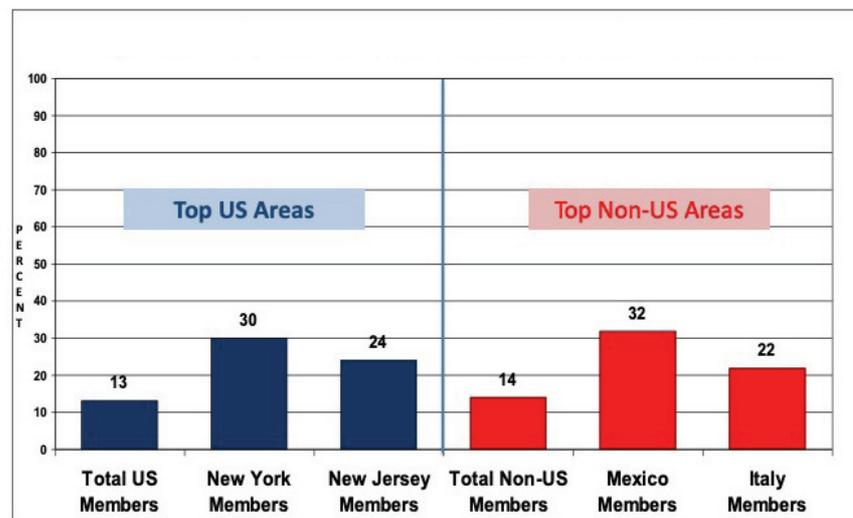


Figure 1. Top areas where AUA members are transitioning to COVID-19 caseload.

planning to close (3%) because of the COVID-19 pandemic (fig. 2).

The personal impact of COVID-19 on AUA members is significant (fig. 3). Three-quarters of AUA members reported increased stress levels due to COVID-19 (78% of U.S. members vs 68% of members outside of the U.S.). Nearly two-thirds

of AUA members are worried about becoming infected with COVID-19 while working and more than three-quarters think their mental health and that of their colleagues has been challenged during the COVID-19 pandemic.

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Blue Light Enhanced Flexible Cystoscopy for Bladder Cancer



Anne Schuckman, MD, FACS
Los Angeles, California

White light flexible cystoscopy (WLFC) is the standard of care for surveillance in nonmuscle invasive bladder cancer (NMIBC). In the U.S. blue light flexible cystoscopy (BLFC) with hexaminolevulinate was approved in 2018 for surveillance of bladder cancer. BLFC has been shown to be safe, is well tolerated by patients, and improves detection rates for papillary tumors and carcinoma in

situ (CIS) compared with WLFC.¹⁻⁵

Hexaminolevulinate (marketed as Hexivix® in Europe and Cysview® in the U.S.) is a photoactive porphyrin precursor that is preferentially taken up in tumor cells. When instilled into the bladder, tumor cells will fluoresce pink under blue light (figs. 1 and 2). Blue light cystoscopy (BLC) has been shown to increase detection and decrease recurrence in NMIBC compared to white light cystoscopy (WLC) alone.⁶ As a result, its use is included in the 2016 AUA/Society of Urologic Oncology guidelines as a

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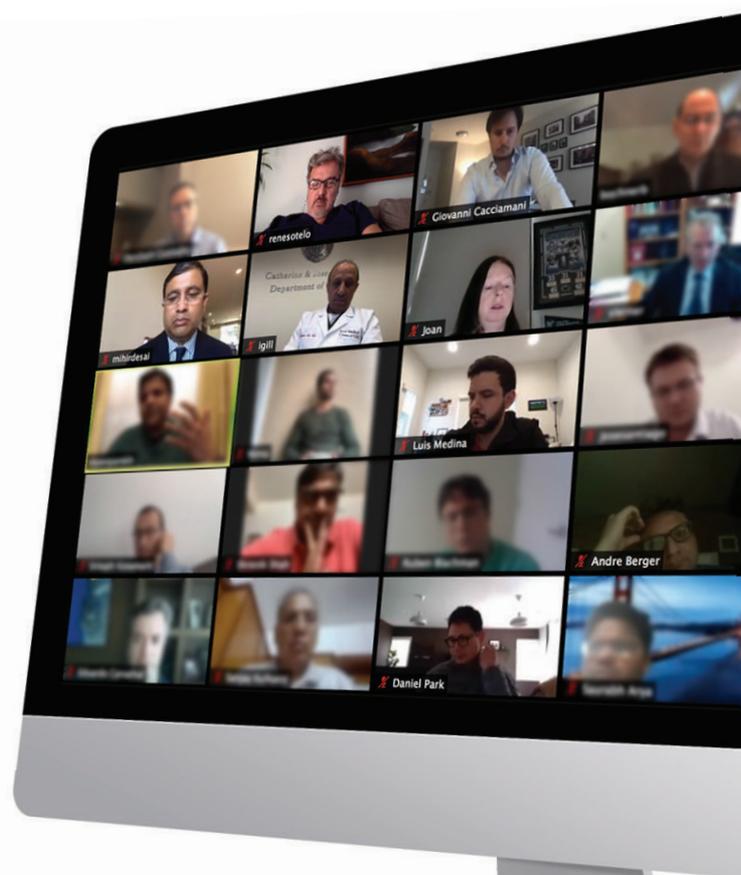
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COVID-19 and Impact on Urology

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When projecting the impact of the COVID-19 pandemic, members indicated a cautious outlook. Only 38% agree that the COVID-19 crisis will be under control in their area in the next 3 months (July/August) and fewer than half (45%) agree they will be back to normal clinical practice 6 months

from now (October/November). The outlook on attending in-person medical conferences is also reserved, with only 15% agreeing they will be able to physically attend medical conferences by the end of August. Members projected an increase in telemedicine, with just under 8 in 10 (79%) agreeing they will use more telemedicine in the future because of COVID-19.

With the ever changing dynamics

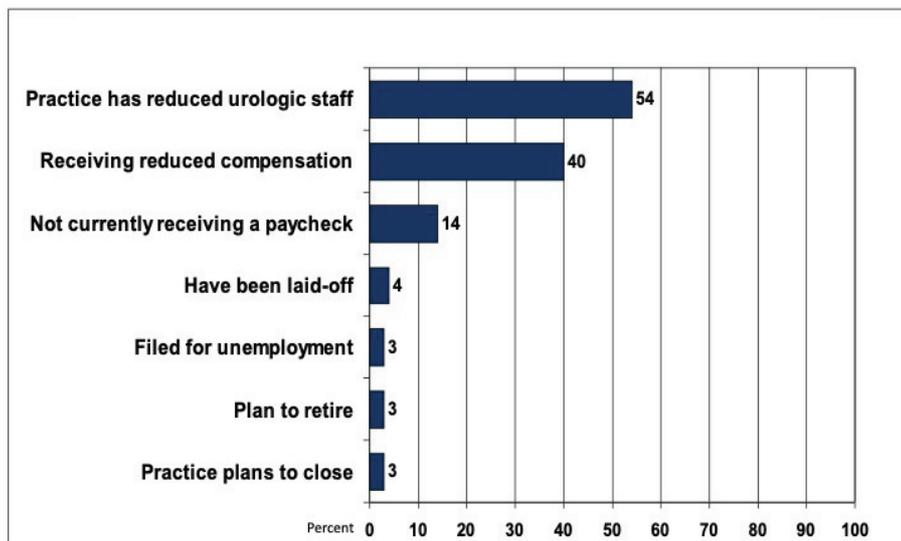


Figure 2. Financial impact of COVID-19.

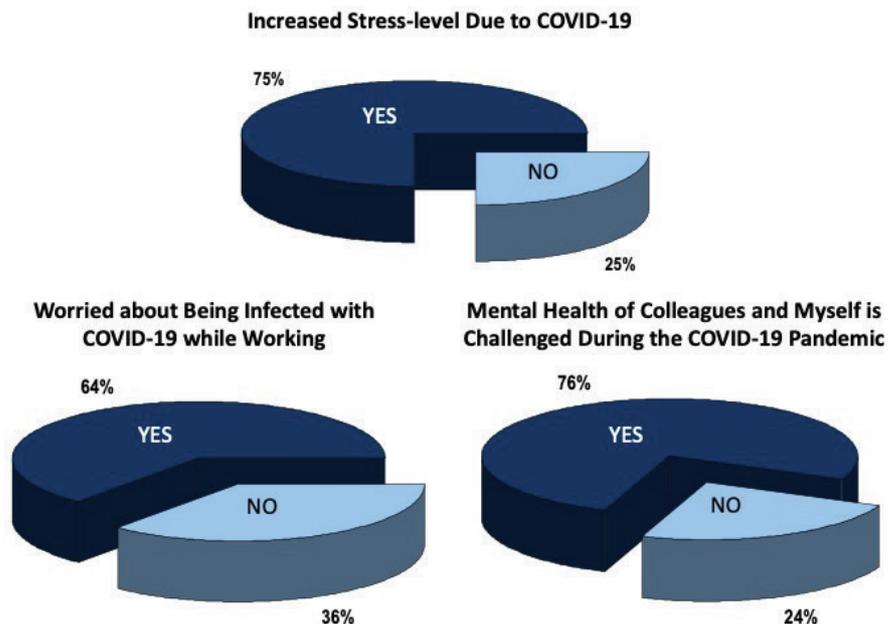


Figure 3. Personal impact of COVID-19.

of the COVID-19 pandemic the AUA believes it is important to continually monitor the effect it is having on our members. Data gleaned from this survey will be used to determine how the AUA can best provide resources to our members and help them during this difficult time. To that end, we are planning to relaunch this survey

later this summer to understand how results have changed over time and to make sure we are continuing to understand how our members are being affected by COVID-19, and how we can best support the global urological community during these difficult times. ♦

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Blue Light Flexible Cystoscopy

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Grade B recommendation in urothelial carcinoma detection.⁷

Before 2018 BLC was only available in the U.S. for use with rigid cystoscopy equipment and, thus, use was mostly confined to the operating room (OR) setting. Frequent trips to the OR made blue light cystoscopy impractical for routine surveillance.

Use of BLFC in the clinic can provide enhanced visualization in an outpatient setting. In the key 2018 phase III prospective multicenter study of BLFC 304 patients with intermediate and high risk NMIBC were evaluated with white light and blue light flexible cystoscopy in the clinic during first surveillance.¹

Suspicious lesions were subsequently biopsied in the operating room. More lesions were detected with blue light, with 20.6% of lesions detected only with BLFC ($p < 0.0001$). CIS was detected in 5 of the 26 patients only with blue light. Several CIS cases detected with blue

light also had negative cytological studies. Cysview was found to be well tolerated with only low levels of irritation even with repeat use.^{1,3}

It is well established that BLC will pick up more tumors and the time to recurrence is longer than with white light alone. The hope is that with earlier detection and treatment of small, high grade lesions or CIS, progression rates will be lower. Some data support this concept.

In a reanalysis of an older rigid blue light cohort using the International Bladder Cancer Group definition of stage or grade progression Kamat et al found that 17.7% of patients had progression with WLC and 12.2% had progression with BLC ($p=0.085$).⁴ This has not been examined yet in patients with BLFC surveillance.

What is the best way to incorporate BLFC into well established surveillance protocols? A consensus panel has recommended using BLFC for intermediate risk patients at the first (3-month) surveillance scope and in high risk patients at the first 2 scopes (3 and 6 months) and every 6 months for the first 2 years. Additional uses may be for patients with positive

cytology, questionable lesions on WLC, during office fulguration and before initiation of intravesical chemotherapy when residual disease is suspected.²

There are some logistical considerations to adopting BLFC in the clinic setting. Patients spend approximately 1 additional hour in the clinic due to the 45-minute intravesical dwell time of Cysview before BLFC. Reformulation of the dye from powder form takes only minutes, but must be instilled via a catheter before the cystoscopy.

Operation of the scope is familiar to urologists and is similar to WLFC. A suction system is required, as the urine must be evacuated from the bladder or it can interfere with the visualization by creating a green hue in the bladder. Biopsy and fulguration can safely be performed under white light or blue light using standard equipment.¹

Surveillance after bacillus Calmette-Guérin can be challenging with WLFC due to inflammation

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A



B



Figure 1. WLFC (A) and BLFC with Cysview (B) for high grade T1 lesion.

A



B



Figure 2. WLFC (A) and BLFC (B) for CIS.

AUA NEWS

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Blue Light Flexible Cystoscopy

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and concerns about false-positive interpretation. In the phase III BLFC study, patients were allowed to undergo evaluation 6 weeks after intravesical bacillus Calmette-Guérin or intravesical chemotherapy. The false-positive rates in the WLC and BLC groups were comparable at 9.1%.¹ It is easy to perform an immediate biopsy in clinic with blue light cystoscopy, potentially eliminating a trip to the OR for an equivocal finding.

An important aspect of the phase III BLFC study was collection of patient reported outcomes and satisfaction data. Patient attitudes were surveyed before and after BLFC in

the clinic, and again after the OR for those taken for biopsy. Validated questionnaires were used to assess pain, anxiety and “was it worth it.”³ Despite the additional time and catheterization required, 91% of patients would recommend blue light, and 94% reported they would undergo blue light in clinic again and that it was “worthwhile.”

Patients reported decreased anxiety after blue light cystoscopy due to a sense they had that nothing was “missed” on their evaluation. In a Nordic study clinicians reported added value with BLFC in several areas, such as refute or confirm suspicious lesions, additional lesions found, confidence in the patient being disease-free, and treatment in the office and

accurate referral to the operating room.⁵

Surveillance with BLFC offers a new approach to the management of NMIBC. It is safe and effective in increasing detection of lesions in the bladder. Going forward, the impact on disease progression and number of invasive procedures endured by patients will be closely investigated. This is an exciting new tool in the urologist’s armamentarium to treat NMIBC. ♦

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3. Smith AB, Daneshmand S, Patel S et al: Patient reported outcomes of flexible blue light cystoscopy with hexaminolevulinate in the surveillance of bladder cancer: results from a prospective multicenter study. *BJU Int* 2019; **123**: 24.
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6. Grossman HB, Gomella L, Fradet Y et al: Long-term reduction in bladder cancer recurrence with hexaminolevulinate enabled fluorescence cystoscopy. *J Urol* 2012; **188**: 58.
7. Chang SS, Boorjian SA, Chou R et al: Diagnosis and Treatment of Non-Muscle Invasive Bladder Cancer: AUA/SUO Guideline. *J Urol* 2016; **196**: 1021.

TAKE HOME Messages

Following are summary overviews of the Annual Meeting abstracts. Abstract numbers are in parentheses (*J Urol*, suppl., 2020; **203**: e1-e1310).

Bladder Cancer



Jennifer M. Taylor, MD, MPH
Houston, Texas

With the growth in available therapies and clinical trials, urothelial cancer (UC) is at the forefront of novel and innovative research, with more than 304 podium and poster presentations accepted for the Annual Meeting across the spectrum of UC.

Cancer Detection and Epidemiology

Investigators examined charges in a private insurance database in the 12 months prior to bladder cancer (BC) diagnosis to identify possible diagnostic opportunities for earlier detection, and found potential diagnostic delays in many cases (MP24-03).

Based on the international IDENTIFY database, global detection of BC varies widely and is independent of underlying BC prevalence (MP24-02). In addition, ultrasound may be appropriate in lieu of computerized tomography in many cases, with risk stratification of hematuria evaluations (MP24-04).

An analysis of BC cases in the National Cancer Database (NCDB) underscored that race (particularly African American) correlated with lower pathological response

to neoadjuvant chemotherapy (PD50-12).

One theme in nonmuscle invasive BC (NMIBC) was intensity of surveillance cystoscopy. One group applied modeling in their institutional database, confirming that cystoscopy for intermediate risk NMIBC at 3 to 6-month intervals in the first 2 years is safe (MP24-09). In veterans with high risk NMIBC less intensive surveillance did not lead to progression or BC death (PD50-08).

Studies focused on the microbiome described urinary changes after urinary diversion (MP41-04), and reported higher rates of BC in mice with intact microbiota and immune systems (PD42-04). These findings highlighted profound interactions between the microbiome and immune system, and inflammatory response and tumorigenesis.

Improving NMIBC Outcomes

Increased use of perioperative chemotherapy instillation was achieved by implementation analysis of the surgical workflow and team member education (PD12-05). An international collaboration developed a new instrument to assess patient reported outcomes with NMIBC treatment (PD12-08).

Studies on intravesical therapy for bacillus Calmette-Guérin (BCG) unresponsive NMIBC included retrospective multicenter data (PD03-07) and institutional data (MP73-08)

supporting clinical benefit with gemcitabine-docetaxel, data on novel cisplatin based intravesical therapy with positive results (MP73-09) and a novel intravesical delivery of paclitaxel with hyaluronic acid with response in CIS only disease (PD12-01).

For therapies earlier in development, a genetically modified BCG that improved tumor control in animal models was described (PD47-07) and an intravesical interferon alpha delivered by lentiviral vector that improved systemic response to PDL-1 blockade was presented (PD42-08).

Several groups reported novel biomarkers, such as serum based cytokine levels (MP73-04) or urinary cytokines (MP01-16), to predict response to BCG, and biopsy identified TERT mutations in nonmalignant urothelium to predict recurrence (MP01-11) and potentially guide additional therapy.

Use of photodynamic diagnosis therapy was described in upper tract disease, using oral 5-ALA with improved detection of malignancy (PD18-05), and in urinary sediment cytological evaluation (MP01-18), as well as in other endoscopic applications.

Improving MIBC and Advanced BC Outcomes

Investigators terminated a clinical trial of post-chemotherapy endoscopic evaluation early after it failed to correctly predict residual disease, emphasizing the limited accuracy of conventional methods (PD50-07). In an evaluation of patients with hydronephrosis before cystectomy there was no difference in subsequent upper tract UC (UTUC) development

in those with percutaneous vs internal drainage (MP82-20).

The use of indocyanine green for ureteral viability in open cystectomy was described, with a notable decrease in anastomotic stricture formation (MP23-12).

Multiple comparisons of robotic and open cystectomy randomized trials (MP61-09, MP61-16) and in large cohort data sets (MP49-12) demonstrated similar complication and readmission rates, and recurrence rates and patterns, while patient frailty most strongly correlated with poor outcomes.

Improvements in post-cystectomy recovery may be achieved by innovative postoperative rehabilitation strategies (PD60-09) or standardized postoperative education to modify rates of discretionary readmission (PD60-12). One study highlighted the low rate of monitoring (~35%) for post-cystectomy B12 deficiency, with a relatively high rate of deficiency (~50%) observed (MP41-15).

Two large series highlighted the more aggressive behavior of sarcomatoid histology compared to conventional UC, and its lower but non-negligible response to neoadjuvant chemotherapy (MP55-17, MP55-18).

Our increasing understanding of genomic profiles in UC was applied in multiple studies to predict risk of pathological up staging (MP55-03), describe subtype associated response to neoadjuvant immunotherapy (PD42-03, MP55-09) and to develop a small cell BC classifier that correlated with response to immunotherapy (MP17-14).

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Take Home Messages—Bladder Cancer

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Many new biomarkers were described that may correlate with response to systemic therapy, including pretreatment serum absolute monocyte count (MP49-05), pretreatment serum T-cell counts (MP49-03), posttreatment urinary epigenetic assay (MP17-16) and presence of endocrine related adverse events (MP49-09).

Palliative care referrals remain underused as reported from inpatient (MP12-02) and outpatient (MP24-20) NCDB data, but it is encouraging to read that referral rates doubled from 22% in 2004 to 2007 to 44% in 2012 to 2015.

Upper Tract UC

In-depth data were presented on the genomic landscape of UTUC, identifying actionable cancer gene alterations in 91% of tumors (PD18-10), and profiling UTUC and corresponding urinary sediment, which could serve as a noninvasive biomarker

source (PD18-11).

A national clinical trial studying chemoablation for low grade UTUC resulted in very recent FDA (U.S. Food and Drug Administration) approval of thermal gel mitomycin, based on a 59% complete response rate and estimated durable response in more than 80% at 6 and 12 months (PD18-07).

While we remain without level 1 evidence for neoadjuvant chemotherapy in UTUC, further support for its use came from retrospective data in a single center with only 2 cycles (MP82-08) and in a multicenter database (MP82-09).

Radiographic indicators after neoadjuvant chemotherapy appear to correlate well with pathological response (PD18-01), and radiographic and clinical features may be useful to risk stratify UTUC (MP82-06, MP82-16).

These data and more not discussed here can only energize our continued efforts to understand UC and alter its outcomes in meaningful ways. Although we could not experience the presentations in person this year, the remarkable achievements and discoveries are to be applauded.

Endourology and Stone Disease



Noah Convasser, MD*
Sacramento, California

Despite the cancellation of the 2020 AUA Annual Meeting, abstracts accepted for presentation confirm that the science of stone disease continues to advance. More than 25 moderated poster, podium and/or video sessions included stone disease related work from pathophysiology to surgical management and everything in between.

Although I highlight numerous abstracts here, this list is not all-encompassing. I encourage readers to engage in the AUA Virtual Experience (<https://www.auavirtual.org/abstracts>), a fantastic resource that has allowed authors to showcase their efforts in lieu of live presentations.

We still have much to learn about mineral and protein interaction in kidney stone formation. One group performed a structural analysis of

calcium oxalate crystals using immunofluorescence staining of osteopontin, renal prothrombin fragment 1 and calgranulin A (MP10-11). Their findings demonstrate unique patterns of protein deposition among crystals during formation and growth of these stones, depending on the stone composition (fig. 1). A further understanding of protein-crystal interaction might provide additional targets for stone prevention.

There is an approximately 50% risk of kidney stone recurrence after an initial event. Typically, a thorough medical history identifies patients at high or intermediate risk for recurrence who warrant a full metabolic evaluation. Investigators found differing metabolomes of patients with recurrent and nonrecurrent stone formation (PD04-07). Using their metabolome based assay they were able to predict recurrent and nonrecurrent stone formation with an error rate of approximately 20%. Adding such a test could help identify which patients need a 24-hour urinalysis, but whether it could be used as a

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On July 10 -11, four of the AUA's annual research symposia will be available as on-demand webcasts and are free for all AUA Members.

YOUNG UROLOGISTS FORUM

On July 21 the AUA will Webcast its popular Young Urologists Forum, featuring speakers discussing "The Top Ten Things I Wish I Knew Before I Started Practicing" on the topics of financial wellness, early-career job change, practicing in a competitive market and more.

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Take Home Messages— Endourology and Stone Disease

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screening tool for those not forming stones who are at risk remains to be seen.

Getting patients with recurrent stone formation to increase hydration is easier said than done. Many patients lack the thirst drive or simply forget to drink. Investigators previously demonstrated that wrist worn sensors can detect drinking behaviors. They presented outcomes of their sip^{IT} system (MP43-08), which includes a wrist worn sensor, connected water bottle and mobile application. They studied 31 patients for 3 months and demonstrated that while using the sip^{IT} system, forgetting to drink and lack of thirst were less of a barrier to meeting daily fluid intake goals.

Hyperoxaluria can be difficult to manage in patients with recurrent stone formation. Given the frequency of restricted diets due to diabetes, metabolic syndrome and food allergies, among others, instructing patients to increase dietary calcium and/or reduce intake of oxalate rich foods can be limiting. Reloxaliase, oral oxalate decarboxylase that breaks down oxalate in the intestines and prevents absorption, has recently been studied in phase I and II trials.

Findings were presented from the URIROX-1 phase III, double-blind, randomized, placebo controlled trial in patients with enteric hyperoxaluria (LBA01-08). Reloxaliase or placebo was given 3 to 5 times per day for 4 weeks to 115 patients. Baseline mean urine oxalate excretion was approximately 90 mg per 24 hours and 68%

of the patients had prior bariatric surgery.

For patients receiving reloxaliase vs placebo there was a 22.6% vs 9.7% reduction in 24-hour urine oxalate ($p=0.004$). This effect persisted throughout the 4 weeks (fig. 2). The main side effects in the treatment arm were gastrointestinal and none required stopping the medication. The ongoing URIROX-2 trial will demonstrate the effect of reloxaliase on kidney stone progression and renal function.

Similar only to shock wave lithotripsy in the noninvasive approach, burst wave lithotripsy (BWL) uses ultrasound to fragment stones and can be more finely tuned based on stone parameters compared to shock waves. In addition, a lower pulse pressure allows the potential to treat stones without anesthesia.

Researchers presented the first human cases of BWL (PD15-01). They demonstrated fragmentation of a 7 mm renal stone after 8 minutes of BWL followed by ureteroscopy to endoscopically confirm the outcome. They also performed BWL in a patient who was awake with a 7 mm distal ureteral stone. Although it took 15 days for the stone to pass, the proof of concept that the procedure can be performed in patients who are awake was demonstrated.

Approximately 5% of patients require blood transfusions after percutaneous nephrolithotomy. Tranexamic acid (TXA) is a generic, low cost, antifibrinolytic agent that reduces bleeding during trauma, postpartum hemorrhage and elective surgeries.

Results were presented from a randomized, double-blind, placebo controlled trial of 1 gm TXA during

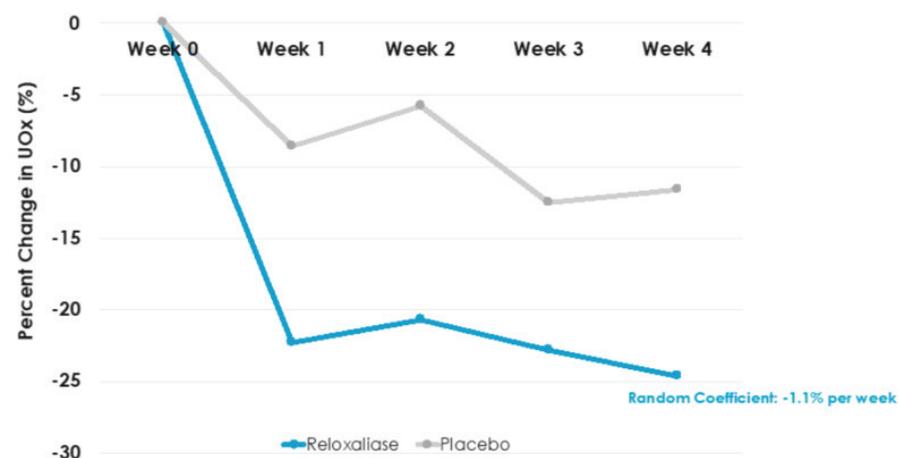


Figure 2. Reduction of urinary oxalate in patients taking reloxaliase vs placebo during 4-week period (LBA01-08).

percutaneous nephrolithotomy in 192 patients with complex renal stones (PD01-04). There was a significant reduction in transfusion rates (2.2% vs 10.4%, respectively, $p=0.03$), and no procoagulant complications were noted in patients who received TXA. It is contraindicated in patients with a history of venous thromboembolism but should be considered in patients at high risk for bleeding.

Although most patients tolerate ureteral stent removal, some experience significant colic in the first hours and days after the procedure. Researchers performed a double-blind, randomized, placebo controlled trial of intramuscular 30 mg ketorolac given at the time of stent removal for 124 patients (MP22-18). They demonstrated no difference in pain outcomes at 24 hours and 7 days post-procedure, but ketorolac did significantly reduce emergency department and unplanned clinic visits (2% vs 13%, $p=0.03$). As long as there is no contraindication, a high dose nonsteroidal anti-inflammatory

drug at stent removal appears to be reasonable prophylaxis.

Postoperative stent discomfort continues to be among the greatest problems affecting recovery after kidney stone surgery. Numerous medications are used to reduce stent related symptoms. Specifically, anticholinergics can have significant side effects that disproportionately affect older patients. Mirabegron is a beta-3 agonist that benefits overactive bladder, especially in patients who cannot tolerate anticholinergics.

A randomized, double-blind trial of mirabegron, solifenacin and tamsulosin on stent pain for 124 patients was performed (LBA01-03). Stents were removed at 4 weeks and questionnaires were administered at 10 days, 4 weeks and 6 weeks after surgery. Mirabegron had benefits similar to those of the other medications and could be considered as adjunctive therapy for stent pain.

Although we missed the face-to-face interactions of the annual meeting, the scientific advancement of our field continues. I wish everyone good health and look forward to next year in Las Vegas.

**Financial interest and/or other relationship with Boston Scientific.*

Sexual Medicine



Seth Cohen, MD, MPH
New York, New York

It has been a challenging yet exciting time for sexual medicine this last year and the abstracts accepted did not disappoint. These works celebrate the continued

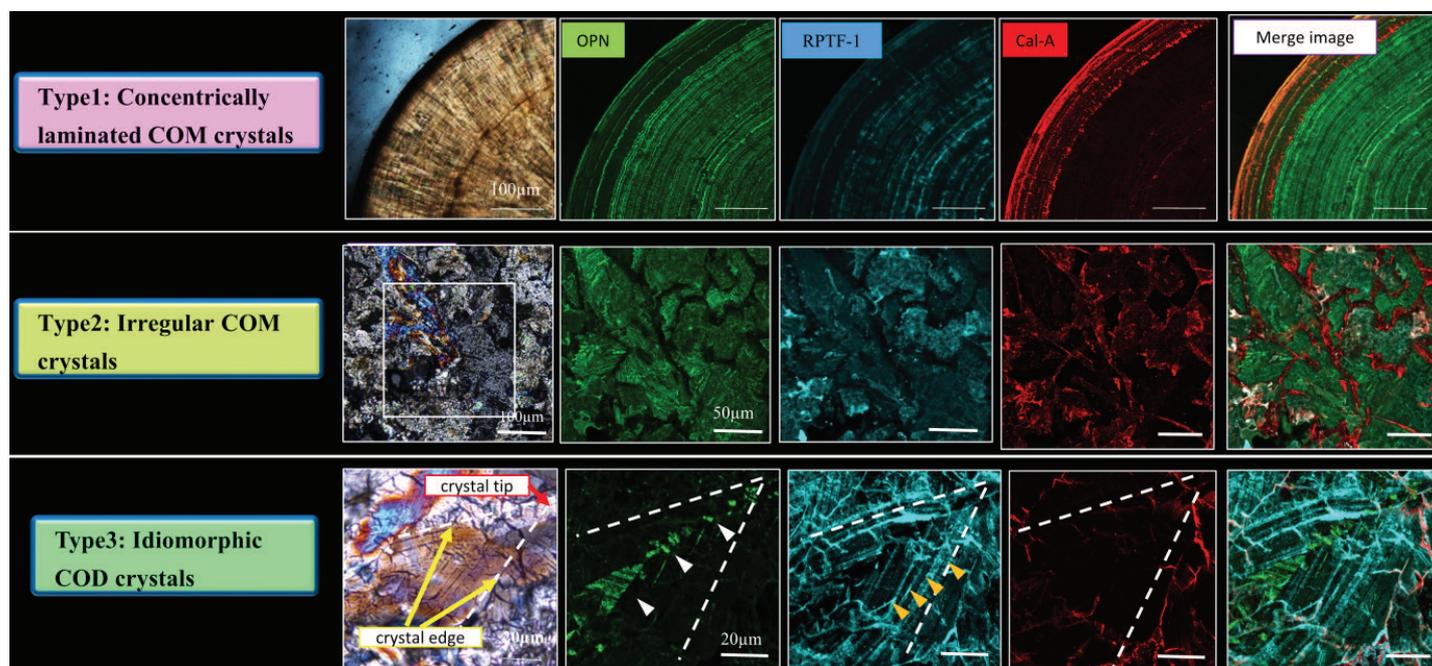


Figure 1. Immunofluorescence staining of osteopontin (OPN), renal prothrombin fragment 1 (RPTF-1) and calgranulin A (Cal A) in calcium oxalate monohydrate (type 1 and 2) and combination calcium oxalate monohydrate and dihydrate (type 3) stones (MP10-11).

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Take Home Messages—Sexual Medicine

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interest spanning from Peyronie's disease to shock wave therapy for erectile dysfunction (ED).

Telemedicine

Traffic to telemedicine sites for the treatment of ED has increased dramatically during a relatively short period of time. With approximately 4 million monthly visits, these websites represent a growing source of information, treatment and access to care (PD28-03, PD28-05). Along the lines of increased online viewing time, some authors hypothesized that increased use of online porn could affect sexual function. They showed a trend suggesting that men who masturbated significantly more to pornography per week noted delayed ejaculation compared to those who did not (PD28-06).

Sexual Dysfunction

Looking at trends in sexual dysfunction over time, some authors have shown a decrease in men reporting

ED and premature ejaculation while the reverse was seen for men reporting Peyronie's disease and low sexual desire (PD28-02). This finding likely reflects increased public awareness and increased direct to consumer advertising.

Injection Therapy

From needle phobia to physical barriers like a large panus and poor dexterity, intracorporal injection can have a high failure rate. A novel program suggests acceptance and commitment therapy can increase compliance as well as satisfaction with injection therapy (PD26-04).

Hypogonadism

The last few years have been exciting for the field of testosterone (T) supplementation. Subcutaneous injection, nasal and even oral applications are newcomers to the market. Early data indicate oral T is safe and effective, with only mild increases in blood pressure with some of the oral medications (MP45-14).

The testosterone guidelines from the Endocrine Society and AUA recommend followup blood work after

starting testosterone supplementation therapy with serum T, hemoglobin/hematocrit and prostate specific antigen within 1 year. Urologists are most likely to follow these recommendations, with general practitioners far less likely (PD26-08).

Testosterone undecanoate is FDA approved and is currently covered by insurance for every 10-week injection. Many have noted that this regimen under-doses a large proportion of patients. One group found that 8-week injections increased the Ctough by close to 10% (MP45-02). However, a smaller increase in Cavg was seen compared to 10 week injections.

In a separate study men with polycythemia as a result of testosterone supplementation therapy have increased rates of sleep apnea, suggesting stronger obstructive sleep apnea screening is warranted in this population (MP45-10).

Patients often come into the office wanting to know what they can do naturally to improve blood flow for better erectile function. Results were reported regarding the dietary patterns of patients presenting to a men's health clinic (MP78-08). After adjusting for age and body mass index, adherence to an organic diet was

significantly associated with higher Sexual Health Inventory For Men (SHIM) scores.

Peyronie's Disease

Traction devices have been used alone and in conjunction with plaque injections to improve curvature. RestoreX® has received a lot of publicity and has now been shown to prevent length loss while improving ED in men after prostatectomy (PD26-07).

The debate over which works better for curvature improvement, clostridium collagenase histolyticum (CCH) or interferon, was addressed. Using a comparative analysis from 2 high volume Peyronie's disease (PD) institutions, CCH was more likely to improve penile curvature and achieve greater results than interferon (MP33-06).

Men with lesser improvements during the first 2 series of CCH injections experienced greater overall improvements after the 3rd and 4th series compared to those who had greater early improvements (MP33-15).

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Lastly, a multicenter retrospective review was performed to assess efficacy/safety outcomes of using CCH to treat acute phase PD (PD20-03). Ultimately there was no statistically significant difference in frequency of treatment related adverse events between the acute phase (16 patients, 11.9%) and the stable phase (77 patients, 9.8%) ($p=0.44$). In their multivariate analysis only the number of CCH cycles received was predictive of curvature improvement.

Length loss during plication surgery may be overexaggerated based on new data. Actual measurements taken from 100 postoperative plication cases showed mean length loss at around 3.3 ± 1.3 mm (MP33-01).

From plication to plaque excision and grafting, advancements like collagen fleece grafting have reduced postoperative complications for PD surgery. A multicenter experience using sutureless collagen fleece grafting along with penile implant placement for severe PD showed it to be safe and effective in the correction of penile angulation (MP33-05).

Low Intensity Shock Wave Therapy

Shock wave therapy for ED has gained increasing interest at the Sexual Medicine Society of North America in the last few years. Men with ED symptoms were split into 2 shock wave groups to compare outcomes between electrohydraulic vs electromagnetic waves (MP45-04). Both groups received 6 weekly treatments, and there was a statistically significant increase in SHIM scores with both machines from baseline, but differences in outcomes between the 2 machines did not reach statistical significance.

Results were conveyed from one of the earliest randomized, sham-controlled, double-blind prospective studies for low intensity shock wave therapy (LISWT) for ED (MP45-12). A total of 96 participants were randomized in a 1:1 ratio to receive sham or LISWT over 6 weeks. Median change in International Index of Erectile Function-Erectile Function Domain score in the LISWT and sham groups was 5.1 and -2.2 ($p < 0.001$), respectively, at the 7-week followup period.

Inflatable Penile Implant

To date, there has been a scarcity of educational penile implantation tools for residents and fellows aside from expensive cadaver education courses. A nonbiohazardous, 3-dimensional printed and hydrogel molded procedural simulation was developed for inflatable penile prosthesis (IPP) placement to help replicate the appropriate steps of the procedure (PD 20-01). Overall 66.7% of the participants found the hydrogel models to be an equivalent training platform vs the cadaver model

Educating patients with moderate to severe ED about the likelihood of disease progression is vital to setting appropriate expectations. One group investigated trends and predictors of disease progression in men with ED who went on to receive IPP placement (MP39-06). Hypertension, increased age, diabetes mellitus type 2 and estimated glomerular filtration rate less than 30 ml/minute/1.73 m² were associated with a shorter time from ED diagnosis to surgical intervention.

Penile implant infection in the diabetic patient is a complication we all dread. Investigators conducted a multi-institutional study of diabetic patients undergoing primary Coloplast® Titan® penile implantation and compared postoperative outcomes based on the antimicrobial solutions used for dipping (PD20-10).

Across 18 different institutions 473 diabetic patients who received a penile implant were reviewed. Vancomycin + gentamicin dip seems to provide the greatest protection against postoperative infections compared to other antibiotic dips. In addition, use of antifungal dips did not seem to provide increased protection in these patients.

Along the lines of penile implant infections, the minimal touch or more extreme no touch technique may greatly reduce post-operative infections but contaminated furlow devices may be an unexpected surprise (PD-08). Up to 2.4% of “sterile” furlows may be contaminated with *Staphylococcus epidermidis* at the time of penile implantation (PD-06).

Looking for a bigger you? A prospective, randomized, single-blinded study investigated whether patient knowledge of before and after penile implant stretched penile length led to increased patient satisfaction

(MP39-07). Preoperative stretched penile length was not a predictor of increased patient satisfaction after prosthesis placement

As “drain and retain” has gained more traction during removal and replacement of IPP cases, the new issue of reservoir migration has become apparent. A novel, time-saving technique permanently anchors the end of the reservoir tubing to the pubic bone, thus preventing future migration (MP39-08).

Priapism

To shunt or not to shunt? This is the eternal question that we battle with when getting a call from the emergency room at 2:00 a.m. A total of 169 ischemic priapism cases were retrospectively identified at a single institution, showing that duration of priapism and prior priapism were independent predictors of surgical shunt placement (PD20-11). More specifically, only 5% (6 of 119) of patients who presented with priapism duration less than 24 hours received a surgical shunt, whereas 57% (20 of 35) of patients with priapism duration 24 hours or greater received a surgical shunt.

Female Sexual Dysfunction

Do bike seats cause sexual dysfunction? There is certainly a paucity of data correlating a hard seat with erectile dysfunction and poor genital sensation. One group assessed genital numbness and its long-term impacts on female sexual function in 875 female cyclists (MP78-15). Overall 44% reported genital numbness with a greater prevalence reported in younger female cyclists, concluding that genital numbness may be more common than we previously suspected in this cohort.

Mirabegron, a β_3 receptor agonist, is a popular choice among patients with overactive bladder (OAB) because of its low side effect profile. However, it seems that there is new information about its role in female sexual dysfunction (MP78-15). Using the validated Female Sexual Function Index questionnaire, 100 sexually active women with idiopathic OAB were included in the study. Mirabegron 50 mg not only controlled and improved OAB symptoms but it also resulted in a significant improvement in their sexual life.

Trauma, Reconstruction and Diversion



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This year was the first all virtual annual meeting, and it is my pleasure to summarize the

strong scientific content in the trauma/reconstruction/diversion section. A total of 140 abstracts were accepted for presentation. Topics included trauma, exstrophy, infection, gender affirming surgery, urethral stricture, erectile dysfunction, and upper and lower tract reconstruction, among others.

Genitourinary Trauma

In one study, despite clinical guidelines supporting ureteral reconstruction for blunt ureteral trauma, the majority of cases were treated with a ureteral stent or nephrostomy (MP29-15). Patients with high severity ureteral injuries were more likely to be treated by stenting or nephrostomy tube compared to reconstruction or nephrectomy, regardless of stability. Ureteral reconstruction was more common only if abdominal exploration was already underway for associated injuries.

A nomogram was externally validated to predict bleeding interventions after high grade renal trauma (PD46-2) (fig. 1). This nomogram may be useful when evaluating trauma patients.

Urethral Stricture Disease

Continuing the trend from last year, many groups focused on outcome measures, patient reported success and symptoms.

Previous studies found lower success of urethroplasty in older men. Investigators identified 654 patients during a 12-year period divided into 3 age groups (young, middle, older) and found that older men fared less favorably when undergoing graft urethroplasty compared to the younger cohorts, while men undergoing excision and primary anastomosis fared

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well at all ages (MP35-19).

Patients with concomitant stricture and dependence on clean intermittent catheterization can be a challenge. The Trauma and Urologic Reconstructive Network of Surgeons (TURNS) group reviewed 37 patients and found comparable outcomes with a functional success rate of 90% (MP35-11). Many of these patients (59%) did not undergo a period of preoperative urethral rest. Appropriate antibiotic stewardship continues to be a hot topic. Infection rate following urethroplasty with oral mucosa graft remains low (6.5%) without postoperative antibiotics and without an oral prep (MP35-08). Data from the TURNS group showed that postoperative contrast extravasation portends a poorer outcome (MP35-04). Those patients may benefit from closer monitoring.

Several investigators looked at cost-effectiveness, success and patient selection for endoscopic treatment vs open urethroplasty. Data from 2 years were presented on the paclitaxel drug coated balloon, showing durability (67% success) without significant side effects (MP60-05). In another study at a mean followup of 33.5 months there was an 88.5% success rate for 22 patients following laser incision, dilation and Kenalog injection for recurrent vesicourethral anastomotic stenosis.

The LSE (Length, Segment,

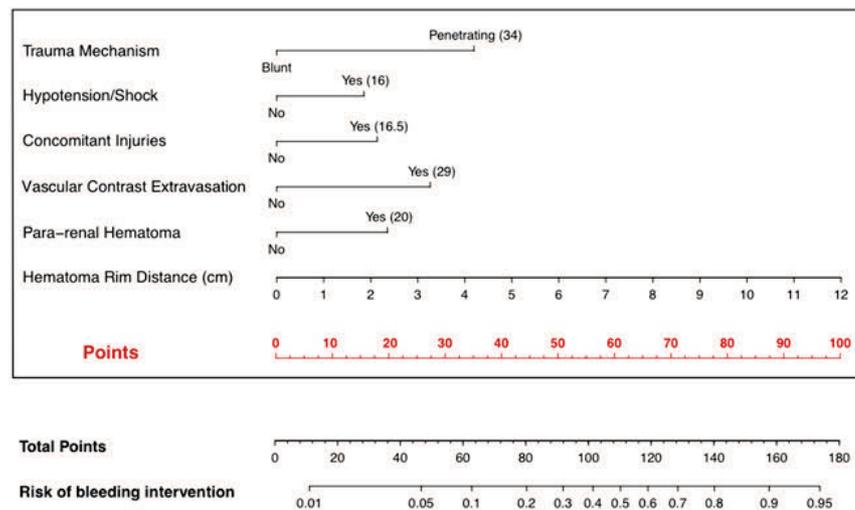


Figure 1. MiGUTS (Multi-institutional Genito-Urinary Trauma Study) nomogram for predicting bleeding interventions after high grade renal trauma.

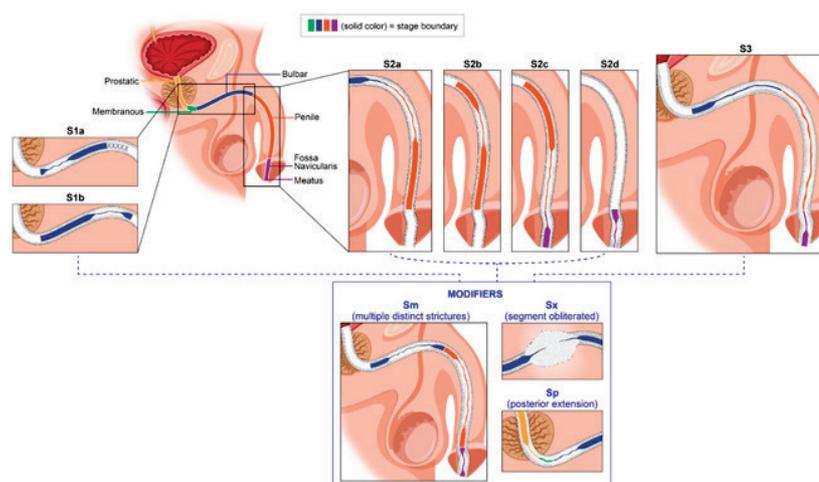


Figure 2. LSE classification system.

Etiology) classification system presented at AUA2019 was validated, showing high interrater reliability. This system may be used to predict urethroplasty type and surgical outcomes and help to standardize communication among physicians (MP60-13) (fig. 2).

Gender Affirmation

Multiple abstracts focused on quality outcomes as well as complications with gender reaffirming surgery. A novel questionnaire was presented looking at qualitative outcomes and patient perception including urinary, sexual and quality of life items

(MP29-19). Further work will be needed to validate the study.

A variety of abstracts focused on techniques and their outcomes. In a matched cohort of 27 patients who underwent metoidioplasty before phalloplasty and 27 patients who underwent primary phalloplasty, there were no significant differences in complications between the groups (MP29-20). Several groups reviewed techniques and complications of radial forearm free flap phalloplasty as well as neovagina, demonstrating that longer term followup is needed. An interesting case report described the use of autologous fascia for neovagina sacrocolpopexy (V07-03).

In 2016 a 3-piece inflatable penile prosthesis was designed specifically for implantation in a neophallus. A group reviewed their experience with 46 patients, showing early (mean 12 months) encouraging results with 83% success (PD46-12).

Robotics in Reconstructive Urology

The video sessions highlighted the advances of robotics in reconstructive urology. Multiple videos show innovation in upper ureteral work including techniques for buccal mucosal graft ureteroplasty (V05-07), which is becoming a more common choice for long segment mid ureteral strictures.

Interesting technical tips and adaptations for robotic assisted Boari flap were shown, highlighting the importance of adequate ureterolysis, antegrade stent placement and wrapping the repair around a 22Fr catheter (V05-06).

In a challenging patient group a novel technique was presented for robotic assisted buccal mucosa graft posterior urethroplasty (V06-07). With short followup (mean 2.2 months) a novel approach was shown to be feasible in these difficult cases. The use of robotic techniques in reconstructive surgery continues to progress and expand, opening up innovative treatment approaches for patients.

ED, Peyronie's Disease and Incontinence

Several how-to videos demonstrated techniques for challenging cases in male incontinence and ED. Investigators showed their technique for component sparing revision of an artificial urinary sphincter (V06-12).

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Techniques were presented for corporal fibrosis use and IPP insertion (V07-09, V07-10), as well for placement of a minisling during IPP to address concomitant mild stress urinary incontinence (V07-11).

Questions were raised about the protective effect of a transcorporal artificial urinary sphincter. In a review of 53 cuff erosions during a 12-year period cuff erosions were predominantly ventral in both groups and did not appear to be protective (MP60-01). In a group of 187 patients who underwent plication for Peyronie's disease, at a mean followup of 141 months overall satisfaction of patients and partners was 77%, showing durability of this common procedure (PD46-06).

Upper and Lower Tract Reconstruction

Several studies again focused on long-term outcomes and patient satisfaction. In lower tract reconstruction in 259 patients with at least 5 years of followup who underwent ileal neobladder continence was acceptable and more than 90% were able to void spontaneously (PD41-03). In patients undergoing ureteral repair using buccal mucosa success rates were excellent at nearly 88% for 49 patients at a median followup of 25 months (PD41-10).

In conclusion, this research represents a wide array of valuable projects in our specialty. While not comprehensive, these highlights draw attention to the excellent work submitted. I encourage all of you to take advantage of the AUA Virtual Experience and access the educational content online (<https://www.auavirtual.org/>).

Kidney Cancer



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This year's AUA annual meeting was set to feature more than 200 renal cancer abstracts spread across 7 podium and 7 poster sessions. There were a few prevailing themes noted, including comparisons of open and robotic partial nephrectomy, on vs off-clamp partial nephrectomy, the impact of warm ischemia time on renal outcomes and a variety of novel scores to predict long-term outcomes.

There was much interest in radiomics, texture analysis and other novel imaging techniques as well as long-term outcomes of a variety of histological subtypes of renal cell carcinoma (RCC). Additionally, basic and translational science studies reported multiple new biomarkers and possible therapeutic targets warranting further investigation. Here we highlight a few abstracts with the greatest potential clinical impact.

In the clinically localized space a novel decision aid to personalize treatment decisions for patients with cT1 renal masses was presented (PD02-07). The authors incorporated treatment outcomes from 4,995 patients

who underwent radical nephrectomy (RN), partial nephrectomy (PN), ablation or active surveillance along with Charlson score and performance status to develop a risk adapted online calculator (<https://rgulati.shinyapps.io/rcc-risk-calculator>) that can be used for shared decision making with patients. The calculator provides details on survival outcomes in addition to treatment related complications to allow for a personalized therapy selection.

The initial results of a noninferiority randomized controlled trial comparing endoscopic robot-assisted simple enucleation and standard PN for cT1 RCC reported that among 180 enrolled participants there was no difference in positive margin rates between patients who underwent simple enucleation and standard PN (2.2% and 3.3%, respectively, $p=1$) (PD11-04). No recurrences were seen in either group but final trial results are pending.

In a large, multi-institutional series of 1,566 patients who underwent robotic partial nephrectomy

continuation of baby aspirin (229 patients) during the perioperative period was associated with more bleeding complications (6.6% vs 2.5%, $p < 0.001$) and a higher risk of blood transfusion (RR 1.6) (PD49-03).

In the IRON (Investigation of Robot-Assisted versus Open Nephron-Sparing Surgery) study investigators compared robotic and open PN cT1-2N0M0 renal masses in a multi-institutional data set (3,468) (PD49-05). On multivariable analysis robotic PN was associated with lower intraoperative (5.7% vs 9.3%) and postoperative (18% vs 33%) complications, including Clavien grade 3 or greater (4% vs 6.1%, respectively). Similar oncologic outcomes were found between cohorts.

Finally, in a study of 60 patients there were significantly more circulating tumor cells following open RN compared to laparoscopic RN, open or laparoscopic PN ($p < 0.001$) (MP57-12). The implications of these findings and role in oncologic outcomes have yet to be determined.

Turning to the advanced RCC presentations, results from a phase 1 clinical trial of high doses of seleno-l-methionine in sequence with axitinib in previously treated and relapsed clear cell renal cell carcinoma (ccRCC) showed that treatment with up to 4,000 μg twice daily of seleno-l-methionine for 14 days followed by once daily in combination with axitinib was safe (PD39-02). In addition, there was evidence of clinical activity with 2 of 12 patients achieving durable complete response. A phase 2 study evaluating this regimen is currently ongoing.

A small study described a novel approach to tumor thrombus management using stereotactic ablative radiation therapy for patients who were not surgical candidates (MP14-12). The 14 treated patients had a median survival of 25 months and 33% demonstrated tumor regression while the remainder had stable disease, indicating that this may be an alternative treatment modality for nonsurgical patients.

In the basic science category, in a cohort of 21 patients with ccRCC miR-210-3p was up-regulated in ccRCC frozen tissue as well as perioperative urine samples (MP08-05). Following either partial or radical nephrectomy miR-210-3p levels dropped during followup for those who were disease free while rising in those presenting with metastasis. These findings suggest a possible noninvasive diagnostic and

prognostic biomarker for patients with ccRCC if further validated.

In a tissue study of 70 cT1a surgical specimens BAP1 was associated with higher tumor grade and BAP1 and PBRM1 mutations were associated with up staging to pT3a disease (MP08-07). These results may help inform patient selection for active surveillance if validated in prospective studies.

In the ablative therapy session, among 103 treated renal angiomyolipomas (AMLs) a third of those treated with initial embolization required a salvage procedure (PD08-06). However, none of the treated AMLs bled during followup. A substantial decrease in AML size was rarely observed among patients treated with either embolization or ablation.

In the epidemiology and evaluation sessions an analysis of 511 patients with sporadic RCC identified nearly 100 mutations in cancer predisposing genes, indicating that 37% of patients with sporadic RCC carried a germline alteration (PD45-05). Updated results from the DISSRM (Delayed Intervention and Surveillance for Small Renal Masses) registry reported that 10-year progression-free survival was 63.8% with 25% of patients on active surveillance (437) demonstrating progression mainly due to growth rate greater than 0.5 cm per year (PD45-10). In total 67 (15.3%) patients underwent delayed intervention. Cancer specific survival was 100%.

A late-breaking abstract from the ARCHERY study of 770 patients treated with systemic therapy for recurrent/metastatic disease reported that PD-L1 status on tumor infiltrating immune cells (using VENTANA IC scoring method) in primary RCC specimens was not independently prognostic in recurrent or metastatic RCC (LBA02-02). However, PD-L1 positivity was associated with poor prognostic factors.

In summary, significant progress continues to be made at the basic and translational levels in addition to refinement of clinical management of patients with renal cell carcinoma. While the annual meeting was disrupted by COVID-19 the tremendous diversity of work investigating and improving the care of patients with renal cell carcinoma should give us hope in the future and cause for celebration. ♦

Male Reproductive Health and the SARS-CoV-2 Virus: Data Evolving Daily



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The ongoing COVID-19 pandemic has evolved into an unprecedented humanitarian and health crisis. Until specific treatments and/or vaccines are available, COVID-19 will remain an imposing factor to be managed in our lives and in our health care system. Regarding the impact of COVID-19 on male reproductive health, and in response to concerns of patients and health care providers, a joint committee of SMRU (Society for Male Reproduction and Urology) and SSMR (Society for the Study of Male Reproduction) board members was convened to address COVID-19 male fertility related issues.

This committee focused on enhancing practice patterns using telemedicine, opportunities for male fertility testing, ongoing educational needs for the discipline, and reviewing pertinent and available scientific data. I would like to thank all the members for their help on this project (see Appendix). This summary expands on the basic foundation of the committee's thoughts and comments that are posted at <https://www.asrm.org/news-and-publications/covid-19/statements/smr-statement-regarding-male-reproductive-health-and-covid-19/>.

The Presence or Absence of SARS-CoV-2 in Reproductive Fluids and Tissue

A study from Wuhan, China, based on polymerase chain reaction (PCR) testing, suggests that the SARS-CoV-2 virus does not appear to be present in the semen of SARS-CoV-2 positive men (34) when tested a mean/median 31 days (range 8 to 75) after serum positive testing.¹ A second study in patients from Shangqiu, China evaluated the semen of 38 COVID-19 positive patients.² Of these patients 15.8% had results positive for SARS-CoV-2 in the semen. The 6 patients with SARS-CoV-2 positive semen collected their samples 6 to 16 days after the onset of symptoms. Four of

15 cases (26.7%) were categorized as in the acute stage of infection, while 2 of 23 (8.7%) were categorized as in the recovery phase.²

Song et al evaluated semen samples from 12 patients with positive nasopharyngeal swabs and/or positive immunoglobulin (Ig)G or IgM antibodies.³ None of the 12 patients showed evidence of positivity in the semen and most patients were in the recovery phase. One testis was studied at autopsy and was negative for SARS-CoV-2 by reverse transcriptase (RT)-PCR. Ongoing studies are needed to confirm these findings before specific recommendations can be made regarding transmission through sexual activity, effects on semen quality etc.

Much has been made regarding the disparity between the more severe effects of SARS-CoV-2 on men compared to women. Is the testis a reservoir for this virus and responsible for these gender differences? Viral entry into target cells by SARS-CoV-2 is mediated by a viral spike protein and cellular angiotensin-converting enzyme 2 (ACE-2). Transmembrane serine protease 2 (TMPRSS2) appears to prime this ACE-2 mediated viral entry. ACE-2 receptors are present in the testis.

In one study investigators found only 6 of 6,470 cells showed evidence of expression of both genes.¹ With respect to clinical effects on the testis, this study reported testis and/or scrotal pain was reported in 17.9% of SARS-CoV-2 cases.

Further investigation is necessary to evaluate whether this observation is SARS-CoV-2 related and whether the testis as a reservoir is responsible for the increased severity of disease in men vs women.

Lastly, a prospective cohort study from Germany evaluated 20 COVID positive men and 14 controls.⁴ The COVID positive patients were either positive by RT-PCR nasal swab or positive with serum antibodies for IgG or IgA. Eighteen patients were in a recovered status and 2 had active infection. No active virus was found in semen of any SARS-CoV-2 positive patients in the active or recovered phase.

The COVID positive patients were divided into mild infection (no hospitalization) and moderate

infection (required hospitalization, and 2 received antiviral lopinavir/ritonavir) groups. There was a statistically significant difference (drop) in semen quality (total motile sperm concentration) in the moderate group vs the mild and control groups. In comparing fever positive vs fever negative patients, there was a statistically significant drop in multiple parameters of semen quality.

In another interesting study assessing disease severity in men vs women, Montopoli et al evaluated SARS-CoV-2 positive patients with cancer and those without cancer, and then specifically patients with prostate cancer with and without androgen deprivation therapy (ADT).⁵ Comparing the total number of SARS-CoV-2 positive patients, those with prostate cancer receiving ADT had a significantly lower risk of SARS-CoV-2 infection compared to those not receiving ADT (OR 4.05, 95% CI 1.55-10.59).

A greater difference was found comparing patients with prostate cancer receiving ADT to patients with any other type of cancer (OR 5.17, 95% CI 2.02-13.40). TMPRSS2 transcription is regulated by the androgen receptor. This effect is seen in nonprostatic tissue such as the lung and may explain the more severe lung infections. These data suggest that testosterone has a role in disease severity.

Effects of Medications for SARS-CoV-2 on Male Reproduction

The effects of medications such as hydroxychloroquine and antivirals on semen quality is unknown when used in the SARS-CoV-2 positive population of men. Prior animal models have shown some effects of antiviral medication on reproductive organs.⁶ Specifically, ritonavir and lopinavir, viral agents used in some COVID positive patients in clinical trials, have shown negative effects on sperm count, motility, lipid peroxidation and decreased antioxidants.⁷ There are no clear data to support or refute the reproductive effects of hydroxychloroquine in men.⁸

Telemedicine and Patient Care

Male reproductive consultations should continue via telehealth or other forms of remote, 2-way consultation. Physical examination by a qualified professional is a key component of a men's health evaluation. Given that physical examination is

not possible during these visits, a followup visit should be scheduled to evaluate for medical pathology and treatable and reversible causes of male infertility.

Physical examination and/or scrotal ultrasound may be used in male factor infertility evaluations with the necessary precautions taken to minimize the risk of SARS-CoV-2 exposure for patients and health care staff.

Assessment of Semen Quality

In lieu of the availability of fresh local semen analysis, home sperm testing can be used as a basic screening testing for male infertility. This may be valuable if local laboratories are not currently open for testing, or if patients prefer not to interface with a laboratory due the COVID-19 crisis period or are uncomfortable with collecting a sample and bringing to a laboratory.

There are 4 U.S. Food and Drug Administration approved at-home tests that offer different parameters of evaluation, which include volume, concentration and motile sperm concentration, but not sperm morphology. YO Sperm measures motile sperm concentration, SpermCheck® measures sperm count, Trak® Fertility measures sperm count and semen volume, and SwimCount™ measures motile sperm concentration.

When a fresh semen analysis cannot be obtained, a formal mail-in semen analysis seems to give reasonable concordance to standard semen analysis, resulting in a full semen analysis report similar to a fresh sample. If no sperm is seen, further fresh testing is recommended at a local laboratory to confirm with a centrifuged sample. The online companies Represource.com and MeetFellow.com offer these options, which may offer sperm morphology testing as well. These tests do not preclude the need for evaluation by a urologist if conception did not ensue, including a fresh semen analysis at a local laboratory at some point.

Post-Vasectomy Semen Analysis

According to the AUA guidelines, "Patients may stop using other methods of contraception when examination of one well-mixed, uncentrifuged, fresh post-vasectomy semen specimen shows azoospermia or only rare, non-motile sperm (rare non-motile sperm [RNMS] or \leq 100,000 non-motile sperm/

Male Reproductive Health and COVID-19

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mL). Recommendation (Evidence Strength Grade C).⁷⁷

None of the current home or mail-in tests meet AUA guidelines for clearance for unprotected intercourse. Waiting for a formal fresh semen analysis within 2 hours of collection is the standard of care based on these guidelines. SpermCheck Vasectomy is sensitive to less than 250,000 sperm but does not measure motility.⁹ Reprosorce.com and Meetfellow.com mail-in testing do not meet the current criteria of evaluation of a fresh sample less than 2 hours old. However, these tests may be valuable for patients in estimating their relative risk of achieving a pregnancy.

Sperm Cryopreservation during the COVID-19 Crisis

Sperm cryopreservation is warranted in certain situations. Cryopreservation should be continued by centers that allow for sperm cryopreservation of fresh and mail-in samples. Patients who may benefit from cryopreservation include those undergoing treatments that are potentially sperm toxic, such as for cancer or nonmalignant disease.

Other patients for whom sperm cryopreservation may be appropriate include those undergoing treatment for concerns regarding deterioration of sperm quality over time, gender affirming therapy, deployment or other occupations with a risk of bodily injury. These situations should

be addressed on a case-by-case basis.

Local sperm cryopreservation laboratories as well as mail-in sperm cryopreservation centers are available. Direct to consumer mail-in laboratories include (but are not limited to) Dadikit.com, givelegacy.com, cryochoice.com, fairfaxcryobank.com, reprotch.com, spermbankcalifornia.com and spare.me. These offer options for patients to cryopreserve their sperm in a timely fashion from the privacy of their own homes. Initial costs and storage are variable and patients are instructed to evaluate the product that works best for them.

A group of international andrologists evaluated the issue of sperm freezing prioritization, and in addition to the previous recommendations indicated several groups as important to undergo sperm cryopreservation, including post-vasectomy reversal patients due to a re-stenosis rate of about 10%, and patients on expensive out-of-pocket medical therapy with return of sperm to the ejaculate (human chorionic gonadotropin, clomiphene citrate etc).¹⁰

Education

In light of the limitations in learning opportunities for medical students, urology residents and andrology/REI (reproductive endocrinology and infertility) fellows due to the COVID-19 crisis, a joint educational committee was formed by the SSMR and SMRU to provide educational content regarding male reproduction. A weekly 1-hour webinar featuring members of both societies will be conducted to address any educational gaps.

Topics include telemedicine and

male reproductive urology, evaluation of the infertile male, andrology and male sexual dysfunction 101 for the REI, role of the urologist in the evaluation of the infertile couple, male infertility: medical and surgical management, fertility options for the hypogonadal male, sperm retrieval vs vasectomy reversal, evaluation of the azoospermic male, AUA vasectomy guidelines, advanced sperm testing, varicocelelectomy in the era of intracytoplasmic sperm injection, oncofertility and sperm cryopreservation, infections and illness: how they affect spermatogenesis, and health policy and male infertility. These webinars are available to AUA members at

<https://ssmr.org/meetings/webinars.aspx>.

Conclusions

COVID-19 has transformed our practice of urology and male reproductive health. As data evolve we will get a better sense of the whether this virus is present or absent in semen at different disease stages. In addition, we will be better equipped to evaluate whether the testis is an important reservoir for viral load and whether androgens have a role in disease severity. Overall, this will allow us to better evaluate our male reproductive patients in a safe and thorough fashion. ♦

Appendix: Committee Members

SMRU: Natan Bar-Chama, Stanton Honig, Harris Nagler, Philip Li, Kathleen Hwang, Matthew Coward

SSMR: Michael Eisenberg, James Hotaling, Joseph Alukal, Mary Samplaski, David Shin, Daniel Williams, James Smith, Jim Dupree

Invited participant: AJ Nangia

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Sexual Function Preservation Surgeries for Benign Prostatic Hyperplasia



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Benign prostatic hyperplasia (BPH) can cause symptomatic bladder outlet obstruction in nearly 30% of men older than 50 years and close to 80% in men older than 80 years. For decades the transurethral resection of the prostate (TURP)

and its variants (such as transurethral saline plasma vaporization and laser ablation or enucleation) have been the mainstay of surgical therapies for obstructive BPH. These surgeries undeniably provide urinary symptom relief for many patients.

Unfortunately, based on systematic review a significant number of men complain of erectile dysfunction (ED) and as many as 75% of men will have ejaculatory dysfunction (EjD) after surgery.¹ Subsequently, sexual function preservation procedures for

BPH has become an ideal choice for many sexually active patients, which has impacted our practice in recent years.

Prostatic Urethral Lift (UroLift®)

UroLift, manufactured by NeoTract, a subsidiary of Teleflex, is a novel technique with a disposable cartridge that delivers a small permanent implant through a needle under direct vision with cystoscopy. The implant is made with nitinol, stainless steel and nonabsorbable sutures. Typically, 4 to 6 implants are required to hold the prostatic lobes apart to create a continuous anterior channel through the prostatic lumen from the bladder neck to the verumontanum.

Because there is no tissue removal

or ablation involved and the implants are placed at anterolateral locations, this procedure avoids damage to the primary neurovascular (NV) bundle to preserve erectile function. Retrograde ejaculation is uniquely prevented by preserving the bladder neck (proximal bilateral implants are placed about 1 to 1.5 cm distal to the bladder neck) and prostate tissue that can seal around the verumontanum.²

Indeed, since U.S. Food and Drug Administration (FDA) approval in September 2013 and more than 25 peer reviewed publications with more than 175,000 patients treated, there has been no de novo ED or EjD reported.³ Large real world outcome

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Sexual Function Preservation Surgeries

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studies have been consistent with the pivotal randomized controlled trials (RCTs) that showed sustained improvements of 51% in quality of life (QoL), 47% International Prostate Symptom Score (IPSS), 59% peak urinary flow rate (Qmax) and 57% in BPH impact index at 5 years after implantation, though postvoid residual (PVR) improvement has been marginal in some studies.^{3,4}

Side effects are minimal and short lasting and include dysuria, hematuria, pelvic discomfort and urgency. The contraindication is prostates greater than 100 ml. The unique advantage of a complete lack of de novo ED or EjD for a quick office or outpatient procedure with a short learning curve and proven efficacy and safety makes Urolift a very attractive option for eligible patients with symptomatic BPH who wish to preserve their erectile and ejaculatory functions.

Water Vapor Thermal Therapy (Rezūm®)

The Rezūm system, manufactured by NxThera now owned by Boston Scientific, is a fundamentally different technology transforming sterile water into thermal energy in the form of vapor or steam convectively to disrupt cell membranes and cause instant cell death.¹⁴ It consists of a generator and handheld delivery device that provides vapor treatment for enlarged prostatic adenoma through a deployment needle under direct vision with cystoscopy.

The precise dose of thermal energy travels through uniformly and is confined within the targeted transition zone of the prostate. There is no thermal damage to the NV bundle located peripherally in posterior and lateral areas to preserve erectile function. The proximal treatment starts about 1 cm distal to the bladder neck to minimize the bladder neck injury so ejaculatory function is most often preserved.

Since the FDA granted 510(k) clearance for treatment of BPH in August 2015 multiple publications are available from a prospective, multicenter RCT with crossover at various stages of the study. No de novo ED was reported but about 7% of patients reported EjD.⁵ This small percent of EjD did not affect the overall mean Male Sexual Health Questionnaire

for Ejaculatory Function scores (MSHQ-EjD) which were not different in treated patients from the control group during the first 3 months.⁵⁻⁷

Further analysis may be required to look at the relationship of treating the median lobe with occasional occurrence of EjD even though the RCT found overall sexual function was well preserved when the median lobe was treated.⁶ The 4 and 5-year data from the RCT revealed improvements of 47% and 48% in IPSS, 43% and 46% QoL, 52% and 49% BPH impact index, and 50% and 49% in Qmax, respectively.^{7,8}

The most common adverse events are dysuria, hematuria, urinary tract infections (UTIs) and symptoms of urgency that typically resolve within weeks after the procedure. The disadvantages are postprocedure catheterization required for a majority of patients and a small potential risk of EjD. However, the advantages of a quick, minimally invasive procedure generally done in an outpatient setting with short learning curve and well preserved sexual function if not all make Rezūm a versatile therapy for patients with prostate ranges from 30 to 80 gm who desire preservation of erectile and ejaculatory function.¹⁴

Aquablation (AquaBeam®)

A robotic-assisted novel technique manufactured by PROCEPT BioRobotics uses high pressure saline to dissect prostatic tissue under transrectal ultrasound guidance and real time cystoscopy monitoring. The robot provides precise resection of prostate tissue autonomously with a heat-free waterjet based on a surgeon personalized treatment plan for each patient.

This technology is designed to use heat-free tissue removal with precise treatment mapping to avoid NV injury and potential bladder neck preservation based on prostate anatomy. Theoretically, it will reduce the risks of ED and EjD with TURP comparable efficacy for prostate tissue removal.

Since the FDA granted the AquaBeam Robotic System permission to treat BPH in December 2017 a double blind RCT demonstrated that aquablation therapy produced similar improvements of IPSS (greater than 15 point decrease) and Qmax (greater than 10 cc per second increase) at 6 and 12 months compared to TURP for patients with prostate 30 to 80 gm.^{9,10} Similar improvements of IPSS

and Qmax were found with the larger prostate (80 to 150 gm) treated with aquablation.¹¹

A recent multicenter all-comers study with aquablation also confirmed a 15.3-point decrease of IPSS and 11.8 cc per second increase of Qmax at 12-month followup for patients with prostate volume range 20 to 148 cc.¹² The RCT showed 33% of aquablation and 56% of TURP cases with some decreases of MSHQ-EjD or IIEF-5 scores. However, IIEF-15 and MSHQ-EjD scores were stable for sexually active patients after aquablation, which were significantly decreased after TURP.⁹ EjD was more common for patients with larger prostates (80 to 150 gm) than men with prostates between 30 and 80 gm after aquablation (18% vs 6%).¹¹

Similar sexual function outcomes were observed with a multicenter all-comers study that showed 8% of patients with EjD and 1% of men with ED after aquablation. However, the overall MSHQ-EjD and IIEF-15 scores among sexually active patients were stable.¹² Common complications were similar between aquablation and TURP including bladder spasm, UTIs, bleeding, urethral stricture and meatal stenosis. About 10.7% of cases required electrocautery for hemostasis and 2.7% needed transfusion.¹²

The biggest disadvantages to this procedure are the requirement of general anesthesia and inpatient admission. Once resection is complete, electrocauterization is required for some patients for hemostasis, making this procedure not a true minimally invasive surgery. The primary advantages of aquablation include a resection time under 10 minutes regardless of prostate size with better sexual function outcomes compared to standard TURP.

Future Strategies

Sexual function preservation surgeries for BPH will continue to evolve. Emerging technologies such as intraprostatic stents (temporary or permanent), implantable nitinol device, ClearRing™ device, ZenFlow™ spring and Butterfly™ device may provide more options for the years to come.¹³

We are anxiously waiting for more clinical evidence, particularly the impact of these new technologies on patient sexual function while providing urinary symptom resolution. Importantly, male sexual function

includes but is not limited to erectile, ejaculatory and orgasmic functions. The pain associated with erection or ejaculation and urine leak during ejaculation (climacturia) have not been well studied with these new technologies, which ultimately will affect decision making in our practice. ♦

*Financial interest and/or other relationship with Boston Scientific, Coloplast, International Medical Devices and Neotract.

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Partial Cystectomy: Past Lessons Learned for Future Progress



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For high risk invasive tumors of the bladder the gold standard for treatment remains removal of the entire bladder and control of the local regional lymph nodes. Radical cystectomy is effective for patients with localized and regionally confined invasive disease particularly when combined with preoperative chemotherapy. However, patients undergoing radical cystectomy have a median age approaching 70 years and usually multiple medical comorbidities. The combination of radical cystectomy, pelvic lymphadenectomy and urinary diversion poses a formidable challenge for many patients with significant perioperative morbidity¹ and a total recovery that may take several months.

For decades the role of partial cystectomy has been explored to control localized invasive bladder cancer, limit perioperative complications and preserve native bladder function to limit lifestyle changes related to urinary diversion. Several key factors for the successful application of partial cystectomy in patients with invasive bladder cancer were established after

early series documented a high rate of recurrence (bladder, pelvic and distant) and risk for wound implantation. Foremost of concerns are patient selection and adherence to proper surgical principles.

Multiple studies have clarified that smaller single tumors with no prior history of multifocal disease or associated carcinoma in situ are optimal for partial cystectomy.² Additionally, all previously established surgical principles for the treatment of invasive bladder tumor must be maintained, including completing a wide resection of the tumor and surrounding perivesical fat to obtain a negative margin; and controlling the regional lymph nodes. The tumor should optimally be in a favorable location such as the dome or upper hemisphere of the bladder. Since muscle invasive bladder cancer T2 or T3 disease carries a significant risk of regional lymph node involvement, a bilateral pelvic lymph node dissection must be incorporated with partial cystectomy.

A technical point that is particularly relevant during partial cystectomy for high grade bladder cancer is to control the urine that escapes from within the bladder once the bladder is opened. In the presence of an invasive tumor the urine is likely to contain high grade cancer cells with the ability to seed the pelvis and wound

if not removed. For open procedures surgical sponges are carefully placed around the cystotomy site to control the urine that leaves the bladder. This remains critical but potentially more challenging during a minimally invasive approach.

Following partial cystectomy the retained bladder must be closely followed due to the recognized high recurrence rate within the remaining urothelium. Bladder cancer is an exposure related tumor linked to carcinogenic ingestion and detoxified via elimination through the urine. Cells lining the collecting system are exposed to urine with the heavy concentration of carcinogenic substances leading to a field of damage. Synchronous and metachronous multifocal diseases are a hallmark of patients with bladder cancer.

Most series have found that after partial cystectomy for urothelial cancer 28% to 48% of all patients experience recurrence in the retained bladder depending upon the length of followup and patient selection.^{2,3} resulting in the need for lifelong surveillance including cystoscopy, urine cytology and imaging. The goal of surveillance is to identify recurrences early enough to implement definitive treatment to minimize the risk of dissemination from a recurrent lesion. Close surveillance is likely to find most but not all recurrences at an earlier enough time to provide effective treatment. Muscle invasive recurrences do represent a significant proportion of all recurrences

identified after partial cystectomy and dissemination of disease is observed even under close surveillance. Despite salvage cystectomy patients with advanced recurrences demonstrate a very poor survival.⁴

While partial cystectomy can ease the perioperative recovery compared to radical cystectomy and urinary diversion,⁵ physicians and patients should understand that to achieve good cancer control proper patient selection is critical and all established surgical principles must be maintained. The implementation of careful patient selection, diligent followup and delayed salvage radical cystectomy in unsuccessful cases with high risk recurrences in the bladder can provide a reasonable long-term survival. ♦

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Are Restorative Therapies for Erectile Dysfunction Ready for Prime Time?



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Novel treatment approaches for erectile dysfunction (ED) have focused on restorative therapies, which are often touted as a cure for ED. Restorative therapies may alter the physiology of erectile function at the cellular and

molecular level and produce downstream effects that result in durable improvements in erectile function as a result of regenerated tissue or improved cellular function.

Currently, there are no available therapies with evidence for a durable improvement in erectile function. The AUA and the Sexual Medicine Society of North America (SMSNA) consider restorative or regenerative therapies for ED as investigational and to be used only in the context of clinical trials.^{1,2} Despite the lack of robust efficacy data restorative therapies for ED are often offered through men's health and wellness clinics as a cash pay treatment option as they

are neither U.S. Food and Drug Administration (FDA) approved nor covered by health insurance. With considerable direct to consumer marketing urologists often encounter questions from patients about these therapies. We briefly review the current knowledge underpinning therapies including low intensity shock wave therapy (LiSWT), stem cell therapy (SCT) and autologous platelet rich plasma (PRP).

Low Intensity Shock Wave Therapy

LiSWT has gained popularity as a novel noninvasive restorative therapy in comparison to injection based therapies. LiSWT is thought to cause cavernosal microtrauma that then promotes angiogenesis.³ A meta-analysis of 7 randomized controlled trials (RCTs) concluded that LiSWT may have some short-term therapeutic efficacy for mild to moderate ED

without significant adverse effects.⁴ Unfortunately, there are no standardized treatment parameters for the optimal number of treatments and shocks per treatment, therapeutic focus, energy flux density, treatment area, and others that vary considerably throughout the published literature.

Several RCTs are underway using standardized protocols and longer followup to better understand the role of this therapy for ED.³ Although LiSWT is approved in Europe and Canada, the FDA has not approved LiSWT for the treatment of ED. Currently, most shock wave generators are class I medical devices that are exempt from the regulatory approvals process and use radial pressure waves. These machines are typically used for connective tissue and musculoskeletal disorders but have not been studied rigorously in

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the setting of ED. The transmitter surface of radial wave machines has the highest energy density, which is quickly dispersed with deeper tissue applications.

In contrast, true shockwaves deliver a focused pressure field with greater penetration depth, resulting in more precise cellular effects without damaging more superficial tissues. There may be a role for radial pressure waves and focused shockwaves for certain urological conditions, but this has not been determined to date.

Stem Cell Therapy

SCT is a very attractive treatment for ED given the possibility of a durable treatment effect resulting from tissue regeneration. Stem cells for SCT in the setting of ED can be derived from several potential sources including adipose tissue, bone marrow, urine, placenta, umbilical vein endothelium and amniotic fluid.³ Most early studies have evaluated intracavernosal stem cell injections, although intravenous administration

has also been explored. Animal studies and phase 0 clinical trials (fewer than 15 patients to assess safety) have suggested improvements in erectile function with SCT.³ However, there is no FDA approved SCT available for ED to date.

Nevertheless, SCT is offered directly to consumers at regenerative medicine clinics across the country without significant regulatory oversight and as a cash pay option. Not only is there lack of proven efficacy, but the safety of this investigational therapy also remains largely unknown.

Autologous Platelet Rich Plasma

SCT and cell free therapies such as PRP are often discussed interchangeably but are significantly different therapies. Autologous PRP has been explored for the treatment of a number of medical conditions. It is obtained using a venous blood sample that is centrifuged to remove immune and red blood cells and the plasma supernatant is used for treatment. The plasma supernatant contains platelets and growth factors such as vascular endothelial growth factor (VEGF), fibroblast growth factor

(FGF), and platelet derived growth factor (PDGF) that may modulate the inflammatory response and stimulate tissue remodeling and angiogenesis.³

Intracavernosal injection of PRP has been explored for the treatment of ED. A phase 0 clinical study demonstrated a small improvement in erectile function in a subgroup of 5 men who received intracavernosal PRP without significant adverse events.⁵ Although PRP has been used for other medical conditions, data supporting its use in ED are exceedingly limited. Similar to SCT, PRP is also heavily marketed directly to consumers at significant out-of-pocket cost and without proven efficacy at this time.

Conclusions

Although restorative therapies for ED are attractive with the promise of obviating the need for the regular use of medications to improve erectile function, current data do not support their broad use in the setting of ED. While LiSWT has the most robust evidence base, additional standardized, controlled clinical trials are needed to assess short and long-term efficacy and safety. Patients who are interested in

restorative therapies for ED should be referred to an open, federally registered clinical trial approved by an institutional review board.^{1,2} Furthermore, participants involved in clinical studies should not incur more than the basic (or “research”) costs of therapy.^{1,2} Forthcoming placebo controlled RCTs with standardized protocols, clear patient criteria and long-term followup will define the future role of these investigational therapies for ED. ♦

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What Has TURNS Told Us about Patient Reported Outcomes after Urethroplasty?



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The Trauma and Urologic Reconstruction Network of Surgeons

(TURNS) is a multi-institutional cohort of reconstructive urologists that began a decade ago with the goal of “advancing current practices, standards of care, and patient outcomes within the field of reconstructive urology.” We began with 8 (now 13) fellowship trained urologic reconstructive surgeons and with some additional education in epidemiology and clinical research that was critical to functioning on a shoestring, member supported budget for data accrual and entry.

Experienced and creative surgeons had already proven that male urethroplasty was technically possible

via various techniques, so we focused on the subjective impact to the patient beyond historical objective measures of success such as urethral patency and/or avoidance of a repeat procedure.

When we designed our initial clinical database there was not a validated condition specific patient reported outcome measure (PROM) for men with a urethral stricture. We originally used 2 voiding (International Prostate Symptom Score [IPSS], Core Lower Urinary Tract Symptom Score [CLSS]) PROMs and 2 sexual function (International Index of Erectile Function [IIEF], Male Sexual Health Questionnaire [MSHQ]) PROMs. We also included 17 additional legacy items from validated PROMs and novel items created by our members to be asked in the postoperative period.

The objective and subjective data resulted in an abundance of information to enable more than 40 published

articles from TURNS in the past 8 years. A notable subset of these publications had a primary aim to evaluate a particular subjective outcome following urethroplasty. For example, TURNS has examined the impact of urethroplasty on predefined subjective outcomes such as lower urinary tract pain, urge/urge incontinence, sexual function, terminal micturition and anxiety/depression. These data have improved our ability to counsel patients appropriately before and after urethroplasty.

An advantage of PROMs is that they harness the patient’s voice and can measure subjective outcomes that are not biologically measurable. However, when there is not a condition specific outcome measure, meaningful measures can be missed. An example of how objective and subjective measures of success can differ was evident in a TURNS study examining sexual function of men who underwent a staged penile urethroplasty.¹ In summary, patients reported new penile curvature (23%), loss of subjective penile length (55%) and altered penile sensitivity (45%) following 2-stage penile urethroplasty. When analyzing noncondition specific PROMs focusing on overall sexual

function (Sexual Health Inventory for Men [SHIM] and MSHQ) there was not a significant change before and after urethroplasty. However, we were able to detect a meaningful change among the legacy and novel items that our group developed based on our collective experience as reconstructive urologists.

Understanding how to improve the subjective outcome is important as patients do not want to trade their presurgery urethral stricture symptoms for new subjective complaints postsurgery that may become chronic. Without a condition specific PROM to guide our ability to understand these issues providers are relegated to providing incomplete care. For example, TURNS reported an 89% overall postoperative satisfaction rate following anterior urethroplasty. However, when controlling for recurrence we noted that dissatisfied patients were bothered by urethral and/or bladder pain, decreased sexual activity, and persistent lower urinary tract symptoms (ie straining to urinate).² While a generic voiding questionnaire would likely discover broad concepts such as obstructive

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Patient Reported Outcomes after Urethroplasty

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voiding after urethroplasty, generic voiding PROMs will not capture more comprehensive data such as sexual function or pain. A condition specific PROM designed to measure outcomes following urethral stricture surgery would be able to encompass multiple concepts that are meaningful for these patients.

In 2011 a urethral stricture specific PROM was developed by Jackson and colleagues.³ In order to develop their PROM the authors met with patients who had a urethral stricture to gather important content and then compiled legacy items from other PROMs that were validated for different health states. This technique for PROM development is less costly and easier to complete as proponents will argue that the item has already been studied to ensure it meets

crucial measurement properties. This PROM has been validated for clinical use and is a noteworthy addition to our field. However, a notable absence in this PROM is reduced involvement by patients with urethral stricture and an absence of items addressing sexual dysfunction. Furthermore, generic items such as a universal visual analog scale and a generic quality of life scale (EQ-5D) were included contaminating the ability to discern whether responses are related to the urethral stricture or other physical ailments. Subsequent work by our group has confirmed that generic items were a major limitation impacting clinical use.⁴

Parallel to the publication of the PROM by Jackson et al,³ TURNS had begun a similar endeavor to develop a urethral stricture specific PROM. While development has taken longer, we have pursued a different approach by increasing patient involvement. Patients with urethral stricture were

involved at all possible stages of development including concept elicitation interviews, cognitive interviews and item prioritization interviews.

The result was a 31-item PROM, the Urethral Stricture and Symptom Impact Measure (USSIM), that included voiding, sexual function, quality of life and surgical outcome items.⁵ Subsequent field testing followed by psychometric testing of measurement attributes in the preoperative and postoperative settings allowed us to reduce the USSIM to a more efficient 13-item measure that can detect changes following a urethral stricture intervention. We are currently field testing this newer version to confirm that it is sensitive to change and valid for clinical use.

As the number of reconstructive urology fellowships has increased over the past decade this influx of new talent has further strengthened our subspecialty with new ideas and novel clinical research. By augmenting the

voices of our patients through a more comprehensive urethral stricture PROM, meaningful clinical research in urologic reconstruction can continue to evolve. ♦

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Partial Nephrectomy in the Management of Wilms Tumor: State of the Art



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Wilms tumor (WT) is the most common malignant renal tumor in childhood with the total number of new cases estimated at about 500 per year. Of the roughly 1 in 10,000 children who are diagnosed with WT 5% to 10% have bilateral disease in either synchronous or metachronous fashion.¹ Bilateral disease tends to occur in younger children and more often in girls, and is an important risk factor for the development of renal failure.

Survival has dramatically improved over the past several decades, largely due to the adoption of treatment guidelines from the National Wilms Tumor Study Group (NWTSG) and the International Society of Pediatric Oncology (SIOP). In general, the recommendation by the NWTSG for unilateral disease is total nephrectomy at diagnosis followed by chemotherapy and possibly radiotherapy depending on tumor stage. Alternatively, the SIOP recommends early biopsy and neoadjuvant chemotherapy followed

by delayed nephrectomy. Regardless of the approach, surgical resection is a mainstay of treatment. Although nephrotoxicity from chemotherapy, radiation and intrinsic renal disease are thought to contribute to the eventual development of renal failure in some patients, the loss of renal mass from tumor resection appears to be a significant factor.

Partial nephrectomy (PN) or nephron sparing surgery (NSS) has been advocated in cases of bilateral Wilms tumor (BWT) for which the only alternative is bilateral nephrectomy in cases of multifocal unilateral disease, or with Wilms predisposition syndromes (ie Beckwith–Wiedemann, WAGR, Denys–Drash, Perlman etc).^{2,3}

Working with our colleagues in the Department of Radiology we have created 3-dimensional (3D) models to aide surgical planning for patients with complex tumors. The modeling process begins when images are obtained during clinical magnetic resonance imaging (MRI). Imaging examinations are tailored to the clinical question and optimized for printing, often obtaining images in arterial, venous and delayed phases of contrast enhancement. The images are re-viewed and the relevant anatomy is

identified and defined during a collaborative discussion by the radiologist, urologist and engineer.

From this segmentation a dynamic PDF (Portable Document Format) file is created on which the anatomy can be manipulated to be viewed from different planes or have certain anatomy added or subtracted to better

understand anatomic relationships.⁴ After further review of this document with the surgeon a 3D model is printed to facilitate presurgical discussion among the team and for intraoperative reference (fig. 1).

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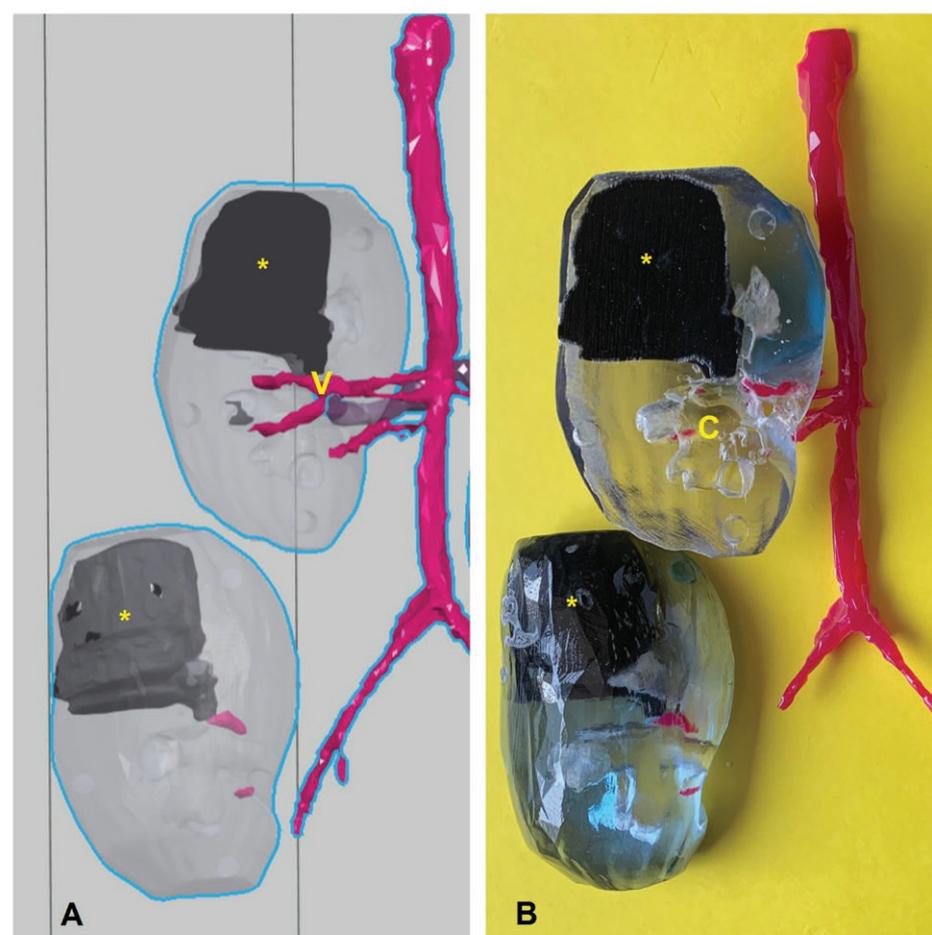


Figure 1. Recreated MRI model of kidney with Wilms tumor in PDF form (A) and 3D model (B) showing critical proximity of vasculature (V) and collecting system (C).

Partial Nephrectomy for Wilms Tumor Management

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As an example, a young patient had a large metachronous Wilms tumor in the middle of a solitary kidney critically close to the renal hilum and impinging on the collecting system. The 3D model allowed me preoperatively to repeatedly review the anatomy in my own hands from multiple viewpoints, increasing my familiarity with the individual anatomy. The 3D model showed arterial supply to the tumor only clearly visible when viewed in the coronal split of the model and from the posterior of the kidney. These views would not otherwise be feasible intraoperatively. This advantage allowed us to recognize this arterial supply early in surgery through a small dissected window near the renal hilum and ligate the primary tumoral blood supply, minimizing blood loss and saving the kidney with a partial nephrectomy.

During NSS we have used traditional renal surgical techniques

including hilar vascular isolation (fig. 2), partial direct compression of parenchyma with the surgeon's fingers and aided by a vascular clamp or an umbilical tape Rummel tourniquet to optimize a bloodless field (fig. 3), and the use of Bovie electrocautery to divide the parenchyma. We favor direct compression of only the affected parenchyma while maintaining blood supply to the rest of the kidney over whole kidney warm or cold ischemia.

After tumor resection attention is directed to meticulous repair of all violations of the collecting system with absorbable suture, the liberal use of oxidized cellulose and argon beam coagulation on the excised parenchyma, and direct mattress suture approximation of the renal parenchyma/capsule whenever possible (fig. 4). In cases of reconstruction of the collecting system we also use externalized drains and internal ureteral stents. In pathology tumor and normal parenchyma sections are not only evaluated histologically but also genetically for genome wide single

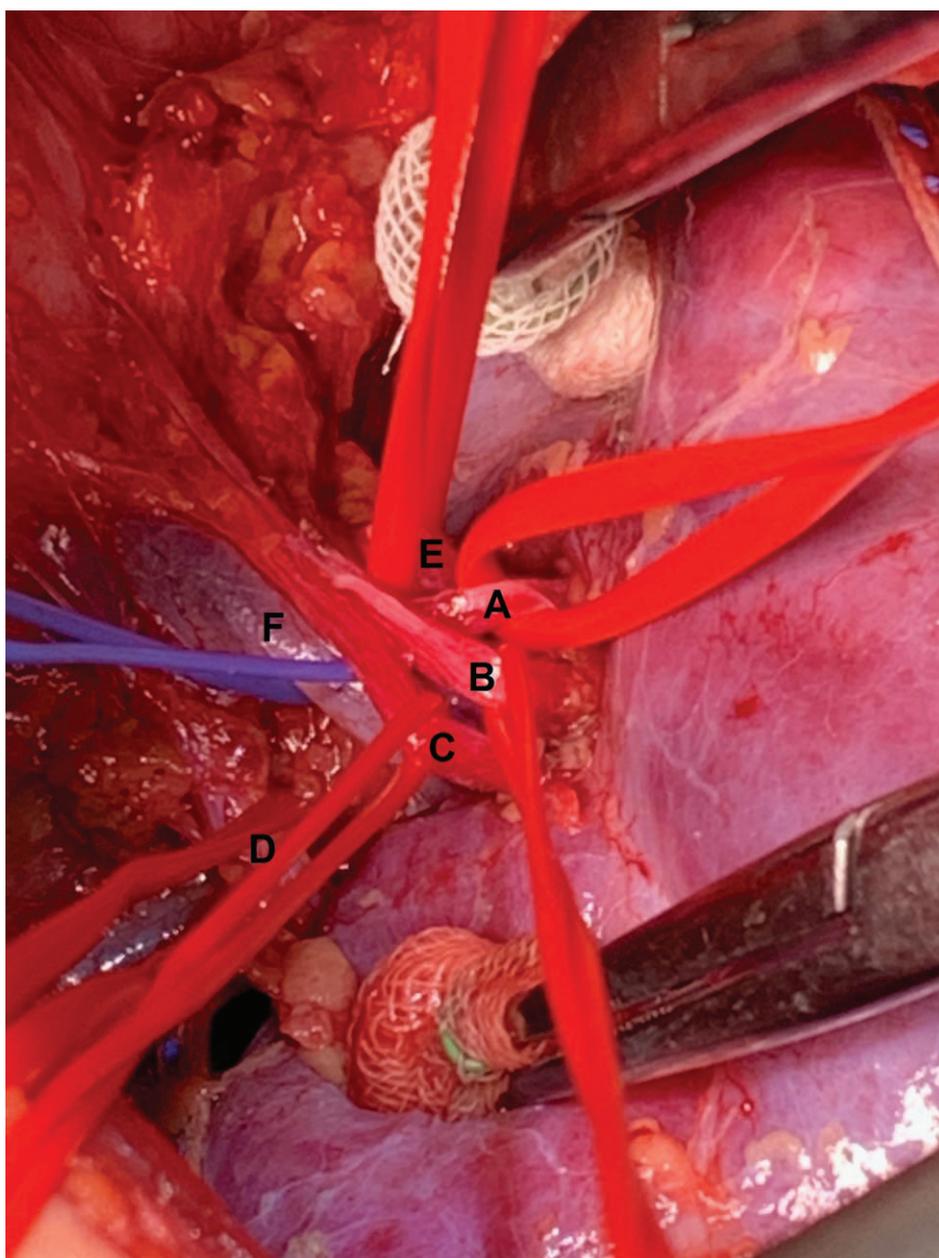


Figure 2. Renal hilum. Segmental arterial blood supply showing apical artery (A), superior anterior artery (B), inferior anterior artery (C), inferior artery (D), posterior artery (E), and renal vein (F).

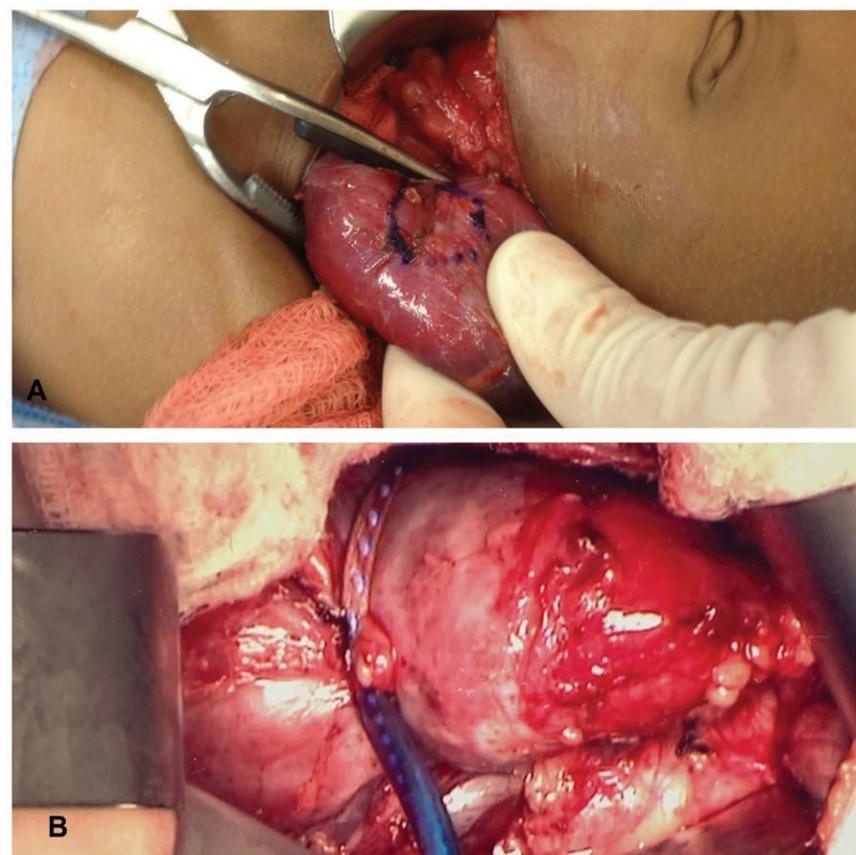


Figure 3. Renal parenchyma compression techniques of digital compression and vascular clamp (A) and umbilical tape Rummel tourniquet (B).

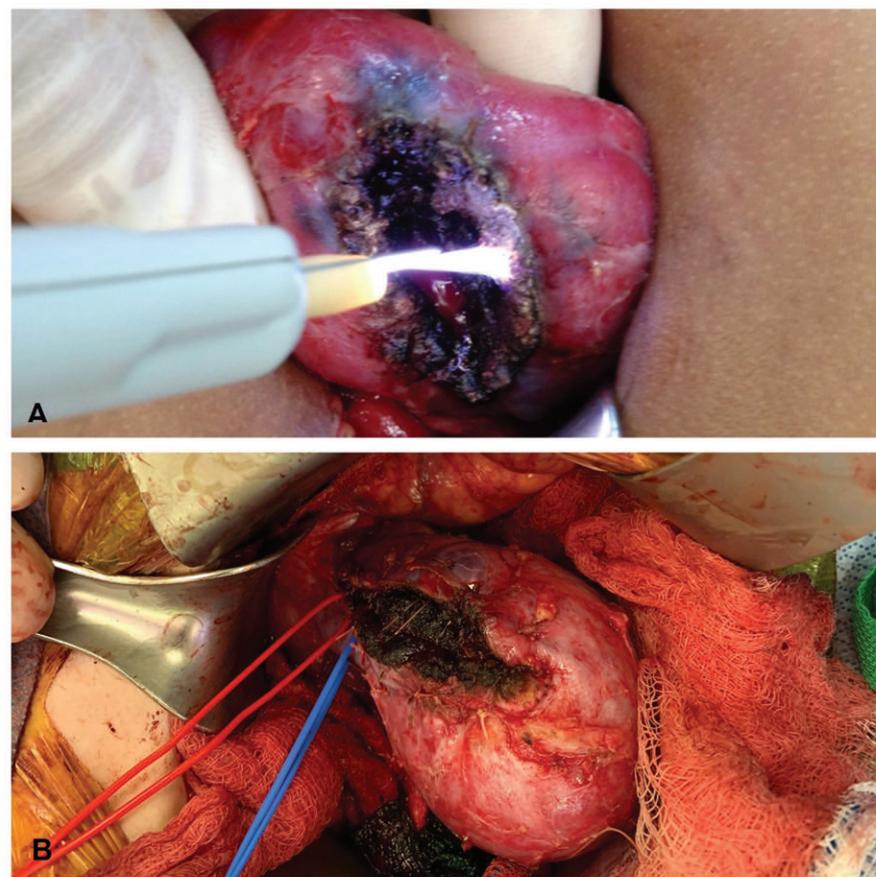


Figure 4. Renal parenchyma repair after tumor excision with argon beam coagulation (A) and direct mattress suture approximation of the renal parenchyma/capsule (B).

nucleotide polymorphism microarray analysis.⁵

We feel it is also important to adhere diligently to sound surgical oncology principles including en bloc resection, avoidance of frank spillage whenever possible and resection of at least a 1 cm margin of normal parenchyma (rather than enucleating the tumor without a margin). Tumors that are indistinctly palpable or that encroach on the renal hilum are

further evaluated using intraoperative ultrasound to delineate the deep extent of the tumor including correlation with the 3D model. Other suspicious renal nodules are excised with a margin.

After full resection we also employ intraoperative frozen section for margins as standard technique. Although we naturally find tumors arising in

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Partial Nephrectomy for Wilms Tumor Management

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the lower pole of the kidney technically easier to resect with these techniques, we do not consider tumors located medially, posteriorly or in the upper pole to be a contraindication to a nephron sparing approach.

RENAL (radius, exophytic/endophytic, nearness to collecting system or sinus, anterior/posterior

and location relative to polar lines) nephrometry is a complexity score validated in adult renal tumors that describes the likelihood of complication after partial nephrectomy. While pediatric use has been limited, we have used this score and found that it is reproducible in pediatrics and correlates with operative time but not necessarily postoperative complications. We have found that the majority of tumors that have high-intermediate complexity (a high RENAL score)

may still successfully undergo NSS.

Based on this recent review of our single surgeon series of 35 consecutive PNs for Wilms during the previous 13 years, we believe that PN can be performed with a minimal complication rate with no increase in the incidence of tumor recurrence and should be considered the standard approach to the management of bilateral Wilms tumor. ♦

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An Update on Selective Serotonin Reuptake Inhibitors and Premature Ejaculation



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Premature ejaculation (PE) is the most common self reported disorder of male sexual function, and selective serotonin reuptake inhibitors (SSRIs) are among the primary treatment options. During the last 3 years there have been several new studies examining the success of SSRIs in the treatment of PE for which we provide a brief review. Studies that examined PE treatment with dapoxetine and the off label SSRIs paroxetine, sertraline, fluoxetine and citalopram were included in this review.

Dapoxetine is currently the only medication specifically developed for the treatment of PE. Dapoxetine is available in more than 50 countries but has not received United States Food and Drug Administration approval. For this reason interest in off label medications has remained high and there has been continued research into the safety and efficacy of these alternative SSRIs.

In 2019 Siroosbakht et al performed a randomized control trial (RCT) examining the safety and efficacy of sertraline, fluoxetine, paroxetine and citalopram.¹ Patients were randomized into 4 groups (120 patients each) corresponding to each SSRI, and groups were matched for

confounding factors. Patients took their medications at standard doses twice daily for 8 weeks.

Intravaginal ejaculatory latency time (IELT) significantly increased in all groups (average before treatment of 76.7 seconds, average at 8 weeks of 338.4 seconds, $p < 0.05$), and there was no significant difference among the groups ($p = 0.75$). There was no significant difference in adverse events (AE) between groups ($p > 0.05$), but fluoxetine had the highest percentage of AEs. None of these AEs was severe enough to merit discontinuation of the medication.

As off label SSRIs appear effective in treating PE, patient medication preference becomes an important consideration. In contrast with other SSRIs, dapoxetine has rapid onset making it appropriate for on demand use prior to sexual intercourse.

However, the question remains whether or not this type of dosing is preferred by patients.

To that end Park et al published a study in 2017 to examine compliance rates with on demand dapoxetine.² Patients were followed for 24 months and dropout rates at 6, 12 and 24 months were 79%, 87% and 90%, respectively. This study did not gather data on the treatment efficacy of dapoxetine but did cite main reasons for drug discontinuation as cost (30%), disappointment that PE was not curable and that dapoxetine was required every time sexual intercourse was contemplated (25%), and side effects (12%). To the best of our knowledge no research has been conducted to compare compliance rates between on demand dapoxetine and daily SSRIs for the treatment of PE.

Despite questions of compliance interest in dapoxetine has remained high during the last 3 years, and several studies have emerged examining different dapoxetine combination therapies to further improve the treatment of PE. One of these studies,

published in 2017 by El-Hamd et al, was a RCT examining 150 men with PE and without erectile dysfunction (ED) divided into the 5 groups of placebo, paroxetine, dapoxetine, sildenafil and a combination of dapoxetine and sildenafil.³

The patients were studied for 6 weeks and took their medications 1 hour prior to initiating sexual intercourse. All groups experienced a robust improvement in IELT and satisfaction scores compared to placebo ($p = 0.001$), and the combination dapoxetine and sildenafil group outperformed all other groups in these measures ($p < 0.001$, see figure). This study is the most recent of several studies to support the addition of a phosphodiesterase type 5 inhibitor (PDE5i) to a SSRI to assist in the treatment of PE in men without ED.

Even though dapoxetine and other SSRIs have transformed the landscape of PE treatment there are still explorations being made into alternative treatments. In 2017 Kilinc

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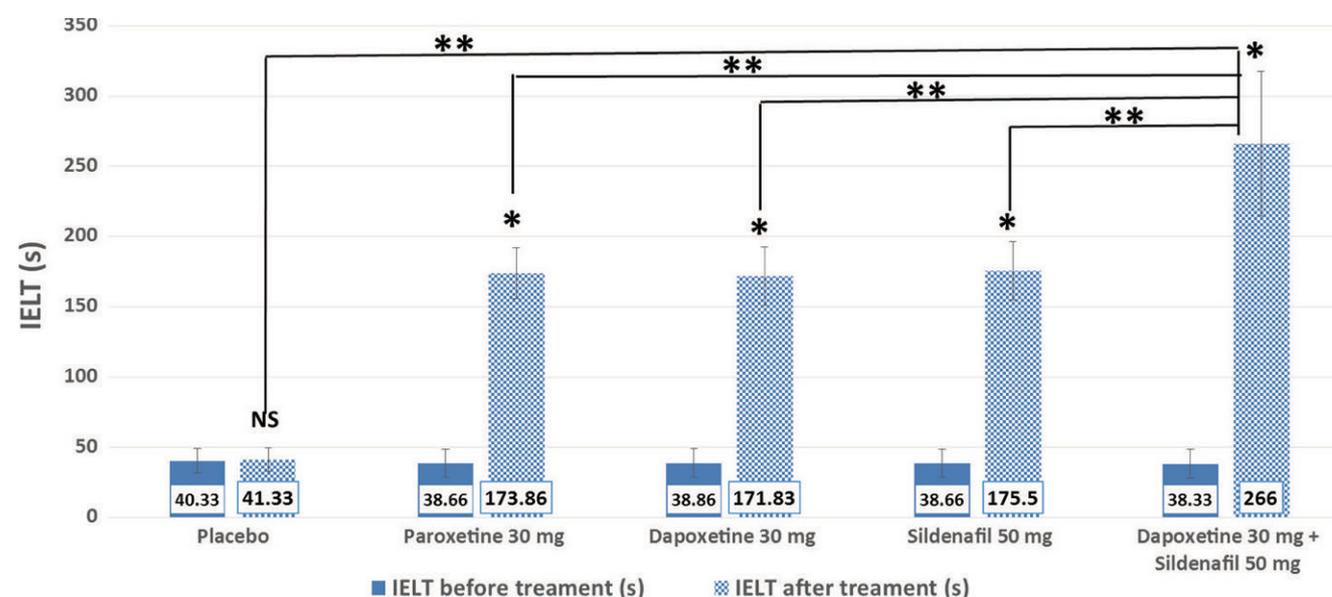


Figure 1. Comparison of IELT before and after treatment among study groups. Data were graphed using mean \pm standard deviation of each group of 30. NS, nonsignificant p value using paired t-test comparing before and after treatment.

* $p = 0.001$ using paired t-test comparing before and after treatment.

** $p < 0.001$ using 1-way ANOVA test comparing all groups after treatment. Reprinted with permission.³

SSRIs and Premature Ejaculation

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et al released the results of their randomized sham controlled trial on the effects of physical exercise on PE.⁴ They randomized 105 patients with PE into the 3 treatment groups of on demand dapoxetine, moderate physical activity and minimal physical activity (sham). Groups were comparable in terms of age, body mass index, metabolic equivalents, and prestudy Premature Ejaculation Diagnostic Tool (PEDT) and IELT (prestudy average of 36.6 seconds across all groups).

They followed patients for 30 days, and reported a significant decrease in PEDT scores and increase in IELT in the dapoxetine and moderate exercise groups as compared to the sham group (average of 185.15 seconds in

the treatment groups compared to 50.3 seconds in the sham group), supporting their hypothesis that exercise may be a reasonable alternative to dapoxetine in the treatment of PE.

DA-8031, a novel, potent SSRI, is still in clinical trial for the treatment of PE (clinicaltrials.gov, NCT01798667), and Shin et al published preliminary data on the drug's pharmacokinetic profile and tolerability in 2017.⁵ These results show that DA-8031 is rapidly absorbed and reaches peak concentration at 2 to 3 hours with a half-life of 18 to 29 hours, suggesting that this medication could be used either on demand or with once daily dosing. Doses less than 80 mg were well tolerated by participants, and the most common AEs were nausea, dizziness, headache and prolonged QT, which are comparable to other SSRIs. If

approved this medication will be the second drug developed specifically for the treatment of PE.

In closing, the use of SSRIs in PE treatment is a continually developing area of clinical research. Compliance for SSRIs is poor, and although dapoxetine is not available in the U.S. there are other SSRIs that provide off label options with similar safety and effectiveness. Combination therapy with a PDE5i and SSRI appears to improve outcomes, and exercise could represent a reasonable alternative to pharmacotherapy. Comparing compliance between on demand dapoxetine and daily SSRIs represents an area of future research. Additionally, no studies were found for inclusion in this update which examined PE in nonheterosexual partnerships, representing a clear deficit in the current literature. ♦

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The Urinary Tract Dilation Grading System for Hydronephrosis



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Since the urinary tract dilation (UTD) classification system was initially published in 2014, 6 articles have reported interobserver reliability, 2 evaluating antenatal classification and 4 evaluating postnatal classification. All but 1 of the studies were single center, and raters included pediatric urology, radiology, maternal-fetal medicine (MFM) and nephrology specialists as well as residents, advanced nurse practitioners and research assistants (see table).

As is often the case it is difficult to interpret the findings as a whole. Variation in the age of the cohort, number of raters, blinding, reference materials provided to the raters, images reviewed and statistics yields not only apples and oranges but an entire fruit salad that is challenging at best. However, important information can often be teased out by looking for overlap among the findings.

In 2016 Chalmers et al reported an interobserver agreement of 0.59 (95% CI 0.50–0.69) in their evaluation of antenatal imaging.¹ Four years later Nelson et al reported an agreement of 0.66 (95% CI 0.63–0.68).² While Nelson et al's results are stronger 95%

confidence intervals from the studies overlap. Interestingly, Chalmers et al reported lower kappa values with ultrasounds (USs) performed at less than 22 weeks gestational age. As median gestational age was 22 weeks in

the Chalmers et al cohort and no images conducted prior to 28 weeks gestation were reviewed in the Nelson et al cohort, differences in ultrasound timing may have contributed to the higher agreement values reported by Nelson et al. The Nelson et al study also conducted a pre-hoc power calculation, increasing the likelihood that their results would capture the true kappa value among their raters.

Considering all this, it might be reasonable to assume that interobserver agreement falls somewhere within the higher reported ranges.

Less overlap of rater agreement is found among the postnatal articles. Rickard et al reported the highest agreement results from 2 reading

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Table. Summary of articles reporting interobserver agreement

References	Design	Sample Size	Age at US	No. Raters	Blinding	Reader Reference Materials	Imaging Reviewed	Results
<i>Antenatal</i>								
Chalmers et al ¹	Single center	47 Subjects 88 Kidneys	Median 22 wks GA	3 (urology, radiology)	Pt history and imaging reports; some ADP measurements provided	UTD consensus statement	Coronal and axial views	Fleiss' kappa 0.59 (95% CI 0.50–0.69)
Nelson et al ²	Single center	300 Studies	28–40 Wks GA	5 (MFM, radiology)	Imaging reports; ADP measurement accessible	UTD consensus statement and table of UTD scoring elements	Full US image set	Fleiss' kappa 0.66 (95% CI 0.63–0.68)
<i>Postnatal</i>								
Rickard et al ³	Single center	40 Images	Less than 12 mos	13 (urology, APRN, resident, nephrology, radiology, research assistant)	Pt identifiers; APD measurement, ureteral dilatation, and bladder abnormalities provided	UTD consensus statement	1 Sagittal view	Krippendorff's alpha first session: 0.77 (95% CI 0.71–0.83) second session: 0.68 (95% CI 0.61–0.75)
Han et al ⁴	Single center	90 Subjects 180 Kidneys	Less than 12 mos	4 (radiology, resident)	Imaging reports; ADP measurement provided	Written instruction and sample images from published articles	1 Axial and 1–2 sagittal views	Generalized kappa 0.59–0.68
Back et al ⁵	Single center	120 Kidneys	2 Days–12 mos	5 (radiology, urology)	Imaging reports	UTD consensus statement and investigator developed guidance document	Prone and supine positions, still images only	Cohen's kappa 0.60–0.77
Nelson et al ⁶	Multi-center	243 Subjects	0–90 Days	7 (radiology, urology)	Fully blinded	UTD consensus statement and table of UTD scoring elements	Full US image set	Fleiss' kappa 0.42 (95% CI 0.40–0.44)

FROM THE *AUA Secretary***The Future of Education**

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London, Ontario, Canada

When the 2020 AUA Annual Meeting was canceled earlier this year, the AUA focused its attention on new and innovative ways to share the abstracts, surgical videos and other important clinical education from the meeting with members and the global urology community. The result was a full virtual learning experience, which included a new, multimedia reinvention of scientific abstracts, instructional courses and more.

There is a new awakening in the course of medical education due to COVID-19 and the imprint this pandemic has, and continues to have, on the educational landscape will be deep and long-lasting. As we adopt new technologies and push them to capacity during these unprecedented times, it seems inevitable the future of education will naturally develop to include more multimedia modes of learning while also driving global experimentation with virtual education and instruction.

Technology continues to grow smarter and is evolving more quickly than ever before. Just 5 years ago, wearable technology was a novel

concept. Today, it's the latest trend in helping you eat better, exercise more and telling you if you had a good night's sleep. This virtual reality renaissance is not foreign to urology as we continue to explore new platforms and technology to achieve our educational goals.

Today's accelerated transition to online education vs in-person lectures has impacted medical students and residents alike, driving them to embrace a new mainstream mode of learning more quickly. Urologists are also embracing this new world order, learning through podcasts and webinars, and even presenting abstracts digitally during virtual medical meetings and conferences as opposed to printed poster or podium sessions.

While these activities cannot replace the traditional benefits of in-person learning and networking, new

strides in technology are being made every day to carry our education and exchange of ideas to every corner of the globe. Through the AUA Virtual Experience a wealth of education spanning the spectrum of urological medicine is at your fingertips. Through video sessions, multimedia abstracts, Summer School webinars and videoconferencing, the AUA is reaching urologists, researchers, advanced practice providers, practice managers and more.

The effects of COVID-19 will forever impact how future physicians and providers are trained, and as a leading advocate for the specialty our focus is to advance urology by fostering the highest standards of clinical care through education, research and the formulation of health care policy.

Visit www.AUAVirtual.org to learn more. ♦

Interobserver Variability in Hydronephrosis Grading

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sessions at 0.77 (95% CI 0.71–0.83) from the first reading and 0.68 (95% CI 0.61–0.075) from the second reading.³ Han et al reported a range of 0.59 to 0.68,⁴ Back et al reported a range of 0.60 to 0.77⁵ and Nelson et al reported an agreement of 0.42 (95% CI 0.40–0.44).⁶ While there is overlap in the findings from Rickard et al's confidence intervals and the ranges reported by Han and Back et al, Nelson et al's reported kappas are much lower. This difference may be the result of a larger sample size capturing a more accurate representation of agreement, variation in the age of the cohorts, or raters coming from several institutions, reducing the possibility of center specific training and/or experience bias.

Regardless of the variation within these findings or how they may compare to existing grading methods, it is essential to understand why the UTD classification system was developed and the importance of its use. The UTD consensus statement provides a framework of common terminology and disease categorization across the continuum of this condition to address the existing number of diverse terms and systems commonly used in practice. The UTD consensus statement was published 6 years ago while the Society of Fetal Urology

(SFU) grading system was introduced in 1993. These articles represent the initial findings of this new system.

The fact that even now the SFU system is not universally used across specialties highlights the need for the UTD consensus statement. Rater agreement for the UTD system should improve with training and experience. Fortunately, a formal training module is available through the Computer Enhanced Visual Learning training platform.⁷ Unfortunately, UTD training is not consistently taught in pediatric urology, much less across the urology, MFM, radiology and nephrology specialties.

No classification system is perfect, and research can lead to progressive improvements. The Gleason scoring system is a good example. First established in the 1960s and 1970s the system has been modified through the years and is now incorporated into the World Health Organization classification of prostate cancer, the American Joint Committee on Cancer/Union for International Cancer Control staging system, and the National Comprehensive Cancer Network® guidelines as a key factor in treatment decision making. Similar modifications can be made to the UTD classification system. However, improvements are based on an accumulated weight of evidence, which is not obtainable until the UTD system is more broadly adopted

by the medical community.

Universally accepted classification systems can also directly improve patient outcomes. As Dome et al stated, "Wilms tumor has provided a paradigm for progressive improvement in clinical outcomes achieved through serial cooperative group studies."⁸ The survival rate for patients with Wilms tumor has reached 90%, and the ability to stratify by risk has been a key contributing factor. This end was achieved by cooperative research, which is currently not possible for urinary tract dilation as there is no common language or grading system.

The terminology and grading system Tower of Babel that has existed since before the release of the UTD consensus statement inhibits conversation among physicians and across specialties, and is a barrier to the amassment of empirical evidence that is required to accurately apply risk stratification and standardize effective treatment modalities for patients.

It is a well-known fact that people are resistant to change, and physicians are no exception. It has been said that the most entrenched conflict of interest in medicine is a disinclination to reverse a previous opinion.⁹ Diffusion of innovations into clinical practice can take 17 years to achieve widespread adoption.¹⁰ Until there is widespread adoption of the UTD consensus statement, our understanding of this condition will be

stymied, and ultimately patients may be the ones paying the price. ♦

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RADIOLOGY Corner



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A 71-year-old male with a history of external beam radiation for Gleason 7 prostate cancer 8 years prior presented with outlet obstruction and scarring in the prostatic urethra. He underwent multiple transurethral resections and was on intermittent self-calibration.

During the preceding 2 months he experienced recurrent urinary tract infections, progressively worsening pain with flexion of his legs, and difficulty walking and getting out of bed. Cellulitis of the prepubic skin developed, requiring admission for intravenous antibiotics. Urine culture grew enterococcus, pseudomonas and yeast.

A plain film x-ray showed widening of the pubic symphysis and erosion of the cortical margins consistent with chronic destructive infection (fig. 1, A). Magnetic resonance imaging (MRI) was performed and the axial T2-weighted images showed definitive urethral pubic symphysis fistula (UPF) with tracking of urine through the pubic symphysis into the prepubic subcutaneous tissue (fig. 2). These images also showed inflammatory myositis along the adductor compartments. Other important diagnostic features seen on MRI included decreased signal intensity on T1-weighted images (fig. 3), as well as intraosseous signal hypointensity and cortical irregularity consistent with pubic bone osteomyelitis.

The patient underwent stabilization with culture directed intravenous

antibiotics for 6 weeks. The antibiotics were withdrawn for 2 weeks before surgery, at which time cystectomy with ileal loop diversion, UPF and pubic bone removal were performed (fig. 1, B). The bone cultures matched the urine cultures, growing enterococcus, pseudomonas and yeast. On followup the patient's pain resolved and at 3 years he was doing well with no gait abnormalities or residual infection, pain or hernia.

Urinary pubic symphysis fistula with chronic osteomyelitis is a devastating disease process and is being increasingly recognized among pelvic cancer survivors with a prior history of radiation therapy and endoscopic procedures for treatment of outlet obstruction.¹ This syndrome is distinctly different from osteitis pubis, osteonecrosis pubis and other forms of acute infective osteomyelitis, which have all been well described.

While urologists have been faced with various side effects to the pubic bone from surgical and energy ablative therapy for benign and malignant disease, historically osteitis pubis and suppurative osteomyelitis of the pubis were seen following open surgery on the bladder and prostate for benign and malignant indications.²⁻⁴ Most recently, UPF with resulting osteomyelitis after radiation or other forms of energy ablation for pelvic cancer has been reported more frequently in cancer survivors, often presenting years to decades after their lifesaving cancer treatment.⁵

The key to early diagnosis is a high index of suspicion. When clinicians are confronted with a patient with a history of radiation therapy for pelvic malignancy and recent endoscopic procedures with pain of the pubic



Figure 2.

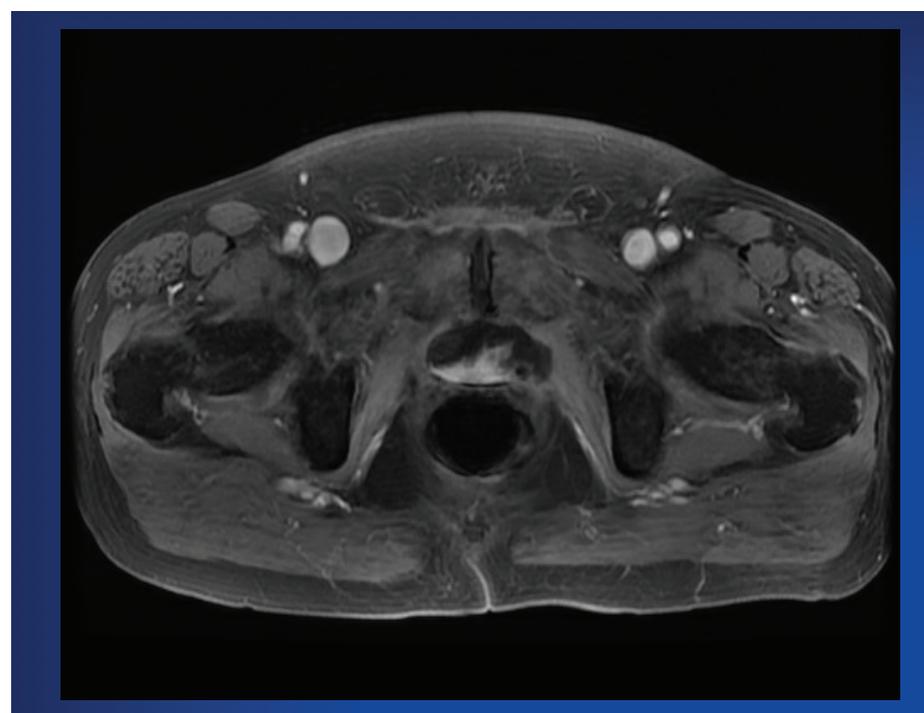


Figure 3.

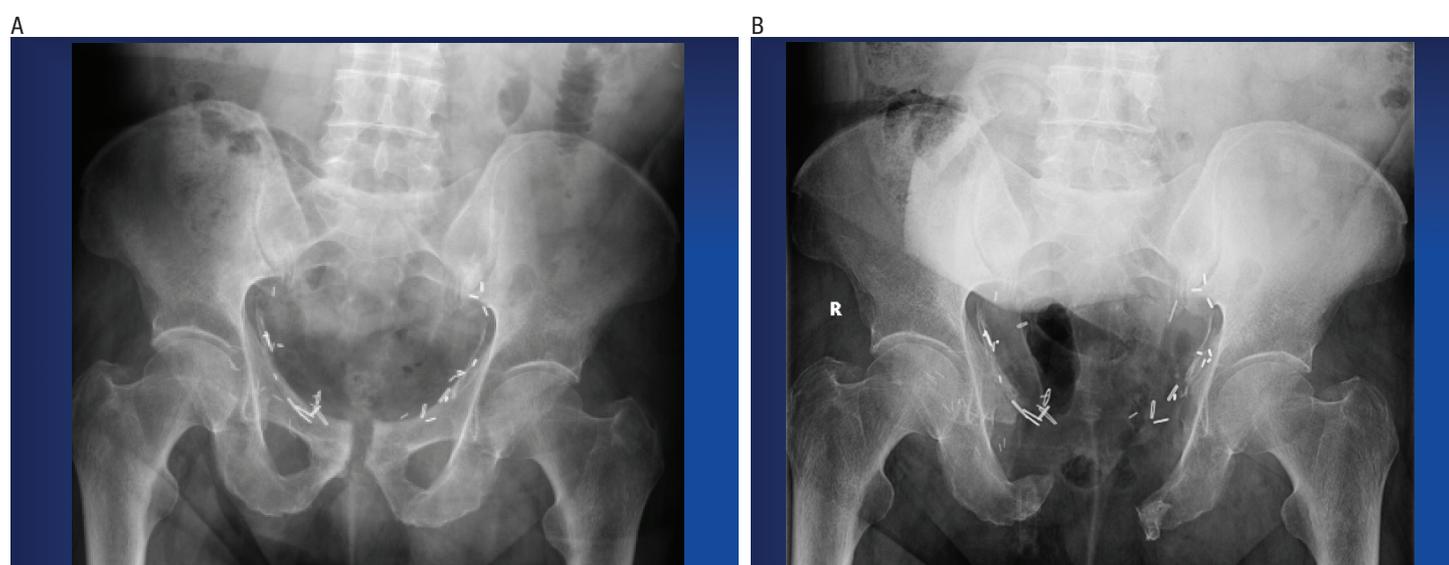


Figure 1.

symphysis and pain with walking, UPF with resultant osteomyelitis of the pubic bone must be considered. MRI is the key to diagnosis with emphasis on indentifying the UPF on T2 axial imaging and concomitant

changes consistent with osteomyelitis on the T1 images.⁶ ♦

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FROM THE *AUA Research Council***Resurrection of Clinical Trials during the COVID-19 Pandemic**

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Boston, Massachusetts

The COVID-19 pandemic has had a significant and negative impact on biomedical research activities worldwide. Clinical trials unrelated to SARS-CoV-2 studies have been challenged by site closures, self isolations, furloughs of research staff, interruptions to supplies, travel limitations and safety considerations for study subjects. Delays and deviations from clinical trial protocols are inevitable, and many study sponsors, including the National Institutes

of Health, are devising strategies to ease the burden on the research community. A consideration will be extending the amount of time allowed to complete trial recruitment and completion of the study. Others may include changes to sponsor oversight responsibilities, frequency of quality assurance activities, alternative mechanisms of oversight and remote source data verification.

As many states are in various phases of reopening, specific considerations need to be given to resurrecting clinical trials. The key to success is streamlined and coordinated communications from the supporting agencies to institutions, institutions to study groups and study groups to subjects. Changes to a clinical trial should

be agreed upon by the sponsoring agency and clearly communicated to the research institution and investigators. Institutions supporting clinical trials need to have a coordinated effort in providing a safe environment for subjects and study staff. Once the personnel who carry out the study are available accessibility of personal protection equipment for research groups is paramount before any consideration of opening research activities. Engaging and maintaining relationships with patients and patient advocacy groups as well as offering assurance of a safe research environment are important to continue to recruit subjects for clinical research projects.

Several measures can be taken to minimize risks to study subjects and research personnel. Greater use of telehealth to obtain consent from study subjects can decrease clinical center exposure and provide a higher likelihood of engagement by patients.

In addition drive-thru visits are alternative offerings to reduce the burden on study subjects. For subjects who may have a long distance to travel to a study site, easing restrictions to complete laboratory or radiologic tests at remote locations may be necessary. Supply and distribution of investigational pharmaceutical products raise other challenges that need to be assessed, modified and managed on individual bases. Efforts to collect biosamples remotely will enhance participation, and assessment of any potential adverse events should be performed remotely as much as possible.

Clinical trials will remain an integral part of the continued advancement and health of our society. Adjusting to a new normal until a coordinated and effective strategy is available to fight the COVID-19 pandemic can lead to innovative strategies to effectively, efficiently and safely carry out clinical trials. ♦

Floppy Glans: Classification, Diagnosis and Treatment

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Introduction

One cause of dissatisfaction after penile prosthesis insertion is an abnormality of the glans penis causing pain on penetration or a poor cosmetic result. This abnormality is reported to occur in up to 5% of patients but we believe the number could be significantly higher.¹ In this article we discuss the management of this common problem. The classification of glans abnormality after penile prosthesis insertion is shown in the Appendix.

Soft Glans

Lack of engorgement of the glans after penile prosthesis insertion is extremely common. Patients often complain

that the glans remains small, cold and sometimes lacks sensitivity. Lack of engorgement also will cause reduced erectile length. The implant tips are correctly sited and the glans is stable over the end of the corporal bodies. The exact etiology is unknown, although neurovascular pathology has been suspected.² The diagnosis is usually clinical but magnetic resonance imaging (MRI) is sometimes used to distinguish from a hypermobile glans.³

The management of this condition is nonsurgical with a trial of phosphodiesterase type 5 inhibitors, intraurethral alprostadil, compression rings and vacuum devices, and in extreme cases the use of hyaluronic acid fillers to bulk up the glans.²

Real Glans Hypermobility

In this condition the implant tips are correctly placed but the glans is very mobile, often causing discomfort at penetration, particularly for the female partner (fig. 1). The etiology is thought to be due to abnormalities of the corporoglandular ligament that stabilizes the glans onto the corporal heads. MRI or ultrasound will confirm the diagnosis and exclude the floppy glans syndrome.



Figure 1. Glans hypermobility.

Conservative management to stabilize the glans should always be tried first, which includes pulling the penile skin down at the time of penetration, the use of a firm condom

or medical therapy to increase glans engorgement as previously outlined.

If this approach fails then surgery

Floppy Glans Management

▼ Continued from page 23

in the form of glanspexy can be performed. There are many modifications of this operation but essentially all involve placing sutures between the glans and the tunica albuginea.^{4,5} The approach can be through the glans itself, with small lateral incisions to allow a minimally invasive approach at anchoring, or a complete mobilization of the dorsal neurovascular bundle to allow safe placement of the sutures (fig. 2).

Nonabsorbable sutures should be used and all placed before tying to aid exposure. Circumcision should be mandatory if not done earlier. Possible complications include recurrence of the glans malposition, implant injury and neurovascular bundle injury with compromised glans sensation.

For obvious real glans hypermobility diagnosed at the time of surgery, there is still debate about whether it should be corrected at the same time or with a subsequent operation to allow some fibrosis to occur.

Floppy Glans Syndrome

This syndrome occurs when the penile prosthesis cylinder tips are

incorrectly sited. The glans droop deformity can be ventral, dorsal or lateral, which often gives a clue to the diagnosis. The ventral droop variety is often due to a short cylinder size, either because of undersizing the cylinders or from incomplete distal dilation of cavernosal bodies, which can commonly occur where fibrosis is present such as in Peyronie's disease. This clinical feature is often referred to as an SST (supersonic transport) deformity after the Concorde aircraft.

The lateral droop variety is often due to a cylinder crossover with the direction of the droop opposite to the crossed cylinder (fig. 3). Correction of this abnormality is often needed urgently as lateral erosion is not an uncommon complication.

A dorsal droop is often caused by oversized cylinders pushing forward ventrally.

Other abnormalities such as unrecognized proximal perforations can also result in a glans droop.

The key to diagnosis is MRI, which will detail the abnormality and allow a more planned revision operation (fig. 4). In conclusion, glans abnormalities following penile prosthesis implantation are a common cause of patient dissatisfaction but can be easily diagnosed with MRI to allow correction. ♦

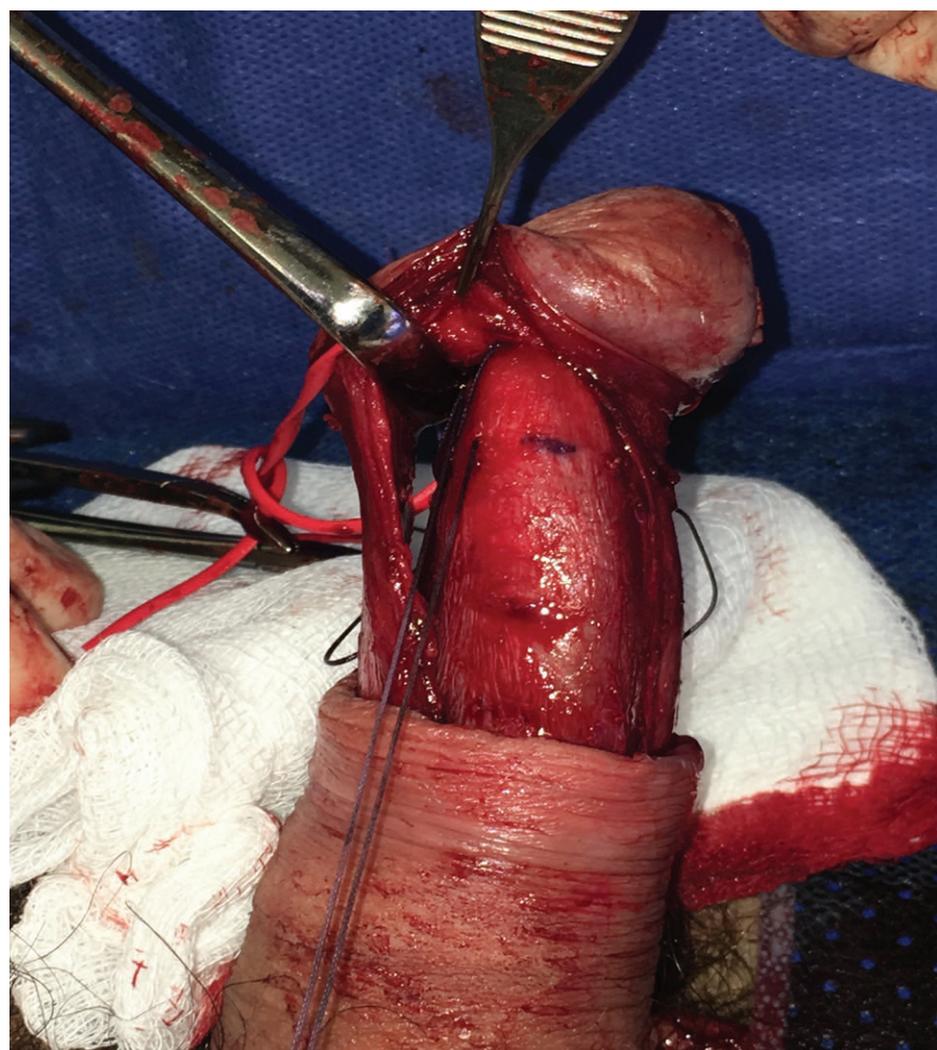


Figure 2. Glanspexy for ventral hypermobile glans. Neurovascular bundle is elevated and 3 nonabsorbable sutures are placed between glans and tunica albuginea with careful protection of underlying cylinders.



Figure 3. Distal crossover to right with lateral glans droop to left.

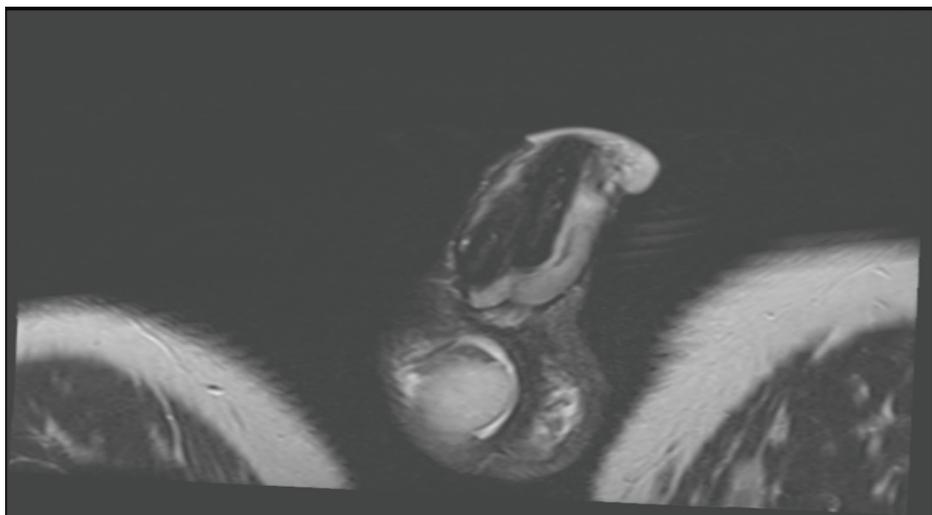


Figure 4. MRI of lateral glans droop due to distal crossover of malleable prosthesis.

Appendix: Classification of glans disorders after penile prosthesis insertion.

Diagnosis	Characteristics
Soft glans	Compromised glans engorgement
Real glans hypermobility	Instability of the glans despite good position and size of the cylinders
Floppy glans syndrome	Instability of the glans due to poor position or size of the cylinders

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CASE Report

Malignant Priapism Following Penile Metastasis from Primary Bladder Cancer



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A 72-year-old man presented with a history of penile rigidity and pain for 36 hours. His comorbidity profile included hypertension and chronic obstructive pulmonary disease as a result of heavy smoking habits. He had a recent history of muscle invasive bladder cancer associated with obstructive hydronephrosis and acute renal failure.

The patient had undergone radical cystoprostatectomy with extended lymph node dissection and an ileal conduit diversion 3 months ago. Pathological report revealed urothelial carcinoma with squamous cell differentiation in which perivesical fat and prostatic tissue invasion was found (stage pT4N0M0). The patient had a favorable postoperative recovery and was discharged 2 weeks after this surgical procedure. Hemodialysis was no longer necessary, although chronic kidney disease remained.

The patient had no previous episodes of priapism and denied sickle cell disease, use of psychotropic medication or intracavernous treatments for erectile dysfunction. He was first seen at a local emergency room and was then referred to a tertiary center after tentative corporal aspiration and percutaneous distal shunting procedure failed. Physical examination revealed a tender cyanotic and semi-erect penis with palpable induration

along the penile shaft. Magnetic resonance imaging (MRI) was suggestive of nonspecific soft tissue infiltration without enhancing focal lesions (fig. 1).

The patient was then conducted to percutaneous biopsy. The aspect of the penis at that time is demonstrated in figure 2. Penile consistency was remarkably firm and prevented further attempts to drain the corporal bodies.

The pathological report from the biopsy revealed high grade carcinoma with squamous cell differentiation infiltrating subepithelial connective tissue and cavernous bodies (fig. 3) compatible with his primary urothelial carcinoma leading to metastatic penile disease. Further image screening found no other metastatic site.

The patient was started on palliative chemotherapy with methotrexate, vinblastine, doxorubicin and cisplatin. The pain was relatively under control with multimodal therapy. Unfortunately, the patient experienced progressive deterioration of his clinical condition ultimately leading to multiple organ dysfunction syndrome and passed away after a 1-month hospital stay.

Malignant priapism was first described in 1938 and refers to persistent erections without sexual stimulation caused by the invasion of malignant cells into the cavernosal sinuses.¹ It is a relatively rare condition with limited reports of case series in the literature. Although most cases originate from prostate, rectal or bladder cancer,^{2,3} there are reports

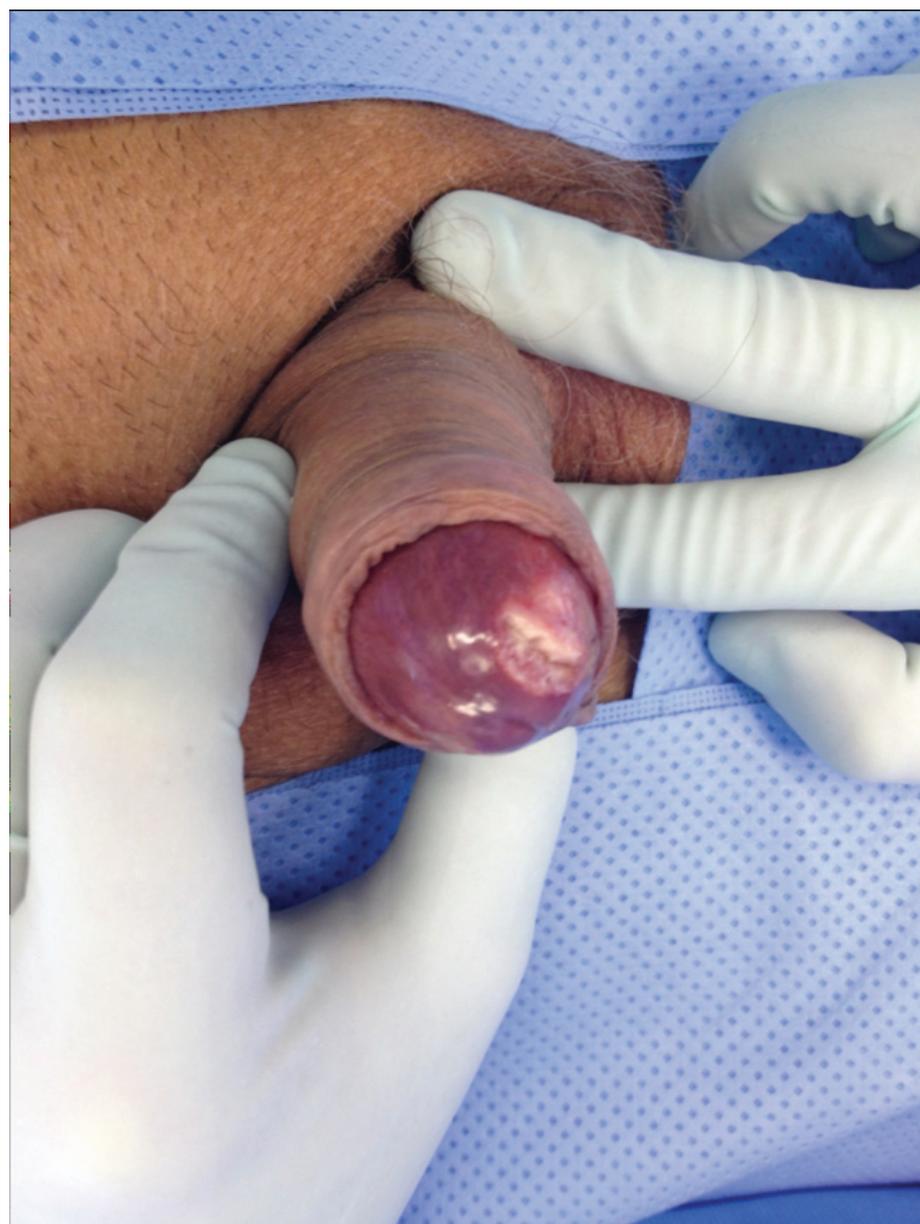


Figure 2. Aspect of penis during percutaneous biopsy.

indicating other primary sites such as kidneys, testicles, lungs, melanomas, sarcomas, gastrointestinal and hematological neoplasms.^{1,3}

Metastatic penile disease may be found in anatomic locations such as corpus cavernosum, glans penis or corpus spongiosum and might affect multiple structures simultaneously.⁴ Different pathways for the spread of cancer to the penis have been proposed. Venous or lymphatic routes through retrograde or direct tumor infiltration are the most likely

mechanisms, although direct arterial dissemination is possible.⁵

Penile metastases may present in a variety of clinical symptoms and its appearance might range from initial signs of malignancy to early or late indication of disease recurrence. Painful penile tumescence, dysuria, skin lesions, paraphimosis, hematuria or even acute urinary retention are among possible clinical presentations. Priapism usually manifests when there is significant obstruction of venous outflow or thrombosis within the corporal tissue. However, there have been reports of high flow priapism following intracavernous arterial rupture secondary to tumoral invasion.⁵

Diagnosis is usually made through corporal biopsies, especially when the primary disease is obscure. Investigation of traditional causes of priapism should be routinely performed. The hypothesis of penile metastasis should be made after ruling out more common conditions also characterized by the presence of

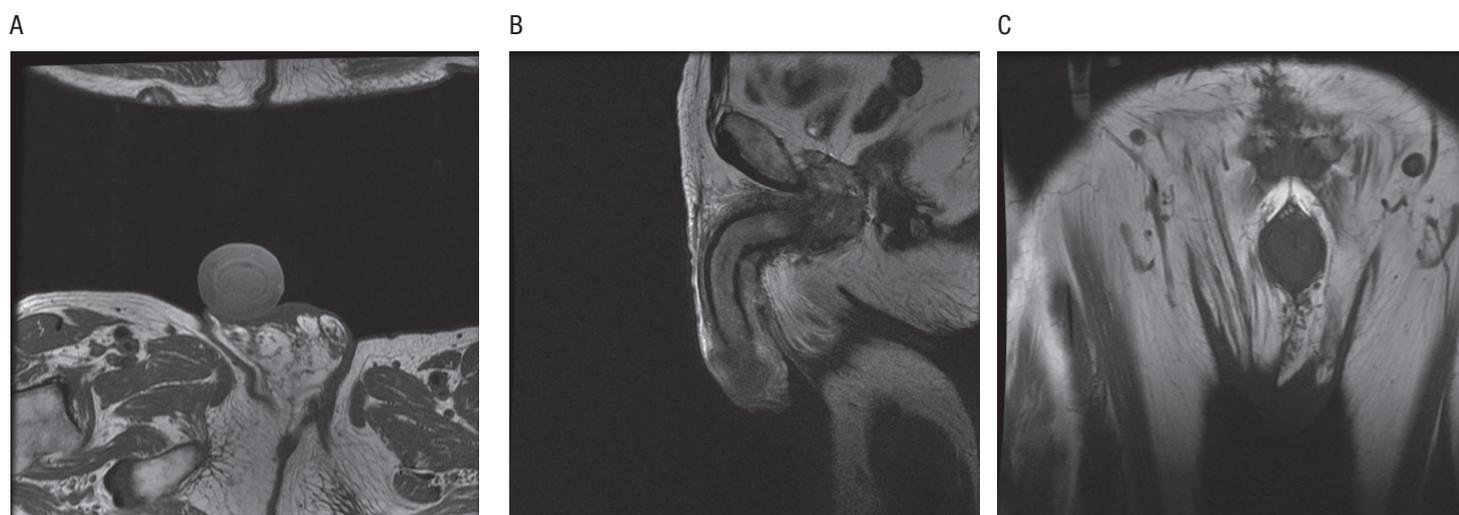


Figure 1. Nonspecific soft tissue infiltration visible on MRI, with cross sectional (A), sagittal (B) and coronal (C) views.

Case Report

▼ Continued from page 25

penile induration such as Peyronie's disease, thrombosis of the corpus cavernosum or deep dorsal vein thrombosis.⁶

Malignant priapism is commonly associated with a poor prognosis with average life expectancy less than 12 months.^{3,5} Aspiration and shunting maneuvers are time sensitive options that are usually ineffective. The mainstay of treatment basically consists of pain management and palliative care. Therefore, conservative therapy is preferred and might include chemotherapy, hormonal therapy or radiation therapy. Surgical options that include partial or total penectomy are reserved for intolerable pain or refractory infections.⁷ ♦

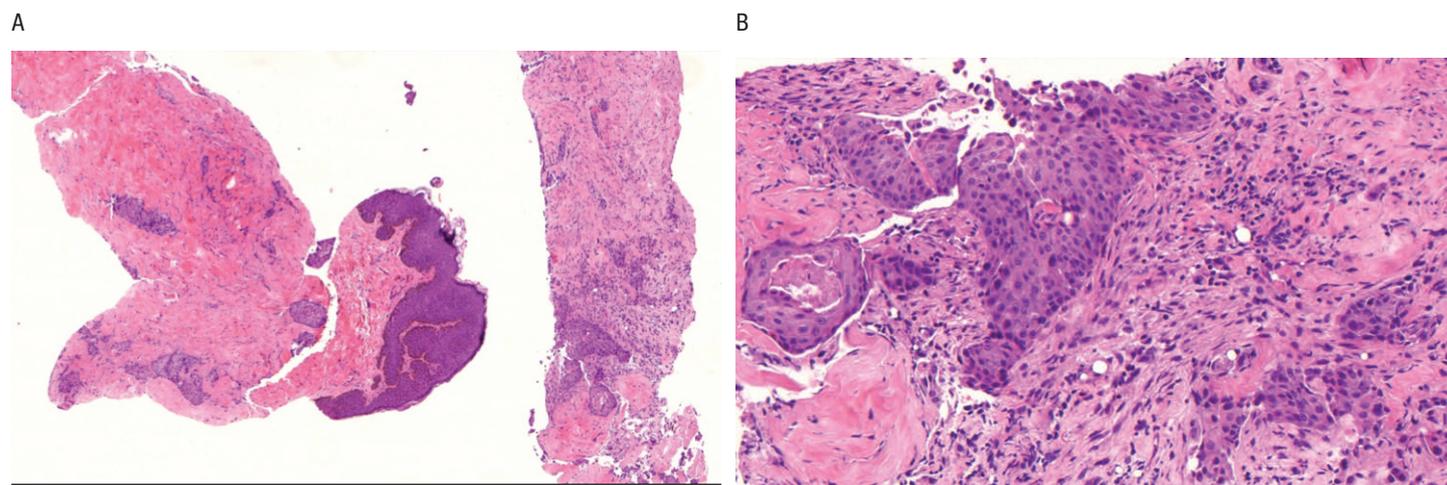
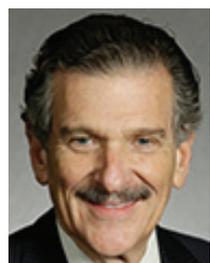


Figure 3. Medium (A) and high (B) magnification photomicrograph of biopsy specimen.

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FROM THE *Urology Care Foundation*

The Times They Are a-Changin'... Welcome New Leadership in Support of our Mission



Harris M. Nagler, MD, FACS
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The Urology Care Foundation has made remarkable contributions to the advancement of patient care. In the last year we have codified our commitment to assure those around the world are beneficiaries of these efforts and we have launched our humanitarian initiatives as previously discussed in this column. These accomplishments are not possible, nor even imaginable, without the determined commitment of our Board of Directors, Committees and Council.

Thank You, Dr. Raju Thomas

Dr. Raju Thomas has been a vital pillar of our Foundation's Board and we are proud that he assumed the role of AUA



President-elect in May. In accordance with AUA/Foundation governance, Dr. Thomas stepped down from his role on our Board, a position he has held since 2016.

Dr. Thomas' contributions to our mission have been immeasurable, as he helped endow the Endourological Society Raju Thomas, MD Award and hosted cultivation events for us in his hometown of New Orleans. Earlier this year Dr. Thomas and his wife, Ginny, were honored for their generosity on our new donor wall at AUA headquarters.

A philanthropist at heart, Dr. Thomas also played a key role in rebuilding Tulane's urology department following Hurricane Katrina. We send our gratitude to Dr. Thomas as he embarks on this new phase of his journey.

Welcome New Board Members

It is my distinct pleasure to congratulate and welcome Drs. Ralph V. Clayman and Joseph Smith, Jr. to the Foundation's Board of Directors.

Dr. Clayman is a cofounder of



the Endourological Society and a Distinguished Professor of Urology at UC Irvine. A passionate and insightful clinician, researcher and administrator, his clinical research has improved patient care globally. An outstanding mentor, he relishes the opportunity to work closely with residents, fellows and students.

Dr. Smith is William L. Bray Professor in the Department of Urologic Surgery at Vanderbilt University Medical Center in Nashville. He has served as editor of *The Journal of Urology*®, and president of the American Board of Urology, Society of Urologic Oncology and the AUA's Southeastern Section. As an outstanding leader, clinician and humanitarian he will be a major asset to our Board.



We are grateful for their guidance and commitment.

I would like to thank Dr. T. Ernesto Figueroa for his many contributions as Chair of the Public Education Council, a position he has held since 2018. Prior to this, Dr. Figueroa served on our Pediatric Health Committee. Dr. Figueroa has guided the Council and Committees to many patient education milestones. Anyone who has met him can attest to his enduring kindness and unwavering dedication to this crucially important work.

Dr. Brian Stork succeeded Dr. Figueroa earlier this year as Chair and I would like to congratulate him on this new role. He joined the Foundation's Technology and Publications Committee in 2015 and assumed the role of Committee Chair in 2017. Dr. Stork's heartfelt commitment to patients will continue to benefit the advancement of patient care worldwide.

Thank you to our volunteers, advocates and supporters for keeping our mission flourishing. ♦



Common Surgical Techniques and Complications of Vaginoplasty



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Polina Reyblat, MD

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The increased recognition of the medical and surgical needs of transgender people has been reflected in a rise in the number of gender affirming surgeries. Consequently, the ability to recognize and manage gender affirming surgery complications becomes more important. Here we focus on male-to-female genital surgery and associated complications.

Penile Inversion Vaginoplasty

Vaginoplasty typically consists of bilateral orchiectomy, penile disassembly, creation of a neovagina, labiaplasty, clitoroplasty and urethroplasty, with the overall goal of creating a functional and feminine appearing perineogenital complex. Patients can choose zero-depth vaginoplasty (also called vulvoplasty), which can be appropriate for those who cannot maintain dilation schedule, have had pelvic surgery and/or radiation, or do not desire penetrative intercourse.

The 3 main approaches for lining the neovaginal canal are 1) genital skin flap, 2) intestinal vaginoplasty and 3) nongenital flaps including peritoneal flap. The genital skin flap based method, specifically the penile inversion approach, is currently most commonly used as primary surgery.

We use a superiorly based penile skin flap with full-thickness scrotal skin graft to line the neovagina. The neovaginal canal is created through a perineal approach, with dissection against the prostate into Denonvilliers' fascia. Rectal wall integrity is confirmed throughout the dissection.

After the phallus is degloved, the urethra is separated from the corpora cavernosum and is transected distally. The corpora cavernosa is removed, preserving the neurovascular bundle on the dorsal tunica albuginea. Finally, the redundant spongiosum at the bulbous urethra is tapered. The

glans is trimmed and rearranged into the neoclitoris, which is set into place at the level of the adductor longus tendons.

The scrotal skin graft is tubularized around a form and anastomosed to the penile skin flap, which is inverted and tunneled into the neovagina and tightly packed (fig. 1). Bilateral vertical incisions are then closed to complete labiaplasty. The urethra is transected just distal to its surrounding tissue and spatulated ventrally. The neomeatus is then everted and matured. A urethral catheter is maintained until vaginal packing is removed.

The reported overall incidence of complications after vaginoplasty ranges widely, from 15%¹ to 70%,² with a reoperation rate of 21.7%³ to 48%.² Common complications that can present to urologists are outlined.

Intraoperative Complications

Rectal injury and bladder/urethral injury can occur during neovaginal canal dissection. A small rectal injury made on sharp dissection can be repaired primarily in multiple layers, using a bulbospongiosus muscle flap to bolster the repair. Colorectal surgeon assistance can be prudent to evaluate the need for a more extensive repair or possible diversion. Similarly, bladder/urethral injury made with sharp dissection can be repaired primarily in layers.

Postoperative Complications

Bleeding. Urethral edge bleeding can often be managed at bedside with hemostatic agent dressing or suture. Hematoma can form inside the neovaginal canal from inadequate hemostasis and can present after packing removal. An expanding hematoma requires drainage and possible clot evacuation, reestablishment of hemostasis and repacking of neovagina to prevent graft loss.

Rectoneovaginal Fistula. Rectoneovaginal fistula is a dreaded complication with a reported rate of 0.8% and 6.25% in primary and secondary vaginoplasties, respectively.⁴ Fecal diversion with temporary colostomy is typically necessary to optimize the chance of resolution. Failure of



Figure 1.

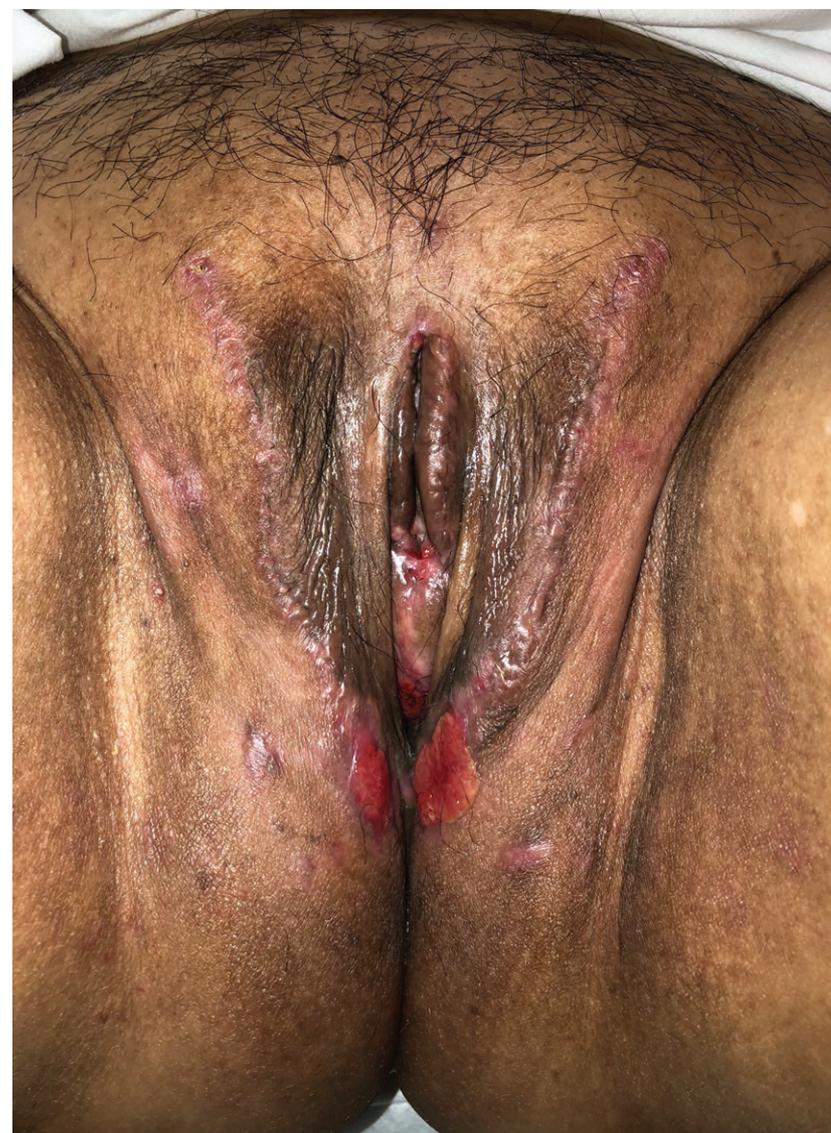


Figure 2.

▼ Continued on page 28

Vaginoplasty Techniques and Complications

▼ Continued from page 27

conservative measures requires fistula excision and repair with interpositioning tissue. We have successfully completed a transvaginal rectoneovaginal fistula repair with gracilis muscle interposition flap and preserved neovaginal patency and depth.

Urethrovaginal Fistula. In patients with a distal fistula one can consider excising the distal bridge of tissue, resulting in a more recessed urethral meatus. A more proximal fistula can be repaired transvaginally with local interposition flaps.

Wound Healing Concerns. Wound dehiscence, tissue necrosis and neovaginal skin graft loss can be seen in the early postoperative period and can be managed with local wound care. Patients should continue neovaginal dilation to prevent neovaginal canal shortening and narrowing.

Granulation tissue occurs commonly and can result from any area

where there is an open wound, often in the neovaginal canal and at the posterior fourchette (fig. 2). Patients may present with pain or spotting. Granulation tissue can be treated with silver nitrate over several weeks to months.

Urethral Stricture. Post-vaginoplasty urethral stricture typically occurs at the meatus. During reconstruction a circumscribing incision is made and corpus spongiosum is mobilized to allow transection of the scarred segment (fig. 3). The urethra is then spatulated ventrally and everted. A V flap is created from the anterior neovaginal wall and advanced into the spatulated portion of the urethra. Urethral meatus is then matured with interrupted absorbable sutures. A catheter remains in place for 5 to 7 days.

Urethral Malposition. Anteriorly deviated urinary stream can be the result of urethral meatus malposition or failure to separate the attachment of the corpus spongiosum to the crus of the corpora cavernosa. A vertical



Figure 3.

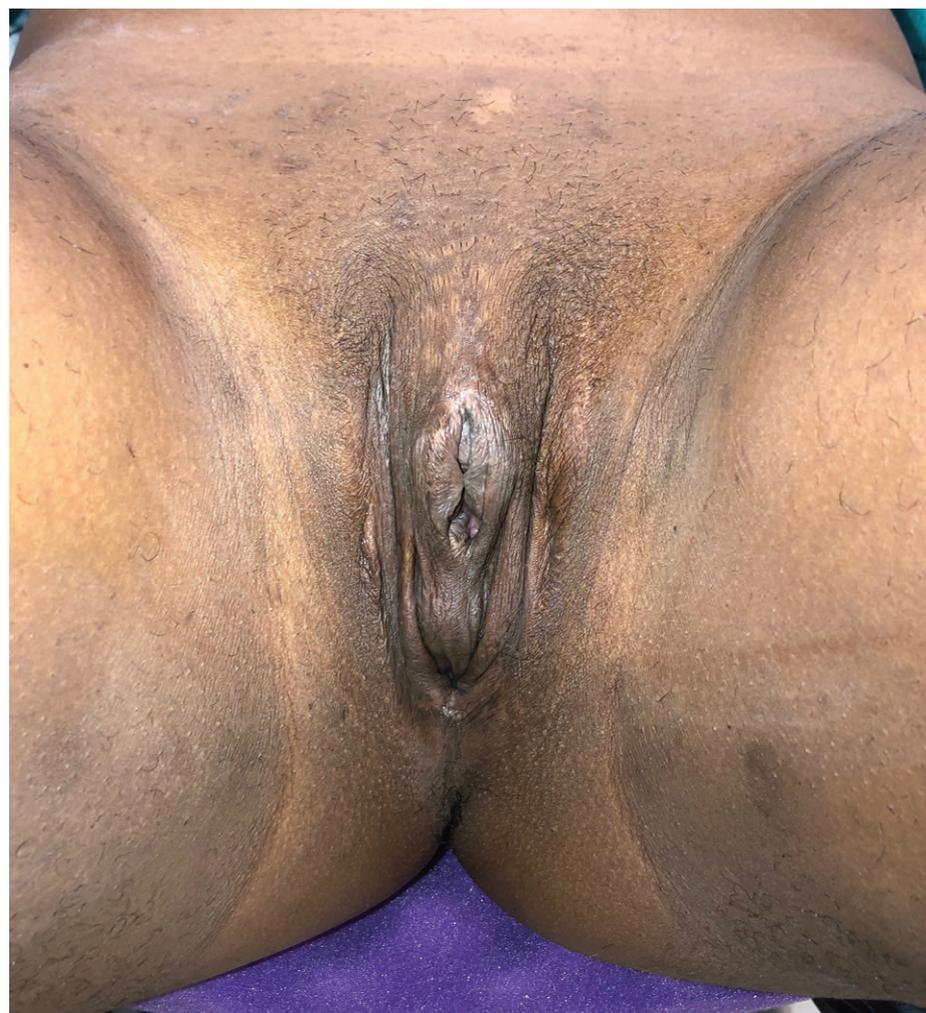


Figure 4.

incision on the anterior neovaginal wall is made to allow mobilization of urethra and separation of the spongiosum to cavernosum attachment. The tissue anterior to the new meatus position has to be closed to compensate for the resultant change in urethral position.

Urethral Bulb Bulge. A bulge that protrudes into the distal anterior vaginal canal, particularly during arousal, can occur when bulbospongiosus muscle or untapered bulb is left behind (fig. 4). The redundant tissue is excised through a midline vertical incision on the anterior neovaginal wall that overlies the urethra. We maintain vaginal packing and urethral catheter for approximately 5 days to facilitate adherence of the overlying anterior neovaginal wall skin flaps.

Neovaginal Stenosis. Introital stenosis can be managed by stricturoplasty, using a combination of advancement flaps and/or additional skin or buccal grafts. Neovaginal canal stenosis requires more extensive repair for reestablishment of the full-length canal. Secondary vaginoplasties are

challenging procedures, for which pedicled intestinal segment and peritoneal flap vaginoplasty have become the 2 most commonly used modalities.

Conclusion

Penile inversion vaginoplasties have a high satisfaction rate of 88% but can present with a range of complications.¹ Deepening our understanding of vaginoplasty and its complications will enhance our ability to provide care for transgender patients. ♦

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FROM THE *Chief Executive Officer*

Celebrating the Milestone of Residency



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Let's face it: 2020 hasn't shaped up the way we all anticipated. The COVID-19 pandemic has had widespread impacts on the global health care community. In-person graduations were canceled, major medical meetings have been canceled, surgeries have been canceled,

and the list of cancellations goes on. But there's one thing the virus didn't cancel, and that's a milestone celebrated by the entire medical community: the July 1 start of training for medical residents in the United States, including more than 350 entering the field of urology.

Earlier this year we celebrated the highest number of applicants to the Urology Residency Match since 2014 and a record number of female applicants matching with urology training programs. This month, we celebrate

once again as our community welcomes the newest members of the urology workforce.

Much has changed since Urology Match Day in January but our residents' commitment has not. Already, the newly minted physicians of 2020 have proven that they are not only highly resilient and flexible, but also that they are dedicated and eager to apply their skills. They have weathered disruptions to clinical rotation schedules, transitions to new education platforms and, in some cases, losses of formal graduation ceremonies to punctuate this important milestone in the life of a physician. Some fourth-year medical students, including some matched to urology, even chose to graduate early and spend their "downtime" between

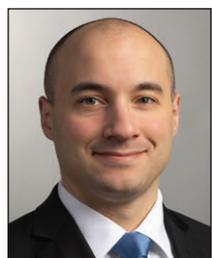
medical school and the start of their residencies to work with COVID-19 patients.

Around the world and here in the United States, urology training programs are to be commended for their hard work and diligence in ensuring learning continuity for residents at all stages of their training. Your work to adapt to and overcome the educational challenges presented by the pandemic, as well as your dedication to the future of urology, are to be celebrated.

Although the long-lasting impacts of the COVID-19 pandemic remain to be seen, some things are clear. The future of urology is bright. On behalf of the entire AUA, welcome to the newest urology trainees! ♦

AUA RESIDENTS & FELLOWS *Committee News*

Urology Resident Burnout and Parental Leave: AUA 2019 Census Update



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Chair, AUA Residents
& Fellows Committee
New Haven,
Connecticut



Eugene Cone, MD
Immediate Past Chair,
AUA Residents &
Fellows Committee
Boston, Massachusetts

addressing burnout was added to the AUA 2019 Census with the objective of quantifying urology resident burnout and the factors contributing to it.

We received 512 responses to the trainee module of the census including 415 responses from residents, making this survey the largest representative sample to date. Among resident respondents 47% met criteria for burnout, which was defined as scoring high in the emotional exhaustion or depersonalization sections of the Maslach Burnout Inventory. The burnout rate was highest among PGY-2 residents (65.2%).³

Our survey also aimed to identify factors causing burnout as a first step in future preventive efforts. Residents were asked to prioritize from a range of resources those most important to burnout prevention. The 4 most commonly selected options were a meal plan, a urology call room, the ability to attend health appointments during work hours and paid family leave. Unfortunately, access to these resources was scarce. For example, only 53.3% of respondents could attend health appointments during work hours. It is perhaps unsurprising that self care activities are prioritized by residents, as access to food, sleep and health care are basic needs, and improving access is an obvious target.

Urology resident burnout continues to be a concern for our trainees. A recent study surveying 211 urology residents in the United States found that 38% were burnt out.¹ In a separate study focusing on PGY (post-graduate year)-2s 38 of 59 residents in the U.S. (64.4%) were burnt out.² Despite being well written both studies were criticized for their relatively small sample sizes and in the case of the second study for restricting the respondent cohort by year.

The health and well-being of urology trainees is a high priority for the AUA Residents and Fellows Committee (RFC). In collaboration with the AUA Data Committee and Science and Quality Council a resident specific module of questions

Nearly 1 in 4 residents had children younger than 18 years old, and nearly 80% of those had their child during residency, so we were surprised to find that only 38.3% of respondents had access to paid family leave. The majority of respondents (55.6%) took 1 week or less parental leave and 22.2% took off 2 weeks. Until recently a lack of family leave was not unusual. A 2018 *Journal of the American Medical Association* survey of 24 medical specialty boards, including the American Board of Urology, found that none had a formal parental leave policy.⁴ However, since then numerous specialty boards, including the American Board of Surgery, have formalized trainee family leave policies with most allowing for more generous leave than was taken by respondents to the census.⁵

A recent randomized trial found that interventions such as formal mentorship and protected didactics had minimal efficacy in preventing burnout,⁶ which the census results may help explain. Absent basic priorities such as food, sleep, health and time to start a family, higher order

interventions are insufficient. On behalf of the RFC our hope is that urologists view the results of the AUA census as an opportunity to improve trainee access to self care, and to formalize and update the current policies surrounding family leave. ♦

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SPOTLIGHT on Global Urology

Asia and Australia



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The discipline of urology is on an unprecedented growth trajectory around the world. Regions of the world that once had urological disease addressed by general surgeons or well-meaning physicians are increasingly served by well trained urologists. Urologists are undergoing formalized training, seeking international fellowships and practicing at the highest standards by accessing educational tools rapidly accessed online and in person.

It is in this context that the AUA is emerging as a truly global organization—a voice, a resource for the discipline with a reach to every corner of the world. As an Assistant Secretary of the AUA, my responsibility is to serve as an envoy for the AUA and its relationships with urologists and their societies in Asia and Australia.

Serving in my role, I found myself in India, Bangladesh, Japan, South Korea, Malaysia and China in 2019, sometimes back to the same country twice in a year. AUA leaders have gone on to Thailand, Cambodia and even more countries in the region. It is a whirlwind of long-haul flights, exotic meals, but most of all, interacting with friends and leaders of partner urological societies, finding ways

to foster vibrant, mutually beneficial partnerships.

The partnerships we are developing are multilayered, deep and enriching. In Bhubaneswar, India, at the Urological Society of India Conference, the AUA partnered with the society in one of the most well attended plenary sessions of the 4-day meeting. AUA leaders and colleagues interacted with associates in India who traveled there from Bangladesh, Sri Lanka, Nepal, Pakistan and several other regional South Asian nations. We returned to India later in the fall to teach a Lessons in Urology course to graduating residents in India, and flew on to Dhaka, Bangladesh for the same course there. The first ever Best of AUA course was inaugurated in Delhi in 2019 as well (fig. 1).

A similarly rich partnership continues with the Japanese Urological Association (JUA), where AUA meeting participation is substantial, as is the commitment to an AUA-JUA International Exchange Program, and a widely attended Advancements in Urology course for Japanese residents was held at UCLA in February 2019 (fig. 2).

South Korea was a repeat destination in 2019 as the Société Internationale d'Urologie was held in Seoul and our team returned for the Korean Urological Association meeting. With the strong support of Korean American urologists working with the AUA team, this remains a vibrant relationship consisting of



Figure 2. Leaders from AUA and Japanese Urological Association meet to nurture friendships and plan collaborative educational programs.

meeting participation as well as the Lessons in Urology Course targeted to urology residents in the country, and the Korean World Urologic Congress at the AUA Annual Meeting (fig. 3). The Chinese Urological Association meeting followed in Guangzhou,

China and remains a robust exchange predicated on teaching, live surgery and dynamic resident and young urologist engagements.

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Figure 1. AUA and Urological Society of India celebrate the first Best of AUA program in India.



Figure 3. Leaders from Korean Urological Association continue to cultivate our friendship and collaborations.



Figure 4. AUA faculty celebrate conclusion of Lessons in Urology Course and Exam with leaders of Urological Association of Asia.

Spotlight on Global Urology

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Kuala Lumpur, Malaysia hosted the Urological Association of Asia meeting in 2019, which also combined a Lessons in Urology course before the meeting start (fig. 4). At the crossroads of East Asia, the meeting

not only strengthened collaborations with Malaysian urologists, but the venue was ideal for productive sessions with urologists from Taiwan, Indonesia, Australia, New Zealand (Urological Society of Australia and New Zealand [USANZ]), Vietnam and many more nations in the region.

The AUA footprint is growing globally, and it is a unique privilege

to be at the table with our Asian and USANZ partners entering into my second year in this role as Assistant Secretary. I have borne witness to the phenomenal commitment urologists have to ongoing learning, research and teaching, and it is humbling to know that despite our diversity, and sometimes access to the latest in technology, a commitment to heal and

care for the patient—anywhere in the world—is truly the same.

While travel may be curtailed in 2020 in light of the pandemic, our relationships are robust and our friendships are strong, as virtual platforms allow us to continue to deliver on our educational commitments until better times return and we emerge from this imposed hibernation. ♦

HAVE YOU *Read?*

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Ahdoot M, Wilbur AR, Reese SA et al: MRI-targeted, systematic, and combined biopsy for prostate cancer diagnosis. *N Engl J Med* 2020; 382: 917-928.

The role of magnetic resonance imaging (MRI) in prostate cancer diagnosis, stratification for biopsy and use for targeting continues to evolve with published data. In this study, men with MRI visible prostate lesions underwent both MRI targeted and systematic biopsy. The primary outcome was cancer detection according to grade group. Grade group 1 referred to clinically insignificant disease, grade group 2 to 3 referred to cancer with favorable intermediate risk or worse and grade group 3 or higher referred to cancer with unfavorable intermediate risk or worse. Secondary outcomes were the detection of cancers of grade group 2 or higher and grade group 3 or higher, cancer detection stratified by previous biopsy status, and grade reclassification between biopsy and radical prostatectomy.

A total of 2,103 men underwent both biopsy methods. Cancer was diagnosed in 1,312 (62.4%) by a combination of the methods (combined biopsy), and 404 (19.2%) underwent radical prostatectomy. Cancer detection rates on MRI targeted biopsy were significantly lower than on systematic biopsy for grade group 1 cancers and significantly higher for grade groups 3 through 5 ($p < 0.01$ for all comparisons). Combined biopsy

led to cancer diagnoses in 208 more men (9.9%) than with either method alone and to upgrading to a higher grade group in 458 men (21.8%). However, if only MRI targeted biopsies had been performed 8.8% of clinically significant cancers (grade group 3 or higher) would have been misclassified. Among the 404 men who underwent subsequent radical prostatectomy, combined biopsy was associated with the fewest upgrades to grade group 3 or higher on histopathological analysis of surgical specimens (3.5%) as compared with MRI targeted biopsy (8.7%) and systematic biopsy (16.8%).

The authors conclude that among patients with MRI visible lesions combined biopsy led to more detection of all prostate cancers. However, MRI targeted biopsy alone underestimated the histologic grade of some tumors. After radical prostatectomy upgrades to grade group 3 or higher on histopathological analysis were substantially lower after combined biopsy.

Weiner SJ, Wang S, Kelly B et al: How accurate is the medical record? A comparison of the physician's note with a concealed audio recording in unannounced standardized patient encounters. *J Am Med Inform Assoc* 2020; 27: 770-775.

The dichotomy of the electronic medical record as purveyor of medical information and documenter of billing level typically favors the latter at the expense of the former. How often does this moral injury translate into documentation error? In this study the authors explored the concordance of information

documented in the medical record with a gold standard measure. They compared 105 encounter notes to audio recordings covertly collected by unannounced standardized patients (paid actors) from 36 consenting physicians to identify discrepancies and estimate the reimbursement implications of billing the visit based on the note vs the care actually delivered. There were 636 documentation errors including 181 charted findings that did not take place and 455 findings that were not charted, and 90% of notes contained at least 1 error. In 21 instances the note justified a higher billing level than the gold standard audio recording, and in 4 it underrepresented the level of service ($p=0.005$), resulting in 40 level 4 notes instead of the 23 justified based on the audio at a 74% inflated misrepresentation.

The authors conclude that the medical record should not be assumed to reflect care delivered. Furthermore, errors of commission (documentation of services not actually provided) may inflate estimates of resource use. This sad state of affairs should be improved by changing the system, not by prescribing more online teaching modules.

El-Arabi AM, Niu A, Chase B et al: Eighteen-year review of resident performance on the American Urological Association In-Service Examination. *Urology* 2020; 137: 33-37.

The in-service exam is an annual rite of passage for our residents. How are they—and we—doing? In this study, trends in the national averages on the in-service examination for

each year of residency training were collected and analyzed between the years 2000 and 2017. Mean and standard error were calculated for examination performance for each year of residency. Subject specific performance was also determined for each given year of residency. Regression analysis was used to model trends in performance as a function of residency year.

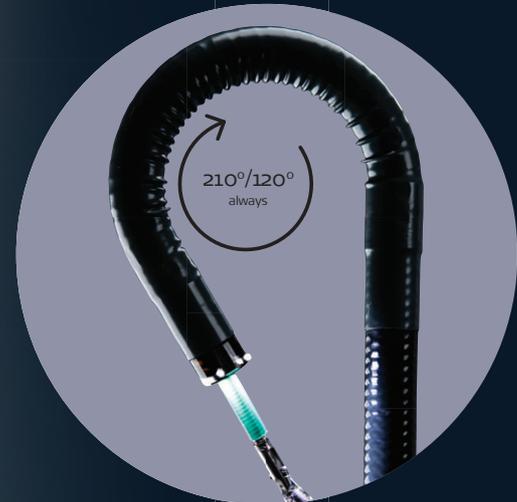
There was no significant difference in examination performance over 18 years with respect to each specific residency year. While there was an overall improvement in total scores with each advancing training year, year-over-year improvement in total examination performance began to plateau after Uro-2. The largest absolute performance improvements from Pre-Uro to Uro-4 were in the subjects of “Urinary Diversion,” “Obstructive Uropathy” and “Neoplasm.” Scores in “Sexual Dysfunction, Endocrinopathy, Fertility Problems” and “Congenital Anomalies, Embryology, Anatomy” were consistently the lowest regardless of year of training.

The authors conclude that there was no significant change in performance in each given year of residency over the 18-year period. There was improvement in overall scores as residents progressed through training, but scores plateaued after Uro-2 with minimal improvement. Difference in subject scores suggests a disparity in educational focus in residency curricula and a potential need to improve the teaching strategies for subjects that tested less well throughout residency training. ♦

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