A CASE OF EPITHELIOID HEMANGIOENDOTHELIOMA OF THE PENIS – REPORT WITH CLINICAL, RADIOLOGICAL, AND IMMUNOHISTOCHEMICAL ANALYSIS

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(Presentation to be made by Jeffrey Redshaw, B.S.)

Background: Epithelioioid vascular tumors are uncommon vascular neoplasm that predominately occur on the head and neck. Histological descriptions have been used to classify these tumors as either benign epitheloid hemangiomas or malignant epitheloid hemangioendotheliomas and epithelioidangiosarcoma. Although extremely rare, 17 cases of hemangioendothelioma of the penis have been reported in the literature; often with a clinical hx depicting a prolonged period of miss-diagnosis with conditions such as Peyronie’s disease or superficial penile vein thrombosis. We report the case of a 59-year-old male who was referred to our institution from a community urologist after initially being diagnosed with thrombosis vs atypical Peyronie’s disease.

Diagnosis/Management: Color Doppler ultrasound demonstrated a highly vascular mass superficial to the tunica. He was taken to the operating room for excisional biopsy of the suspicious lesion. Histological analysis of the specimen revealed a vascular tumor with plump endothelial cells and clusters of epithelioid neoplastic cells with abundant eosinophilic cytoplasm, absent of necrosis and mitotic figures, consistent with an epitheliod hemangioendothelioma. Follow up CT chest/abdomen/pelvis was negative for evidence of metastatic disease. With his low risk pathological features, no further treatment was felt indicated at that time.

Conclusion: Significant uncertainty exists regarding the need for adjuvant therapies especially in patients with low risk pathological features. Indeed several case reports have reported cure with only local excision even in the setting of recurrent disease. Given the uncertainty surrounding treatment, early clinical recognition is paramount so as to avoid prolonged periods of miss-diagnosis.

Source of Funding: None
Purpose: Three phase 3 studies have been conducted to examine the safety and efficacy of collagenase clostridium histolyticum (CCH) in subjects with Peyronie’s Disease (PD). The effect of CCH on change in penile curvature deformity from baseline to end of study was analyzed by the subjects’ duration of disease or degree of plaque calcification.

Materials and Methods: All subjects within the phase 3 studies (2 randomized, double-blind, placebo-controlled; 1 open label [interim data]) and who were treated with CCH received up to 8 injections of CCH (0.58 mg) with two injections per cycle separated by about 24 to 72 hours, with the second injection followed 24-72 hours later by plaque modeling. Up to 4 cycles each was allowed, with each cycle separated by a 6-week interval. Penile x-ray or ultrasound findings were used to determine the degree of plaque calcification.

Results: CCH-treated subjects (n=776) were stratified by duration of disease: 1-2 years (n=280), >2 to ≤4 years (n=266), and >4 years (n=230). The percent reduction in mean curvature deformity for CCH-treated subjects was 33.7% overall. Percent reductions in mean curvature deformity were 28.6% for subjects reporting PD duration 1-2 years, 34.8% for PD duration of >2 to ≤4 years, and 38.9% for >4 years. For patients with no calcification, non-contiguous stippling, and contiguous calcification that did not interfere with the injection, percent reductions in mean curvature deformity were 34.8%, 33.8%, and 27%, respectively. Duration of disease had no relationship to the degree of calcification (no calcification=3.8 years, non-contiguous stippling=4.2 years, and contiguous calcification that did not interfere with the injection=3.3 years).

Conclusions: Treatment with CCH resulted in improvements in curvature deformity regardless of duration of disease or level of plaque calcification; although small differences were noted within the subgroups, they are not expected to be clinically meaningful. The observation that the duration of disease had no relationship with the degree of calcification in this population warrants further exploration.

Source of Funding: Auxilium Pharmaceuticals, Inc., Chesterbrook, PA, USA

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AUA Western 2013: Primary endpoints by duration of disease
SUBCUTANEOUS TESTOSTERONE PELLET (TESTOPEL™) IMPLANTATION IN ANTICOAGULATED PATIENTS IS SAFE AND EFFECTIVE
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Mountain View, CA
(Presentation to be made by Manki Wong, B.S.)

Purpose: Subcutaneous testosterone pellet (Testopel™) implantation is an emerging therapy option for hypogonadal men. It is the only FDA approved long-term option for testosterone replacement therapy. The testopel implant is an office-based surgical procedure requiring a 16 gauge trocar to be used to place the pellets in a subcutaneous location. Despite the lack of prescribing information regarding pellet implants in anticoagulated patients, many physicians will choose to discontinue anticoagulation prior to the procedure, increasing the risk of thrombotic events or avoid offering Testopel to their patients. Our practice has been to continue patients on anticoagulation therapy while undergoing the Testopel implant procedure.

Materials and Methods: We retrospectively reviewed our medical records between 2009 and 2012 for all patients undergoing Testopel implant procedure in our office. Pellets were implanted in the supra-iliac location. All patients had a single suture wound closure and placed in a lumbar support for a few hours after the procedure. Patient age, baseline testosterone, peak testosterone, number of pellets used, anticoagulant use, complications and duration of therapy were reviewed.

Results: We identified 157 patients who had undergone Testopel implant procedure during the study period. Twenty-seven patients were continued on anti-coagulation during the pellet implant procedure. Mean patient age was 55.4 years. Mean baseline testosterone was 242.5 ng/dl. Mean peak testosterone was 920.6 ng/dl on a mean of 10.9 pellets/implant. Time to repeat pellet implantation was 137 days. Eighteen patients were on aspirin therapy, 5 patients were on warfarin therapy, 3 patients were on Plavix and one on Pradaxa. There were no bleeding complications in anticoagulated patients. One patient on aspirin had pellet extrusion 6 weeks after implantation, which was not related to anticoagulation.

Conclusions: Subcutaneous testosterone pellet implantation is safe and effective in restoring therapeutic testosterone levels in hypogonadal patients on anticoagulation therapy. Our experience shows that men do not need to discontinue anticoagulation therapy during the procedure. The risks of thrombotic events off therapy and bleeding risks on therapy should be discussed with all patients.

Source of Funding: None
Purpose: The trauma incurred with pelvic fractures results in much collateral damage. One of the common Urological injuries is urethral injury. Erectile dysfunction as a result of this has been well documented and has been associated with vascular injury or neurologic injury or a combination of both. However, there has been a growing recognition of individuals who have sustained a pelvic fracture in the absence of urethral injury who are requiring management of new erectile dysfunction. This study evaluates the diagnostic measures and treatment modalities in individuals with erectile dysfunction after pelvic fracture.

Materials and Methods: A retrospective chart review was performed of all individuals seen by the Division of Urology for erectile dysfunction with a history of pelvic fracture based on ICD coding from 2009 to 2013. Each patient’s chart was evaluated for medical co-morbidities and concomitant urethral injury. The timing of onset of ED after fracture, severity of ED, diagnostic testing, and treatment modalities were recorded in an attempt to assess differences in those with urethral injury and those without.

Results: A total of 14 males met our criteria. The average age in years at the time of pelvic fracture was 41 (range 20-65 years of age). 3 out of the 14 had significant medical co-morbidities prior to their fracture including smoking, hypertension, and coronary artery disease requiring coronary artery bypass grafting. 7 of the 14 also sustained a urethral injury as a consequence of their trauma and eventually underwent repair with posterior urethroplasty. The average time to be seen for ED after fracture was 304 days and the average length of follow-up once seen was 218 days.

All individuals had new onset of ED after their fracture described as not sufficient for intromission, with the exception of 1 who had a prior history who was able to have intercourse prior to his fracture with the assistance of a phosphodiesterase 5 inhibitor. Initial evaluation included color duplex ultrasound with combined intracavernous injection and stimulation. Individuals with urethral injury (n=7) were compared to those without (n=7). Findings on duplex ultrasound were similar between the two groups. From the urethral injury group 71% (n=5) had no sign of abnormal vascular flow (considered neurogenic ED) and 29% (n=2) had evidence of minimal arterial insufficiency. 2 individuals underwent duplex testing prior to urethral repair for surgical planning due to known pelvic vascular injury at the time of fracture. In the group without urethral injury 71% (n=5) had no sign of vascular anomaly, 14% (n=1) had evidence of venous leak plus new onset spongiosfibrosis and curvature, and 14% (n=1) had evidence of both arterial insufficiency and venous leak.

8 (3 without and 5 with urethral injury) of 14 were treated with daily tadalafil 5 mg alone and 1 individual was treated with sildenafil 100 mg as needed alone. Neither of these groups experienced an erection sufficient for intercourse. 2 of the 3 without urethral injury had a second agent added to their regimen, one had sildenafil 100 mg as needed and the other had Trimix injection. Both of these individuals experienced adequate erection with this change. The third has not been seen after his duplex study. Of the 5 with urethral injury three added Trimix injections with adequate results, one has not been seen after Trimix addition, and the other was lost to follow-up. The remaining 5 of 14 individuals have been lost to follow-up.

Conclusions: Pelvic fracture independent of urethral injury is a cause of ED. In the majority of individuals the etiology of their ED whether found in conjunction with a urethral injury or not is likely secondary to neurologic injury. Independent of urethral injury, individuals responded adequately to local therapy with Trimix injection during clinic evaluation re-enforcing this point. Diagnostic testing with penile duplex ultrasound is key however to rule out vascular causes since treatment options vary significantly. Overall, adequacy of erection was observed to be greatest in groups who received combination therapy with a low dose daily systemic medication like tadalafil 5mg in conjunction with local therapy such as Trimix independent of urethral injury. Review of this data reveals other questions that a prospective trial with a larger cohort may answer including long term outcomes with potential recovery of erection without treatment, other complications related to pelvic fracture such as penile fibrosis and curvature and the potential loss of penile length without therapy. One could also consider following these individuals with standardized questionnaires to better account for improvement or worsening of symptoms to better guide therapy.

Source of Funding: None
BONE SAW FOR CALCIFIED PEYRONIE’S DISEASE PLAQUES
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Daniel D. Dugi III, M.D., Jason C. Hedges, M.D., Ph.D.,
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(Presentation to be made by Dr. Ostrowski)

**Introduction and Objective:** Calcified Peyronie’s Disease plaques are rare and surgically difficult to treat. Several techniques have been described to remove or cut through the ossified plaque with varying success. Excision of the plaque often results in erectile dysfunction with shortening and deformity of the penis. Our goal is to determine the incidence in a tertiary referral center and describe a new surgical treatment option using a soft tissue-protecting bone saw.

**Materials & Methods:** We performed a review of all Peyronie's Disease patients who were surgically treated from 10/1996 - 12/2012. We identified patients who required the use of the TPS Bone saw and evaluated for post-operative complications, type of surgery performed and erectile function.

**Results:** 100 surgical patients required surgery for their Peyronie's Disease. Six patients required use of the bone saw due to severe calcification; four with SIS grafts and two with inflatable penile prosthesis. The saw was used to make transverse incisions in the plaque to allow for a straight erection. There were no surgical complications and both IPP pts had working prosthesis at >8yrs. One of the SIS grafted patients required re-operation for more proximal curvature 11months later and ultimately required an IPP.

**Conclusions:** Calcified Peyronie's disease plaques are rare. The vibrating bone saw is a novel technique to incise calcified plaques before grafting or IPP placement. The saw’s advantages are that there is no loss of length or physical deformity of the penis, it is readily available in most operating rooms, has an easy to use handle control and that due to the micro-vibration action it does not cut through soft tissue.

**Source of Funding:** None
THE IMPACT OF POSTOPERATIVE WEIGHT CHANGE ON SEXUAL FUNCTION AFTER ROBOTIC-ASSISTED RADICAL PROSTATECTOMY

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(Presentation to be made by Dr. Boone)

Purpose: Sexual dysfunction is one of the most distressing morbidities following radical prostatectomy and significantly affects quality of life. While obesity has been shown to have a negative impact on postoperative sexual function, the effect of weight change after radical prostatectomy is unknown. The goal of this study was to investigate the impact of postoperative changes in body mass index (BMI) on sexual function in patients undergoing robotic-assisted radical prostatectomy (RARP).

Materials and Methods: A cross-sectional analysis was performed of patients who underwent RARP at Kaiser Permanente Southern California (KPSC). Using Expanded Prostate Cancer Index Composite (EPIC-26) questionnaires, sexual function scores were calculated at baseline and at 6 months after RARP. Patients were grouped according to BMI (normal: <25kg/m², overweight: 25-29.9kg/m², and obese: >30kg/m²). Comparative analysis was performed using the Kruskal-Wallis test and Spearman’s rank correlation.

Results: Between March 2011 and March 2013, 1895 patients had undergone RARP at KPSC. At the time of analysis, a total of 180 patients had completed baseline and 6-month postoperative EPIC-26 questionnaires with available BMI data within 30 days of each questionnaire completion (normal: n=33, overweight: n=88, and obese: n=63). At baseline, the median age was 63 years (range 43-77), BMI was 28.3kg/m² (range 19.2-41.4), and sexual function score was 66.7 (range 0-100). The median change in BMI from baseline to 6-months was -0.1kg/m² (range -6.3-4.0), and the median change in sexual function score was -44.5 (range -100-18). When evaluating the relationship between the change in BMI and change in sexual function score, there was a strong negative correlation (r= -0.229, p=0.003). On sub-group analysis, this trend was only statistically significant for the obese patients (normal: r= -0.136, p=0.481; overweight: r= -0.109, p=0.339; obese: r= -0.328, p=0.013). Thus, for the obese group, patients who lost weight had better relative sexual function scores.

Conclusions: For obese patients, weight loss after RARP may improve postoperative sexual function. More data and longer follow-up is needed.

Source of Funding: Intuitive Surgical
NATIONAL TRENDS IN SURGICAL TREATMENT OF ERECTILE DYSFUNCTION  
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(Presentation to be made by Dr. Mirheydar)  

Introduction and Objectives: It is estimated that erectile dysfunction affects up to 30 million American men. Available treatment options include vacuum erection device, phosphodiesterase V inhibitors, intracavernosal injections, and penile prosthetic surgery. We sought to examine national surgical trends over time for the treatment of erectile dysfunction and to identify patient specific factors that predicted receipt of inflatable versus semi-rigid penile prosthesis.

Methods: The Nationwide Inpatient Sample (NIS) provides a 20% stratified estimate of inpatient surgeries performed between 1998 and 2010. Penile prosthetic surgery were captured using ICD-9 codes in patients ≥50 years old. The primary endpoint was total number of implants performed and the proportion of inflatable versus semi-rigid prosthesis, which was calculated annually. We used multivariate regression analysis to examine patient factors associated with the selection of inflatable vs. semi-rigid penile prosthesis.

Results: We identified 53,967 penile prostheses (48,479 inflatable and 5,488 semi-rigid) between 1998 and 2010. The total number of penile implants performed annually decreased from 4,703 (1998) to 2,338 (2010), p<0.001. In 2010, the total number of implants reached a nadir (n=2,338). Significantly larger proportions of African-Americans (p<0.001), Medicaid (p<0.001), and spinal cord injury (SCI; p<0.001) patients received semi-rigid prosthesis. Inflatable prosthesis incurred higher cost ($29,720 vs. $20,663, p<0.001), with similar lengths of stay (median LOS 1 day, p=0.593). In multivariate analysis, Caucasian race, Peyronie’s disease, age 70-79 versus 50-59, and private insurance were independently associated with receipt of inflatable prosthesis (p<0.001).

Conclusions: Utilization of penile prosthetic surgery has decreased significantly in the United States between 1998 and 2010. Caucasian race, Peyronie’s disease, absence of spinal cord injury, and private insurance were patient specific factors independently associated with receipt of an inflatable penile prosthesis. The overall decrease in volume of penile prostheses performed is likely multifactorial, and warrants further investigation.

Source of Funding: None
Purpose: The treatment of erectile dysfunction (ED) with inflatable penile prosthesis (IPP) in the immunocompromised patient has had limited study. A review of the literature revealed three series with conflicting results. We describe our recent experience in this complicated group with focus on results with currently available prosthetic devices.

Materials and Method: We identified 10 men with immunocompromised status (immunosuppression after solid organ transplant [n=7] or immunocompromised due to HIV [n=3]) who underwent IPP implantation between 2009 and 2012 and retrospectively reviewed their charts.

Results: The mean age was 58.8 (range 50-70), average length of stay was 1.28 days (range 1-2), and median American Society of Anesthesiologists (ASA) score was 3 (range 2-3). Two men had ED due to priapism while the rest had organic ED. 60% of the men had successful implantation in a single setting. Four patients required multiple surgeries. One underwent a staged corporal salvage for severe corporal scarring from priapism with semirigid implantation followed by IPP. Another presented with an infected IPP from an outside hospital (OSH) and developed infection after two subsequent replacements. The third had four prior IPP surgeries at an OSH with failed placement at the last setting. He required multiple reconstructions in order to place IPP cylinders. The final patient experienced infection after primary placement and required removal followed by a staged reimplantation. All patients ultimately had a functional prosthesis except for one man who desired only the cylinders after having had multiple prior procedures. The overall reoperation rate was 40%. The infection rate in the 18 surgeries was 22%. There were no intraoperative complications and no other postoperative complications with an average follow-up of 8.8 months (range 0-29).

Conclusions: This small series further demonstrates the feasibility of IPP in the immunocompromised patient, and demonstrates successful implantation in patients with HIV and prior solid organ transplantation. Primary implantation has a low complication rate. Patients with prior surgery and redo operations are at increased risk of complications. Patient selection needs to be carefully considered, but IPP should be included among the therapeutic options for immunocompromised men suffering from ED.

Source of Funding: None
VAESECTOMY PRACTICES AMONG UROLOGISTS, PRIMARY CARE PHYSICIANS AND GENERAL SURGEONS
A. Scott Polackwich, M.D., Jason Hedges, M.D., Ph.D.: Portland, OR
(Presentation by Dr. Polackwich)

Purpose: Vasectomy is one of the most common procedures with an estimated 526,000 performed in 2002. Previous analyses of practices have been performed in 1991, 1995 and 2002. We present an analysis of these practices in the western United States in light of the new 2012 AUA guidelines on vasectomy.

Materials and Methods: An electronic survey was sent to members of the WSAUA, the Oregon Medical Association and the Oregon branch of the American College of Surgeons. This survey included 15 questions covering 6 domains: volume, antibiotic usage, technique, pain management, post-vasectomy semen analysis and cost.

Results: There was a wide range in the numbers of vasectomies being performed yearly. Urologists, PCPs and GS performed a mean of 86.4, 12.7 and 10.4 vasectomies yearly. Urologists and GS were more likely to perform vasectomy on the same day as the initial visit compared to PCPs (16% vs 3%). 22.1% of Urologists routinely used antibiotics, compared to 2.5% of PCPs (p<0.05). The use of NSV is rising with 51.1% and 60% of Urologists and PCPs utilizing any variant of the NSV technique. There was a wide variety of vas closure methods used, with suture ligation and cauterization being the most common and being utilized by 51.7% and 76.8% of respondents. 78%, 67% and 42% of Urologists, PCPs and GS followed the 2012 AUA guidelines for vas closure. Over 30% of all respondents gave no narcotics for pain control and Urologists were less likely to advise patients to use NSAIDs (p<0.05). Urologists and GS wait almost twice as long as PCPs to obtain semen analysis (60.8 and 63 vs 33 days). As expected, Urologists were faster at performing vasectomy (20.7 vs. 35 min). Mean price for vasectomy was $741, $807 and $494 for Urologists, PCPs and GS.

Conclusions: There is a wide variety of vasectomy practices among those practitioners who are performing them. These differences highlight not only specialty specific practices, but also areas of discussion and education.

Funding: None
AUTOLOGOUS ADIPOSE DERIVED STROMAL VASCULAR FRACTION COMBINED WITH LOW INTENSITY SHOCK WAVE THERAPY FOR THE TREATMENT OF PEYRONIES DISEASE-A PILOT STUDY
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(Presentation made by Dr. Lander)

Objectives: We evaluated the safety and efficacy of deployment of SVF Stromal Vascular Fraction (rich in adult mesenchymal stem cells and growth factors) combined with Low Intensity Shock Wave Therapy for the Treatment of Peyronies Disease in two patients. Autologous SVF can be easily obtained from adipose tissue lipo-aspirate and is known to contain adult mesenchymal stem cells in high numbers as well as numerous cytokine growth factors. Regenerative cells in SVF can be activated by signals released from tissue that is diseased, damaged, or inflamed. Low Intensity Shock waves create controlled micro-trauma that is expected to be able to mimic these conditions and activate the repair cells. SVF can be procured and deployed within a few hours in the operating room as a type of lipo-transfer procedure.

Methods: Two men with documented chronic stable peyronies disease associated with erectile dysfunction were selected. After IRB approved consent, Mini-liposuction (50cc) was performed. A closed system (TimeMachine™ by MediKhan) device was used for SVF procurement. Patients underwent Low Intensity Shock Wave Therapy to the penis on the day of SVF deployment and treatments were also performed 48 hours prior and after SVF. SVF was deployed by intracavernosal injection. Patients were evaluated using IIEF and EHGS scores at baseline and at one month.

Results: Clinically significant improvement was seen in both patients at one month. There were no adverse events. Both patients noted subjective straightening of the penis. Erectile function IIEF scores went from 24 to 26 and 19 to 27. Overall sexual satisfaction IIEF scores went from 8 to 9 and 4 to 7. EHGS scores increased from 3 to 4 and 3 to 3. Both patients described subjective improvement in curvature.

Conclusions: Intracavernosal deployment of SVF in a small group of peyronies patients can decrease curvature and improve sexual function in short term follow-up. Shock wave therapy may contribute to disruption of peyronies plaques providing an opportunity for improved healing associated with the introduction of exogenous mesenchymal stem cells in extremely high numbers from autologous SVF. Cell based therapies in conjunction with shock wave therapy may have a role in the treatment of Peyronies and further studies are needed to determine long term results, shock wave settings, intervals and timing of SVF deployment.

Source of Funding: None
RETROPERITONEAL VERSUS TRANSPERITONEAL ROBOTIC PARTIAL NEPHRECTOMY FOR POSTERIOR RENAL TUMORS: RESULTS OF A MULTI-INSTITUTIONAL MATCHED-PAIR COMPARISON

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(Presentation to be made by Dr. Ahmadi)

Objectives: To compare perioperative outcomes between matched cohorts of retroperitoneal (RTP-) and transperitoneal (T-) robotic partial nephrectomy (RPN) for posterior renal tumors.

Materials and Methods: Between 2010 and 2012, RTP-RPN was performed in 63 patients at 2 institutions. This cohort was matched 1:1 to a group of 63 patients undergoing T-RPN over the same time period. All renal tumors for both cohorts were posterior. Matching was based on radiologic tumor size, RENAL nephrometry score, and laterality. Study parameters included operative time, estimated blood loss (EBL), warm ischemia time (WIT), length of hospital stay, and pathological features. Postoperative complications were classified according to the Clavien Dindo system.

Results: In matched-pair analysis, the RTP-RPN was associated with a decreased median operative time (167.0 vs 248.0 min; p<0.01), less EBL (100.0 vs 187.5 ml; p=0.01), shorter hospital length of stay (2.0 vs 4.0; p<0.01), with a similar WIT (19.0 vs 17.0; p=0.14) while providing equivalent short-term oncologic outcomes as well as complications compared to the T-RPN (p>0.05). (Table 1)

Conclusions: RTP-RPN is safe and feasible for posterior renal tumors associated with shorter total operating time, less blood loss, and shorter duration of hospitalization and no significant differences in surgical margin status or complication rates compared to the retroperitoneal approach.

Table 1. Baseline characteristics, surgical margin status, and postoperative complications

<table>
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<th>Robotic-assisted partial nephrectomy</th>
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<tr>
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<td>Retroperitoneal (n=63)</td>
<td>Transperitoneal (n=63)</td>
</tr>
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<td>Age (years), Median</td>
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<td>Surgical margin status</td>
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<tr>
<td>90-days complications rate (CCSC)</td>
<td>7/63 (11.1)</td>
<td>13/63 (20.6)</td>
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<tr>
<td>Severity of complications</td>
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<tr>
<td>Minor (CCSC grade I – II)</td>
<td>6/7 (83.4)</td>
<td>11/13 (84.7)</td>
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<tr>
<td>Major (CCSC grade III – V)</td>
<td>1/7 (16.6)</td>
<td>2/13 (15.3)</td>
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CCMI, Charlson Comorbidity Index; CCSC, Clavien- Dindo Classification for Surgical Complications

Source of Funding: None
ANALYSIS OF RENAL FUNCTIONAL OUTCOMES AFTER RADICAL OR PARTIAL NEPHRECTOMY FOR RENAL MASSES ≥7 CM UTILIZING RENAL SCORE

Jason Woo, M.D., Ryan P. Kopp, M.D., Reza Mehrazin, M.D., Kerrin L. Palazzi, M.P.H., Michael A. Liss, M.D., Hossein S. Mirheydar, M.D., Ramzi Jabaji, B.S., Anthony L. Patterson, M.D., Jim Wan, Ph.D., Ithaar H. Derweesh, M.D.: La Jolla, CA

(Presentation to be made by Dr. Derweesh)

Introduction: It is unclear if there is a size or complexity threshold where partial nephrectomy (PN) no longer confers a benefit to renal functional preservation compared to radical nephrectomy (RN). We evaluated renal function outcomes of PN compared to RN for T2 renal masses (T2RM) applying RENAL score to control for tumor variability.

Methods: Multicenter retrospective analysis of 202 patients (80 PN/122 RN), median follow-up 41.5 months, who underwent RN or PN for clinical T2RM at two institutions from 1999 to 2012. We excluded metastatic disease or thrombus at presentation. Patient characteristics, RENAL score, and renal functional outcomes were analyzed within subgroups of RN and PN. Main outcome was median change of estimated Glomerular Filtration Rate (ΔeGFR) between preoperative to postoperative value, with secondary outcomes being median creatinine change (ΔCr) from preoperative to postoperative values, and de novo Chronic Kidney Disease (CKD, eGFR<60 mL/min/1.73m2). RN and PN cohorts were then subanalyzed according to RENAL sum as a categorical variable of <10 or ≥10. Association between procedure and renal functional decline was analyzed using binary logistic and linear regression models.

Results: Demographics and comorbidities were similar between PN and RN. No significant differences existed between PN and RN for RENAL sum and component scores. Mean tumor size (cm) was larger (p<0.001) in RN (10.2) vs. PN (8.8). PN was more likely to undergo open surgery (p<0.001), have longer operative time (p=0.011), higher estimated blood loss (p=0.005), and benign pathology (p=0.02). ΔeGFR was significantly greater in RN (-19.7) vs. PN (-11.9, p=0.006), with median ΔCr RN 0.3 vs. PN 0.2, p=0.003. De novo CKD was 52% RN vs. 26% PN (p=0.003). These significant differences in renal functional outcomes persisted for RN vs. PN for RENAL sum <10, however not for sum ≥10 on subanalysis. RN was not independently associated with increased risk of de novo eGFR<60 on logistic regression; RENAL sum ≥10 (OR 6.67, p=0.025) and RN among RENAL sum <10 (OR 24.8, p =0.001) were associated with de novo CKD. Linear regression confirmed RN was associated with ΔeGFR -21.3 compared to PN among RENAL sum <10 (p<0.001).

Conclusions: RN is independently associated with decreased renal function compared to PN for T2RM with RENAL sum <10, but not ≥10. Larger cohorts and prospective investigation with further follow up are needed to determine potential advantages and optimal candidates for PN for T2RM.

Source of Funding: None
SURVIVAL OUTCOMES AFTER EXTIRPATIVE SURGERY FOR CLINICALLY LOCALIZED RENAL TUMORS ≥7 CM CATEGORIZED BY RENAL SCORE

Jason Woo, M.D., Ryan P. Kopp, M.D., Reza Mehrizin, M.D., Kerrin L. Palazzi, M.P.H., Michael A. Liss, M.D., Hossein S. Mirheydar, M.D., Ramzi Jabaji, B.S., Anthony L. Patterson, M.D., Jim Wan, Ph.D., Ithaar H. Derweesh, M.D.: La Jolla, CA

(Presentation to be made by Dr. Derweesh)

Introduction and Objectives: Utilization of partial nephrectomy (PN) for clinical T2 renal masses (T2RM) is increasing; analyses comparing PN to radical nephrectomy (RN) may not account for inherent variability among renal masses ≥7cm. We evaluated survival outcomes of PN compared to RN for T2RM controlling for RENAL score.

Methods: Multicenter review of 202 patients (80 PN/122 RN), median follow-up 41.5 months, who underwent RN or PN for T2RM from 1999 to 2012. We excluded metastatic disease or thrombus at presentation. Progressive disease (PD) was defined as new metastases or local recurrence. Patient characteristics, RENAL score, and oncologic outcomes were analyzed within subgroups of RN and PN. Kaplan–Meier analysis compared PD and overall survival (OS) among the entire cohort and within categories of RENAL sum ≥10 and <10 using log rank test. Association between procedure and PD and survival was analyzed using Cox-proportional Hazard models adjusted for clinicopathological characteristics and RENAL score.

Results: Demographics and comorbidities were similar between PN and RN. Mean tumor size (cm) was larger (p<0.001) in RN (10.2) vs. PN (8.8). PN was more likely to undergo open surgery (p<0.001), and have longer operative time (p=0.011). 4 RN and 10 PN were benign (p=0.02) and excluded from oncologic analysis. No significant differences between PN and RN existed in pathologic T stage, or for RENAL sum and component scores. PD occurred in 28 RN (23.7%) and 9 PN (13.8%), p=0.127, with median time to PD of 18.9 and 21.7 months, respectively. Cox regression demonstrated no association between RN vs. PN and PD, however RENAL sum ≥10 was associated with increased risk of PD (HR 6.69, p=0.002) compared to sum <10. On Kaplan-Meier analysis RN vs. PN had no difference in survival from PD for the entire cohort or within RENAL sum categories ≥10 and <10; Survival from PD was superior for RENAL sum <10 compared to ≥10 (p<0.001) and also for cT2a compared to cT2b tumors (p=0.012). OS was no different between cT2a and cT2b tumors, however RENAL sum ≥10 was more likely to die of disease (p<0.001) or any cause (p<0.001) compared to sum <10.

Conclusions: RENAL sum ≥10 is negatively associated with OS among tumors ≥7cm compared to sum <10 and provides additional risk assessment beyond clinical T stage. PN may be oncologically effective for T2RM. Further follow up and prospective randomized investigation is requisite to confirm efficacy of PN for T2RM.

Source of Funding: None
PERFORMANCE STATUS AFFECTS OVERALL SURVIVAL AFTER LEVEL III & IV INFERIOR VENA CAVA TUMOR THROMBECTOMY WITHOUT CARDIOPULMONARY BYPASS

Mukul B. Patil, M.D., Jeremy Montez, M.D., Jeffrey Loh-Doyle, M.D., Eila Skinner, M.D., Anne Schuckman, M.D., Donald G. Skinner, M.D., Siamak Daneshmand, M.D.: Los Angeles, CA
(Presentation to be made by Dr. Patil)

Introduction and Objective: Inferior vena cava (IVC) tumor thrombectomy is an advanced procedure requiring experienced urologic & anesthesia teams that utilize complex hemodynamic maneuvers. Patients with poor performance status prior to surgery may have high peri-operative mortality and may not benefit from an extensive surgical procedure. We determined factors associated with overall survival in patients with intrahepatic, supradiaphragmatic and selected intra-atrial thrombi that underwent IVC tumor thrombectomy without cardiopulmonary bypass by a single surgical team.

Methods: From 1978 to 2012, 87 patients underwent extirpative surgery for patients with intrahepatic, supradiaphragmatic and selected intra-atrial thrombi with intrapericardial IVC control, a maneuver utilized to eliminate morbidity associated with cardiopulmonary bypass. Patient and tumor characteristics, intraoperative variables, post-operative parameters and overall survival were analyzed. Intrapericardial control was performed in 44 cases of supradiaphragmatic tumors (intra-atrial = 9, supradiaphragmatic = 35), and 43 intrahepatic tumors (infrahepatic = 43). Extensive lymphadenectomy was performed in 78 patients. ASA was >3 in 23 patients (26.4%) and Karnofsky Status was <60 in 50.6% of patients. ECOG status was 0 or 1 in 38 patients (69.1%), 2 in 11 patients (20%), and ≥2 in 6 patients (10.9%). Only patients with clear cell renal cell carcinoma were included in survival analysis.

Results: Of 87 patients, 38 underwent successful extirpation (97%). Median Pringle maneuver time was 13.5 min (3-27). Additional procedures included IVC resection or partial interruption (n=36), IVC filter placement (n=7) and vena cavoscopy (n=16). Cavoscopy permitted visualization of residual tumor thrombus in 3 patients. Median length ventilator dependence was 1.7 day, median ICU stay was 5.6 days, and median length of stay was 12.9 days. Post-operative complications occurred in 40 patients (48.7%), including high-grade complications in 17 (20.7%). Of patients with clear cell histology, lymph node metastasis was found in 30 patients (38.5%). Median survival for pT3bN0, pT3cN0 and pN+ patients was 2.8, 1.5 and 1.3 years, respectively. On multivariate analysis, cranial extent of disease (p=0.04) and presence of distant metastasis <60 (p=0.03) were associated with worse survival. For patients with ECOG level available, this measure of performance status was associated with overall survival (p=0.001). Overall survival at 1 year for ECOG <2, 2, and ≥3 was 75.4%, 50% and 0%, respectively. In the absence of metastasis, other pathologic findings, including presence of lymph node metastasis (p=0.67), were not associated with worse survival.

Conclusion: In clear cell renal cell carcinoma with Level III-IV inferior vena cava tumor thrombus, the extent of thrombus is associated with worse overall survival. Patients with ECOG performance status 0, 1 and 2 demonstrate meaningful survival following advanced inferior vena cava tumor thrombectomy without cardiopulmonary bypass. ECOG 3 and higher is associated with extremely poor survival after surgery, and may serve as a parameter to deter attempts at heroic surgery.

Source of Funding: None
CAN RENAL MASS FEATURES ON CT PREDICT POSITIVE MARGINS?
Nick N. Tadros, M.D., Brian D. Duty, M.D., Michael J. Conlin, M.D.: Portland, OR
(Presentation to be made by Dr. Tadros)

Objectives: The C-Index, PADUA, and RENAL nephrometry scores are three standardized scoring systems commonly used to quantify renal mass complexity. These scoring systems are based upon tumor size and location. They do not take into account tumor characteristics such as heterogeneity and shape. The purpose of our study was to determine if renal mass features on computed tomography (CT) can predict margin status in patients undergoing partial nephrectomy.

Methods: This is a case-control study of patients treated by partial nephrectomy comparing patients with positive margins (cases) to those with negative margins (controls). Patients were identified from the Oregon Health & Science University tumor registry. OsiriX, an open source medical imaging application, was used to measure tumor heterogeneity, perinephric fat stranding, distinctness of the tumor/kidney interface, tumor geometric complexity (measured surface area/calculated surface area of a sphere of the same volume) and percentage of visceral fat relative to subcutaneous fat. Imaging characteristics of 15 individuals with positive margins were compared to 15 patients with negative margins.

Results: Baseline demographics (age, gender), tumor size, RENAL nephrometry score, treatment modality (open versus laparoscopic) did not differ between the two groups. On univariable and multivariable analysis, no difference was found between the two groups with regard to tumor heterogeneity, perinephric fat stranding, distinctness of the tumor/kidney interface, nephrometry score, tumor geometric complexity and percentage of visceral fat.

Conclusions: Although no difference was found in tumor characteristics between patients with and without positive surgical margins, there was a trend towards significance for tumor geometric complexity ($p=0.099$). We plan on expanding our sample size and evaluating geometric complexity as a predictor of pathologic (benign versus malignant, tumor subtype, tumor grade, and tumor stage) and surgical outcomes.

Source of Funding: None
MASSIVE POLYCYSTIC KIDNEY DISEASE: IS SIZE A CONTRAINDICATION TO LAPAROSCOPY?

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(Presentation to be made by Dr. Wisenbaugh)

Objectives: Performing a laparoscopic bilateral nephrectomy can be a daunting task in a patient with massively enlarged kidneys from autosomal dominant polycystic kidney disease. While the laparoscopic approach has been shown to reduce morbidity, some have advocated the open approach for kidneys which may be excessively enlarged. We aim to determine if size is a contraindication to undertaking a laparoscopic approach to bilateral nephrectomies.

Methods: We retrospectively reviewed medical charts for all laparoscopic bilateral nephrectomies performed at our institution. Data collected included demographics, transplantation status, indication for surgery, peri-operative data, and long-term status of renal allografts. Group 1 was classified as all patients who did not have a kidney greater than 2500g, and group 2 included all patients with at least one kidney greater than 2500g. The two groups were compared using a 2-sided T-test and Fisher’s exact test to determine any differences. Multivariate regression analysis was performed to account for confounding variables. Additionally, a subset of patients who had at least one kidney greater than 3500g was examined.

Results: A total of 68 patients were identified with a mean kidney weight of 1984g (range 197 – 5042g). Twenty four patients had at least one kidney greater than 2500g. As expected, group 2 did have significantly longer operative times than group 1 (309 vs. 264, p = 0.04), however there were no significant differences in estimated blood loss, transfusion rate, complications or length of hospitalization. A multivariate model also showed no significant association between total renal mass and complication rates. For those who underwent simultaneous renal allotransplantation, there was no difference between groups in short- or long-term graft function. Additionally, there were six patients who had at least one kidney greater than 3500g, of whom there was only one that required a blood transfusion. There were no intraoperative or postoperative Clavien grade ≥ 3 complications in this group. There were no conversions to open surgery in the entire cohort.

Conclusions: We found no association between renal size and undesirable outcomes and believe massive size should not be an absolute contraindication to attempting a laparoscopic approach to bilateral nephrectomies for polycystic kidney disease in an experienced, high-volume center.

Source of Funding: None
DETERMINANTS OF RENAL FUNCTIONAL DECLINE AFTER OPEN PARTIAL NEPHRECTOMY: A COMPARISON OF WARM, COLD, AND NON-ISCHEMIC MODALITIES

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(Presentation to be made by Dr. Derweesh)

Objective: Renal functional decline after partial nephrectomy (PN) may be related to a variety of nonmodifiable and modifiable factors, including ischemia time (IT) and modality. We sought to determine the impact of these factors on renal functional degeneration after PN.

Methods: Multicenter retrospective analysis (n=347) was performed, identifying patients who underwent open PN using warm, cold, and non-ischemic techniques. Primary outcome was development of de novo CKD (eGFR <60 ml/min/1.73 m2) at last follow up. Univariate and multivariable analysis (MVA) were performed examining factors associated with ischemia technique and the development of de novo CKD.

Results: Median follow-up 34.7 months. 241 patients underwent warm-ischemic, 31 cold-ischemic, and 75 clampless PN. Patient characteristics were similar between groups. Clampless group had lower mean RENAL scores (6.4) than cold (7.9, p=0.005) and warm (7, p=0.037) ischemia groups. Cold ischemia cohort had longer median IT than the warm cohort (50 vs. 25 min, p=0.001). There were no significant differences in proportion of patients developing de novo CKD (warm 14.9%, cold 15%, clampless 8.7%, p=0.422). MVA demonstrated that neither ischemic modality nor IT ≥30 minutes was associated with development of de novo CKD, while RENAL scores of increasing complexity (RENAL score 7-9 OR 5.44, p=0.001; RENAL score ≥10 OR 20.40, p<0.001) were independently associated with de novo CKD.

Conclusions: Increasing tumor complexity, as indicated by the RENAL score, was an overriding determinant of post PN renal functional outcome. Prospective investigation is requisite to elucidate risk and protective factors for renal functional degeneration after PN.

Source of Funding: None
DEVELOPMENT OF SURGICAL STAGE IV CHRONIC KIDNEY DISEASE AND IMPACT ON OVERALL MORTALITY IN PATIENTS WITH STAGE I RENAL CELL CARCINOMA AND WITHOUT PREOPERATIVE RENAL INSUFFICIENCY

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(Presentation to be made by Dr. Derweesh)

Purpose: We examined impact of renal surgery on development of all-cause mortality and surgical stage IV chronic kidney disease (stage IV CKD-S) in patients with stage I renal cell carcinoma (RCC) and who did not have preexisting CKD (estimated glomerular filtration rate <60 ml/min/1.73 m²).

Methods: Retrospective analysis of 524 patients [293 Radical Nephrectomy (RN)/231 Partial Nephrectomy (PN), mean age 56 years, mean follow-up 6.8 years] who underwent surgery at two institutions from 7/1992–6/2007. Data were analyzed within subgroups based on treatment. Primary endpoint was all-cause mortality. Secondary outcomes included stage IV CKD-S, cardiovascular (CV) mortality, and cancer-specific mortality. Kaplan-Meier analysis was carried out for overall survival (OS) and cancer-specific survival (CSS), between RN and PN groups, and also between groups that developed stage III CKD-S, stage IV CKD-S, and those that did not develop either. Multivariable analysis (MVA) was conducted for risk factors for all-cause mortality and for development of de novo stage IV CKD-S.

Results: No significant demographic differences were noted. Tumor size (cm) was larger for RN (4.8 vs. PN 3.3, p<0.001). Significantly more stage IV CKD-S developed in RN (15.7 % vs. PN 6.9%, p=0.002). All cause mortality was higher in RN (8.5% vs. PN 1.7%, p=0.001). CVD mortality was higher in RN (5.5% vs. 0.9%, p=0.004). Increasing postoperative CKD was associated with increased risk of death from any cause and cancer specific death. 5-year OS for the patients was 84% in patients with stage IV CKD-S, 96% with stage III CKD-S, and 100% in patients without stage III or IV CKD-S (p < 0.0001). MVA for all-cause mortality identified stage IV CKD-S (OR 27.3, p<0.001), BMI ≥30kg/m² (OR 3.7, p=0.014), hyperlipidemia (OR 3.7, p=0.039), proteinuria (OR 6.0, p=0.043), and RN (OR 6.2, p=0.007) as independent risk factors. ASA class ≥ 3 (OR 2.4,p=0.005), preoperative hyperlipidemia (OR 5.6, p<0.001), and RN (OR 2.5, p=0.003) were factors associated with the development of Stage IV CKD-S.

Conclusion: Stage IV CKD-S can develop in Stage I RCC patients without preexisting CKD, and may negatively impact overall survival. RN, preoperative hyperlipidemia and increasing ASA class are independent risk factors for development of CKD-S Stage IV. Further prospective investigation on impact of renal surgery and identification of preoperative risk factors for development of significant renal degeneration is requisite.

Source of Funding: None
Objective: Biomarkers may be useful for risk assessment and as prognostic indicators prior to and during systemic cancer therapies. We evaluated utility of platelet count (Plt) as a biomarker for response to neoadjuvant tyrosine kinase inhibitor (TKI) therapy for renal cell carcinoma (RCC).

Methods: Multicenter cohort analysis of 56 patients who initiated neoadjuvant TKI from 2005 to 2011, with median follow up 24.7 months. Plt was measured at baseline and at the end of the first TKI cycle. ΔPlt was defined as Plt after cycle 1 (PltC1) minus Plt pretreatment (PltPT). Primary outcome was response of disease to TKI, defined by RECIST criteria for partial response (PR), stable disease (SD), and progressive disease (PD). Patient clinicopathologic characteristics, ECOG performance status, and disease response were analyzed between patients with stable/increased ΔPlt (+ΔPlt) versus those with decreased ΔPlt (-ΔPlt). Plt measurements were also analyzed within subgroups of PR, SD, and PD. Multivariate analysis (MVA) was performed to analyze factors associated with SD or PD. Sensitivity and specificity were calculated for ΔPlt and disease response.

Results: Demographics, comorbidities and ECOG performance status were similar between +ΔPlt (N=13) and –ΔPlt (N=43). Baseline tumor size, number of metastases, pT stage, and tumor grade were not significantly different. Median number of TKI cycles was +ΔPlt 2 and –ΔPlt 3, p=0.21. Median months from TKI to surgery were +ΔPlt 2.9 and -ΔPlt 4.1, p=0.109. Median % reduction of primary tumor to TKI was +ΔPlt 5.6% vs. –ΔPlt 15.6%, p=0.044. There was no difference in PltPT among PR, SD, and PD. PD was more common among +ΔPlt (92%) vs. –ΔPlt (39%), with PR more common in –ΔPlt (20.9%) vs. +ΔPlt (0%), p=0.004. Kaplan Meier demonstrated overall survival was significantly less in +ΔPlt compared to -ΔPlt (p=0.004), with median survival of 5.7 and 24.2 months (p=0.087), respectively. MVA for SD/PR demonstrated -ΔPlt was associated with SD/PR, (OR 32.0, p=0.002), and ECOG performance status >1 was negatively associated with SD/PR (OR 0.115, p= 0.006). +ΔPlt had a specificity of 96.3% for PD, and –ΔPlt a 96.3% sensitivity for SD/PR.

Conclusions: Patients with –ΔPlt were more likely to respond to TKI therapy and had longer median survival. +ΔPlt had a high specificity for PD, and –ΔPlt a high sensitivity for SD/PR. Further investigation is requisite to determine the utility of ΔPlt as a biomarker for RCC response to TKI.

Source of Funding: None
Purpose: We sought to examine frequency and risk factors for infectious complications after partial nephrectomy (PN), as PN use is increasingly performed for imperative and elective indications.

Materials and Methods: Retrospective single center (UCSD Health System) analysis of all patients who underwent PN from 2000 to 2012. Surgical details including approach, operating time, estimated blood loss (EBL), and materials used for the renorrhaphy were collected for each patient. Infectious complications were reviewed and graded according to the Clavien System. These were further categorized as perioperative, short-term (<30 days), and long-term (30-90 days) complications. Primary outcome was development of infection within 30 days following PN. Multivariable analysis (MVA) was performed to examine risk factors associate with development of infection <30 days and <90days.

Results: 272 patients who underwent PN were included in the final analysis. Infectious outcomes were observed in the 30-day postoperative period in 23 patients (8.5%); 90-day infection in our patients was 10.7%. Rates of each particular 30-day complication were determined for pneumonia (2.9%), urinary tract infection (UTI, 2.6%), wound infection (2.2%), Clostridium difficile colitis (1.5%), and perinephric infection (0.4%). Trend analysis demonstrated an increase in number of PN performed between 2000-2007 and 2008-2012 (60 vs. 212), with a concomitant significant increase in mean RENAL score (6.1 vs. 7.3, p=0.001), and decrease in median EBL (250 vs 200, p=0.011), and a marginally significant decrease in 30-day infectious complication rate (13.3% vs. 7.1%, p=0.062). Duration of perioperative antibiotic administration (<24 hours vs. 24-48 hours vs. >24 hours) did not significantly affect 30-day infectious complication rate (6.7%, 0%, and 15.9%, respectively; p=0.061). Univariable analysis revealed that post-op urine leak was associated with a higher risk of 30-day infection (p=0.008), while higher rates of 90-day infection were seen in those with urine leak (p=0.006) as well as patients with RENAL nephrometry scores ≥8 (vs. <8, p=0.034) and EBL ≥250 ml (vs. <250 ml, p=0.025). MVA revealed that only urine leak was an independent factor associated with 30-day (OR 4.1, p=0.005) and 90-day infection (OR 4.4, p=0.003), while both urine leak and diabetes mellitus (OR 7.17, p=0.011) were significantly associated with 90-day postoperative UTI.

Conclusions: Despite increasing tumor complexity, there was a trend toward decreased risk of infection over time with increased volume of PN performed. Urine leak appears to be the main driver of infection in both the 30-day and 90-day postoperative period. Further prospective investigation is required to determine optimal length of antibiotic prophylaxis as well as validate such risk factors associated with postoperative infection.

Source of Funding: None
THE ACCURACY OF CT SCAN IN DIAGNOSING RENAL ARTERY PSEUDOANEURYSM FOLLOWING LAPAROSCOPIC PARTIAL NEPHRECTOMY
Devin Patel, Lang Nguyen, M.D., Daniel Linn, M.D., Thomas Jarrett, M.D.: Falls Church, VA
(Presentation to be made by Devin Patel)

Objectives: To present our experience with the use of computed tomography (CT) to aid in the early diagnosis of renal artery pseudoaneurysm following laparoscopic partial nephrectomy (LPN).

Methods: Our LPN database of 225 patients from March 2006 to August 2012 was probed for patients who underwent CT scan of the abdomen and pelvis within post-operative day (POD) 14. Clinical indications suspicious for pseudoaneurysm were defined as flank pain, bleeding or gross hematuria. Bleeding was defined as either dropping serial hematocrit, increase in surgical drain site output or hypotension.

Results: We identified 31 patients (13.7%) who were scanned within POD 14. The mean age of our cohort was 53.5 (32-75), mean BMI 26.0 (17.7-43.1), mean operative minutes 237.8 (164-342) and mean milliliters blood loss 226.9 (50-500). Among this group, thirteen had an initial suspicious clinical picture including flank pain (6), bleeding (4), or gross hematuria (3). Four patients (1.7%) ultimately developed pseudoaneurysm that was diagnosed on CT scan. All were successfully treated with either coil (2) or embolization (2). In the six patients presenting with flank pain, mean time to scan was POD 2. None were initially diagnosed with pseudoaneurysm. One patient presented initially on POD5 developed gross hematuria on POD 8 and then found on repeat CT scan to have a pseudoaneurysm. A second presented initially on POD1 developed gross hematuria on POD3 and went directly for arteriography, at which time a pseudoaneurysm was found. In the four patients with bleeding, mean time to scan was POD 2. None were found to have a pseudoaneurysm on initial or follow-up CT and required no further intervention. In the three patients scanned initially for hematuria, the mean scan was on POD 11. Of these patients, 2 had a clinically significant pseudoaneurysm.

Conclusions: Early identification and proper management can help reduce the potential morbidity associated with renal artery pseudoaneurysm following partial nephrectomy. Our experience indicates that the diagnostic yield of a CT scan within the first 5 post-operative days in patients who present with flank pain or bleeding suspicion without hematuria may be limited. However, in patients presenting with gross hematuria further out in the post-operative course, a CT scan is an effective diagnostic tool to quickly implement life saving intervention.

Source of Funding: None
RISK FACTORS OF NEPHRECTOMY AT PC-RPLND: SINGLE INSTITUTION CASES SERIES
Claudio Jeldres, M.D. M.Sc., Richard Johnston, M.D. Ph.D., Angela Wilson, Christopher Porter, M.D.: Seattle, WA
(Presentation to be made by Dr. Jeldres)

Purpose: Retroperitoneal lymph node dissection (RPLND), in the setting of testicular germ cell tumor exposes patients to a wide range of potential complications, such as adjuvant nephrectomy. Limited published data from single institution series estimate the risk of nephrectomy during an RPLND at 5-10%. We examined the rates of nephrectomy at our Institution and explore potential risk factors.

Materials and Methods: We retrospectively examined all patients undergoing RPLND for testicular cancer at Virginia Mason Medical Center between 2005-2012. We reviewed pre-operative radiological features of the tumors (size, location, changes after chemotherapy) as well as their clinical, pathological and biochemical characteristics. Descriptive statistics and cross tabulation were used to analyze the data.

Results: Of 79 RPLND performed at VMMC between 2005-2012, 6 (7.6%) patients underwent nephrectomy (left kidney 6/6) at RPLND. All cases were post-chemotherapy RPLND (BEP x 3 or 4) for advanced mixed germ cell tumors (Stage IIB to Stage IIIC). None of the clinical characteristics or orchiectomy features were consistent among the six patients nor differed significantly from those without nephrectomy. At pre-operative CT, median size of the predominant residual mass was 5.1 cm (range 2.5-12 cm) vs. 2.5 cm (range 0.5-8.5) among those without nephrectomy. The main common radiological features (5/6) were: (1) presence of disease in the supra hiliar region and (2) encasement the renal artery and/or vein. The exception was one patient who had a complete left ureter tumor encasement. Median follow-up was 2.8 years. Median serum creatinine levels increased from pre-op 0.8 (range 0.7-0.97) to 1.3 (range 1.2-1.8) mg/dl at last follow-up. Our findings were limited by the sample size.

Conclusions: Nephrectomy at RPLND was performed in patients with advanced disease, and where all left side. Radiological signs of renal hiliar involvement were consistent across the group, and the loss of a renal unit resulted in higher baseline serum creatinine levels after chemotherapy and surgery. Further characterization of those at higher risk of nephrectomy at RPLND will need a multi-institutional effort.

Source of Funding: None
**HOW ACCURATE IS ENDOSCOPIC INTRA-OPERATIVE ASSESSMENT OF KIDNEY STONE SIZE?**


(Presentation to be made by Dr. Patel)

**Introduction and Objective:** Endoscopic treatment of renal calculi often relies on surgeon assessment of residual stone fragment size for either basket removal or for the passage of fragments post-operatively. Stone fragments are left behind as either “insignificant” residual fragments or to pass post-operatively. We therefore sought to determine the accuracy of endoscopic assessment of renal calculi size.

**Methods:** Four Five board certified endourologists participated in an ex vivo artificial endoscopic simulation. A total of 10 pebbles were obtained by non-participating urologist (NP). Each stone was measured (mm) by non-participating urologist (NDP) with electronic calipers and placed into separate labeled opaque test tubes to prevent visualization of the stones through the side of the tube by this urologist. These Endourologists results were blinded from the endourologiststo the actual size of the stones. The endourologists then placed aA flexible digital ureteroscope with a 200- micron laser fiber in the working channel (used as a size reference was placed) thru the ureteroscope into the test tube to estimate the stone size (mm). Accuracy was determined by comparing the mean measurements to the true measurements.

**Results:**

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<th>Endo 2</th>
<th>Endo 3</th>
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**Conclusions:** This ex-vivo simulation study demonstrates that endoscopic assessment is relatively reliable when assessing stone size. On average, there was a slight tendency to over-estimate stone size by 0.05 2mm. These findings could be generalized to state that endourologists are accurately able to assess residual stone fragment size intra-operatively.

**Source of Funding:** None
MICRO ARCHITECTURE OF RANDALL PLAQUES USING ADVANCED IMAGING TECHNIQUES
Sarah D. Blaschko, M.D., Thomas Chi, M.D., Joe Miller, M.D.,
Sirine Fakra, M.S.*, Marshall L. Stoller, M.D.: San Francisco, CA
(Presentation to be made by Dr. Blaschko)

Purpose: Randall plaques are thought to serve as a nidus of stone formation that ultimately erode from the renal papilla into the collecting system leading to a symptomatic stone. Little is known about the micro architecture and trace elements present in Randall plaques. We utilized synchrotron based X-ray fluorescence (XRF), X-ray absorption (XAS), and X-ray diffraction (XRD) techniques to evaluate in situ Randall plaques endoscopically biopsied with surrounding human renal papilla tissue. We postulate that knowledge of the trace elements present and the details of their incorporation in Randall plaques may provide additional insight into lithogenesis.

Materials and Methods: Human stone samples were obtained during percutaneous nephrolithotomy. Subepithelial Randall plaques were removed in situ with their surrounding tissue via endoscopic biopsy. XRF, XAS, and XRD measurements were carried out at the Advanced Light Source synchrotron radiation facility at the Lawrence Berkeley National Laboratory to examine the presence, spatial distribution, and speciation of the constituent elements in the Randall plaques and whole stone sample from the same patient.

Results: The main components of the Randall plaques identified were calcium, zinc, and strontium with trace amounts of iron and chromium. Calcium, zinc, and strontium co-localized in the Randall plaques. XRD and calcium XAS confirmed the specimen to be hydroxylapatite. Zinc XAS showed its incorporation into the hydroxylapatite crystal lattice.

Conclusions: Our findings may point to the critical role of trace metals incorporated into Randall plaques during early lithogenesis. Exact distribution, speciation, and elemental incorporation of these metals are demonstrated by advanced x-ray imaging techniques.

Source of Funding: None
LASER-GUIDED PERCUTANEOUS ACCESS: A NOVEL TECHNIQUE EVALUATED IN A BENCHTOP MODEL


(Presentation to be made by Dr. Lightfoot)

Purpose: Fluoroscopy is commonly used to obtain percutaneous access prior to percutaneous nephrolithotomy. However, this technique accounts for a substantial percentage of the procedure radiation exposure. In an attempt to minimize radiation dose during percutaneous access, a novel laser-guided technique has been developed at our institution. The purpose of this paper is to compare this technique to the conventional “bullseye” technique using a benchtop model.

Materials and Methods: In the novel laser-guided technique, fluoroscopy was used only for selecting the skin site above the calyx with the C-arm rotated at 30° towards the operator. The access needle was placed so that the tip was at the site where the laser contacted the skin and the hub was in-line with the laser beam. The needle was inserted with tactile feedback to the appropriate depth, which was then confirmed with a pulse of fluoroscopy at 30° away from the operator. This technique was then compared to the conventional “bullseye” technique in a randomized-controlled benchtop model. Eleven subjects of varying experience with percutaneous access obtained entry into the upper, middle, or lower pole. Endpoints measured included insertion time, number of puncture attempts, number of course corrections, fluoroscopy time, and subjective procedural difficulty (1-10). Paired samples and the Wilcoxon Signed Rank Tests were used for statistical analysis with alpha set to 0.05.

Results: A total of 33 conventional and 33 laser-guided attempts were recorded and all were ultimately successful. No statistical difference was seen between techniques in regard to insertion time (p = 0.509), puncture attempts (p = 0.705), or number of course corrections (p = 0.520). However, the novel laser technique displayed a significantly lower average fluoroscopy time (6.3 vs 18.7 seconds; p < 0.001) and was rated as significantly easier to perform on the difficulty scale (2.8 vs. 4.4; p = 0.002).

Conclusions: This benchtop study demonstrates that this novel laser-guided technique was significantly easier to perform and reduced fluoroscopy time by 66%. Therefore, we feel that this technique is a promising new option for percutaneous renal access.

Source of Funding: None
DEVELOPMENT OF AUTOMATED KIDNEY STONE DETECTION USING A RESEARCH-BASED ULTRASOUND IMAGER
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(Presentation to be made by Dr. Lee)

Purpose: CT remains the gold standard for the detection of kidney stones but there are concerns regarding radiation risk. Ultrasound does not generate ionizing radiation, but its performance is operator dependent. Existing ultrasound systems are optimized for characterizing soft tissue inhomogeneities and blood flow, not hard structures such as stones. However, using our research ultrasound engine, we have developed the capability to excite and detect an ultrasound echo unique to stones and therefore automatically demarcate stones on the image. The purpose of this study was to evaluate the performance characteristics of a research-based ultrasound imager and develop algorithms to improve kidney stone detection.

Materials and Methods: Patients referred for the evaluation of kidney stones with a prior CT (within 60 days) were recruited to undergo a renal ultrasound study with the Verasonics ultrasound imager. The Verasonics device has a research based platform and allows for the radiofrequency data to be captured and processed. Blinded reviewers of the CT and ultrasound images separately recorded the location of each stone within the upper, middle, lower poles, and the renal pelvis/UPJ. Performance characteristics were calculated based on whether a stone or stones were seen (yes/no) in each of the four regions. The raw data from selected true positive and false positive stones were analyzed and processed using new algorithms. The first new algorithm rescaled B mode data and added color to the image on bright echoes apparent on stones. The second algorithm used Doppler mode and processing similar to that which produces twinkling artifact.

Results: In 9 patients with 17 renal units, there were 27 stones with mean size 4.4 ±3.3 mm. Compared to CT, the research ultrasound imager had a sensitivity of 80.0%, specificity 89.6%, PPV 76.2%, and NPV 91.5% with B mode alone. With the first algorithm, false positive stones showed many fewer pixels of color than with true positive stones. With the second algorithm, little or no color appeared on the stone image on false positives, but was present on true positive stones. Thus, the second algorithm correctly avoids identifying a false positive as a true positive stone.

Conclusions: The performance characteristics of the Verasonics research ultrasound imager compares favorably to commercially available ultrasound machines. The raw signal data captured by the ultrasound machine can be used to develop algorithms to reduce false positives and improve the accuracy of stone detection.

Source of Funding: Work supported by NIH DK43881, DK092197 and NSBRI through NASA NCC 9-58.
Purpose: Medical expulsion therapy (MET) with alpha-adrenergic blockade (AB) is an established treatment option for ureteral stones. However, utilization rates remain low. Specific reasons for this remain largely unknown. We hypothesized that low utilization of MET would be most pronounced in women as AB medications are routinely used for men with urologic conditions.

Materials and Methods: Retrospective chart review of adults with an ED diagnosis of acute ureteral stone disease between 2006-2012 was undertaken to identify variables related to presentation, history, management, and disposition.

Results: Between 2006-2012, 672 patients were discharged from our ED with a diagnosis of ureteral stone disease. 57% of patients were discharged with MET. Male sex was independently associated with discharge with MET compared to female sex (OR 1.86, 95% CI 1.33-2.6). Use of imaging (computerized tomography or ultrasound) for diagnosis was also independently associated with MET use compared to patients with a clinical diagnosis alone (OR 1.85, 95% CI 1.14-2.94). Age, race, primary language, occupation, history of stone disease, hematuria, and pain at presentation were not associated with MET utilization. Analyses of trends of MET utilization found that rates of use to have peaked and stabilized since 2008.

Conclusions: In a tertiary care ED, MET use remains low and women are nearly half as likely to be discharged with MET compared to men. This may be due to providers’ perception that AB agents are for male urologic conditions only. Rates of MET use have stabilized since 2008, suggesting that increased awareness and education regarding proper utilization of MET, particularly in women, is important to promote appropriate, increased use amongst ED care providers.

Source of Funding: None
Introduction: American adults are increasingly turning to the web to obtain health-care related information. The quality of treatment related information online, however, remains variable. DISCERN is a standardized and validated tool developed for clinicians and for health-care consumers to evaluate the quality of information regarding treatment choice. We use the DISCERN instrument to examine available online information for common urologic conditions.

Methods: A Google-based search was performed for 13 common urologic conditions: benign prostatic hyperplasia, bladder cancer, bladder prolapse, erectile dysfunction, hematuria, incontinence, interstitial cystitis, kidney cancer, kidney stones, overactive bladder, prostate cancer, prostatitis, and urinary tract infections. Search queries were performed for each urologic condition; every website in the first two pages of results was quantified, and after exclusions, evaluated using the validated 16-item DISCERN questionnaire.

Results: 279 websites were identified, 181 websites were reviewed. The most commonly reason for exclusion was commercial advertisements (35%). The DISCERN tool rated 12% of websites as excellent (a DISCERN average of 4 - 5), 28% as good (average 3 - 4), 38% as fair (average 2 - 3), 23% as poor (average 1 - 2), and none as very poor (average 0 - 1). The highest mean DISCERN score was 3.55 (95% CI 3.11, 3.98) for benign prostatic hyperplasia and the lowest was 1.56 (95% CI 1.35, 1.78) for hematuria. The best scoring website was http://emedicine.medscape.com at 3.79 (95% CI 2.81, 4.76).

Conclusion: Although typically fair, there is significant variability in the quality of treatment related websites for common urologic conditions. The urologic community should be more actively involved in developing and advocating the use of high quality publications and websites to better inform and involve patients in the shared decision making process.

Source of Funding: None
INTERVENTIONAL RADIOLOGIST-DIRECTED PERCUTANEOUS RENAL ACCESS PERFORMED AT AN OUTSIDE INSTITUTION IS RARELY ACCEPTABLE FOR PERCUTANEOUS NEPHROLITHOTOMY

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(Presentation to be made by Andrew Callen)

Objectives: While most patients undergoing percutaneous nephrolithotomy (PNL) have renal access performed at the time of their intervention, some require nephrostomy tube placement prior to definitive surgery. The goal of this study was to identify predictors for which of these percutaneous renal access tracts was appropriate for PNL.

Methods: PNL cases consecutively performed at our institution between 2005 and 2012 were identified. Patients who required nephrostomy tube placement at an outside institution prior to surgery were identified. Patient clinical data was examined including what type of physician (interventional radiologist versus urologist) had placed the percutaneous drainage tube and this tract was appropriate and used for renal access. Primary outcome measures included change in hematocrit, GFR, length of stay, fever, and complication rates.

Results: 68 patients (18% of total) were identified who had required percutaneous drainage prior to surgery. Patients with a previously placed percutaneous nephrostomy tube had a significantly smaller drop in hematocrit 24 hours after their surgery (-4.1 vs -6.0 points, p<.05) but no difference in other primary outcomes. Of those previously placed nephrostomy tubes, 33 had their existing tract dilated during PNL, and 35 were deemed to be inappropriate and not used. For these 35 cases requiring a new percutaneous access, a higher rate of post-operative fever (23% vs 6% p<.05) and a greater drop in GFR 24 hours post-procedure (-8.61 vs 1.28, p>.05) were seen. In patients with preexisting drainage tubes in place, the majority (75%) of their tubes had been placed by interventional radiologists, while the remaining 25% of tubes were placed by urologists. More than half of the tubes (55%) placed by interventional radiology were inappropriate and unusable for percutaneous renal access and patients underwent a new percutaneous access to perform PNL at the time of their surgery. In contrast, 59% of percutaneous access obtained by prior urologists were appropriate for dilation and renal access (p<0.05).

Conclusions: While patients with pre-existing nephrostomy tubes prior to PNL may have lower rates of bleeding compared to those patients requiring a new puncture, renal access tracts must be carefully evaluated and selected for dilation at the time of PNL. Interventional radiologist-directed renal access results in lower rates of appropriately placed nephrostomy tubes useable for PNL when compared to urologist-placed tubes.

Source of Funding: None
ENDOSCOPIC VALVE LEAK POINT PRESSURE AND INSTRUMENT ADVANCEMENT FORCE

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(Presentation to be made by Dr. Taylor)

Introduction: To measure and compare the leak point pressure (LPP) and instrument advancement force (IAF) of three commercially available endoscopic valves.

Methods: The LPP and IAF of the US Urology UroSeal, the Applied Medical Sureseal II, and the Gyrus ACMI Biopsy Port Seal were measured and compared. LPP was defined as the infusion pressure at which the first drops of irrigation fluid were observed to leak around the working instrument at the instrument insertion opening of the endoscopic valve. IAF was defined as the force required to advance the working instrument through the endoscopic valve to a fixed distance of 83 cm. Working instruments tested included a 0.035” PTFE guide wire, a 0.035” glidewire, a 200 μm and a 365 μm laser fiber, and a 1.9F nitinol stone basket. A single operator performed all measurements and each trial was repeated three times for each instrument, in each endoscopic valve. Results were compared using single-factor ANOVA, with a p-value <0.05 considered statistically significant.

Results: The UroSeal demonstrated the lowest LPP with all instruments tested. The Biopsy Port Seal demonstrated the highest LPP, and did not leak at pressures ≥ 10 atm with most working instruments. The IAF of the Biopsy Port Seal was significantly higher for 4 of 5 working instruments tested, often requiring 3-times the IAF of the UroSeal and the Sureseal II. The UroSeal consistently demonstrated the lowest IAF with all instruments tested.

Conclusions: Commercially available endoscopic valves differ in LPP and IAF, and each may be uniquely suited to specific clinical applications. The Biopsy Port Seal permits high-pressure irrigation without leakage, but requires significantly more force to advance most working instruments. The UroSeal leaks at lower pressures than other endoscopic valves, but permits easier advancement of all working instruments.

Source of Funding: None
Purpose: Non-contrast computed tomography (CT) is the study of choice for evaluating urinary calculi, however, this modality results in significant patient radiation exposure. Although low-dose CT protocols have been shown to have high sensitivity and specificity for detection of dense calcium oxalate ureteral stones, the ability of low-dose CT to diagnose less dense uric acid stones has not been well characterized. The purpose of this study is to determine the detection rates of low-dose CT for uric acid ureteral stones.

Materials and Methods: Uric acid stones ranging from 3-7 mm were prospectively placed into seven intact urinary systems creating 523 total scanned stones. The intact urinary tracts were placed into a male cadaver (BMI 27.1 kg/m²) and CT imaging was performed at various settings ranging from 140 to 5 milliampere-seconds (mAs), while holding all other imaging parameters constant. CT images were reviewed by a single blinded radiologist. The Wilson score method was used to compare sensitivity and specificity between different mAs settings.

Results: Overall sensitivity and specificity were 89% and 91%, respectively. Imaging using 140, 70, 50, 30, 15, 7.5, and 5 mAs settings resulted in 97%, 97%, 96%, 93%, 83%, 83%, and 70% sensitivity, and 92%, 92%, 91%, 89%, 88%, 91%, and 94% specificity, respectively. False negatives were more frequent among 3 mm stones compared to 5 and 7 mm stones (p = 0.01).

Conclusions: Low and conventional-dose CT both demonstrate excellent sensitivity and specificity for the detection of uric acid ureteral stones. Detection of 3 mm uric acid stones is compromised at ultra low-dose (< 30 mAs) settings.

Source of Funding: None
PREVALENCE OF MULTIDRUG RESISTANT BACTERURIA IN PATIENTS UNDERGOING PERCUTANEOUS NEPHROLITHOTOMY

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(Presentation to be made by Dr. Raheem)

Purpose: American Urological Association (AUA) Best Practice guidelines exist to minimize infectious complications from percutaneous nephrolithotomy (PCNL). However, multidrug resistance bacteruria (MDR bacteruria) is becoming an evolving problem in patients undergoing PCNL and contribute to significant co-morbidity at our institution. We sought to document the prevalence of MDR bacteruria in patients whom underwent PCNL at our institution.

Materials and Methods: We retrospectively reviewed all subjects who underwent PCNL in 2011 performed by single surgeon (RLS). A detailed analysis of patients’ preoperative and postoperative urine cultures, microbial resistances and antibiotics treatment was performed. Multidrug resistance was defined as resistance to three or more of the AUA Best Practice Statement antimicrobial treatment for PCNL.*

Results: A total of 27 PCNL subjects were analyzed with 15 males and median age 50. Ten (37%) subjects developed MDR bacteruria (9 pre op MDR and 3 post op MDR). There was a total of 21 different type of MDR pathogens. The most common MDR pathogens were E. Coli (6/21, 29%), Proteus Mirabilis (2/21, 10%) and coagulase negative Staphylococcus (2/21, 10%). 7/9 pre-operative MDR patients did not develop MDR bacteruria post-operatively. One patient without pre-operative MDR bacteruria developed MDR bacteruria post-operatively. Ciprofloxacin resistance was noted in all MDR patients.

Conclusions: This study demonstrates the relatively high prevalence of MDR bacteruria in our PCNL population. It reinforces the need for identification of pre-operative bacteruria as well as the appropriate management of the bacteruria. Resistance to common antimicrobials is a serious concern for the kidney stone population and warrants further investigations.

Source of Funding: None

Introduction: Hydronephrosis is commonly diagnosed with ultrasound imaging in the ambulatory care setting. Without prior comparative imaging studies the acute or chronic nature of hydronephrosis cannot be determined. We present the results of a study to determine the renal sinus fat thickness as seen on ultrasound imaging in patients with acute or chronic hydronephrosis.

Materials and Methods: Representative longitudinal renal ultrasound images of patients presenting to the ambulatory care setting with an ultrasound-documented diagnosis of hydronephrosis were obtained for analysis. Acute hydronephrosis was defined as hydronephrosis documented for 6 months or less. Chronic hydronephrosis was defined as hydronephrosis documented for more than 6 months. ImageJ software (National Institutes of Health, Bethesda, MD) was used to set a 100 mm scale according to reference scales on the renal ultrasound image. Linear measurements of the maximum renal sinus fat were then made during two separate analytic sessions, and performed by two blinded and independent readers. Intra-reader and inter-reader reliability were calculated using intra-class correlation coefficients. Bland-Altman assessment for agreement was also used to compare measurements. Unpaired T-test was used to compare the mean maximum renal sinus fat thickness of patients with acute hydronephrosis to those with chronic hydronephrosis, with $p<0.05$ considered statistically significant.

Results: Fifty representative images were obtained for analysis, including 27 images from patients with acute hydronephrosis and 23 images from patients with chronic hydronephrosis. Demographic, anthropometric and clinical variables were similar between the groups. Mean maximum renal sinus fat thickness of patients with acute hydronephrosis was 9.1 mm (SD= 2.6), while the mean maximum renal sinus fat thickness of patients with chronic hydronephrosis was significantly less at 5.8 mm (SD=1.3, $p<0.001$). The intra-reader intra-class correlation coefficient was 0.98 and the inter-reader intra-class correlation coefficient was 0.93. The Bland-Altman analysis indicated agreement between the measurements.

Conclusions: Longitudinal renal ultrasound images can be used to obtain maximum renal sinus fat measurements in a reliable fashion. The maximum renal sinus fat thickness of patients with chronic hydronephrosis is significantly less than that of patients with acute hydronephrosis. These data may be used to help determine the acute or chronic nature of hydronephrosis and may aid in clinical decision-making.

Source of Funding: None
Intra and Extra-Renal Autonomic Nervous System Redefined

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(Presentation to be made by Dr. Okhunov)

Introduction: The role of the autonomic nervous supply to the kidneys is known to be involved in the development of several diseases, including hypertension. The neural distribution at the segmental vessels and intra-renal vasculature has not been well characterized. Herein, we evaluated the autonomic nerve distribution from the great vessels to the renal cortex in a cadaveric model.

Methods: We performed a detailed anatomic nerve dissection from the inferior mesenteric artery to the renal operculum in two human cadaveric torsos. Autonomic nerve fibers were verified by dissecting the greater splanchnic, sympathetic trunk and ganglia. We then systematically cross-sectioned the kidneys in twelve 1mm slices across a total 3.6 cm, and stained the slices for histopathologic analysis of neural tissue in relation to segmental arteries and other anatomic landmarks. Advanced reconstructive software (SolidWorks; Waltham, MA, USA) was used to create a three dimensional computer image of the nerves in relation to arteries, veins, and the collecting system.

Results: On the main renal arteries and segmental arteries autonomic nerve fibers are located almost exclusively anteriorly with only rare fibers wrapping posteriorly. No nerve fibers ran with veins. Once within the parenchyma, histopathology revealed that the intra-renal nerves continued to track with the arteries but were more distributed circumferentially around the arteries. The nerve to the lumen intima distance of the arteries decreased from 0.91mm to 0.36mm from the medial to lateral slides. While the nerve tissue did not run with the collecting system, the proximity of the collecting system put most nerves within a few millimeters. The mean distance of the nerves to the renal collecting system components was 7mm [range 0.69–21.4mm].

Conclusion: The autonomic nerves supplying the kidney maintain their distribution almost exclusively along the anterior surface of arteries as they pass from the aorta to the segmental arteries. Once inside the renal parenchyma, the nerves are circumferentially distributed around the renal arteries and are in close proximity to the renal collecting system.

Source of Funding: None
Background: In approximately 74% of cases, intratesticular masses in pediatric patients are benign. Here, we present a case of a young boy with an intratesticular cyst that was followed by serial ultrasounds. This presentation is uncommon as the majority of cases are immediately referred to a pediatric urologist and resected when diagnosed. This case illustrates the natural history of a cystic intratesticular mass sonographically from infancy into early childhood.

Case: A 2 month old full-term boy with bilateral descended testes was noted by the pediatrician to have nontender, nonerythematous swelling of the right testis. An ultrasound identified a 1.7x1.1x1 cm ovoid, anechoic, avascular, intratesticular cystic mass with an imperceptible wall surrounded by normal-appearing testicular tissue, described as a simple intratesticular cyst. One year later, an ultrasound demonstrated a 1.6x0.8x1.4 centimeter cystic ovoid mass with an echogenic, thickened wall but with a lack of solid components. Two years later, an ultrasound demonstrated a 0.9x0.5x0.8 centimeter heterogeneous mass with multiple non-shadowing echogenic regions. At this time, he was evaluated by a pediatric urologist. On exam, there was an enlarged right testis with a discrete palpable region of firmness. αFP and HCG were within normal limits; LDH was mildly elevated. Intraoperatively, the right testis was delivered through an inguinal incision and the mass was excised in its entirety. The frozen section was reported as consistent with epidermoid cyst, at which time the partial orchiectomy was completed. Final pathology confirmed the diagnosis of epidermoid cyst with normal testicular biopsy tissue.

Discussion: Pediatric testis tumors are rare with a reported incidence of 0.5-1 per 100,000. In case series, up to 74% of intratesticular masses are benign, with >95% of cystic masses also benign. There is a paucity of experience when it comes to observation of these lesions. In our case, sonographic changes in the cyst correlated with a higher probability of malignancy given development of heterogeneity and solid components. In this regard, epidermoid cysts appear particularly challenging to manage, as the natural course of the lesion may evolve with time, as epithelial desquamation of the wall produces keratin that is deposited in successive layers allowing maturation of the cyst from outer to inner layers. Hence, despite their benign nature, younger lesions may contain fewer keratin layers and appear more cystic, with later appearance being increasingly solid on imaging studies.

Conclusion: In summary, we present a rare case of a prepubertal boy with an intratesticular epidermoid cyst was monitored with serial ultrasounds. The longitudinal evolution of the mass was reviewed and the surgical procedure discussed. This case highlights the potential for changes in a cystic intratesticular structure over time, even if benign, and reiterates the role in conservative management strategies of these lesions, including the role of management when resected via testis sparing procedures.
HOME PRESSURE AND VOLUME MEASUREMENT AS A SCREENING INSTRUMENT TO IDENTIFY PATIENTS WITH SAFE INTRAVESICAL PRESSURES: A PROSPECTIVE VALIDATION STUDY

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(Presentation to be made by Dr. Hidas)

Purpose: We had clean intermittent catheterization (CIC) dependant patients use a simple ruler-based manometer to measure their intravesical home pressures prior to leakage or prior to scheduled drainage at home. These patients and their families generated a bladder pressure and volume diary (PVD). The aim of this study is to evaluate the ability of PVD to identify patients at low risk for having high bladder pressures measured during urodynamic study (UDS).

Methods: We prospectively collected clinical, urodynamic, and home PVD data in children with spina bifida. Patients were asked to use a ruler to measure the height of the column of urine within the CIC catheter, with the zero centimeter mark at the urethral meatus in females and at the penoscrotal angle in males. Measurements were taken in the supine position with relaxed abdominal muscles. We defined abnormal intravesical pressures as Pdet pressures above 30cmH2O as measured by UDS. ROC Curves were plotted to correlate different PVD variables with abnormal intravesical pressures.

Results: 30 children with spina bifida were included in the study. Mean age was 10 years (range 1-20 years). Home pressures measured at maximal CIC volume and mean PVD pressures were found to be the most reliable variables to predict UDS pressures above 30cmH2O [AUC 0.93(p=0.001) and AUC 0.87 (p=0.02) respectively]. Home pressure measured at maximal CIC volume below 20cmH2O was associated with normal bladder pressures (UDS pressures below 30cmH2O) with sensitivity of 100% and specificity of 80%.

Conclusion: Home ruler pressure below 20 cmH2O provides a reliable measurement of safe bladder pressures. PVD is easy to perform, and is useful to monitor and screen bladder pressures of patients already performing CIC at home with no additional morbidity or cost. Patients with low pressures on PVD may be followed without multichannel UDS.

Source of Funding: None
THE COMBINATION OF ADULT AND PEDIATRIC SURGERY TECHNIQUES FOR A NEW PENOSCORTAL HYPOSPADIUS REPAIR

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(Presentation to be made by Dr. Horan)

Introduction: A 19 y.o. adult with penoscrotal hypospadius and severe curvature occasioned a review of the literature. It revealed that successful urethral repairs did not repair the curvature and vice versa. Adult urology’s repair of Peyronie’s disease with Gortex patches over the incised plaque made more sense than the Nesbit counter-plication for the curvature. A graft of transitional cell tissue from the bladder as reported by the Chinese in 1995 seemed better than the popular buccal mucosa. Two stages were better than one.

Materials and Methods: On 9/10/2013 the penis was straightened and the urethra separated dorsally from the under-induced corpus spongiosum; the flimsy urethra contracted down to the penoscrotal junction. The now exposed ventral surfaces of the two corpus cavernosae were then incised across the axis in two places. When the penis was pulled straight, two elliptical wounds down to the erectile tissue resulted. These were closed with Gortex patches sewn in with a vascular suture. The resultant penis was longer and straighter. The Gortex patches were covered by pedicles of well vascularized subcutaneous fibrous tissue.

A Pfannenstiel incision was taken down to the bladder which had been filled with 150 cc's of saline. The future neo-urethra was marked with 4 sutures and incised with generous length and borders. A suprapubic #18 Foley catheter was drawn into the bladder through a separate incision. The harvested urothelium was packed in ice and the bladder wound closed.

The urothelium was then sutured to the glans area and to the retracted urethra in a Y-V configuration. It was anchored at its mid-point and then wrapped around an 18 Foley all silicone catheter. Lateral pedicles derived from Scarpa’s fascia were brought over the neo-urethra followed by skin using 4-0 monocryl. A modest attempt was made to close the ventral gap at the penoscrotal junction of the old and new urethra.

A month later on 11/13/2012 the retracted old urethral meatus, which was leaking, was circled widely. The resultant flaps of glabrous skin were closed over a #16 Foley catheter introduced on a stylet from the meatus at the glans to the bladder. Dartos muscle from the adjacent scrotum was criss-crossed over the closure and then the skin was closed.

A month later, he was brought back for urethroscopy prior to catheter removal. Proud flesh seemed to block the urethra at the junction of old and new urethra. But, when the pediatric scope was withdrawn, a column of irrigant hit the scrub nurse in the eye. This proved the patency of the new and old urethra. On a subsequent visit he worried only about his short penis, not the strength of his urinary stream.

Conclusion: Adult urology can inform pediatric urology and vice versa.

Source of Funding: None
OUTCOMES OF ILEOCECOCYSTOPLASTY VS. OTHER TYPES OF CONTINENT CATHETERIZABLE CHANNELS IN ADULTS
(A MULTI-INSTITUTIONAL OUTCOMES STUDY)
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(Presentation to be made by Jeffrey Redshaw)

Purpose: To compare the rates of subsequent procedures for leakage or obstruction in adults undergoing ileoceccystoplasty (IC) versus other types of continent catheterizable channels with or without augmentation. IC is unique among channels in that the ileocecal valve provides continence, rather than a detrusor tunnel. The outcomes of a variety of continent catheterizable channels are well-described in children but little is known about these outcomes in adults. Among the factors that make the adult population unique: (1) both the appendix and a single Monti channel are often too short, meaning the creation of a double Monti or spiral Monti may be required; the IC may offer a straighter and better vascularized channel reducing stenosis rates and catheterization problems; (2) chronic cystitis often complicates the creation of a detrusor tunnel; because the IC relies on a physiological continent mechanism provided by the ileocecal valve rather tunneling it may offer improved continence.

Materials and Methods: A retrospective review was performed of all adult patients who underwent construction of a catheterizable channel at the Universities of Utah, Minnesota, Iowa, and Stanford University and had at least 6 months of follow-up. Patients undergoing hybrid channel creation, such as IC with addition of a Monti in order to reach the abdominal wall were excluded. Patient demographics, post-operative complications, concurrent operations, continence outcomes, interventions for obstruction, and presentation to an emergency department due to urinary retention and an inability to catheterize were collected for each patient. Our primary outcome was the need for an additional procedure to correct continence or obstruction. Statistical methods included chi-square for comparison of frequencies and multivariate logistic regression controlling for age, BMI, and gender.

Results: 54 patients met inclusion criteria. 28 patients underwent IC. The comparison cohort was composed of spiral Monti (n = 9), large bowel Monti (n=1), appendicovesicostomy (n=5), and tapered ileum channels (n=9). There was no difference in mean age or BMI between the two groups. Median follow up for the two groups was 16.5 months for IC and 15 months for other channels. Three patients were not included in the analysis, one due to a fatal post-operative event, and the other two because of complications requiring takedown of the channel in the immediate post-operative period. 17% (5/28) who underwent IC required a subsequent procedure on their catheterizable channel compared with 47.8% (11/23) in the comparison group, (P=0.034). A trend in lower rate of leakage requiring intervention was observed in the IC cohort, 7.1% (2/28) compared with 30.4% (7/23), (P=0.061). No difference in obstruction requiring intervention was observed between the two groups. The adjusted OR for intervention on the catheterizable channel was 0.22, (P=0.034, 95% CI 0.055 to 0.893) for IC versus other. Patients with IC had an adjusted OR for undergoing a procedure to improve urinary leakage of 0.163, (P=0.049, 95% CI 0.027 to 0.989) versus other. A statistical difference in overall postoperative complications was not observed between the two groups with complication rates of 50% and 36% for IC and other respectively. In the other channel cohort, a trend toward higher severity complications (Clavian III-V) was observed with 6 patients in this group experiencing a serious post operative complication compared with 3 in the IC cohort (P=0.092).

Conclusions: IC provides a reliable bladder augmentation and continent channel creation with less need for subsequent revision procedures compared to other techniques.

Source of Funding: None
Improvised explosive device explosion is the most common mechanism of injury in Operation Enduring Freedom (OEF) with severe soft tissue injury to the lower extremities and amputation common in survivors. As a result of the upward blast wave, external genitalia trauma has become increasingly more common compared with historical data for both OEF and Operation Iraqi Freedom, necessitating the routine deployment of a urologist to Afghanistan beginning in late 2010. The Naval Health Research Center (NHRC), Expeditionary Medical Encounter Database (EMED), which contains coded injury data from combat theater for all levels of medical care, was queried for ICD-9 codes specific to urologic injuries occurring during OEF from January 2010 to June 2012. During the study period, 526 US casualties sustained 992 urologic injuries with the majority being men (523, 99%) serving in the US Army (286, 54%). 79% (417) were dismounted at the time of injury and were injured by a blast mechanism (462, 88%). Of the 992 urologic injuries, including burns, 537 (54%) were to the scrotum or testicles while 146 (15%) were to the penis. The remaining injuries were to the kidney (43, 4%), bladder/urethra (57, 6%), ureter (4, <1%), or had a non-specific label (205, 22%). Casualties with genitourinary injuries often had severe Injury Severity Scores (ISS > 16) and many also required amputation. Over 90% were unable to return to duty. These data suggest a continued need to deploy a theater Urologist and ongoing efforts to design and field better protective equipment particularly for dismounted patrols. Further medical research is needed to understand the outcomes of these injuries and to provide DoD and VA medical providers with training to support the needs of casualties who sustain urologic injuries.

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Source of Funding: None
GOOD EXPERIENCE WITH ADDING SIMULTANEOUS BOTOX INJECTION TO DMSO INSTILLATION FOR INTERSTITIAL CYSTITIS

Anthony H. Horan, M.D.: Delano, CA
(Presentation to be made by Dr. Horan)

Introduction: Dimethylsulfoxide (DMSO) installation in the bladder works reasonably well for interstitial cystitis. But the salutary effect only lasts a month in some women. Recent publications regarding painful bladder spasms of an unspecified origin have touted good results with Botox\(^1\). But the combination of Botox and DMSO has not been widely reported. Herein is reported four patients given both DMSO and Botox at the same time to see if a more long lasting result is possible.

Material and Methods: of the four patients three (C.F., M.C., M.M. ages 30-50) were inherited from Dr. Chi who ran an extensive interstitial cystitis practice featuring DMSO. All three were having difficulty getting to the three month interval of DMSO.

Procedure: Lidocaine and Marcaine with epi’ were instilled first. Then under I.V. sedation, 100 units of Botox were injected in .5cc increments around the base of the bladder with two .5cc injections into the trigone. Finally one bottle of DMSO was instilled and the Foley clamped for thirty minutes. One of these patients, C.F. insists on over night observation with narcotics for pain. She has very active systemic lupus erythematosis. The fourth patient J.E. age 22 was a mysterious abdominal pain patient; the primary care M.D. insisted had interstitial cystitis. I resisted and she went elsewhere and got good results from therapy for interstitial cystitis. She returned after a year and I consented to do DMSO but suggested Botox as well.

She had both treatments and was jubilant about the result. She did not have bad pain from the DMSO as she had had with the other practitioner.

Results: four of four have had excellent prolonged results meaning at least 3 months of relief from pain and frequency of interstitial cystitis because of the combination 100 units of Botox injection and DMSO instillation at the same time.

Source of Funding: None

\(^1\) Botulinum toxin a has antinociceptive effects in treating interstitial cystitis.

Smith CP, Radziszewski P, Borkowski A, Somogyi GT, Boone TB, Chancellor MB.
Urology. 2004 Nov;64(5):871-5; discussion 875.
A SERIES OF 5 CONSECUTIVE OF MINIMALLY METASTATIC TESTIS TUMORS: DOES A LOW PERCENTAGE OF KILLER CANCERS CHANGE THE ORCHIOPEXY ARGUMENT?
Anthony H. Horan, M.D.: Delano, CA
(Presentation to be made by Dr. Horan)

Introduction: Cancer of the testis is not common in private practice or in V.A. practice. The speaker had dealt with 2 undiagnosed unoperated testis tumors in the previous 32 years. Both were embryonal cell cancers that presented with pain. The second was an obvious menace with lymphangitic spread. In central city university hospitals, urology trainees gain the impression that almost all testis cancers are metastatic. But, a recent experience with 5 consecutive patients from the California prison system suggests that impression is a cultural artifact. Most seem to be non-metastatic and therefore are not referred to the residents at universities or big oncology groups where they would be reported.

Materials and Methods: 5 consecutive patients from the California prison system presented with firm masses in the testis and ultrasound readings of probable testis cancer. These testes were taken off by high ligation of the cord structures and removal with all the tunics intact.

Results: The pathology readings were surprisingly benign as seen in table 1.

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Pathology</th>
<th>Metastatic Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.C.</td>
<td>26</td>
<td>Mature Teratoma + Yolksac+embyronal</td>
<td>Minimal, HCG stain +AFP+</td>
</tr>
<tr>
<td>L.C.</td>
<td>41</td>
<td>Seminoma</td>
<td>None. HCG=134, AFP12ng/ml</td>
</tr>
<tr>
<td>J.A.</td>
<td>32</td>
<td>Teratoma</td>
<td>Minimal</td>
</tr>
<tr>
<td>J.V.</td>
<td>30</td>
<td>Seminoma</td>
<td>None</td>
</tr>
<tr>
<td>M.M.</td>
<td>27</td>
<td>Seminoma</td>
<td>None</td>
</tr>
</tbody>
</table>

Conclusion: Adult urology informs pediatric urology. If this series is close to a true account of the distribution of the malignant potential of testis tumors, the argument for orchiopexy of undescended testicles looks weak in the setting of an Accountable Care Organizations (ACO). Orchiopexy could be ‘low hanging fruit’ for ACO’s because (1) improved fertility after orchiopexy has never been proven and (2) the small personal series above suggests these testes could be left in situ until they became symptomatic. The incidence of testis tumor in undescended testes is only 4%; Most of these tumors can be cured by radical orchietomy. ACO’s could save a lot of money on the remaining 96% of children who do not develop neoplasms and have anticipated fertility. That money goes to the M.D.’s in ACO’s.

Source of Funding: None
Background: Recently, flexible transurethral lithotripsy (f-TUL) has become one of essential treatment options for patients with renal and upper ureteral stones (calculi). We evaluated the initial clinical outcomes of f-TUL with the Holmium:YAG laser and compared them with those of extracorporeal shock-wave lithotripsy (ESWL) and other treatments in our institution, so investigated into optimal conditions for f-TUL.

Patients and Methods: Between January 2011 and June 2013, 45 patients (26 men and 19 women) with a mean age of 57.9 years (range, 20～90 years) were treated with f-TUL in our institution. In the f-TUL group (mean stone size 15.2mm ranged from 3.0mm to 34.2mm), with regard to the location of the stones, 28 stones were on the left, and 17 stones were on the right, furthermore, 22 stones were in the renal pelvis or calyx(R2), 16 stones were in the ureteropelvic junction (R3), and 7 stones were in the upper ureter (U1). Lithotripsy was performed using a 7.4Fr Karl Storz or 8.5Fr Olympus ureteropyeloscope with the Holmium:YAG laser and 200㎛ SlimLine fiber. As a control group, 43 patients (28 men and 15 women) with a mean age of 55.2 years (range, 23～87 years) were treated with ESWL for renal stones during the same period. In the ESWL group (mean stone size 10.6mm ranged from 5.0mm to 21.0mm), 21 stones were in the renal pelvis or calyx(R2) and 22 stones were in the ureteropelvic junction (R3). ESWL was performed using the Dornier Delta II. Success was defined as stone-free on radiographic findings with no hydronephrosis at three months after surgery.

Results: In the f-TUL group, the stone-free rate was 62.2% (28/45 stones). In the stone-free rate, no significance was revealed according to the location of the stones, however, the stones less than 20mm in diameter were significantly higher compared to the stones more than 20mm in diameter (66.5% v.s. 37.5%). Furthermore, the mean size (12.3mm) in the stone-free group was significantly smaller compared to the mean size (19.5mm) in the residual group. Finally, f-TUL demonstrated a significant difference when compared with ESWL, in mean stone size (15.2mm v.s. 10.6mm) and stone-free rate (60.0% v.s. 41.9%). No severe complications were experienced in the both groups.

Conclusions: Stone-free rate of f-TUL was low in the stones over 20mm in diameter, and required to consider for selection of PNL, ESWL, f-TUL, and other options. However, in this study, f-TUL was relatively safe and showed higher stone-free rate than that of ESWL in managing renal and upper ureteral stones.

Source of Funding: None
Introduction: No published data to date have assessed the insurance-related disparities among patients undergoing percutaneous nephrolithotomy (PCNL). This study examines whether being uninsured is associated with more perioperative complications after PCNL in the United States and to determine possible risk factors that influence PCNL outcomes.

Methods: Retrospective cohort study of 13,982 patients who underwent PCNL and were included in Nationwide Inpatient Sample from 1998 through 2010. The main outcome measure was ≥1 perioperative complication stratified by insurance status. Associations between this outcome and insurance status were examined using logistic regression.

Results: The overall percentage of patients with ≥1 perioperative complication after PCNL was 14.4% (n=2,008). When stratified by insurance status, the unadjusted analysis showed significantly higher complication rates among Medicare (17.1%) and Medicaid (16.9%) beneficiaries compared to privately insured (12.3%) and uninsured (13.4%) patients (P<.001). However, in a fully adjusted analysis of patients without medical comorbidity, these differences were no longer statistically significant, even when stratified by hospital teaching status. Multivariable-adjusted analysis of preoperative medical comorbidity showed that pulmonary disorders (odds ratio [OR], 7.77; 95% CI, 4.54-13.31), coagulopathy (OR, 6.16; 95% CI, 4.27-8.89), deficiency anemias (OR, 3.82; 95% CI, 3.29-4.44), and paralysis (OR, 2.16; 95% CI, 1.78-2.61) were the strongest predictors of ≥1 perioperative complication.

Conclusion: Perioperative morbidity after PCNL varied significantly by insurance status, but this variation was explained mostly by differences in overall health status.

Source of Funding: None
Purpose: The Affordable Care Act (ACA) of 2010 was enacted to reform the U.S. health care system, and its implementation is currently ongoing. This essay reviews the key elements of the ACA and discusses the implications for practicing urologists.

Materials and Methods: The medical and public policy literature were reviewed to discuss the main elements of the ACA and their implications on urologic patient volume, reimbursement for urologic care, organization of urologic care, and how urologic care quality is measured.

Results: The ACA has 3 broad themes: expanding health care coverage, cost containment, and quality improvement. The ACA will likely impact urologic care by increasing urologic patient volume, changing the way care is reimbursed, reorganizing the delivery of care, and defining and rewarding quality of care.

Conclusions: While it is difficult to predict how the ACA will impact urologic care, the thrust of implementation will continue over the next few years, coinciding with the time current urology residents and fellows will be entering the workforce. It is important for those preparing to join the profession to be familiar with the implications of the ACA and its reforms.

Source of Funding: None
The United States government budget includes a “public diplomacy budget” whose objective it is to try and spread our democratic values through creative avenues: an Afghan version of Sesame Street, free bikes for Pashtun women, free balloons festooned with democratic slogans. Yet the right to life and health is one of our most cherished values, fundamental not only to democratic governments but also to basic human rights. Health diplomacy is an arena in which urologists are best positioned to spread such values, and a stage in which we should play a more active role.

Global health is not a new concept, but only until recently has there been more accountability and an effort to evaluate aid in terms of cost efficacy. In order to do so, accurate assessments of burden of disease are necessary. Cost had long been cited, erroneously, as a reason why surgery (much less urology) had no role in global health, leading Paul Farmer to declare surgery “the neglected stepchild of global health.” Surgically treatable conditions already are among the top 15 causes of disability. The Global Burden of Disease project by the Institute for Health Metrics and Evaluation has tried to quantify on a comprehensive scale the diseases and health conditions affecting the world at large. In their data, chronic noncommunicable diseases account for an increasing share of death and disability, with similar projections by the World Health Organization that ischemic heart disease and cancer will constitute 69% of mortality worldwide by 2030.

What this means is that as low-income countries transition to middle-income status, an epidemiologic transition shifts causes of death from infectious etiologies to chronic ones. Prostate cancer is already the second most common malignancy among males worldwide. However, kidney stones and benign prostatic hypertrophy – both surgically treatable – and their effect on chronic kidney function may exert far more influence in terms of disability adjusted life years (DALYs) lost than prostate cancer, especially in countries in which life expectancy is just beginning to approach 65.

As urologists, it is crucial for us to push for more research into assessing the global burden of urologic disease, which will in turn allow us to make informed decisions regarding resource allocation in low-resource environments. Research and development should include a focus on technical innovations for transitioning economies. Priority should be placed on building infrastructure to meet quantified need, not just free vertical surgical camps as stopgap measures. Studies show that surgical trainees consistently voice a high level of interest in global health, and formalized international rotations should be created and approved by the Residency Review Committee to integrate global urology into residency and fellowship training. It is only by directed investment of human and financial capital, combined with the crafting of policies that target a global platform, will we be able to be in the forefront of the evolving global health discussion and avoid being the orphaned neglected stepchild with failure to thrive. The improvement of health may be our best opportunity for global diplomacy.

**Source of Funding:** None