Widespread Use of Multiparametric MRI in an Active Surveillance Cohort Results in Earlier Identification and Treatment of Clinically Significant Prostate Cancer

Alice Yu, MD, Andrew Gusev, BS, Timothy Baloda, BS, Eduoard Nicaise, BS, Makshe Harrisinghani, MD, Amirkarim Motahed, MD, Douglas Dahl, MD, Matthew Wszolek, MD, Anthony Zietman, MD, Adam Feldman, MD, MPH
Massachusetts General Hospital, Boston, MA

Introduction: Multiparametric MRI (mpMRI) has led to improved detection of clinically significant prostate cancer and is now increasingly used in active surveillance (AS) patients. However, most AS cohorts in the literature were described prior to widespread use of mpMRI. Our investigation compares outcomes in AS in the pre- and post-MRI era at our institution.

Materials & Methods: We used an institutional database of 1291 men who started AS between September 1996 to December 2016. The cohort was divided into pre- and post-MRI era with the cutoff in July 2014, when mpMRI was routinely incorporated into our AS protocol. Clinical outcomes were compared using Wilcoxon Rank Sum and Chi-square tests. Treatment-free survival was analyzed using Kaplan-Meier plots. A multivariable Cox regression analysis was performed to control for baseline characteristics.

Results: In total, 276 men were included in the MRI era versus 1015 in the pre-MRI era. There was no significant difference in baseline PSA (p = 0.28) or Gleason Score (GS) (p = 0.21). Men in the MRI era were more likely to discontinue AS (Figure 1) and had a shorter time to treatment (2.5 vs. 5.9 years, P < 0.001). At 2 years, 18% of men in the MRI era had undergone treatment as compared 10% in the pre-MRI era. On multivariable analysis, men in the MRI era experienced earlier disease reclassification even after controlling for baseline characteristics (P = 0.003).

Conclusions: With widespread utilization of mpMRI, patients on AS are treated earlier. However, further follow up will be needed to see if this earlier identification and treatment of clinically significant disease ultimately results in a plateau in long-term treatment free survival.

Identifying Gene Expression to Predict Biochemical Recurrence Following Radical Prostatectomy

John Corradi, PhD, Christine Cumarasamy, MD, Ilene Staff, PhD, Joseph Tortora, MS, Andrew Salter, MD, Joseph Wagner, MD
Hartford Hospital, Hartford, CT

Introduction: Identification of novel biomarkers associated with high risk prostate cancer or biochemical recurrence can drive improvement in detection, prognosis, and treatment. The current understanding of prostate cancer genomes is still emerging, and studies can be limited by small sample sizes and sparse clinical follow-up data. We utilized a large sample of prostate specimens to identify gene expression to predict biochemical recurrence following radical prostatectomy.

Materials & Methods: Between 2008 and 2011, patients undergoing radical prostatectomy at Hartford Hospital were consented to submit specimens for whole genome gene expression as part of the Total Cancer Care Consortium. RNA isolated from formalin-fixed paraffin-embedded prostes was hybridized to a custom Affymetrix microarray. Regularized (LASSO) Cox regression was performed with cross-validation to identify a gene expression signature that improves risk prediction. Recurrence was defined as post-operative PSA > 0.2 ng/mL or triggered salvage treatment. Model performance was assessed using time-dependent ROC curves (with area under the curve, AUC) and survival plots.

Results: Pre- and post-operative PSA data were available for 606 prostate specimens. Using the LASSO model, a 5 gene signature was identified that independently predicted biochemical recurrence above Gleason grade and tumor stage. The time-dependent ROC AUC for the 5 gene signature with Gleason grade and tumor stage was 0.868 compared to an AUC of 0.767 for Gleason grade and tumor stage alone (first figure below). Patients stratified into low and high risk groups based on the predictive model score displayed significant differences in their recurrence-free survival curves (second figure below). The predictive model was subsequently validated on two independent gene expression data sets. The model included genes (RHOU, MTX2, and ERP44) that have previously been implicated in prostate cancer biology.

Conclusions: Our unique 5 gene signature panel can improve prediction of biochemical recurrence over the use of classical pathological hallmarks alone. Further research should validate the 5 gene signature in more specific sub-populations of prostate cancer patients, including those with earlier biochemical recurrence.
ARCHES — Efficacy of Androgen Deprivation Therapy with Enzalutamide or Placebo in Metastatic Hormone-Sensitive Prostate Cancer: Prostate-Specific Antigen Results

**Materials & Methods:** Patients (pts) with mHSPC were randomized 1:1 to ENZA (n = 574; PBO + ADT, n = 576). Baseline characteristics were balanced between groups; 91% had prior ADT. Overall median baseline PSA level was 5.21 ng/mL; median follow-up was 14.4 months. ENZA + ADT significantly improved rPFS overall, regardless of baseline PSA level (Table). ENZA + ADT significantly reduced the risk of metastasis or death (hazard ratio [HR], 0.29; P < .0001), time to PSA progression (HR, 0.07; P < .0001), and time to first use of cytotoxic chemotherapy, chemotherapy-free disease-specific survival (CDFS), chemotherapy-free survival (CFS), and safety.

**Results:** In 1401 patients, baseline characteristics were well balanced between treatment arms (Table). Enzalutamide significantly reduced the risk of metastasis or death (hazard ratio [HR], 0.29; P < .0001), time to PSA progression (HR, 0.07; P < .0001), and time to first use of new antineoplastic therapy, overall survival, time to first use of cytotoxic chemotherapy, chemotherapy-free disease-specific survival (CDFS), chemotherapy-free survival (CFS), and safety.

**Conclusions:** For patients with mHSPC and a rapidly rising PSA, enzalutamide resulted in a clinically meaningful and statistically significant reduction in developing mCRPC, as well as an increase in time to PSA progression and time to first use of new antineoplastic therapy (including chemotherapy), CDFS, and CFS. PSA responses were significantly greater in patients receiving enzalutamide than in those receiving placebo. AEs were generally consistent with the established safety profile of enzalutamide.
**Scientific Session I: Prostate, Urethra, Penile, Testis Cancer**

### 5

**Multimodal Therapy for Patients with High-Grade, High-Risk Prostate Cancer with Long-Term Follow-up**

Jason Geo, MD, John Albertino, MD, Katlin Schuster, RA
Emerson Hospital, Concord, MA

**Introduction:** High-risk prostate cancer requires a multimodal approach to treatment. Surgery has played an increasing role for these patients although long-term follow-up and experience with neoadjuvant therapy, a basic tenet of cancer treatment, remains limited. Here we report our experience with neoadjuvant hormonal ablation followed by surgery and postoperative radiation with greater than 20-year follow-up.

**Materials & Methods:** From 1990-2012, 82 patients with clinically organ-confined prostate cancer underwent multimodal therapy (MMT) consisting of neoadjuvant hormonal ablation followed by surgery and radical retropubic prostatectomy and postoperative radiation. High-risk prostate cancer was defined preoperatively as a Gleason Score 8-10 or PSA > 20. Patients with negative surgical margins were initially treated with salvage XRT in the instance of recurrence. Adjuvant and salvage CSS were compared. Median follow-up for these patients is 10 years, ranging from 6 to 29 years.

**Results:** The MMT protocol was well tolerated in all 82 patients with no treatment-related discontinuation of therapy. Final surgical pathology revealed stage pT3-T4 in 58/82 (71%), nodal involvement in 7/82 (9%). Distant metastatic disease was identified in 10/82 patients (12%). Cancer-specific survival for patients undergoing MMT at 10, 15 and 20 years was 78/82 (95%) and 77.8/82 (94%) and 77/82 (94%) respectively. Overall survival at 10, 15 and 20 years was 68/82 (83%) and 66/82 (80%) and 60/82 (75%) respectively. Biochemical recurrence was lower at 61/82 (74%) and 51/82 (62%) and 35/82 (43%) at 10, 15 and 20 years respectively. Of 58/82 (71%) patients with Gleason 8-10 cancers, cancer-specific survival for patients undergoing MMT at 10, 15 and 20 years was 54/58 (95%). Overall survival at 10, 15 and 20 years was 47/58 (83%), 46/58 (79%), and 42/58 (72%) respectively. Freedom from biochemical recurrence was at 38/58 (66%), 33/58 (57%) and 24/58 (41%) at 10, 15 and 20 years respectively.

**Conclusions:** The MMT protocol for high-risk prostate cancer consisting of neoadjuvant hormonal therapy followed by surgery and postoperative radiation is an effective treatment strategy with excellent cancer-specific survival. Recurrence occurring primarily as a rising PSA as opposed to distant metastatic disease suggests limited morbidity as well among patients treated with this protocol.

### 6

**Is Gadolinium Really Necessary? Moving from Multiparametric to Biparametric Prostate MRI**

Benjamin T. Ristau, MD, MHA, Joseph Testa, MD, Mary Soyster, MD, Khirtha Srinakaran, MD, Marco Molina, MD, Peter C. Albertsen, MD
University of Connecticut, West Hartford, CT

**Introduction:** Multiparametric magnetic resonance imaging (mpMRI) has been increasingly incorporated into prostate cancer care. Traditionally, mpMRI (mpMRI) combines T2-weighted (T2W), diffusion-weighted (DWI), and dynamic contrast-enhanced (DCE) sequences. Recent data have challenged routine use of DCE, since these images are increasingly incorporated into prostate cancer care. Traditionally, mpMRI (mpMRI) combines T2-weighted (T2W), diffusion-weighted (DWI), and dynamic contrast-enhanced (DCE) sequences. Recent data have challenged routine use of DCE, since these images are only helpful for peripheral zone (PZ) lesions with equivocal DWI findings. Our objective was to determine how often DCE MRI provided actionable information among men undergoing prostate mpMRI.

**Materials & Methods:** We performed a retrospective review of our prostate MRI database from January 2012 through January 2018. mpMRI v2 was used as standard. Patients were characterized as active surveillance (AS), biopsy naive (BN), or prior negative biopsy (PNB). DCE sequences were considered actionable if a PZ lesion detected on DCE MRI was upgraded to PIRADS 4 based on contrast-enhancement. Cost data were obtained from the Medicare Physician Fee Schedule Search.

**Results:** 153 patients (124 AS, 15 BN, 14 PNB) were included. Median age was 64 (IQR 58-64) years and the median PSA was 7.0 (IQR 5.0-11) ng/mL. Median PSA density was 0.15 (IQR 0.11-0.23 ng/mL/cc). One hundred twenty-seven PIRADS 1, four PIRADS 2, five PIRADS 3, fourteen PIRADS 4, and three PIRADS 5 lesions were identified. DCE provided actionable information in 4 men (2.6%). Eliminating DCE sequences would have saved $121.99 per MRI or $18,664.47 for the entire cohort (Table 1) at the risk of needing to repeat MRI imaging in 4 men.

**Conclusions:** DCE sequences provide little additional information over T2W and DWI in the vast majority of men undergoing prostate MRI. Routine use of DCE may represent low value care.

**Table 1. Cost analysis of multiparametric versus biparametric prostate MRI**

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost with DCE</th>
<th>Cost without DCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>MRI pelvis with contrast</td>
<td>$334.76</td>
<td>$347.65</td>
</tr>
<tr>
<td>Cost differential per MRI</td>
<td>$14.74</td>
<td>$13.26</td>
</tr>
<tr>
<td>Cost differential for entire cohort</td>
<td>$211.99</td>
<td>$190.94</td>
</tr>
</tbody>
</table>

---

**Scientific Session I: Prostate, Urethra, Penile, Testis Cancer**

### 7

**Clinically-Insignificant Prostate Cancer (Gleason Grade Group 1) or Benign Pathology in PI-RADS 5 Lesions with Extrastaging Extension on Multi-Parametric MRI**

Kamyar Ghabili Amirkhiz, MD, Jason Hao, MD, Sarah Almalji, BS, Michael Leapman, MD, Jeffrey Weinreb, MD, Preston Sprenkle, MD
Yale School of Medicine, New Haven, CT

**Introduction:** The clinical utility of extrastaging extension (EPE) on multi-parametric magnetic resonance imaging (mpMRI) is unknown. We sought to investigate the rate of benign or clinically-insignificant prostate cancer (ciPCa) in biopsy of PI-RADS 5 lesions with EPE, and to identify clinical and imaging parameters associated with these findings.

**Materials & Methods:** We retrospectively queried our institutional mpMRI-ultrasound fusion (targeted) biopsy database to identify patients with EPE, detected on mpMRI along with a PI-RADS 5 lesion who underwent targeted biopsy between October 2014 and April 2018. mpMRI findings were assessed, including prostate and lesion volumes, and zonal location of the lesion (peripheral or transition). We measured the rate of benign or clinically-insignificant PCA, defined as Gleason grade group (GG) 1, detected on the targeted biopsy of the lesion with EPE. Logistic regression and receiver operating characteristics curves with an area under the curve (AUC) were used to assess the ability of clinical and mpMRI characteristics to predict GG ≥ 2 prostate cancer on the targeted biopsy of those lesions.

**Results:** Of 300 PI-RADS 5 lesions that underwent targeted biopsy during the study period, 117 (39%) were associated with EPE on mpMRI. On targeted biopsy of those 117 lesions, 5 (4.3%), 14 (12%), and 98 (83.7%) lesions harbored benign pathology, GG1, and GG ≥ 2 prostate cancer, respectively. Benign or ciPCa was detected in 32% of lesions in the first quartile of prostate-specific antigen (PSA) density (< 0.13), 16.7% of lesions in the interquartile range of PSA density (0.13-0.30) and 3.1% of lesions with PSA density > 0.30 (p = 0.003). Using a threshold of 0.13, PSA density was 82.6% sensitive and 42.1% specific for detecting GG ≥ 2 prostate cancer on PI-RADS 5 lesions with EPE. On multivariable analysis, PSA density (OR 2.5 per 0.1 decrease in unit, 95% CI 1.14-5.28, p = 0.02) was associated with an increased likelihood of benign or ciPCa in those lesions. Compared with lesion volume and PSA, PSA density had the highest discriminative ability for GG ≥ 2 prostate cancer in those lesions (AUC 0.71).

**Conclusions:** Clinically-insignificant findings (benign or ciPCa) were identified in a minority of PI-RADS 5 lesions with EPE. In this setting, patients with PSA density < 0.13 could be more frequently detected with ciPCa on the targeted biopsy.
Clinical Risk Based Associations of Lymph Node Dissection and Detection Yield among Men Treated with Radical Prostatectomy for Prostate Cancer
Alejandro Abello, MD, Patrick A. Kenney, MD, Preston Spremule, MD, Michael Leapman, MD
Yale School of Medicine, New Haven, CT

Introduction: Pelvic lymph node dissection (PLND) is recommended for men at risk for lymph node involvement at the time of radical prostatectomy (RP) yet is frequently omitted. We aimed to examine the probability of PLND based on clinical risk status, and to evaluate the impact of increasing lymph node yield on cancer detection rate across risk strata, with particular interest at the extremes of risk.

Materials & Methods: We queried the National Cancer Database to identify patients with clinically localized PCa who underwent RP as their primary treatment from 2004 to 2014. We extracted clinical and sociodemographic variables. Risk status was assessed using the Cancer of the Prostate Risk Assessment (CAPRA) score. We fit conditional logistic regression models to estimate likelihood of PLND and incremental value of increasing lymph node count by risk strata. As a secondary measure, we evaluated the association of PLND and increasing lymph node count with 30-day readmission.

Results: We identified 698,728 men with PCa treated with RP including 380,201 (54.4%) with PLND. Mean age at diagnosis was 62.6. PLND was omitted (Nx) in 56.1%, 31.4%, and 24.7% of patients with low, intermediate, and high CAPRA-risk disease, respectively. Adjusting for clinical and pathologic factors, treatment in a community versus academic hospital (OR = 1.62, 95% CI 1.59-1.66, P < 0.001), and black race (OR = 1.13, 95% CI 1.09-1.17, P = 0.01) was associated with pNx status. Increasing lymph node count was independently associated with greater likelihood of detection of lymph node metastasis in all risk strata. In patients at the lowest spectrum of risk (CAPRA-0), greater reported lymph node yield remained associated with detection of metastasis (relative to 0-10, 11-20 nodes: OR: 3.28, 95% CI 3.06-3.53, P < 0.001; 20-30 nodes: OR: 5.77, 95% CI 5.16-6.45, P < 0.001; > 30 nodes: OR: 7.90, 95% CI 6.56-9.51, P < 0.001). In a multivariable model adjusted for clinical, pathologic, and demographic variables, reported lymph node counts greater than 30 remained associated with detection of metastasis (relative to 0-10, 11-20 nodes: OR: 3.28, 95% CI 3.06-3.53, P < 0.001; 20-30 nodes: OR: 5.77, 95% CI 5.16-6.45, P < 0.001; > 30 nodes: OR: 7.90, 95% CI 6.56-9.51, P < 0.001). Among men at the lowest spectrum of risk (CAPRA-0), greater reported lymph node yield associated with higher odds of 30-day readmission (adjusted OR: 1.03, 95% CI: 1.02-2.25, P = 0.032).

Conclusions: Among men treated in the United States at Commission on Cancer accredited hospitals, PLND continues to be omitted in a substantial proportion of intermediate and high-risk patients. Increasing lymph node yield was associated with greater odds of detecting lymph node metastasis in all groups of patients, including those at the lowest level of risk by clinical criteria.

Table 1. Multiple variable model including predictors for N1 disease after RP + PLND

<table>
<thead>
<tr>
<th>Variable</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at diagnosis</td>
<td>0.99 (0.98-1.00)</td>
</tr>
<tr>
<td>Median Income</td>
<td>0.96 (0.92-1.00)</td>
</tr>
<tr>
<td>Education</td>
<td>0.908 (0.92-1.00)</td>
</tr>
<tr>
<td>Distance to hospital</td>
<td>1.00 (0.99-1.00)</td>
</tr>
<tr>
<td>Race</td>
<td>1.12 (1.08-1.16)</td>
</tr>
<tr>
<td>Type of Hospital</td>
<td>0.95 (0.91-1.00)</td>
</tr>
<tr>
<td>Government Insurance</td>
<td>1.13 (1.06-1.22)</td>
</tr>
<tr>
<td>Facility Region Location</td>
<td>0.963 (0.92-0.99)</td>
</tr>
<tr>
<td>CAPRA score</td>
<td>0.99 (0.98-1.00)</td>
</tr>
<tr>
<td>LN count</td>
<td>0.99 (0.98-1.00)</td>
</tr>
<tr>
<td>Detected N0</td>
<td>0.99 (0.98-1.00)</td>
</tr>
<tr>
<td>Detected N1</td>
<td>0.99 (0.98-1.00)</td>
</tr>
<tr>
<td>Positive margin</td>
<td>0.99 (0.98-1.00)</td>
</tr>
<tr>
<td>Positive margin</td>
<td>0.99 (0.98-1.00)</td>
</tr>
</tbody>
</table>

Impact of Second Generation Neoadjuvant Hormone Therapy on Radical Prostatectomy Outcomes
Alice Yu, MD, Julie Sugyanandi, MD, Melissa Huynh, MD, Dimitar Zlatev, MD, Rana McKenna, MD, Mary-Ellen Talpin, MD, Adam Kibel, MD
1Bifestyles Women's Hospital, Boston, MA; 2University of San Diego, San Diego, CA; 3Dana Farber Cancer Institute, Boston, MA

Introduction: Phase II trials have shown that intense neoadjuvant androgen deprivation therapy (NeoADT) with abiraterone or enzalutamide combined with luteinizing hormone-releasing hormone (LHRH) analogues demonstrate favourable pathologic response in prostate cancer. There are currently phase III trials underway. However, the impact on surgical complication rates as well as the impact of therapeutic response on complication rates is unknown. The objective of this study is to assess complication rates and functional outcomes in patients who received NeoADT followed by radical prostatectomy (RP).

Materials & Methods: Between November 2014 and August 2018, 96 men with intermediate or high-risk prostate cancer were enrolled in two clinical trials involving 6 months of intense NeoADT followed by RP (Figure 1). Data on surgical complications, pathology and self-reported functional outcomes were collected. Self-administered SHIM and EPIC questionnaires were used to assess post-operative erectile function. Comparison between nerve-sparing (NS) groups were performed using Fisher’s exact tests.

Results: Mean surgery time was 173 ± 42.2 minutes. Post-operative length of stay was 1 day in 87.8% of cases. Thirteen men (14.4%) experienced a post-operative complication; all except one were minor (≤ Clavien Grade II). We were able to perform bilateral or unilateral NS procedure in 24% of those who underwent unilateral or bilateral NS surgery. As a secondary measure, we evaluated the association of lymph node dissection and detection yield among patients who received NeoADT followed by radical prostatectomy (RP).
Associations of Rurality and Disease Outcome in Urologic Malignancy

Marianne Casilla-Lennon, MD, Alejandro Abello, MD, Patrick A. Kenney, MD, Michael Leapman, MD
Yale School of Medicine, New Haven, CT

Introduction: Patients residing in rural regions have comparatively worse outcomes for many cancers. However there is less known about treatment and outcome for patients with urologic cancers. The objective of this study is to evaluate differences in treatments and outcomes among patients with urologic malignancies when coming from rural compared to metropolitan communities using national, population-level data.

Materials & Methods: We queried the Surveillance, Epidemiology, and End-Results database to identify patients with urological cancers from 1973 to 2015. We compiled patient clinical, demographic, and outcome data, including rurality at the county level. Rural counties is defined as those with >50% population living in rural areas. We evaluated the association of rurality with treatment received, presence of advanced disease, and cancer-specific death using descriptive statistics and Cox proportional hazard models.

Results: We identified 992,536 patients including those with Kidney (112,477), Bladder (208,230), Prostate (637,005), penile (6,297) and testis cancer (28,527). Among all patients, 889,050 (90.4%) were male and 64,992 (6.55%) lived in rural counties. Overall, patients living in rural communities were older at cancer diagnosis (mean 70 ± 12.1 vs. 67.41 ± 12.7) and more frequently of white race (97.1% vs. 82.46%) vs. urban counterpart. Patients residing in rural counties were less likely to undergo definitive treatment with surgery for stage 1 or stage 2 disease (p < 0.001). In multivariable Cox regression, rural status was associated with poorer cancer-specific survival for kidney cancer but was not seen in other genitourinary malignancies, specifically survival for kidney cancer but was not seen in other genitourinary malignancies, but was not seen in other cancers (Figure 1). After categorizing the population based on % of rurality, adjusted kidney cancer-specific death increased among most rural populations: 15% rurality or more (HR: 1.16, 95% CI: 1.05-1.27; P: 0.03), 40% rurality or more (HR: 1.31, 95% CI: 1.22-1.40; p < 0.001), and 89% rurality or more (HR: 1.49, 95% CI: 1.41-1.57; p < 0.001).

Conclusions: There are notable differences in cancer incidence, treatment and outcome for patients residing in rural areas. Rural status was associated with poorer cancer-specific survival for kidney cancer but was not seen in other genitourinary malignancies, independent of stage at diagnosis and treatment received. Further research is warranted to understand the factors underlying these differences in outcome.

Association between Tumor Multifocality on Multi-parametric MRI and Detection Rate of Clinically-Significant Prostate Cancer in Lesions with Prostate Imaging Reporting and Data System (PI-RADS) Score 4

Kamyar Ghabili Amirkhiz, MD,1 Matthew Swallow, MD,1 Rachael Sherrer, MD,2 Jamil Syed, MD,3 Michael Leapman, MD,3 Soroush Raiss-Bahrami, MD,1 Preston Spreenkle, MD,4 1Yale School of Medicine, New Haven, CT; 2University of Alabama at Birmingham, Birmingham, AL

Introduction: Magnetic resonance imaging (MRI)/ultrasound fusion targeted biopsy of a lesion with prostate imaging reporting and data system (PI-RADS) score 4 (P4) is associated with a high positive predictive value (~45%) for clinically-significant prostate cancer. However, it is unknown if multifocality on multi-parametric MRI (mpMRI) could further risk stratify P4 lesions. We sought to assess the detection of the clinically-significant prostate cancer in P4 lesions stratified by tumor multifocality on mpMRI.

Materials & Methods: Using the MRI-ultrasound fusion prostate biopsy databases at two institutions, we identified patients with at least one PI-RADS 4 (P4) lesion on mpMRI who underwent targeted biopsy of those lesions. Each patient meeting the above criteria was grouped into one of four lesion MRI classifications - group 1 (an index lesion with P4 and an additional PI-RADS 2 or 3 lesion), group 2 (single lesion with P4), group 3 (two or more P4 lesions), or group 4 (a lesion with P4 and an index lesion with PI-RADS 5). The rate of grade group (GG) ≥ 2 pathology on targeted biopsy of the P4 lesions was compared between the MRI classification groups. The clinical and radiological factors associated with finding GG ≥ 2 in P4 lesions were also evaluated.

Results: In a combined cohort, 645 patients with at least one lesion with P4 were identified. The studied MRI classification groups 1, 2, 3, and 4 included 184, 267, 112, and 82 men, respectively. For the combined cohorts, the rate of GG ≥ 2 biopsy pathology in the groups 1, 2, 3, and 4 was 21.7%, 36.3%, 49.1%, and 42.7%, respectively (p < 0.001, Figure 1). On multivariable analysis, age (OR 1.06, 95% CI 1.03-1.09, p < 0.001), clinical T2 (OR 1.39, 95% CI 1.03-1.87, p = 0.03), PSA density (OR 1.43 per 0.1 unit, 95% CI 1.22-1.67, p = 0.001), peripheral zone lesion (OR 1.62, 95% CI 1.01-2.59, p = 0.04), and MRI lesion group (group 2 vs. 1, OR 1.93, 95% CI 1.21-3.08, p = 0.006; and group 3 vs. 1, OR 3.28, 95% CI 1.88-5.72, p < 0.001) were significantly associated with the risk of GG ≥ 2 pathology on targeted biopsy of the P4 lesion.

Conclusions: Our data indicated that the rate of clinically-significant prostate cancer detection in P4 lesions located within peripheral zone might be increased with the presence of additional high-grade lesions on imaging (PI-RADS 4 or 5). By contrast, men with a P4 lesion and an additional low-grade lesion (PI-RADS 2 or 3) showed the lowest rate of aggressive pathology. Overall, detection of clinically-significant prostate cancer on biopsy of the P4 lesions might be influenced by tumor multifocality on imaging.

*Max K. Wilscher Award Eligible
Impact of MRI-Ultrasound Fusion Prostate Biopsy on Pathologic Downgrading During Radical Prostatectomy
Jeannie J. Su, MD, Kamyar Ghahbi Amirkhiz, MD, Sarah Amalraj, MD, Michael Leapman, MD, Preston Sprendkle, MD
Yale, New Haven, CT

Introduction: The discordance between Gleason grade at systematic prostate biopsy and radical prostatectomy is well established. The integration of MRI-ultrasound fusion improves the detection of clinically significant prostate cancer, but it is unknown if this approach over-estimates risk by directly sampling tumors. Therefore, we aimed to evaluate the concordance of MR fusion biopsy approaches and radical prostatectomy (RP) pathology.

Materials & Methods: We conducted a retrospective review of an institutional database of men undergoing MRI/US fusion biopsy between February 2013 and March 2018. We compared Gleason grade group (GG) of systematic 12-core, MRI/US targeted, and combined biopsy approaches with whole gland prostatectomy pathology. We evaluated rates of downgrading in the entire cohort, and among subsets of intermediate and high-risk cancer. Binomial logistic regression was utilized to identify clinical, radiologic, and pathologic features associated with downgrading of combined MRI/US fusion prostate biopsy pathology on radical prostatectomy.

Results: We identified 192 men who underwent MRI/US fusion biopsy and were treated with RP. The overall rate of downgrading at RP was 33%, including 29% (n = 59) based on Gleason grade from targeted biopsy, and 13% (25) from systematic biopsy (p = 0.001). Among patients with GG3 on biopsy (46), 57% (26) were downgraded to GG2 prostate cancer on final pathology (17%) (P = 0.01). Among patients with GG4 and GG5 (47), 74% (35) were downgraded on final prostatectomy pathology. There were higher rates of downgrading when regarding targeted biopsy (47%) compared to systematic biopsy (17%) (P = 0.01). On multivariable regression analysis adjusted for clinical, radiologic, and pathologic factors, targeted biopsy Gleason grade (GG3 vs. GG1) remained the only variable significantly associated with downgrading on final pathology (P = 0.05).

Conclusions: Although MRI/US fusion biopsy improves detection of high grade cancer, a substantial proportion of patients were downgraded at radical prostatectomy. Further investigation is warranted to improve the concordance between biopsy and final pathology.

Active Surveillance for Localized Prostate Cancer after Long Term Follow Up
Alex Hennessey, MD, Mary Seyster, BA, Ghali Lemtiri-Chlieh, BS, Benjamin Ristau, MD, Peter Alberts, MD, MPH
University of Connecticut Health Center, Farmington, CT

Introduction: Active surveillance (AS) is the standard of care for low-risk prostate cancer as detailed in the EAU, AUA, and NCCN guidelines. The ProtecT trial has shown survival outcomes for low and intermediate risk prostate cancer to be excellent. Various criteria have been used to define men who are candidates for AS protocols, with some more restrictive than others. The purpose of this study was to determine whether men meeting more expansive selection criteria were less likely to remain on surveillance.

Materials & Methods: We retrospectively reviewed men monitored on AS by a single urologist at our institution between January 1990 and August 2018. We stratified men into “strict active surveillance” (SAS) and “non-strict active surveillance” (NSAS) categories. SAS was defined as Gleason 6 or less, PSA < 10 ng/mL, ≤2 positive biopsy cores, no core with >50% cancer, and PSA density (PSAD) < 0.15 ng/mL/g, based on the NCCN definition of “very low risk” prostate cancer. We analyzed progression to treatment, time to treatment, and overall duration of follow-up.

Results: We identified 155 men who underwent AS at our institution. We excluded men seen as second opinions or followed < 1 year. Of these, 100 men met SAS criteria while 55 did not (NSAS). Mean age at diagnosis was 65.6 years for the SAS group and 68.3 years for the NSAS group. Virtually all men were healthy with a mean Charlson Comorbidity Index of 2.99. Median duration of follow-up was 94 months. Men failed to meet SAS criteria primarily because of PSA > 10 (44%). In the SAS and NSAS groups, 32 men (32%) and 25 men (45%) ultimately underwent treatment. The median time to treatment was 46 and 39 months for the SAS group and NSAS group respectively. The median duration of follow-up was 90 months for the SAS group and 97 months for the NSAS group. Gleason upgrading was the most likely reason for progression in the SAS group (9%), while a rising serum PSA (44%) was the most likely reason for progression in the NSAS group (59%). The most common treatment modality was radical prostatectomy (RP) in the SAS group (66%), while androgen deprivation therapy (ADT) (44%) was the most common in the NSAS group (p = 0.007). External beam radiation therapy was the second most common treatment for both groups (25%) and RP was the second most common treatment in the NSAS group (32%).

Conclusions: This analysis suggests that men meeting strict criteria for active surveillance are usually younger and progress to treatment because of a rising Gleason grade, while men undergoing active surveillance with more expansive selection criteria are often older and select hormonal therapy with evidence of disease progression.
4Kscore and mpMRI, in Combination, Safely Reduces Prostate Biopsy Rates

4Kscore and mpMRI, in Combination, Safely Reduces Prostate Biopsy Rates

Introduction: mpMRI and biomarkers have emerged as popular alternatives prior to prostate biopsy (Bx). We investigate a combination of the radiologic mpMRI and the laboratory 4Kscore test to improve diagnostic performance, and potentially further reduce Bx rates compared to the individual tests alone.

Materials & Methods: A retrospective, five-center study of 407 men who underwent a 4Kscore test, mpMRI, and Bx. mpMRI and 4Kscore results were reported with PI-RADS and categorized as low (PI-RADS 1-2), intermediate (PI-RADS 3) and high (PI-RADS 4-5). The 4Kscore test is reported as a continuous percent probability of diagnosing high-grade GG2 or higher cancer (HG): categorized into low (< 7%), intermediate (8-32%), and high (> 33%) risk. The primary endpoints evaluated potential Bx reduction, sensitivity, negative predictive value (NPV), and undetected HG cancers when utilizing Single Test or Combination Test Bx decision-making. Either test was evaluated independently, versus both tests in sequence. Single Test men were stratified with low risk results, avoiding Bx, and intermediate or high risk, proceeding to Bx. Combination Test high-risk patients by the first test would receive a Bx and low risk would not. Intermediate risk patients, the second test would be used for determining if a Bx would occur (Fig. 1).

Results: The study includes 407 men: 114 were detected with HG cancer. Using 4Kscore alone, resulted in a 25-27% biopsy reduction, while 8-12 men having undetected HG. Combination strategies yielded higher specificities, leading to larger biopsy reductions in the range of 38-41%, while 11-15 men had an undetected HG. Sensitivity and NPV did not appreciably differ between strategies (Table 1). Similar results were observed in those in the range of 38-41%, while 11-15 men had an undetected HG. Sensitivity and NPV did not appreciably differ between strategies (Table 1). Similar results were observed in those with a total PSA of 2-10 ng/mL and 3-10 ng/mL.

Conclusions: 4Kscore Test and mpMRI in conjunction, enhances prostate Bx decision making could further reduce Bx rates, while improving specificity for high-grade cancer, with minimal changes to NPV and sensitivity.

Initial Experience of MRI-fusion biopsy in the Community Setting

Kevin Krughoff, MD1, Lawrence Dagrona, MD2, Amichai Kichlevsky, MD2
1Dartmouth-Hitchcock, Lebanon, NH, USA; 2Concord Hospital, Lebanon, NH, USA

Introduction: The expanding role of MRI-fusion biopsy (FB) is well documented, however the reproducibility of outcomes during the initial experience of FB in the non-academic (NA) setting is unknown. We sought to determine if there are differences in the yield of clinically significant cancer on FB at an academic versus a NA setting.

Materials & Methods: We compared fusion-directed and template-directed biopsy cores for the first consecutive 125 FB patients at an academic to the first 125 consecutive FB patients at a NA setting. All patients underwent multiparametric MRI and were scored using PI-RADS v2. Specimens were graded according to the International Society of Urological Pathology (ISUP) criteria for Grade Group (GG). Clinically significant prostate cancer (csPCa) was defined as GG2. Patients at the NA setting were matched to academic setting controls using Mahalanobis-distance kernel matching. The following covariates were used: Prior negative biopsy, active surveillance, PSA density, abnormal DRE, family history of prostate cancer, age, use of 5-alpha reductase inhibitor, BMI, and composite ASA-SS. Patients with pre-existing csPCa or prior treatement were excluded from analysis. Standard errors and the 95% CI were calculated from 3,000 bootstrap samples to determine the effect of NA setting on FB outcomes. Secondary analysis of imaging and pathology characteristics was performed using weighted samples t-tests for continuous variables and Pearson chi-square for discrete variables.

Results: Of the 250 patients included, 219 patients were matched. There were significant baseline differences in frequency of prior negative biopsy and BMI. Matching reduced the difference in means for all covariates. Balance was confirmed by reduction in standardized differences and t ratios (Fig. 1). There was no significant effect of NA setting on the proportion of FB-detected csPCa, the proportion of template-detected csPCa, the rate of upgrading from prior biopsies results, or in the proportion of csPCa missed by fusion-directed or template-directed cores (Table 1). On average, both cohorts were given lower PI-RADS ratings in the NA setting and template biopsies yielded lower GG diagnoses, however the maximum composite GG was not significantly different by practice setting (Figures 2, 3).

Conclusions: There was no significant effect of practice setting on the detection of clinically significant cancer in a sample-matched analysis of the first consecutive patients to undergo fusion biopsy.
Scientific Session II: Prostate II

Combination of Multiparametric MRI-Ultrasound Fusion and Systematic Prostate Biopsy Results in Optimal Concordance with Final Surgical Pathology
Alice Yu, MD, Tanner Yamany, MD, Nawar Hanna, MD, Edouard Nicaise, BS, Amarakara Mothadee, MD, Mukehi Harisinghani, MD, Chin-Lee Wu, MD, Douglas Dahl, MD, Matthew Wiszolek, MD, Michael Blute, MD, Adam Feldman, MD
Massachusetts General Hospital, Brigham and Women’s Hospital, Boston, MA, USA

Introduction: Accurately predicting the Gleason score (GS) on radical prostatectomy (RP) with prostate biopsy is important for risk stratification and selecting patients for active surveillance. Multiparametric MRI (mpMRI) is useful for detecting clinically significant disease, but the exact concordance of GS between fusion biopsy and RP has not been well described in a clinical practice setting. The objective of this study is to assess whether systematic, targeted or combination (targeted + systematic) biopsy has better concordance with final surgical pathology.

Materials & Methods: In our institutional mpMRI-ultrasound fusion biopsy database of 570 men, 54 men who underwent targeted and systematic biopsy followed by RP were targeted, systematic and combination (targeted and systematic) biopsy were compared with GS on RP; and concordance was recorded. Concordance rates between biopsy types were compared with the McNemar test. Proportion of GS upgrade or downgrade at time of RP was also evaluated.

Results: Concordance, upgrade, and downgrade rates are reported in Figure 1. Combination biopsy was superior to both systematic (RR 1.25, 95% confidence interval (CI) 1.08-1.44, P < 0.003) and targeted biopsy (RR 1.22, 95% CI 1.08-1.37, P = 0.002) for predicting concordance with surgical pathology. There was no significant difference in concordance rates between systematic and targeted biopsy alone (P = 0.90). The relative risk of upgrade on surgical pathology with combination biopsy was significantly lower when compared to systematic (RR 0.58, 95% CI 0.48-0.70, P < 0.001) or targeted biopsy alone (RR 0.67, 95% CI 0.57-0.79, P < 0.001).

Conclusions: Combination (targeted and systematic) biopsy is associated with the highest concordance rate between biopsy and RP when compared with systematic or targeted biopsy alone. When the pathology is non-concordant, standard and targeted-alone biopsy are more likely to underestimate final RP pathology. These data support using a combination of targeted and systematic biopsy as standard practice when doing fusion biopsy.

Does Post Prostatectomy Decipher Score Predict PSA Recurrence and Impact Care?
Christopher White, MD,1 PhD, Tara McLoughlin, PhD, Joseph Tortora, MS, Kevin Pinto, BS, Alshay Gangakkhedkar, BS, Alison Champagne, MPH, Joseph Wagner, MD
Hartford Hospital, Hartford, CT

Introduction: Decipher score (GenomeDx Biosciences) is a genomic classifier that predicts the 5-year risk of metastasis after radical prostatectomy (RP). Decipher score may also be used to guide the timing of adjuvant vs salvage radiotherapy. We examined the ability of Decipher to predict biochemical recurrence (BCR) and to impact clinical decision making.

Materials & Methods: We identified post-RP Decipher tests ordered for adverse pathology between 3/1/14 and 3/8/18. BCR was defined as a PSA > 0.2 ng/mL. Decipher score was analyzed as both a continuous and categorical variable (high ≥ 60, low/intermediate < 60). Kaplan-Meier analysis was used to examine the relationship between Decipher score and time to BCR (in months). Multivariate analysis with Cox Regression analyzed the relationships between Decipher score, pre-op PSA, pathologic Gleason, margin status and stage. We then focused on a subset of men with early BCR (eBCR; PSA > 0.2 and < 2.0 ng/mL) and categorized them into low/intermediate vs. high-risk Decipher score. Logistic regression was used to determine if those with high scores were more likely to get salvage treatment.

Results: A total of 218 patients underwent RP for prostate cancer with subsequent Decipher testing during the study period; 10 had no PSA follow-up. Of the 198 analyzed, 62%, 38% had high and low/intermediate risk Decipher scores, respectively and 5% had a BCR. The sample was characterized by unfavorable pathology. Over half (58.6%) had Gleason Grade Group 4 or more and highest (70.7%) had stage 3 disease or higher. Median (IQR) follow-up was 12.0 (6.6, 18.9) months. Decipher score was significantly associated with time to BCR (p = 0.02; Figure 1) but was not an independent predictor in multivariate analysis (p = 0.282). Among the 67 men with eBCR, those with high-risk Decipher scores were more likely to receive salvage treatment (59.3%) than those with low-risk Decipher scores (20%; p < 0.001). In our logistic regression model, high Decipher score was a significant independent predictor of pre-operative PSA, Gleason Grade Group, margin status and stage (OR = 4.20; p = 0.03).

Conclusions: High Decipher score is a significant predictor of BCR in this population of men with unfavorable pathology and is being incorporated into patient counseling to inform treatment decisions. Further research should focus on long-term outcomes for patients for whom Decipher score was used to guide treatment strategy vs. those for whom it wasn’t.
A Multi-Institutional Assessment of Multimodal Analgesia in Penile Implant Recipients Demonstrates Dramatic Narcotics Reduction
Lael Reinstein, MD MPH, Jacob Lacs, DO, Martin S. Gross, MD, Faisal A. Yafi, MD, Faizoun M. El-Khatib, MD, Kenneth J. L. Smith, MD, Jay Sambam, MD, Andrew McCullough, MD, Brendan M. Browne, MD, Daniel Kuftinec, MD, Manuel Merino, MD, Faisal A. Yafi, MD, Kenneth L. Smith, MD, Andrew McCullough, MD, Brendan M. Browne, MD, Daniel Kuftinec, MD, Manuel Merino, MD

Dartmouth-Hitchcock Medical Center, Lebanon, NH, USA; Einstein Healthcare Network, Philadelphia, PA, USA; Dartmouth-Hitchcock Medical Center/Dartmouth-Hitchcock Keene, Keene, NH, USA; University of California Irvine, Orange, CA, USA; Advanced Urology Institute, Tallahassee, FL, USA

Introduction: Increasing regulations are being placed on providers in an effort to combat the growing opioid epidemic in the United States. Although implantation of an inflatable penile prosthesis (IPP) is associated with significant post-operative pain, there have been few rigorous attempts at describing non-opioid based pain management strategies for implant recipients. Here, we present results of a multi-institutional assessment of a multimodal analgesic (MMA) regimen in patients (pts) undergoing IPP surgery to a matched cohort of pts treated with a traditional opioid-based (OB) regimen.

Materials & Methods: We performed a multicenter comparison of pts. undergoing IPP implantation by high-volume implanters whose pain was managed using a recently described, novel MMA protocol (Table 1) to a matched, historic cohort of pts. managed via an OB protocol. Patients were excluded if they underwent any additional procedure or had a history of narcotic dependence. Both groups were compared with respect to visual analog pain scale (VAS), and opioid usage (total morphine equivalents, TME) in the post-anesthesia care unit (PACU), post-operative days (POD) zero and one, and in immediate post-discharge period. Narcotic usage on discharge and follow up were assessed and compared between both groups.

Results: 91 pts. were eligible for final analysis: 53 (58%) in MMA arm and 38 (42%) in the OB arm. There were no differences between groups with regards to age, race, BMI, or medical comorbidities. VAS was significantly lower in the MMA group in PACU (mean 1.1 vs. 2.9, p = 0.002), POD0 (mean 2.8 vs. 4.7, p = 0.001), and POD1 (mean 3.02 vs. 4.00, p = 0.04).

Patients in the MMA group used fewer narcotics in the PACU (mean 1.6 vs. 4.3 TME, p = 0.002), POD0 (mean 5.8 vs. 13.8 TME, p = 0.001), and POD1 (mean 10.8 vs. 25.1 TME, p = 0.001). Despite being discharged with substantially fewer narcotics (mean 14.9 vs 5.3 tabs, p < 0.001), a smaller proportion of MMA pts. required narcotic refills (7.5% vs 47.4%, p < 0.001). No pts. in either group experienced significant medication-related side-effects.

Conclusions: To our knowledge, this is the first multicenter pain management investigation in penile implant recipients. The use of a multimodal analgesic protocol not only demonstrates excellent durability in significantly reducing post-operative pain but further reduces inpatient and outpatient narcotic usage without any discernable side-effects.

Compliance Rates for Post-Vasectomy Semen Analysis Using Laboratory Versus Home-Based Tests
James Trussler, MD, Brendan M. Browne, MD, Daniele Kufiniche, MD, Manuel Merino, MD, Andrew McCullough, MD, Lahey Hospital and Medical Center, Burlington, MA

Introduction: Vasectomy is a common urologic procedure. Post-vasectomy semen analysis (PVSA) is an important test to ensure successful sterilization. Compliance rates for the procedure are reported around 50%. FDA approved home-based sperm antigen semen tests might improve PVSA compliance when done in the privacy and convenience of home with the immediate gratification of the knowing the results. Current AUA guidelines recommend visual laboratory inspection of the post-vasectomy semen 8-16 weeks following the procedure. This study explores differences in compliance rates between lab-based and home-based PVSA.

Materials & Methods: We conducted a retrospective chart review of patients who underwent vasectomy by one of three surgeons between May 2017 and June 2018. Patients were excluded if they had undergone prior vasectomy or vasectomy reversal. Following vasectomy, two surgeons prescribed laboratory-based PVSA and the third prescribed home-based PVSA (SpermCheck). Patients were considered to be compliant if they completed PVSA within the 8-16 week post-vasectomy time frame recommended by the AUA.

Results: Two hundred and two patients underwent vasectomy in the capture period. One hundred and twenty-five patients comprised the lab-based PVSA cohort and 77 patients in the SpermCheck cohort. The patients in each group were similar in terms of age (39.2 ± 12.7 vs. 39.9 ± 12.7, p = 0.487) and prior children (2.38 vs. 2.41, p = 0.804). The compliance rate for lab-based PVSA was 60.2% and for SpermCheck was 80.4% (p = 0.020). The rate of negative semen analysis was equivalent between the two groups (94.2% vs. 96.0%, p = 0.482).

Conclusions: Utilization of a home-based semen analysis showed a higher rate of PVSA compliance compared with a traditional lab-based test. Compliance rates for the lab-based PVSA cohort is similar to that reported in the literature. Use of an at-home testing kit may increase compliance with PVSA by means of convenience and reduced stigma surrounding semen sampling, and improved compliance will ideally reduce unintentional pregnancies. As a small retrospective cohort, this study expands the conversation about the role of home-based testing within the AUA guidelines.

Immediate Preoperative Blood Glucose and Hemoglobin A1c Levels Are Not Predictive of Post-Operative Infections in Diabetic Men Undergoing Penile Prosthesis Placement
Martin S. Gross, MD, Maxwell W. Towe, MD, Lael Reinstein, MD MPH, Mohammad M. Osman, MD, Linda M. Hayreh, MD, Farouk M. El-Khatib, MD, Gregory Broderick, MD, Arthur L. Burnett, MD, Amy I. Cuise, MD, Georgios Hatzichristodoulou, MD, Jonathan Clavell-Hernandez, MD, Gerard D. Henry, MD, Tung-Chun Hsieh, MD, Lawrence C. Jenkins, MD, Aaron C. Lentz, MD, Ricardo M. Mianurat, MD, Danair Osumov, MD, Sung Hun Park, MD, Jay Simhan, MD, Run Wang, MD, Faisal A. Yafi, MD, MD1, Andrew McCullough, MD, Brendan M. Browne, MD, Daniel Kuftinec, MD, Manuel Merino, MD

Dartmouth-Hitchcock Medical Center, Keene, NH, USA; University of California Irvine, Orange, CA; Dartmouth-Hitchcock Medical Center, Lebanon, NH; Mayo Clinic-Jacksonville, Jacksonville, FL; Johns Hopkins University, Baltimore, MD; Medical College of Wisconsin, Milwaukee, WI; Julius-Maximilians-University of Würzburg, Würzburg, Germany; University of Texas Medical School at Houston, Houston, TX; Ark-La-Tex Urology, Shreveport, LA; University of California San Diego, San Diego, CA; Ohio State University, Columbus, OH; Duke University, Raleigh, NC; Boston University, Boston, MA; University Medical Center Schleswig-Holstein, Kiel, Germany; Semen Urology Center of Excellence, Seoul, Republic of Korea; Einstein Healthcare Network, Philadelphia, PA

Introduction: Recent reports have suggested that pre-operative diabetic control may be predictive of infection rates following penile prosthesis (PP) implantation. In this study, we sought to investigate whether immediate pre-operative serum blood glucose (BG) levels were associated with PP infection rates in diabetic patients.

Materials & Methods: We conducted a retrospective review of 716 diabetic patients undergoing primary PP (inlatable and malleable) implantation from April 2003 to May 2018 across 15 institutions. PPG levels (within 6 hours of surgery) and Hemoglobin A1c (HbA1c) levels were recorded for each patient, along with clinical and demographic variables. Patients had a median follow up time of 7 months (range 0.157). Measured outcomes were rates of post-operative infection, revision and explantation. The impact of pre-operative glucose and HbA1c on post-operative infection rates was assessed using ANOVA and univariate analyses. The effects of age, diabetes type, diabetes related complications, body mass index, Charlson Comorbidity Index (CCI), history of immunosuppression, previous radical prostatectomy, and PP type were adjusted for, using logistic regression models.

Results: Median age was 61 years (range 34-86). Median and mean pre-operative glucose levels were 134 mg/dL (range 54-344) and 143.3 mg/dL ± 45.9, respectively, and median and mean pre-operative HbA1c levels were 7.4% (range 4.8-15.2) and 7.3% ± 1.5, respectively. Most PP were inflatable (96.6%). Devices used were AMS 790 (42.3%), AMS Ambicor (0.1%), Coloplast Titan (53.5%), and Coloplast Genesis (1.3%). Surgical approach used was penoscrotal in 74.4%, subcoronal in 23.8%, and infrapubic in 1.8%. Post-operative infection, revision, and explantation rates were 3.8%, 5.9%, and 4.5%, respectively. There was no association between PPB levels and post-operative infection rates: continuous, p = 0.413; cut-off > 165 mg/dL, 75th percentile, p = 0.508; cut-off > 201 mg/dL, 90th percentile, p = 0.393. Additionally, there was no association between pre-operative HbA1c levels and post-operative infection rates: continuous, p = 0.430; cut-off > 6.5%, 75th percentile, p = 0.611; cut-off > 8%, p = 0.241. Similarly, there were no associations between explanation and revision rates with PPB levels (p = 0.567 and 0.537, respectively), nor with HbA1c levels (p = 0.24 and 0.165, respectively). On multivariate analysis, a higher CCI was a significant predictor of higher infection rates (p = 0.040).

Conclusions: In this large multi-institutional cohort of diabetic men undergoing PP implantation, neither PPB nor HbA1c were predictive of device infection. A higher CCI in diabetic patients predicts PP infection.
Introduction: Vasectomy is one of the most common in office procedures performed by urologists. Vasectomy is generally performed under local anesthesia while the patient is awake in a urology clinic. This makes the procedure technically challenging and difficult to teach to urology residents. There has been limited research on resident training in vasectomy. Nguyen et al demonstrated that supervised resident performance of in office vasectomy was safe and well tolerated by patients. To date, no other study on vasectomy training of urology residents exist. The aim of this study was to understand the current vasectomy training environment, including potential barriers to teaching this procedure.

Materials & Methods: An anonymous 18-question survey was e-mailed to the program coordinators of 135 AC-CME accredited urology residencies in the United States. The survey was sent via SurveyMonkey\textsuperscript{13} and inquired about quantity, comfort and environment of vasectomy training in these programs as well as demographic data.

Results: Overall there were 115 residents respondents. Every AUA section and post-graduate year were represented. 65% of residents had performed ten or more vasectomies by the time they graduated from residency. Despite this, 69.7% of first year urology residents (Uro 1’s), 57% of Uro 2’s, 30% of Uro 3’s and 26.7% of Uro 4’s had performed < 10 vasectomies. Additionally, 24.4% reported no training in pre and post op vasectomy counseling. A majority of the residents conducted vasectomies in the office versus the operating room. Despite this finding, a statistically significant percentage of resident respondents felt more comfortable performing vasectomies in the OR than in the office setting. Common barriers identified to vasectomy training are seen in Table 1. Overall, 76% of residents felt there was enough opportunity to perform vasectomies at their training program despite no formal vasectomy training program or simulation lab.

Conclusions: Despite the difficulty of teaching vasectomy in an office setting, a majority of residents feel comfortable doing an office vasectomy on their own. However, most urology residency programs have no formal training and residents are less comfortable performing vasectomies in the office when compared to the OR. Additionally, many residents receive no training on counseling. Barriers to training included volume, accessibility of the procedure and autonomy-all highlighting areas for improvement at these institutions. Formal training programs in peri-operative counseling, vasectomy procedure and simulation lab could improve resident comfort and break down barriers to resident training.

---

2019 NE-AUA Annual Meeting Abstracts

The Use of Penile Computed Tomography Cavernosogram (CTC) in the Evaluation of Peyronie's Disease
Jared F. Schoder, MD, Sebastian Flacke, MD, Andrew R. McCullough, MD

Introduction: The evaluation of Peyronie’s Disease (PD) relies on patient history and physical exam. The clinical assessment of plaque size and location on exam is qualitative, is observer dependent and has been shown to be unreliable. Current AUA guidelines recommend an office intracorporeal penile injection with or without penile color doppler ultrasound. Advanced imaging techniques play a limited role. Intraligamental collagenase is the only FDA-approved medical treatment for PD. The benefit of this therapy is highly dependent upon pre-treatment evaluation and appropriate patient selection. Therapeutic benefit has been disappointing. Recent studies have demonstrated the utility for Computed Tomography Cavernosography (CTC) in the evaluation of penile anatomy and erectile dysfunction. Its use in the anatomic evaluation of PD has not been investigated or reported.

Materials & Methods: Men with documented PD underwent 3D CTC with concurrent intra-cavernosal injection (ICI). Patients were placed in the Philips IQon Spectral CT scanner and an injection of Trimix (papaverine 30 mg/cc, phentolamine 2 mg/cc, prostaglandin 20 mcg/cc) in the proximal base of the penis. The medication dose was determined by pre-existing erectile function. The dose was repeated until a 3 out of 4 erection was achieved (adequate for penetration) or the maximum dose (1cc) had been administered. A 20-gauge angio-catheter was inserted into the left subcoronal corpora after injection of lidocaine for local analgesia. The penis was then manually inflated using a 50% mixture of iodinated contrast solution until maximum erection was achieved. 3D CT imaging was then obtained. A reversal dose of phenylephrine was administered if necessary, the catheter was removed, and a compressive dressing was placed. Images were processed using Philips software v4.7.5.43524.

Results: The procedure was uniformly well tolerated. Plaque size and location were underestimated by clinical assessment when compared to CTC. Extensive cavernosal disease was identified in locations inaccessible on physical exam. Precise measurement of the penile angulation in multiple planes was possible through three-dimensional software manipulation of the images. CTC revealed extensive fibrosis and/or atrophy of the underlying corpora cavernosa, identifying patients unlikely to respond to localized collagenase. In these cases, advanced imaging offered benefit in the process of patient counseling and therapeutic decision-making.

Conclusions: CTC is a valuable tool in the evaluation of Peyronie’s disease. CTC imaging provided enhanced pretreatment assessment of the location, size, and clinically unrecognized severity of disease. The procedure was well tolerated and demonstrated utility in clinical decision-making regarding disease management and patient education. Further prospective studies are needed to determine the role of CTC in the diagnosis and treatment of PD.
Adherence to the AUA Penile Prosthesis Antibiotic Prophylaxis Guidelines in Diabetic Patients is Associated with Significantly Higher Risks of Device Infection

Maxwell M. Towe, MD3, Lael Reinstatler, MD MPH2, Jacob Lucas, DOP4, Ryan Barlotta, DOP3, Martin S. Gross, MD4, Lael Reinsteatler, MD MPH4, Jacob Lucas, DOP4, Ryan Barlotta, DOP3, Martin S. Gross, MD, FASEB

Introduction: Adherence to the AUA penile prosthesis antibiotic prophylaxis guidelines that differed from guidelines. The number of infections in the AUA guidelines group was 23 (3.8%), 29 (4.8%), and 33 (5.5%), respectively. The AUA prophylaxis guidelines were followed in 282 patients, 220 (36.5%) received Gentamicin + Vancomycin as prophylaxis for 90-second intervals for as many cycles as necessary to achieve < 30° curvature. Concomitant grafting and/or plication cases were excluded. EMM was performed by forcibly bending the erect penis in the direction opposite of the point of maximal curvature for 90-second intervals for as many cycles as necessary to achieve < 30° curvature.

Results: Of 78 patients in the final analysis, 26 (33.3%) underwent EMM while 52 (66.6%) were in the NAS group. There were no differences in age, race, BMI or medical comorbidity between the groups. The pre-modeling curvature in the EMM group was 47.5° (range 30-90°) while post-modeling curvature improved to a mean of 11.7° (range 0-30°; p < 0.001). On further analysis, the infection rate for patients treated with Gentamicin + Vancomycin (7.3%) dropped significantly when a Quinolone (1.04%) was added to the regimen, p = 0.001. Similar reductions were seen with explantation (9.6% to 3.8%). There were no differences in age, race, BMI or medical comorbidity between the groups.

Conclusions: Adherence to the AUA penile prosthesis antibiotic prophylaxis guidelines confers a higher rate of device infection in diabetic patients. The high rate of infection adherence to the AUA guidelines.

Materials & Methods: Between April 2003 and May 2018, data was collected from 15 different institutions, and charts of 710 patients with diabetes receiving primary PP implantation were reviewed. Demographic information including age, race, Body Mass Index (BMI), and type of diabetes were collected for each patient. Pre-operative antibiotic regimen was recorded for each patient and primary and secondary outcomes were post-operative infection, explantation, and revision rates. Patients had a median follow up time of 7 months (range: 0-157). Results: Patients were included in the analysis only if they had completed information regarding perioperative antibiotics and outcomes. Univariate comparisons of proportions were completed for rates of infection, explantation, and revision between different antibiotic regimens.

Results: Overall, 603 patients had complete records and were included in this study. The total number of infections, explorations, and revisions for all patients included were 23 (0.8%), 29 (4.8%), and 33 (5.5%), respectively. The AUA prophylaxis guidelines were followed in 282 patients, 220 (36.5%) received Gentamicin + Vancomycin as prophylaxis and 62 (10.3%) received Gentamicin + Cephalosporin (Cefazolin), while 31 (52.2%) received prophylaxis that differed from guidelines. The number of infections in the AUA guidelines group was 17 (6.0%) vs. 6 (1.9%) for the non-AUA guidelines group, p = 0.008. The number of explorations in the AUA guidelines group was 23 (8.2%) vs. 8 (1.9%) in the non-AUA guidelines group, p < 0.001. There was no significant difference in revision rates between the two groups (p > 0.360). On further analysis, the infection rate for patients treated with Gentamicin + Vancomycin (7.3%) dropped significantly when a Quinolone (1.04%) was added to the regimen, p = 0.001. Similar reductions were seen with explantation (9.6% to 3.8%). There were no differences in age, race, BMI or medical comorbidity between the groups.

Conclusions: Adherence to the AUA penile prosthesis antibiotic prophylaxis guidelines confers a higher rate of infection device in diabetic patients. The high rate of infection adherence to the AUA guidelines.
### Regional Variation in Penile Prosthesis Implantation among Medicare Patients Diagnosed with Erectile Dysfunction

**Michael Rezaee, MD, MPH,1 Briana Goddard, BA,2 Ricardo M. Munarriz, MD, MPH,1 Martin S. Gross, MD**

1Dartmouth-Hitchcock Medical Center, Lebanon, NH; 2Boston Medical Center, Boston, MA

**Introduction:** Erectile dysfunction (ED) is a common and costly urologic condition with increasing prevalence as men age. Penile prosthesis implantation is an effective surgical treatment option for ED and is associated with high rates of patient and partner satisfaction. To date, limited research has been conducted to understand penile prosthesis utilization. The purpose of this study was to characterize penile prosthesis utilization and assess for regional variation in the use of this procedure in Medicare beneficiaries across the United States.

**Materials & Methods:** We examined penile prosthesis utilization (inflatable and semi-rigid implants) in Medicare beneficiaries with a diagnosis of ED for the years 2004 and 2014, the latter being the last year of complete International Classification of Disease, Ninth Revision data available. Adjusted utilization rates were calculated per 1000 beneficiaries accounting for age and race. Utilization rates were examined nationally and by hospital referral region (HRR).

**Results:** The national adjusted rate of penile prosthesis utilization was 5.0 and 3.7 per 1000 beneficiaries in 2004 and 2014, respectively. In 2014, 1,283,176 Medicare beneficiaries had a diagnosis of ED. Significant variation was found in penile prosthesis utilization; up to a 12-fold difference was observed between HRRs (1.9/1000 in Norfolk, VA vs. 24.2/1000 in Miami, FL). Over 60% of HRRs performed zero or < 11 penile prosthesis surgeries per year and were censored from the study. The adjusted rate of penile prosthesis utilization was highest among men age 65 to < 70 (4.6 per 1000) and lowest among men greater than age 85 (0.9 per 1000).

**Conclusions:** Significant regional differences exist in the utilization of penile prostheses among Medicare beneficiaries, up to a 12-fold difference was found in our study. This variance may be explained by a combination of demand, urologist availability, and patient-specific factors. Additionally, over two-thirds of U.S. hospital referral regions perform few to zero implants per year. Penile prosthesis implantation in Medicare beneficiaries with ED likely depends on where these patients receive their urologic care.

### The Use of Urethral Slings to Treat Incontinence in Elderly Women: Is it Safe?

**Valary T. Raup, MD, MD; Alexandra Berger, MD; Julie Szymanki, MD; Steven Chang, MD; Eldoi Dieu-Bihanana, MD**

Briangh and Women's Hospital, Harvard Medical School, Boston, MA

**Introduction:** Urethral slings are a durable treatment for stress urinary incontinence. However, there is a paucity of data on the use of slings in the very elderly. Here, we sought to evaluate the use of urethral slings to treat incontinence in female octogenarians.

**Materials & Methods:** The Premier Hospital Database (2003-2015) was queried using International Classification of Diseases (ICD-9) procedural codes (CPT) codes for urethral sling procedures. Slings were classified by type (retropubic, transobturator or single incision). Advanced age was defined as ≥ 80 years old. Prolonged length of stay (pLOS, ≥ 1 day), prolonged operative time (pOT, ≥ 90 minutes), major post-operative complications, sling type, and excess cost (≥ $5397) were analyzed. Each threshold was set at the 95th percentile. The purpose of this study was to examine the use of urethral slings to treat incontinence in female octogenarians.

**Results:** A total of 143,474 women who underwent urethral sling placement were identified, with a median age of 55 years (25-85). Of these, 59,212 were ≥ 80 years old (41%). There was no association between advanced age and the type of sling (p = 0.142). Sling placement was associated with an overall post-operative complication rate of 0.3% (583/143,474). Age ≥ 80 was associated with a higher rate of major post-operative complications (OR 3.99, 1.72% vs. 0.29%, p < 0.0001), pOT (27.2% vs. 20.3%, p < 0.0001), pLOS (32.7% vs. 21.6%, p < 0.0001), and excess cost (33.5% vs. 24.6%, < 0.0001). When controlled for pOT and Charlson Comorbidity Index (CCI), age was still associated with increased rate of major complications (OR 3.44, p < 0.0001).

**Conclusions:** While octogenarians are more likely than younger women to experience major complications after sling placement, the observed rate was only 1.7%. In our nationally-representative sample, age ≥ 80 was also associated with pOT, pLOS, and excess cost. Thus, urethral sling should be considered for well-selected octogenarians suffering from stress incontinence, but every effort should be made to medically optimize these patients pre-operatively, and patients should be counseled appropriately on their increased risk.

---

**P1**

### Intravesical Botulinum Toxin Injections for Detrusor Overactivity in Patients Suffering from Multiple Sclerosis: Appropriate Clinical Practice for Retaining this Population

**Michael E. Goltzman, MD, PhD; Brendan Contantz, MD; Gerard Preguerena, MD**

1UCare Health, Farmington, CT; 2Saint Francis Hospital and Medical Center, Hartford, CT

**Introduction:** Multiple sclerosis (MS) is a progressive demyelinating disease affecting the central nervous system which is frequently related to voiding dysfunction and a wide range of urinary complications. Detrusor overactivity (DO) is the most frequently reported urodynamic abnormality. DO is often associated with an overactive bladder, defined by urgency, possibly associated with urge incontinence, daytime frequency, and nocturia. When DO is refractory to antimuscarinic medication, botulinum toxin-A (BTX-A) injections may be a reasonable alternative to improving bladder function. Muscle fiber paralysis occurs within the first few days of injection, and toxin effects in the detrusor muscle generally last 6 to 12 months. Clinically, intradetrusor injection of BTX-A has been found to decrease urinary incontinence and improve quality of life. BTX-A is an ideal therapy due to its effectiveness and long duration of action, relative ease of administration, easy learning curve, reproducibility of results on repeated administration, and low incidence of complications. There is a reported prevalence of 72% of MS patients requesting retreatment with BTX-A. This study was conducted to assess adherence among MS patients who initiated BTX-A injection therapy with intent to identify the patient characteristics, comorbidities, or complications related to treatment cessation.

**Materials & Methods:** After IRB approval, a retrospective chart review of patients who had been identified through a multidisciplinary MS care center were analyzed. Patients received at least 1 BTX-A detrusor injection between August 2016 and October 2018. BTX-A treatment consisted of multiple trigone-sparing detrusor muscle injections consisting of 200 to 300 units of BTX-A under cystoscopic guidance.

**Results:** A total of 276 BTX-A treatments were performed on 76 patients. There was a preponderance of females (69% vs. 31%) and mean patient age was 53.1 years (range 28 to 86). Of those patients, 13 received 1 injection (17%), 12 received 2 treatments (16%), and 51 received 3 or more treatments (67%). The median time between successive treatments was 7.6 months (SD 2.4). Of the patients who failed to return for subsequent visits, the primary reasons reported for nonadherence were urinary retention requiring CIC, progression to alternative treatment (i.e. sacral nerve stimulation), or infectious complications. The majority of patients who received multiple injections reduced or even stopped taking anticholinergic drugs.

**Conclusions:** Poor patient adherence is an important area to consider in outcomes research and healthcare cost. Despite substantial sequelae, there is limited research substantiating best practices for engaging and retaining the MS population. Appreciating the high adherence rate to treatment with BTX-A will hopefully underscore the importance of thorough education efforts, exploring questions and patient misconceptions, and providing for treatment adherence. We may conclude that patients prematurely discontinue therapy for a number of possible reasons that include the treatment failure or complication, the cost (financial or personal), dosing frequency and expectations of treatment. The route of administration of medication is also a factor which influences adherence.

---

**P2**

### Periodontal Disease and Periodontal Treatment as a Predictor of Urinary Incontinence


**Introduction:** Periodontal disease (PD) is a chronic inflammatory disease caused by the presence of biofilm in the mouth. This infection can cause inflammation and chronicity in the oral cavity, which can subsequently spread to other areas of the body. One such area where PD can cause significant damage is the urinary system. PD has been shown to affect the urinary system, leading to various urological complications such as urinary incontinence. This study explores the relationship between PD and urinary incontinence.

**Materials & Methods:** A retrospective cohort study was conducted on patients attending the periodontology clinic at a tertiary care hospital over a period of 2 years. The study included patients with a diagnosis of PD and urinary incontinence. The patients were followed up after periodontal treatment to assess the impact on urinary incontinence.

**Results:** A total of 100 patients were included in the study. The mean age of the patients was 65 years, and 60% were females. The duration of PD was 10 years on average. The majority of patients (70%) had Grade II PD. After periodontal treatment, there was a significant decrease in urinary incontinence in 80% of the patients. The mean duration of follow-up was 12 months, and the patients continued to show improvement in urinary incontinence.

**Conclusions:** The results of this study suggest that periodontal treatment can have a positive impact on urinary incontinence. Early diagnosis and treatment of PD can prevent the progression of urinary incontinence and other urological complications. Further research is needed to confirm these findings and to establish the optimal management of urinary incontinence in patients with PD.
The Role of Anesthesia in Urinary Retention Following Mid Urethral Sling
Eric Katz, MD, Kareem Alazem, MD, Kristian Stersland, MD, Lata MacLachlan, MD
Lahey Hospital and Medical Center, Burlington, MA

Introduction: Postoperative urinary retention is a known complication of mid urethral sling placement for stress urinary incontinence, occurring in 3-39% of cases. The use of certain perioperative medications may influence the risk of this complication. Antiemetics are commonly used to manage perioperative nausea, some of which also have anticholinergic properties. Additionally, muscle relaxants used for paralysis could impair detrusor function. The aim of this study was to investigate the association of perioperative medications with urinary retention in the perioperative period following mid urethral sling.

Materials & Methods: This was a retrospective cohort study of all women undergoing mid urethral sling placement for stress urinary incontinence by a single fellowship-trained urologic surgeon at one institution between March 2015 and June 2018, under approval by the Institutional Review Board. Recorded data consisted of preoperative demographics and clinical data including voiding function, surgical data, intraoperative anesthesia and perioperative medications, and postoperative voiding function. Both retropubic and transobturator approaches were included. Exclusion criteria included incomplete surgical or perioperative data. All patients underwent an active retrograde void trial in the recovery area on the day of surgery. Retention rates were compared with Fisher’s Exact test.

Results: 82 patients were included, 17 (21%) of whom failed postoperative void trial. All of these women eventually passed a void trial, with no cases of permanent retention. A total of 25 patients received transdermal scopolamine and 40% of those patients receiving scopolamine failed the postoperative void trial (p=0.048). There was no statistically significant association between other antieptics (Ondansetron, Promethazine) and urinary retention. Rate of retention was also higher in patients undergoing retropubic vs. trans obturator approach (36% vs. 9%; p = 0.005). Administration of a muscle relaxant for anesthesia (rocuronium or vecuronium) was additionally associated with urinary retention (28% vs. 13% with muscle relaxant vs. no paralysis, respectively), though this association was not statistically significant (p = 0.16). Last, the rate of retention was lower in patients on preoperative perioperative antidepressants (p = 0.03).

Conclusions: Perioperative administration of transdermal scopolamine is associated with increased risk of urinary retention after mid urethral sling. This correlation is not seen with other common antiemetics and may provide a new avenue for minimizing postoperative complications. Retropubic approach, muscle relaxation, and absence of perioperative antidepressants may also correlate with higher rate of retention. Further studies are needed to elucidate these relationships.

Effect of Perioperative Variables on Void Trial Success Rate

<table>
<thead>
<tr>
<th>Variable</th>
<th>Passed void trial</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scopolamine</td>
<td>0.048</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>15/23 (65%)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>50/57 (87.7%)</td>
<td></td>
</tr>
<tr>
<td>Surgical approach</td>
<td>0.005</td>
<td></td>
</tr>
<tr>
<td>Trans obturator</td>
<td>37/46 (80.4%)</td>
<td></td>
</tr>
<tr>
<td>Retropubic</td>
<td>26/35 (74.3%)</td>
<td></td>
</tr>
<tr>
<td>Paralysis (rocuronium or vecuronium)</td>
<td>0.16</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>30/42 (71.4%)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>30/40 (75.0%)</td>
<td></td>
</tr>
<tr>
<td>Preoperative antidepressants</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2/22 (9.5%)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>44/49 (90.2%)</td>
<td></td>
</tr>
</tbody>
</table>

Green Light Laser Enucleation of the Prostate (GLEP) with Lasting Outcomes: Longer-Term Follow-up
Tammer Yamany, MD, Carlos Mejia, BS, Kai Li, MD, Alan Yaghoubian, MD, Mahdi Zangi, MD, Bo Wu, MD, Shahin Tabatabaei, MD
Massachusetts General Hospital, Boston, MA

Introduction: The short-term safety and efficacy of the Green Light Laser Enucleation of the Prostate (GLEP) has been reported previously. Theoretical advantages of GLEP include improved hemostasis due to the absorption spectrum of 532nm laser, better tissue handling due to the side-firing laser fiber, better visualization of the prostate capsule, and more versatility with concomitant vaporization. We study the long-term (greater than 12 months) safety and efficacy of en-bloc GLEP with prostate morcellation using a side-firing laser for definitive management of symptomatic LUTS in patients with enlarged prostate.

Materials & Methods: We performed a retrospective analysis of the first 148 patients to undergo GLEP at our institution from 9/2014 to 8/2017. Primary outcomes were AUA symptom score, maximum flow rate, and post-void residual volume. Secondary outcomes were quality of life score, IIEF-5 score, and PSA. The technical for GLEP has previously been described.

Results: Patient and peri-operative characteristics can be found in Table 1. No intraoperative complications occurred. Median follow up time was 12 months. Primary and secondary outcomes can be found in Figure 1, with statistically significant improvement in all parameters (p < 0.001) except IIEF-5, which demonstrated no change (p = 0.31). The benefits of surgery are lasting with no significant change in primary or secondary outcomes from 6-8-week follow up to 12 month follow up. Complication rates included 1.4% blood transfusion, 6.1% clot retention, and 4.2% urinary tract infection. 10.8% of patients had stress urinary incontinence (SUI) at three months with 6.8% of patients having persistent SUI at 12 months. Among patients with SUI, the median number of pads per day used was 1 at 6 months. 2.7% of patients developed an anterior urethral stricture that could be passively dilated with flexible cystoscopy. No patients required additional prostate debulking procedure in the time frame studied.

Conclusions: In experienced hands, GLEP is a safe and feasible option for management of large prostates with lasting outcomes beyond one year.

Materials and Methods: This was a retrospective cohort study of all women undergoing mid urethral sling placement for stress urinary incontinence by a single fellowship-trained urologic surgeon at one institution between March 2015 and June 2018, under approval by the Institutional Review Board. Recorded data consisted of preoperative demographics and clinical data including voiding function, surgical data, intraoperative anesthesia and perioperative medications, and postoperative voiding function. Both retropubic and transobturator approaches were included. Exclusion criteria included incomplete surgical or perioperative data. All patients underwent an active retrograde void trial in the recovery area on the day of surgery. Retention rates were compared with Fisher’s Exact test.

Results: 82 patients were included, 17 (21%) of whom failed postoperative void trial. All of these women eventually passed a void trial, with no cases of permanent retention. A total of 25 patients received transdermal scopolamine and 40% of those patients receiving scopolamine failed the postoperative void trial (p=0.048). There was no statistically significant association between other antieptics (Ondansetron, Promethazine) and urinary retention. Rate of retention was also higher in patients undergoing retropubic vs. trans obturator approach (36% vs. 9%; p = 0.005). Administration of a muscle relaxant for anesthesia (rocuronium or vecuronium) was additionally associated with urinary retention (28% vs. 13% with muscle relaxant vs. no paralysis, respectively), though this association was not statistically significant (p = 0.16). Last, the rate of retention was lower in patients on preoperative perioperative antidepressants (p = 0.03).

Conclusions: Perioperative administration of transdermal scopolamine is associated with increased risk of urinary retention after mid urethral sling. This correlation is not seen with other common antiemetics and may provide a new avenue for minimizing postoperative complications. Retropubic approach, muscle relaxation, and absence of perioperative antidepressants may also correlate with higher rate of retention. Further studies are needed to elucidate these relationships.

Effect of Perioperative Variables on Void Trial Success Rate

<table>
<thead>
<tr>
<th>Variable</th>
<th>Passed void trial</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scopolamine</td>
<td>0.048</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>15/23 (65%)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>50/57 (87.7%)</td>
<td></td>
</tr>
<tr>
<td>Surgical approach</td>
<td>0.005</td>
<td></td>
</tr>
<tr>
<td>Trans obturator</td>
<td>37/46 (80.4%)</td>
<td></td>
</tr>
<tr>
<td>Retropubic</td>
<td>26/35 (74.3%)</td>
<td></td>
</tr>
<tr>
<td>Paralysis (rocuronium or vecuronium)</td>
<td>0.16</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>30/42 (71.4%)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>30/40 (75.0%)</td>
<td></td>
</tr>
<tr>
<td>Preoperative antidepressants</td>
<td>0.03</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2/22 (9.5%)</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>44/49 (90.2%)</td>
<td></td>
</tr>
</tbody>
</table>
P5

Rezúm Water Vapor Thermal Therapy for Lower Urinary Tract Symptoms (LUTS) Due to Benign Prostatic Hyperplasia (BPH): Durable 4-Year Results From a Randomized Controlled Study

Andrew J. Tompkins, MD

Introduction: A randomized controlled trial of water vapor thermal therapy was conducted to treat men with severe LUTS/BPH and to determine minimal differences in International Prostate Symptom Scores (IPSS) associated with perceptible changes in quality of life (QOL).

Materials & Methods: Total 188 subjects in active arm: 135 men ≥ 50 years old, IPSS ≥ 13, maximum flow rate (Qmax) ≤ 15 ml/s and prostate volume 30 to 80 cm3 treated with Rezúm® System thermal therapy were followed 4 years; subset of 53 men, requalified for crossover from control to active treatment were followed 3 years.

Results: IPSS, QOL, Qmax and BPH Impact Index improved ~50% and remained consistently durable throughout 4 years, p < 0.001 (Figure), crossover subjects had similar sustained outcomes. At 4 years surgical retreatment rate was 4.4%, BPH medication resumption rate was 5.2%. Sexual function was preserved. IPSS and QOL scores strongly correlated as mean IPSS difference corresponding to a 1-point QOL improvement is ~5 points for IPSS 13-19, ~8.2 for IPSS 20-26, ~11.7 for several LUTS of IPSS 27-35.

Conclusions: Rezúm thermal therapy provides effective symptom relief and improved QOL with durability over 4 years, has limited impact on sexual function and is applicable to all prostate zones with procedures performed under local anesthesia in an office setting.

P6

Comparison of Transabdominal and Transrectal Ultrasound for Sizing of the Prostate

Wesley R. Pate, MD

Introduction: Prostate size is an important metric utilized in the management of many urologic diseases. Imaging to estimate prostate volume includes ultrasound (US), Computed Tomography (CT), and Magnetic Resonance Imaging (MRI); however, US stands apart as a fast, radiation-free, and cost-effective modality. Two methods of ultrasound used are transabdominal pelvic (PUS) and transrectal (TRUS) ultrasound, with the latter considered to be more accurate, but more invasive. This study aims to compare the accuracy of PUS to TRUS sizing and is the largest study to date to do so.

Materials & Methods: We performed a single-center, retrospective study of 244 patients with PUS and TRUS prostate sizing between January 1, 2012 and August 31, 2017. Prostate volume was derived from ellipsoid volume calculation using measurements documented on US. Ultrasound TRUS measurements were compared by calculating the Pearson correlation coefficient and interclass correlation coefficient (ICC), and agreement between modalities assessed using the Bland Altman analysis. This analysis was done for the whole sample population as well as for specific groupings according to BMI, prostate size, and time between exams.

Results: A total of 244 patients had both PUS and TRUS. Median age was 63 years old, median BMI was 28 kg/m2, 50 (20%) were white, 120 (49%) were black, and 41 (17%) were Hispanic. Median PSA value prior to PUS was 7.6 ng/ml. Median time between each US was 31 days, with 126 (52%) patients having TRUS within 31 days. The average value obtained by PUS was 63 ± 4.8 cm³ and by TRUS 64 ± 4.9 cm³. The mean of the differences in volume, ΔVUS - ΔVRUS, was 0.2 ± 2.2 cm³, with 161 (66%) patients having a ≤ 10% difference between PUS and TRUS estimations. Pearson correlation coefficient was 0.90, and ICC was 0.93 overall and 0.8 for all specific subgroups analyzed. Bland-Altman analysis showed 95% limits of agreement were 34/-35 cm³. When analyzed by prostate size, limits of agreement for prostates < 40 cm³ and > 100 cm³ were 14/22 cm³ and 65/58 cm³, respectively.

Conclusions: There is strong correlation between PUS and TRUS, suggesting that PUS is a useful tool for measuring prostate volume. It is important to note, however, that the Bland-Altman analysis suggests that you cannot use PUS and TRUS interchangeably in all scenarios. Since PUS is non-invasive, it should be the preferred initial modality when the goal is estimating prostate size. However, if the prostate is very large or a specific volume would drastically change management decisions, one should consider utilizing additional imaging modalities.

P7

En Bloc Enucleation of the Prostate

Robin Djang, MD

Introduction: Lower urinary tract symptoms (LUTS) are a common constellation of symptoms classically associated with bladder outlet obstruction from prostatic hyperplasia. Several medical and surgical options exist for management of bladder outlet obstruction secondary to prostatic hyperplasia. In this surgical video, we discuss the indications, techniques, and step-by-step procedure to perform a Greenlight photovaporization and enucleation of the prostate (PVEP).

Materials & Methods: A 72-year-old male was admitted for an episode of acute urinary retention complicated by ursepsis. He was referred to urology for follow up evaluation with a preference to proceed electively. On examination, the patient reported an IPSS 27 with Qol. 3. He had a 132 cc prostate as confirmed on TRUS.

Results: The accompanying video illustrates the following principles: proximal and distal limits of dissection, the technique for adenoma dissection and enucleation, mobilization of the specimen, and use of the Greenlight laser system. On a 1 month follow-up visit, the patient reported IPSS 2, Qol 0, with a PVR 13 cc. No readmissions or ED visits. No incontinence and no change in erectile function.

Conclusions: The accompanying video illustrates the principles for evaluation and surgical management of prostatic hyperplasia and bladder outlet obstruction using the Greenlight laser system to perform a photovaporization and enucleation of the prostate in a safe, controlled manner.

P8

Cost-Effectiveness Analysis of Autologous versus Allograft Pubovaginal Slings

Michal Ursiny, MD

Introduction: Pubovaginal slings are considered the gold standard in the treatment of stress urinary incontinence when considering clinical outcomes. When considering sling material, there are numerous options available to the surgeon and patient with notable differences in durability, success rates, and cost. Autologous fascial slings harvested either from the rectus fascia or the fascia lata have the best long-term outcomes, but with improvements in processing, allograft material may approach in efficacy. In the literature, the assumption has been that allograft slings are more costly, but no analysis has been done to support this assertion.

Materials & Methods: A decision analysis model was constructed to compare the cost-effectiveness of cadaveric (allograft) and autologous pubovaginal slings. Clinical outcomes and complication data was obtained from published studies. Cost data was obtained from a conglomeration of healthcare claims data from health plans, plan administrators, and medicare using the FairHealth Consumer database. Expected value calculations with Markov modeling and sensitivity analysis was used to determine the superior sling material based on overall cost-effectiveness inclusive of equipment, time, secondary costs from complications, and re-interventions. The model was analyzed over a 5 year period and a perspective of cost to society was adopted.

Results: Decision analysis modeling demonstrated that on a per-procedure basis, autologous and allograft pubovaginal slings incur an expected cost of $8635 and $9717, respectively. The primary driver of increased cost of allograft pubovaginal slings is the increased re-operation rates in comparison to autologous slings. However, varying costs of operating room time, regional cost discrepancies, and individual success rates are critical variables in altering cost-effectiveness.

Conclusions: Our decision analysis model demonstrates superior cost-effectiveness for autologous pubovaginal slings compared to allograft-based slings. The cost-savings are primarily due to superior clinical outcomes despite longer operative times. Based on this analysis, modeling, surgeons can aim to utilize their own loco-regional outcomes and cost data to determine the most cost-effective approach in their specific practice.
Adequately Represent Racial Minorities with Genitourinary Cancers? Testing for Racial Sampling Bias in the National Cancer Database: Does the NCDB

Nicholas Suss, BS1, Andrew Winer, MD2

were discharged from the recovery room, with 72 patients (93.5%) being discharged on
an average of 34.2% of total prostatic tissue mass resected. Thirty-eight patients (49.4%)
post-procedure. Average operative time was 130.7 minutes and average EBL was 51.8 mL.

when interpreting NCDB-driven studies in urologic oncology. and Pacific Islander patients are universally underrepresented in the NCDB compared to
Black male patients in the USCS with prostate and renal cancers are less
for NANA and API patients for these cancers (p =< 0.0001).

Conclusions:
The NCDB captures 57.12% of the prostate cancer diagnoses for white patients found in the USCS (Table 1) versus 53.19% for black patients, 29.55% for Native American/Navajo (NANA), and 30.23% for Asian or Pacific Islander (API), which are all significantly lower than that of white patients (p = 0.0001 for all), with 73.25% of white vs. 71.62% of black, 39.20% NANA, and 65.5% of API renal cancer diagnoses captured. This difference remained when looking at black male renal cancer patients (p = 0.0001), but not in females (p = 0.9997). The capture rate was higher for black than white female patients with bladder cancer (p = 0.0001). However, all NANA and API bladder cancer patients had significantly lower capture rates than their white counterparts (28.34% and 56.36% respectively, p = 0.0001 for both). No difference was found for penile (p = 0.5155) and testis cancer (p = 0.1024) in black patients, but the capture rate was lower for NANA and API patients for these cancers (p = 0.0001).

Conclusions:
Bladder and bowel symptoms are potential surrogate symptoms for endometriosis. Complete surgical resection of endometriosis results in improvement of pain, bladder, and bowel symptoms for the majority of patients.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>White</th>
<th>Black</th>
<th>Actin or Pacific Islander</th>
<th>Native American/Navajo</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-LEP</td>
<td>75.7%</td>
<td>81.6%</td>
<td>75.7%</td>
<td>65.5%</td>
<td>68.1%</td>
<td>73.4%</td>
</tr>
<tr>
<td>Post-LEP</td>
<td>75.7%</td>
<td>81.6%</td>
<td>75.7%</td>
<td>65.5%</td>
<td>68.1%</td>
<td>73.4%</td>
</tr>
</tbody>
</table>

Introduction: The ProTouch (1470 nm) laser is a novel diode laser for use in endoscopic enucleation of the prostate. ProTouch laser enucleation of the prostate (ProLEP) may provide similar outcomes to traditional HoLEP, with the additional benefit of improved hemostasis and tissue vaporization.

Materials & Methods: This is an IRB approved single surgeon chart review of 77 patients (average age 69 ± 9.9 years) who underwent ProLEP (10/16-3/19). Pre-operative, intra-operative, and post-operative variables were collected and analysed.

Results: Average prostate gland size was 92.4g (range: 27.29g to 296.06g) by pelvic ultrasound and average pre-operative International Prostate Symptom Score (IPSS) (on medical therapy) was 25.3 ± 6.9. Post-operative IPSS was significantly reduced at 1, 3, 6, and 12 months (12.9 ± 9.3, 5.9 ± 8.1, 3.7 ± 3.0, 9.2 ± 6.0, p-value < 0.0001). Quality of life (IPSS bother scale) was significantly improved from baseline (4.7 ± 1.2) at 1, 3, 6, and 12 months (2.5 ± 1.9, 1.7 ± 1.6, 1.0 ± 1.5, 2.5 ± 1.9, p-value < 0.0001). Average pre-operative Qmax was 9.1 ± 4.3 mL/sec and significant post-operative improvement at 1, 3, and 6 months [27.2 ± 11.3 mL/sec, 15.1 ± 11.1 cc/sec, 20.8 ± 6.8 mL/sec (p-value < 0.05)] 25 patients (52.5%) were catheter dependent prior to surgery, 19 of whom had indwelling catheters while the remaining 6 performed daily clean intermittent catheterization. All patients were voiding spontaneously at 1-month post-procedure. Average operating time was 130.7 minutes and average EBL was 53.8 mL. An average of 30.4g of prostatic tissue was resected during the ProLEP procedure, with an average of 34.2% of total prostatic tissue mass resected. Thirty-eight patients (49.4%) were discharged from the recovery room, with 72 patients (93.5%) being discharged on or before POD1. 53 patients (68.8%) had their catheters removed on or before POD1. 14 patients (18.2%) experienced intra-operative or post-operative complications, 8 of whom required re-catheterization for post-operative acute urinary retention. Urinary false passage occurred in 1 patient, 2 patients required antibiotics for a UTI, and 1 patient underwent cystoscopy for persistent hematuria. Two patients returned to the operating room for clot evacuation and fulguration. No patients received a blood transfusion. All of the complications were Clavien-Dindo IIB classification or less (Clavien I - 64.3%, Clavien II - 14.3%, Clavien III-a - 7.1%, Clavien III-b - 14.3%). No patients required repeat surgery.

Conclusions: To our knowledge, this study is the first to investigate ProLEP for the treatment of LUTS in men with BPH. Our data suggest that ProLEP is indeed a safe and effective alternative to TURP. Further studies are required to investigate the outcomes of ProLEP beyond one year.
Both clinical and non-clinical factors predict the care setting of index PP procedure (FL vs. NY: OR 34.16, 95% CI 9.54-122.3; p < 0.001). There was no difference in area (small metro vs. large metro: OR 3.15, 95% CI 1.29-7.70; p = 0.01), and state of index 0.11-0.71; p = 0.008), race (black vs. white: OR 0.57, 95% CI 0.33-0.99; p = 0.05), small metro 0.43, 95% CI 0.28-0.64; p < 0.001), payer status (Medicaid vs. Medicare: OR 0.28, 95% CI of receiving care in the ambulatory setting included fewer comorbidities (CCI ≥ 2 vs. 0: OR inpatient PP was $11,224.74, compared to $9,480.01 for outpatient PP (p < 0.001). Predictors Results: Of the 1,894 patients undergoing index PP, 387 (20.4%) received care in the inpatient setting compared to 1,507 (79.6%) in the ambulatory setting. The median cost associated with Of the 1,894 patients undergoing index PP, 387 (20.4%) received care in the inpatient setting compared to 1,507 (79.6%) in the ambulatory setting. The median cost associated with inpatient PP was $11,224.74, compared to $9,480.01 for outpatient PP (p < 0.001). Predictors of receiving care in the ambulatory setting included fewer comorbidities (CCI ≥ 2 vs. 0: OR 0.43, 95% CI 0.28-0.64; p < 0.001), payer status (Medicaid vs. Medicare: OR 0.28, 95% CI 0.11-0.71, p = 0.008), race (black vs. white: OR 0.57, 95% CI 0.33-0.99; p = 0.05), small metro area (small metro vs. large metro: OR 3.15, 95% CI 1.29-7.70; p = 0.01), and state of index procedure (FL vs. NY: OR 34.16, 95% CI 9.54-122.3; p < 0.001). There was no difference in 30-day revist rates between inpatient or outpatient PP (8.0% vs. 6.23%, p = 0.21).

Conclusions: Both clinical and non-clinical factors predict the care setting of index PP procedure and inpatient PP is associated with higher procedural costs. Our findings may help providers better identify patients who should be considered for outpatient PP procedures.

Table 1. Predictors of ambulatory PP procedures, multivariate analysis

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Odds Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1.01 (0.99-1.03)</td>
</tr>
<tr>
<td>CCI</td>
<td>1.00 (0.97-1.03)</td>
</tr>
<tr>
<td>Race</td>
<td>0.57 (0.33-0.99)</td>
</tr>
<tr>
<td>Small Metro</td>
<td>0.43 (0.28-0.64)</td>
</tr>
<tr>
<td>Medicaid</td>
<td>0.28 (0.11-0.71)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>0.43 (0.28-0.64)</td>
</tr>
<tr>
<td>Other</td>
<td>0.57 (0.33-0.99)</td>
</tr>
</tbody>
</table>

Introduction: Penile prostheses (PP) are indicated in patients with refractory erectile dysfunction. PP insertion is traditionally performed as an inpatient procedure, but is now felt to be safe in the outpatient setting, which is more cost-effective. However, few studies have determined which patients undergo PP procedures in the outpatient setting. Thus, we sought to identify predictors of index PP care setting and perioperative outcomes and cost associated with inpatient versus outpatient procedures.

Materials & Methods: All-payer data from the 2014 Healthcare Cost and Utilization Project (HCUP) State Databases from Florida (FL) and New York (NY) were used to identify all patients undergoing index inatable PP (IPP) or maljacle PP (MPP) insertion. Patient demographics, regional differences, total charges (converted to costs), and 30-day revisit rates were measured. Multivariable logistic regression adjusted for facility-level clustering was utilized.

Results: Of the 1,894 patients undergoing index PP, 387 (20.4%) received care in the inpatient setting compared to 1,507 (79.6%) in the ambulatory setting. The median cost associated with inpatient PP was $11,224.74, compared to $9,480.01 for outpatient PP (p < 0.001). Predictors of receiving care in the ambulatory setting included fewer comorbidities (CCI ≥ 2 vs. 0: OR 0.43, 95% CI 0.28-0.64; p < 0.001), payer status (Medicaid vs. Medicare: OR 0.28, 95% CI 0.11-0.71, p = 0.008), race (black vs. white: OR 0.57, 95% CI 0.33-0.99; p = 0.05), small metro area (small metro vs. large metro: OR 3.15, 95% CI 1.29-7.70; p = 0.01), and state of index procedure (FL vs. NY: OR 34.16, 95% CI 9.54-122.3; p < 0.001). There was no difference in 30-day revisit rates between inpatient or outpatient PP (8.0% vs. 6.23%, p = 0.21).

Conclusions: Both clinical and non-clinical factors predict the care setting of index PP procedure and inpatient PP is associated with higher procedural costs. Our findings may help providers better identify patients who should be considered for outpatient PP procedures.

*Max K. Willecher Award Eligible

---

ReExamining an Old Trend: The Association of Human Papillomavirus and Bladder Cancer

Lael Reinstatler, MD, MPH 1

Using NHANES, a large nationally-representative population-based survey, we gathered clinical and demographic data on all patients with a diagnosis of bladder cancer; however, associations with HPV serology have not been reported. In this study, we assessed the correlation between HPV positive serology and bladder cancer. Exposure to the Human Papilloma Virus (HPV) is a recognized carcinogenic factor. Previous studies have shown a possible association between HPV and bladder cancer; however, associations with HPV serology have not been reported. In this study, we assessed the correlation between HPV positive serology and bladder cancer.

Materials & Methods: Using NHANES, a large nationally-representative population-based survey, we gathered clinical and demographic data on all patients with a diagnosis of bladder cancer from 2007-2010 and analyzed their HPV serology status. We assessed the association of sero-positive results for HPV16, HPV18, HPV11, and HPV6 on the rates of bladder cancer diagnosis.

Results: Over the four-year period there was a weighted population of 298,120,000 Americans. The prevalence of HPV positive serology was as follows: HPV18 - 5.5%, HPV16 - 13.2%, HPV11 - 6.4%, HPV6 - 17.4%. There were 443,948 bladder cancer cases. Among cases compared to controls there was a higher prevalence of male gender (80% vs. 53%, p = 0.0056), Caucasian race (93% vs. 66%, p = 0.001), and HPV6 positive serology (18.1% vs. 17.6%, p = 0.0005). There was no difference among the other three HPV types. On logistic regression controlling for race, gender, and smoking status, increasing body weight (OR 1.01, p = 0.014), Caucasian race (93% vs. 66%, p = 0.001), and HPV6 positive serology (18.1% vs. 17.6%, p = 0.0005) were associated with increased odds of bladder cancer diagnosis while increasing age (OR 0.89, p < 0.0001) and HPV11 positivity (OR 0.23, p < 0.0001) were protective. This finding is striking and might affect future investigation into the pathophysiological basis of this relationship.

Conclusions: A new decision aid for men with high-risk features following RP for PCa, empirically designed with patient input, shows promising evidence of understandability and usability. Further research will assess the effectiveness of the DA in improving shared decision making for this subset of prostate cancer patients.

*Max K. Willecher Award Eligible

---

I Don’t Know What a Nomogram is: A Mixed Methods Approach to the Creation of a Patient Decision Aid for Men with High-Risk Features Post Prostatectomy

Jesse D. Sammon, DO, Christina R. Gentile, BS, Michael Kobut, PhD, Christopher Stockdale, MD, Moritz Hanauer, MD, Paul Han, MD, Maine Medical Center, Portland, ME, USA

Introduction: Three large multi-institution RCTs have demonstrated that for men with extracapsular extension, seminal vesicle involvement, and/or positive surgical margins, after radical prostatectomy, adjuvant radiotherapy (ART) may have a favorable impact on biochemical and local recurrence rates. However there is conflicting evidence concerning the effect of ART on cancer specific and overall survival. Given limitations of existing data, and the risk of treatment related side effects, the decision to pursue ART is patient preference-sensitive.

Materials & Methods: A multidisciplinary work-group (Urologists, Radiation Oncologists, Medical Oncologists, Physician Assistants, Nurse practitioners, Oncology nurses) created an evidence-based decision aid (DA), based on a review of available literature and guided by International Patient Decision Aid Society criteria, to inform patients of the risks, benefits, and uncertainties of ART vs. early salvage RT for men with high-risk features following RP. Alpha testing included readability, plain language assessment and 3 iterative waves of qualitative usability interviews with prostate cancer patients recruited from a large metropolitan Urology group practice (n = 12). Three members of the study team conducted software-assisted coding and thematic analysis of transcribed interviews, focusing on participants’ reactions to the DA, points of confusion, and recommendations for improvement. Usability of the DA was measured using the NASA-TLX and system usability score.

Results: Prostate cancer patients reported favorable perceptions of the value of the prototype DA, but also identified several areas for improvement, including confusing terms and jargon. Patient feedback was used to iteratively revise the DA to maximize its understandability and usability. Patients also provided valuable input on their informational and emotional needs in dealing with prostate cancer. Quantitative Measures suggested that the prototype DA had an acceptable level of usability.

Conclusions: A new decision aid for men with high-risk features following RP for PCa, iteratively designed with patient input, shows promising evidence of understandability and usability. Further research will assess the effectiveness of the DA in improving shared decision making for this subset of prostate cancer patients.

*Max K. Willecher Award Eligible
Fascial Anastomosis Suspension Technique (FAST) During Open Retropubic Radical Prostatectomy: A Novel Method to Improve Early Postoperative Recovery of Urinary Continence
Alessandra Ambu, MD; Stefano Gaercio, MD; Marco Russo, MD; Mariateresa Carchedi, MD; Antonio Battaglia, MD; Giulio Bonivvusto, MD; Maurizio Bellina, MD
Ospedale degli Infanti di Rovigo - ASL TO3, Rovigo, Italy

Introduction: Postoperative urinary incontinence after radical prostatectomy (RP) may greatly affect patients’ quality of life and may require a long time and further treatments to be addressed. We show our results with a novel technique for urethral suspension during RP, which is a modification of the technique originally described by JW Thuroff et al in 1992, but which is also considered the use of a single sling, harvested from the rectus muscle fascia, while we created one fascial limb on each side of the linea alba, then suturing both limbs to the vesico-urethral anastomosis, in order to suspend it and to avoid its downward dislocation.

Materials & Methods: From June 2017 to October 2017, 40 patients with localized prostate cancer underwent to open RP at our institution, with nerve, bladder neck sparing technique. Our standard technique for the anastomosis includes an interrupted suture with 3 stitches on both sides (towards 11, 9, 7 on the left, and towards 1, 3, 5 on the right), and a running suture on the posterior urethral plate. For the modified fascial anastomosis suspension technique (FAST), once the anastomosis is sutured, 2 limbs of rectus muscle fascia are harvested, each 8 cm long and 1 cm wide, with a distal attachment; the free extremity is brought to the anastomosis and sutured to the stitch towards 7 on the left and to the stitch towards 3 on the right, under a mild perineal pressure to enhance the urethral suspension. In 20 patients (group 1) the standard vesico-urethral anastomosis was performed without additional procedures, while in 20 patients (group 2) a FAST was added to the standard vesico-urethral anastomosis. Continence results were evaluated in terms of number of pads per day and according to the International Consultation on Incontinence Questionnaire (ICQ) score at 24 and 48 hours and at 4 weeks postoperatively. Continence was defined as the need of 0-1 pad per day.

Results: Continence rate (CR) for group 1 and group 2 was 15% Vs. 40% at 24 hrs; 20% vs. 50% at 48 hrs, and 30% vs. 70% at 4 weeks respectively. No urinary obstructive complications were observed. Overall survival was significantly better in responders (P = 0.003).

Conclusions: Although on a small series of patients, our results show better early continence results for patients who received a modified anastomosis suspension technique, compared to patients who underwent RP according to a standard technique with respect to vesico-urethral anastomosis suspension. The mechanism on which early recovery of urinary continence following urethral suspension may be related, is basically unknown. Our hypothesis is that vesico-urethral anastomosis suspension created with 2 limbs of rectus muscle fascia may provide an additional support to the urethral striated sphincter, and a good response from surgery can delay the use of cytotoxic agents and potentially improve survival. The objective of this study is to assess whether early responders to CN have better long-term outcomes.

Materials & Methods: Using a retrospective institutional database, 76 patients who underwent CN between September 2002 and January 2018 were identified. Those who had stable disease on their first evaluation within 6 months after surgery were considered responders. Non-responders demonstrated progression of disease defined as increased volume or new sites of metastasis. Survival analysis was conducted using Kaplan-Meier and log-rank tests.

Results: Median age was 61.9 years (IQR 52.8-70.5) in responders and 56.5 (IQR 52.1-70.9) in non-responders. Only 4 patients received systemic treatment before surgery, in each group. At the time of surgery, 32 had lymph node dissection and 15 underwent concurrent metadectomy. After a median follow up of 11.6 months (IQR 5.2-29.3), 38 deaths were observed. Overall survival was significantly better in responders (P = 0.002, Figure 1) with median survival of 55.6 months versus 12.4 months in non-responders. A good response to CN also delayed need for systemic treatment. Median time to start of systemic treatment was 26.1 months in responders compared to 2.5 months in non-responders (P = 0.003).

Conclusions: A good early response to CN is associated with better overall survival. These findings suggest that some patients do benefit from surgery and future studies need to focus on how to better identify CN responders.
A Comprehensive Pan-Cancer Gene Expression and Drug Sensitivity Analysis Reveals SLFN11 as a Marker of Sensitivity to DNA-Damaging Chemotherapy
Kevin Shee, PhD¹, Ladel S. Reinstatler, MD, MPH², John D. Seigne, MD², Todd W. Miller, PhD²
¹Geisel School of Medicine at Dartmouth, Lebanon, NH; ²Dartmouth Hitchcock Medical Center, Lebanon, NH

Introduction: Precision medicine seeks to integrate data from a patient’s cancer to effectively tailor anti-cancer therapy. DNA-damaging chemotherapies have been successfully used to treat urologic cancers, but tend to be associated with significant toxicities. Thus, the identification of biomarkers of response to chemotherapeutics may allow providers to limit treatment to only those patients who stand to clinically benefit. Here we have developed and implemented a comprehensive pan-cancer analysis integrating gene expression and drug sensitivity data to identify novel biomarkers of response to DNA-damaging chemotherapeutics.

Materials & Methods: Gene expression profiling and drug sensitivity analyses from the Cancer Cell Line Encyclopedia (CCLE) database (860 cell lines x 481 drugs), the Genomics of Drug Sensitivity in Cancer (GDSC) database (1065 cell lines x 266 drugs), and the National Cancer Institute 60 dataset (60 cell lines x 237 drugs) were correlated using Pearson’s method. 1-way ANOVA was used to compare relationship between chemotherapeutic classes. Human tumor gene expression and protein data was obtained from the Human Protein Atlas.

Results: The only gene found to be significantly correlated with drug sensitivity in correlation analysis for all 4 classes of chemotherapeutic agents in all 3 databases was SLFN11, or Schlafen Family Member 11. Cancer cells with high SLFN11 gene expression were found to be highly correlated with sensitivity to DNA-damaging chemotherapeutic agents (Fig 1A; p < 0.0001). This relationship was not found for similar analyses performed for microtubule inhibitors (p > 0.05). When stratifying the analysis by chemotherapeutic class, SLFN11 expression was found to be an especially strong marker of topoisomerase inhibitor sensitivity (Fig 1B) (p < 0.05 by 1-way ANOVA for each dataset). RNA sequencing and IHC for SLFN11 gene expression and protein, respectively, in human tumors showed highest levels of expression in renal cell tumors among all tumor types.

Conclusions: Using pan-cancer cell line gene expression profiling and drug sensitivity data, we have identified SLFN11 expression as a novel biomarker of sensitivity to DNA-damaging chemotherapeutics, particularly topoisomerase inhibitors, that is highly expressed in renal cell tumors.

Assessing the Learning Curve for Robotic Assisted Laparoscopic Intraocular Urethral Diversion: Initial Experience and Outcomes
Keith O'Brien, MD¹, Ryan Dorin, MD²
¹University of Connecticut, West Hartford, CT; ²The Hospital of Central Connecticut, West Hartford, CT

Introduction: Robotic assisted radical cystectomy with intracorporeal urinary diversion is a relatively new surgical technique for management of patients requiring bladder removal, with potential advantages relating to postoperative recovery, wound complications, and cosmesis. We sought to study the outcomes of our early experience with this procedure performed at a community medical center.

Materials & Methods: We reviewed a prospectively maintained database of a single surgeon series of 35 consecutive robotic assisted radical cystectomies with extended pelvic lymph node dissection and intracorporeal urinary diversion (RC/IKUD). Time to return of bowel function, hospital length of stay, estimated blood loss, and 90-day postoperative complications were assessed. Cases were subsequently stratified into 3 consecutive time periods to assess for change in operative time. Patients were placed on a standardized ERAS protocol.

Results: 29 patients underwent ileal conduit urinary diversion, while 6 underwent construction of an ileal neobladder. Average follow up interval was 12 months (1-42 months). Median total operative time for RC/IKUD was 459 minutes (range 266-665 min). Median operative time for ileal conduit patients was 430 minutes (range 266-635 min) and for neobladder patients was 533 minutes (range 479-665 min). For ileal conduit patients, the first 10 cases had a median operative time of 514 minutes. The next 10 cases had a median total operative time of 456 minutes and the most recent 9 cases had a median operative time of 331 minutes. Median EBL was 150 cc (range 50-800 cc). Median length of stay was 6 days (range 3-14 days). Median time to flatus was 3 days (range 1-7 days). Median time to return of bowel movement was 4 days (range 2-7 days). 24 patients (68%) experienced a complication. 4 of the 35 patients (11%) experienced Clavien >2 complication. There were no high grade bowel complications or wound infections.

Conclusions: Our initial experience with intracorporeal urinary diversion supports the feasibility of this technique as a minimally invasive approach to radical cystectomy, with a similar safety profile to open urinary diversion. Median operative time improved with experience. Further study is needed to clarify the benefits of intracorporeal diversion.
Introduction: Laparoscopic partial nephrectomy (PN) is a widely performed, minimally-invasive alternative to open PN. We compared pre-, peri- and post-operative factors in 760 unique PN cases (187 open and 573 laparoscopic). 48 (8.4%) of the laparoscopic cases were performed with robotic assistance and were not analyzed separately. The median size of the tumor on imaging was 2.6 cm (IQR, 2-3.9 cm) for open procedures and 2.45 cm (IQR, 1.8-3.4 cm) for laparoscopic. Surgical pathologic findings revealed 458 (78.2%) pT1a, 90 (15.4%) pT1b, 4 (0.7%) pT2, 3.4% for laparoscopic PN. 4.5% of patients with PCNL revealed 458 (78.2%) pT1a, 90 (15.4%) pT1b, 4 (0.7%) pT2, 3.4% for laparoscopic PN. The mean surgery time was 213.6 minutes (SD 65.0) for open procedures and 208.8 minutes (SD 74.8) for laparoscopic procedures (p = 0.433). When vascular clamping was used, the mean ischemic time was 20.6 minutes (SD 9.0) for open procedures compared to 22.0 (SD 7.4) minutes for laparoscopic procedures (p = 0.025). Mean estimated blood loss was 400 cc (SD 401) and 248 cc (SD 267) for open and laparoscopic procedures respectively (p = 0.001). Positive margins occurred in 19/573 (3.2%) of laparoscopic PN. Risk of any post-operative complication for open PN was 29.9%, with a 3.3% risk of Clavien grade 3a-4a complications. For laparoscopic PN, the risk of any complication was 15.4% and 3.3% for Clavien grade 3a-4a complications. Local recurrence rates were 2.1% for open procedures and 2.8% for laparoscopic procedures.

Conclusions: Laparoscopic partial nephrectomy is an effective, minimally-invasive surgical option for curative treatment of RCC with comparable oncologic outcomes and an apparent lower complication risk. The statistically significant difference in ischemic time of 1.4 minutes is of unlikely clinical significance and we are currently investigating functional outcomes.

Materials & Methods: Under IRB approved protocol we interrogated our institutional RCC database for all patients who underwent either open or laparoscopic PN for RCC from 1997-2018. Patients with benign pathology on surgical pathology were excluded from this analysis. Open versus laparoscopic technique decision was at the discretion of the treating urologic surgeon. Laparoscopic cases include both pure laparoscopic and robotic assisted laparoscopic techniques. Outcomes analyzed included intra-operative parameters, pathologic outcomes, post-operative complications and disease local recurrence rates.

Results: The study cohort consisted of 752 patients with a median age of 59 at the time of surgery. 424 (56%) patients underwent open PN, and 328 (44%) patients underwent laparoscopic PN. The overall median follow-up was 36 months (IQR, 2-74 months). The mean operative time was 154.4 minutes (SD 58.7) for open PN and 154.4 minutes (SD 47.4) for laparoscopic PN. The patients were followed up for a median of 39.5 months (IQR, 2-3.9 cm) for open PN and 2.45 cm (IQR, 1.8-3.4 cm) for laparoscopic PN. The overall recurrence rates were 2.1% for open PN and 2.8% for laparoscopic PN.

Conclusions: Laparoscopic partial nephrectomy was performed significantly faster than open PN, with a comparable recurrence rate. The study cohort consisted of 752 patients with a median age of 59 at the time of surgery. 424 (56%) patients underwent open PN, and 328 (44%) patients underwent laparoscopic PN. The overall median follow-up was 36 months (IQR, 2-74 months). The mean operative time was 154.4 minutes (SD 58.7) for open PN and 154.4 minutes (SD 47.4) for laparoscopic PN. The patients were followed up for a median of 39.5 months (IQR, 2-3.9 cm) for open PN and 2.45 cm (IQR, 1.8-3.4 cm) for laparoscopic PN. The overall recurrence rates were 2.1% for open PN and 2.8% for laparoscopic PN.
Impact of a Multidisciplinary Kidney Stone Prevention Clinic

Kevin Krughoff, MD1, Cassandra Dehade, APRN1, Kathy Barzynski, RD1, Scott Fabozzi, MD1
1Dartmouth-Hitchcock, Lebanon, NH; 2Concord Hospital, Concord, NH; 3Concord Hospital, Lebanon, NH

Introduction: There are several known benefits of a multidisciplinary approach to stone prevention; however, the implementation of this model in the community setting has not been described. Our goal was to assess the feasibility of a stone prevention clinic in a community-based practice using responses to questionnaires, 24-hour urine parameters and routine imaging results.

Materials & Methods: Patients with recurrent stone disease, risk factors or comorbidities that place restrictions on their diet were enrolled in the stone prevention clinic. Appointments included a review of patient history, medications, dietary habits, stone analysis, lab work and 24-hour urine results. Patients were met with an APRN and Registered Dietitian (RD) who used this information to create personalized dietary and lifestyle plans. Patients were administered a questionnaire to determine how beneficial they felt the clinic was. Questionnaire results, stone risk parameters and imaging results were retrospectively reviewed for all consecutive patients referred to the clinic. Paired-samples t-tests were used to assess changes in individual 24-hour urine parameters across follow up visits. For patients with prior 24-hour urine data, difference-in-difference testing was used to assess change in stone supersaturation trends following enrollment.

Results: 77 patients were followed over an average of 1.76 follow up visits (275 ± 143 days). Of the 63 surveys completed, 100% of patients found their visit with the RD helpful and 98.4% would recommend the clinic to friends/family. Of the 46 records with consecutive 24-hour urine studies, significant reductions were observed in the supersaturation profiles for uric acid (0.301 ± 0.089, p < 0.01) and calcium phosphate (0.641 ± 0.298 p = 0.04) (Table 1). A significant decrease was seen in the trajectory of uric acid supersaturation following enrollment (-0.371 ± 0.158, p = 0.02) (Figure 1). Follow up KUB and renal US showed no stone growth in 95% of patients.

Conclusions: The implementation of a multidisciplinary stone prevention model is feasible in the community setting. This is supported by positive feedback, significant reduction in stone risk parameters and lack of stone growth on routine imaging.

Table 1. Change in stone supersaturation and supersaturation trajectory

<table>
<thead>
<tr>
<th>Stone Risk [Risk Range]</th>
<th>Change in Value [5%]</th>
<th>Change in Trajectory [5%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Oxalate [CaOx]</td>
<td>0.301 (p = 0.01)</td>
<td>-0.371 (p = 0.02)</td>
</tr>
<tr>
<td>Struvite [Struvite]</td>
<td>0.641 (p = 0.04)</td>
<td>-0.450 (p = 0.06)</td>
</tr>
</tbody>
</table>

Figure 1. Change in supersaturation profile from most recent 24-hour urine collection

Creation and initial implementation of the D.I.R.E.C.T Pathway (Delayed Imaging to Reduce Excessive Computed Tomography) for the Evaluation of Patients with Suspected Renal Colic

Kevan M. Sternberg, MD, David W. Sobel, MD, Aaron Greenspun, BS, Roz Bidad, BSN, Peter Weimersheimer, MD
1University of Vermont, Burlington, VT

Introduction: Computed tomography (CT) remains the standard of care for the evaluation of acute renal colic and its use has significantly increased over the past 2 decades. Concerns, however, exist regarding radiation exposure and cost. Ultrasonography has been proposed as an alternative initial imaging approach. While shown to be safe, urologists often require the additional anatomic information provided by CT to help guide patient management. Considering that the majority of ureteral stones (~80%) will pass without intervention, obtaining a CT initially on every patient with a suspected stone may not be necessary. We propose an ED algorithm using initial ultrasonography for patients with high suspicion of uncomplicated ureterolithiasis that provides a mechanism for appropriate outpatient urologic follow-up with CT imaging if necessary.

Materials & Methods: A prospective study was approved by the UVM IRB and an algorithm was developed defining patient eligibility, screening, diagnostic evaluation, discharge instructions, and follow-up supported through an internal grant at the University of Vermont (Figure 1). Through funding, a research coordinator was hired to organize workflow, collect data, and contact patients to arrange follow-up after the ED visit. Patient eligibility is determined by the STONE score and/or clinical judgement of the likelihood of the presenting symptoms being secondary to a stone. For those with a high suspicion, an ultrasound is obtained. If the presenting symptoms are controlled without change in suspected diagnosis, the patient is discharged home. For those with urologic follow-up, patient eligibility is determined by the STONE score and/or clinical judgement of the likelihood of the presenting symptoms being secondary to a stone. For those with a high suspicion, an ultrasound is obtained. If the presenting symptoms are controlled without change in suspected diagnosis, the patient is discharged home. For those with urologic follow-up, patient eligibility is determined by the STONE score and/or clinical judgement of the likelihood of the presenting symptoms being secondary to a stone. For those with a high suspicion, an ultrasound is obtained. If the presenting symptoms are controlled without change in suspected diagnosis, the patient is discharged home. For those with urologic follow-up, patient eligibility is determined by the STONE score and/or clinical judgement of the likelihood of the presenting symptoms being secondary to a stone. For those with a high suspicion, an ultrasound is obtained. If the presenting symptoms are controlled without change in suspected diagnosis, the patient is discharged home. For those with urologic follow-up, patient eligibility is determined by the STONE score and/or clinical judgement of the likelihood of the presenting symptoms being secondary to a stone. For those with a high suspicion, an ultrasound is obtained. If the presenting symptoms are controlled without change in suspected diagnosis, the patient is discharged home. For those with urologic follow-up, patient eligibility is determined by the STONE score and/or clinical judgement of the likelihood of the presenting symptoms being secondary to a stone. For those with a high suspicion, an ultrasound is obtained. If the presenting symptoms are controlled without change in suspected diagnosis, the patient is discharged home. For those with urologic follow-up, patient eligibility is determined by the STONE score and/or clinical judgement of the likelihood of the presenting symptoms being secondary to a stone. For those with a high suspicion, an ultrasound is obtained. If the presenting symptoms are controlled without change in suspected diagnosis, the patient is discharged home. For those with urologic follow-up, patient eligibility is determined by the STONE score and/or clinical judgement of the likelihood of the presenting symptoms being secondary to a stone. For those with a high suspicion, an ultrasound is obtained. If the presenting symptoms are controlled without change in suspected diagnosis, the patient is discharged home. For those with urologic follow-up, patient eligibility is determined by the STONE score and/or clinical judgement of the likelihood of the presenting symptoms being secondary to a stone. For those with a high suspicion, an ultrasound is obtained. If the presenting symptoms are controlled without change in suspected diagnosis, the patient is discharged home. For those with urologic follow-up, patient eligibility is determined by the STONE score and/or clinical judgement of the likelihood of the presenting symptoms being secondary to a stone. For those with a high suspicion, an ultrasound is obtained. If the presenting symptoms are controlled without change in suspected diagnosis, the patient is discharged home. For those with urologic follow-up, patient eligibility is determined by the STONE score and/or clinical judgement of the likelihood of the presenting symptoms being secondary to a stone. For those with a high suspicion, an ultrasound is obtained. If the presenting symptoms are controlled without change in suspected diagnosis, the patient is discharged home. For those with urologic follow-up, patient eligibility is determined by the STONE score and/or clinical judgement of the likelihood of the presenting symptoms being secondary to a stone. For those with a high suspicion, an ultrasound is obtained. If the presenting symptoms are controlled without change in suspected diagnosis, the patient is discharged home. For those with urologic follow-up, patient eligibility is determined by the STONE score and/or clinical judgement of the likelihood of the presenting symptoms being secondary to a stone. For those with a high suspicion, an ultrasound is obtained. If the presenting symptoms are controlled without change in suspected diagnosis, the patient is discharged home. For those with urologic follow-up, patient eligibility is determined by the STONE score and/or clinical judgement of the likelihood of the presenting symptoms being secondary to a stone. For those with a high suspicion, an ultrasound is obtained.
Dusting is Efficacious and Safe with a 30-Watt Laser

Eric Jung, MD, Ohad Kott, MD, Osama Al-Alao, MD, Aleksandra Balen, MD, Timothy O’Rourke, MD, Meredith Wasserman, MD, Christopher Tucci, RN, Gyan Fereek, MD
Minimally Invasive Urology Institute, The Miriam Hospital, Department of Urology, The Warren Alpert Medical School of Brown University, Providence, RI

Introduction: It has been reported that 100-Watt lasers may shorten operative and lasing times leading to higher efficiency during ureteroscopic laser lithotripsy (URSL) and costs savings. At our institution, 30-Watt lasers are utilized for ureteroscopic cases. In this study, we sought to compare our institutions experience with 30-Watt lasers in the domains of cost-effectiveness and operating times to reported 100-Watt laser data from literature.

Materials & Methods: We identified 246 adult patients who underwent URSL at our institution between March 1, 2017 to September 1, 2017. Cases were included if their pre-operative stone burden was measured using standard non-contrast CT imaging and if post-operative imaging for residual stone burden assessment showed complete stone free status. All cases started with a similar stone fragmentation laser setting of 0.8 J and 8 Hz. Dusting cases followed with a 0.4 J and 25 Hz setting. Basketing cases included stone fragment extraction. We compared the operating time in our cohort to recently published data from the EDG research group that compared dusting vs. basketing using a high-power holmium laser (Humphreys et al. J Urol. 2018 May).

Results: 101 patients met the inclusion criteria and were stone free post URSL. 39 cases used basketing with 200 nm laser (30.8%) and 365 nm laser (69.2%). 62 cases dusted the stones using 280 nm laser (27.4%) and 365 nm laser (72.6%). Mean-operative time of URSL cases dusting the stones (mean size 52.85 mm²) was 35.4 minutes. Mean operating time of URSL cases using basketing of stones (mean size 50.69 mm²) with 30-Watt was 50.4 minutes. Data from the EDGE research group depict mean operative time in URSL cases using dusting of stones (mean size 96.1 mm²) with 100 Watt is 35.9 minutes. No significant time difference was found when comparing mean operating times of the EDGE group study and our cohort. In addition, mean operative time of URSL cases using basketing of stones (mean size 63.3 mm²) with 100 Watt is 67.4 minutes.

Conclusions: In this study, ureteroscopic stone treatment using 30-Watt laser was efficacious and did not prolong operating time compared to dusting with a 100-Watt laser. Considering the price difference between the high and low power lasers, we estimate the yearly costs savings in our institution to be around $100,000. Operative time difference may be noticed in cases involving very large stone burden. However, when comparing the potential benefits of an expensive advanced laser, it is important to consider that actual time and cost savings may not be achieved, especially if operating time savings does not allow the addition of another surgical case to the schedule. In addition, basketing of kidney stones was found to prolong the operating time in our institution and therefore should be used in selected cases.

Informing the Management of Asymptomatic Nephrolithiasis: Markov Decision Analysis for the 1cm Renal Stone

Robin Djang, MD, Vernon M. Pais, MD
Dartmouth Hitchcock Medical Center, Lebanon, NH

Introduction: The management of incidentally discovered, asymptomatic renal stones is controversial. While some choose watchful waiting, others recommend pre-emptive surgical treatments. Of surgical options, shock wave lithotripsy (SWL) is considered the least invasive and has purported highest initial postoperative quality of life (QOL), although it has inferior stone-free rates (SFR) compared with ureteroscopy with basket extraction of fragmented stones (URS-B). More recently, ureteroscopy with laser “dusting” (URS-D), generating very fine fragments left in situ to pass, has enjoyed growing acceptance as it reduces the need for a ureteral stent and thus may offer improved QOL. Literature, though suggests inferior SFR compared with URS-B. We performed decision analysis to assess quality adjusted life-years (QALY) associated with each treatment option.

Materials & Methods: A Markov Model was constructed to represent potential outcomes for a single 1cm renal stone via each of the four possible interventions of interest (watchful waiting, URS-B, URS-D, and SWL) with TreeAge Pro-software (Figure 1). The cohort was followed for 1 month cycles over three years. Toll-penalties for receiving a stent and undergoing surgery were standardized and incorporated into each subtree when indicated. Probabilities, utilities, and toll-penalties were derived from existing literature as available and clinical extrapolation when no published data was available. In addition to overall preferred options, one-way sensitivity analyses were performed to determine threshold probabilities and utilities that may alter preferred options.

Results: Employing baseline published stone free probabilities, watchful waiting was the preferred intervention, preserving 2.82 QALYs over the three years. The remaining options had similar but decreasing QALYs – URS-B provided 2.78 QALYs, SWL provided 2.72 QALYs, and URS-D provided 2.67 QALYs. One-way sensitivity analysis was performed for the range of expected stone free probabilities for each intervention, as well as for the full range of potential disutility related to ureteral stents. URS-D was preferred when the probability of becoming stone free with URS-B dropped below 37% (Figure 2). Shock wave lithotripsy was preferred over URS-B when the probability of becoming stone free with URS-B dropped below 62%. As stents became progressively less bothersome, watchful waiting is preferred, followed by URS-B, SWL, and URS-D respectively.

Conclusions: When accounting for SFR and anticipated utilities of associated health states over a three-year period, watchful waiting is a preferred management decision for asymptomatic renal stones. However, these results are sensitive to both actual stone free rate and individual stent tolerance. These varying thresholds underscore the importance of shared decision making informed by surgeon-specific stone free rates and patient-specific stent tolerance.

*Max K. Wilscher Award Eligible

Figure 1. Markov Decision Tree, Global View

Figure 2. URS-B, one-way sensitivity analysis
### Introduction
Holmium laser lithotripsy has become standard for uroteroscopic management of urinary tract stones. During flexible uroteroscopy, laser fibers may be subject to multiple sharp bends depending on stone location. It remains relatively unknown whether power delivery at the fiber tip changes due to fiber curvature. We evaluated whether bending angles affect the power output of a commonly used holmium laser.

### Materials & Methods
We used a Lumera Pulse 30H Holmium Laser, a standard mirror, a collection fiber with a 400 µm core diameter, a Thorlabs Amplified Si Photodetector, and a Tektronix MDO7004 Oscilloscope. Two commonly used laser fibers were used: a SlimLine™ 850-365, and a SlimLine™ 200 D/Φ/L. The laser fiber and collection fiber were positioned in parallel, pointing downwards at a small mirror. The mirror and the fiber tips were then submerged in deionized water. The laser was fired at 0.3 J/5 Hz without any significant bend to establish a baseline. For subsequent testing, a portion of the laser fiber was horizontally and tightly wrapped around cylinders of varying radii. The fiber was wrapped one or more full revolutions around the cylinders, and the power output recorded over eight seconds. The peak values were used to calculate a Root-Mean-Square (RMS). Due to experimental setup variations, three baselines were taken. The smallest radii used are the smallest radii each fiber could achieve without breaking.

### Results
The RMS of pulse peak power did not vary significantly at any bending radius or number of turns measured. The Oscilloscope is accurate within 2% of measurement. Because our experiment compared two values, any measured power output difference of less than 4% was within the margin of error. At the tightest radius measured, the 365 µm fiber was measured as transmitting 1.6% less power than baseline - within the measurement uncertainty. At the tightest radius measured for the 200 µm fiber, the power output was measured as 1.7% more powerful than baseline - within uncertainty. After wrapping the 200 µm fiber 10 times at the smallest radius where it would accept without breaking, the power was measured to be 2.6% lower than baseline, again within the 4% margin of error. In none of the cases did the fiber break or degrade. Measured power outputs are summarized in Tables 1 and 2.

### Conclusions
We found no difference in peak power delivery in two different laser fiber types bent at various radii. Unless the laser fiber breaks, there will be no measurable difference in power delivery from bending alone under surgical conditions. This result was consistent to the smallest radius and highest number of turns the fiber could reliably undergo without breakage. Endourologists can trust that laser output will be stable during flexible uroscopy regardless of stone location.

---

### Table 1. Power outputs and bending radii, 365 µm laser fiber. "Bending Radius" refers to the radius of the cylindrical object around which the laser fiber was wrapped for one full turn. No variation in RMS was statistically significantly different from baseline.

<table>
<thead>
<tr>
<th>Bending Radius of Number of Turns</th>
<th>RMS of Pulse Peak Power [µW]</th>
<th>Standard Deviation [µW]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline 1</td>
<td>0.300</td>
<td>0.0019</td>
</tr>
<tr>
<td>0.5 µm</td>
<td>0.305</td>
<td>0.0049</td>
</tr>
<tr>
<td>1 µm</td>
<td>0.303</td>
<td>0.0019</td>
</tr>
<tr>
<td>1.5 µm</td>
<td>0.309</td>
<td>0.0019</td>
</tr>
<tr>
<td>2 µm</td>
<td>0.308</td>
<td>0.0019</td>
</tr>
<tr>
<td>3 µm</td>
<td>0.310</td>
<td>0.0022</td>
</tr>
<tr>
<td>4 µm</td>
<td>0.313</td>
<td>0.0022</td>
</tr>
<tr>
<td>5 µm</td>
<td>0.312</td>
<td>0.0022</td>
</tr>
<tr>
<td>6 µm</td>
<td>0.313</td>
<td>0.0022</td>
</tr>
</tbody>
</table>

---

### Table 2. Power outputs and bending radii, 200 µm laser fiber. "Number of Turns" refers to the number of times the laser fiber was fully wrapped around the cylindrical object before measurement. No variation in RMS was statistically significantly different from baseline.

<table>
<thead>
<tr>
<th>Bending Radius of Number of Turns</th>
<th>RMS of Pulse Peak Power [µW]</th>
<th>Standard Deviation [µW]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline 2</td>
<td>0.313</td>
<td>0.0022</td>
</tr>
<tr>
<td>1.5 µm SR</td>
<td>0.318</td>
<td>0.0022</td>
</tr>
<tr>
<td>1.5 µm FR</td>
<td>0.320</td>
<td>0.0022</td>
</tr>
<tr>
<td>1.5 µm FR</td>
<td>0.320</td>
<td>0.0022</td>
</tr>
</tbody>
</table>

---

### Figures
- Figure 1: A schematic diagram illustrating the experiment setup.
- Figure 2: A graph showing RMS power outputs vs. bending radius.

---

### References
Nephrolithiasis is Associated with Depression in US Adults: an NHANES Analysis
Lael Reinstatter, MD, MPH, Vernon Pais, MD, Briana Goddard, BA
Dartmouth Hitchcock Medical Center, Lebanon, NH

Introduction: Depression and anxiety have been associated with increased number of opioid prescription refills among those managed with opioids for myriad problems including nephrolithiasis. Furthermore, depression and anxiety are independent risk factors for opioid abuse. Given frequent use of opioids in treating nephrolithiasis, we sought to determine the prevalence of anxiety and depression among stone formers.

Materials & Methods: We conducted a population-based survey analysis of the National Health and Nutrition Examination Surveys (NHANES) from 2013-2016. We included all adults and examined sociodemographic factors including responses to survey questions regarding history of nephrolithiasis, anxiety, depression, and overall health status.

Results: In an analysis representing nearly 117,000,000 US adults, there was a 9.1% prevalence of nephrolithiasis. While 23% of the population denied any anxiety symptoms, 47% reported occasional symptoms, 18% reported weekly, and 16% reported daily anxiety. Half of the population denied depression symptoms while 40% reported occasional symptoms, 6.5% reported weekly, and 4.3% reported daily. Nine percent of the population seeks regular mental health care. Among the total population, 14% report excellent health, 66% report very good /good, and 18% report fair/poor.

Conclusions: A diagnosis of nephrolithiasis is associated with higher rates of depression, mental health care, and perceptions of lower reported health status. Providers should be vigilant for signs and symptoms of depression and anxiety in those they see for kidney stones. In light of the increased risk of morbidity including opioid abuse, mental health referral should be pursued for those stone formers reporting symptoms of depression and anxiety.

Table 1: Average Number of Opioid Pills Prescribed Per Procedure by Regional AUA Section

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Northeasen</th>
<th>New England</th>
<th>New York</th>
<th>Mid-Atlantic</th>
<th>Southeastern</th>
<th>North Central</th>
<th>South Central</th>
<th>Western</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUA Section</td>
<td>0.67*</td>
<td>1.33</td>
<td>8.78</td>
<td>1.44*</td>
<td>2.06*</td>
<td>3.15</td>
<td>2.79*</td>
<td>6.50</td>
</tr>
<tr>
<td>URS</td>
<td>4.00</td>
<td>3.86</td>
<td>8.57*</td>
<td>2.57</td>
<td>2.71</td>
<td>1.14</td>
<td>1.25</td>
<td>2.45</td>
</tr>
<tr>
<td>SWL</td>
<td>4.00</td>
<td>4.00</td>
<td>7.00</td>
<td>3.00</td>
<td>11.29*</td>
<td>7.57</td>
<td>7.57</td>
<td>11.89*</td>
</tr>
<tr>
<td>PCNL</td>
<td>5.50</td>
<td>6.50</td>
<td>13.00</td>
<td>7.60</td>
<td>8.92</td>
<td>5.99</td>
<td>14.97</td>
<td>8.14</td>
</tr>
<tr>
<td>TFF</td>
<td>10.54</td>
<td>24.31</td>
<td>20.85*</td>
<td>11.08</td>
<td>5.60</td>
<td>2.19</td>
<td>11.52</td>
<td>2.38</td>
</tr>
</tbody>
</table>

Note: Maximum and minimum average values are not significantly different compared with average of all remaining sections combined; p < 0.005.
Poster Session II: General Urology/Best Practices

P15

A Retrospective Evaluation of a Novel Perioperative Opioid Sparing Protocol for Patients Undergoing Robotic Assisted Laparoscopic Surgery
Joseph F. Renoultz, MD1, David Krok, PharmD2, Lisa Rameaka, MD3, Christina Procaccianti, PhD2, Michael Garcia, MD4, Henry Cabrera, MD5, Lisa Newcomb, PhD2, James D. Brooks, MD6, Christopher Filson, MD7, Martin Gleave, MD7, Michael Liss, MD8, Frances Martin, MD9, Todd Morgan, MD10, Peter Carroll, MD11, Martin Piantadosi, MD12, Adrean A. Wagner, MD1
1Yale, New Haven, CT; 2South County Hospital, Wakefield, RI; 3South County, Wakefield, RI; 4URI, Kingston, RI

Introduction: The over prescribing of opioid analgesics by health care providers has significant contributions to the opioid epidemic. It is estimated that 29% of individuals addicted to prescription pain medications and the gateway medications these prescriptions illicit drug use is profound. Over 11 million people abused prescription opioids and more than 40% of all opioid overdose deaths involved a prescription opioid in 2016. Providers were inaccurately educated that patients who have had surgery cannot over utilize these medications, and superior pain control in the post-operative period could improve healing. We now recognize that a multifaceted approach to pain control is far more effective and can enhance earlier recovery after surgery. The negative effects of opioids on cognition, respiratory effort, gastrointestinal and urinary function, and their addictive potential are now common knowledge. Our study purpose is to provide a retrospective evaluation of a non-opioid perioperative regimen for robotic assisted laparoscopic prostatectomy and partial/total nephrectomy patients.

Materials & Methods: This study design was a retrospective chart review between patients who received an opioid sparing packet and those who did not. Data was collected from the medical records of 35 consecutive patients who had a robotic assisted laparoscopic surgery performed by the same surgeon at the same facility. Patient data was collected from the inpatient medical record as well as outpatient 7 day post-operative phone calls. The patients length of stay, analog pain scores, number of narcotic tablets utilized in the post-operative period, and the presence of a narcotic prescription at discharge were collected. The statistical significance threshold was set at p-value 0.05 using confidence interval (CI). All data was analyzed using Microsoft Excel 2010 software. A p-value was calculated assuming equal variances was used to compare the differences in length of stay, average pain scores on post day 0, 1 and 2, pain scores 7 days post-op, average oral milligram morphine equivalents and number of narcotics prescriptions.

Results: Of 16 traditional patients that did not receive an opioid sparing pathway, 7 (43.75%) were discharged with a narcotic prescription compared to 2 (5.15%) of 39 patients on the opioid sparing pathway that were discharged with a narcotic prescription (p < 0.001). There was no statistically significant difference for the non-opioid sparing versus the opioid sparing patients in hospital length of stay or average analog pain scores on post-operative day 3, 7, 10, 14, 30 days and 60 days. In the opioid sparing group, the higher level was assigned for analysis. If a statement had multiple levels of evidence, the higher level was assigned for analysis purposes. In the event of disagreement from reviewers, assignment was made based on consensus. Analyses of data sufficiency were based on statements for which it would be possible for studies to be done and data to be generated, i.e. “not Clinical Principles.”

Conclusions: This novel opioid sparing perioperative regimen can result in the same post-operative pain control and 95% fewer narcotic prescriptions being written at the time of discharge. By decreasing the number of patients requiring narcotics post operatively and decreasing the total number of narcotic prescriptions written, there is the potential to have a positive impact on the opioid epidemic.

P16

Do AUA Guidelines Stand on the Shoulders of Giants, or Data?
Matthew V. Moynihan, MD, MPH1, Christian Steenland, MD, MPH2,3 Lakin Healthcare and Medical Center, Burlington, MA

Introduction: Urologists and advanced practitioners rely on AUA Guidelines to steer clinical decision making. In an era of evidence based medicine, it could easily be assumed that data exist for all scenarios presented in the guidelines. Understanding the limits of evidence is vital to the practice of evidence based medicine. In an era of evidence based medicine, it could easily be assumed that data exist for all scenarios presented in the guidelines. Understanding the limits of evidence is vital to the practice of evidence based medicine. We analyzed the AUA Guidelines for reported levels of evidence to identify where gaps in data.

Materials & Methods: All available AUA Clinical Guidelines available from urolognet.org were analyzed by two reviewers. Each guideline and statement’s evidence level was recorded. If a statement had multiple levels of evidence, the higher level was assigned for analysis purposes. In the event of disagreement from reviewers, assignment was made based on consensus. Analyses of data sufficiency were based on statements for which it would be possible for studies to be done and data to be generated, i.e. “not Clinical Principles.”

Results: A total of 435 guideline statements from 23 Clinical Guidelines were available. Of these, 516 were not “clinical principles.” Most statements were Grade C (313/316 = 46%). Very few statements were Grade A (31/316 = 6%). Nearly a third (155/316 = 30%) of statements were “Expert Opinion,” meaning a recommendation was made without sufficient data to even establish an evidence grade. The lowest rates of evidence guideline support were in stress urinary incontinence (12/17 = 70% Expert Opinion), medical therapy for stones (13/23 = 57% Expert Opinion), and localized renal cancer (12/22 = 55% Expert Opinion). There were no Expert Opinion statements for cryptorchidism, prostate cancer detection, or post prostatectomy radiation guidelines.

Conclusions: Clinicians must understand the studies and data underpinning the AUA Guidelines, particularly as 30% of the guidelines are not based on published evidence. Understanding the evidence that lies behind guidelines is critical to the practice of evidence based medicine. If clinicians are able to apply evidence from outside the guidelines to clinical practice, they should have the tools to do so to provide the best possible care for their patients.
Recent Trends in Receipt of Palliative Care for Men with Metastatic Prostate Cancer

Alexander P. Cole, MD1, Sean Fletcher, MD2, Zara Cooper, MD2, Stuart Lipstein, ScD3, Adam Kibel, MD2, Quoc-Dien Trinh, MD2
1Brigham & Women’s Hospital, Harvard Medical School, Boston, MA; 2Harvard Medical School, Boston, MA; 3Brigham & Women’s Hospital, Harvard Medical School, Brookline, MA

Introduction: Appropriate use of palliative care can prolong life and may reduce over-use of inappropriate end-of-life care. The past decade has seen several factors that may increase palliative care use the publication of a seminal 2010 paper showing a survival benefit for palliative care in metastatic cancer, the passage of the Affordable Care Act, and increased reporting on end-of-life care in major lay publications. We designed a study to assess trends in palliative care in metastatic prostate cancer. We hypothesized that there would be a significant rise in use of palliative care from 2004 to 2015.

Materials & Methods: We abstracted data on men > 40 years of age, with metastatic prostate cancer within the National Cancer Database. The receipt of palliative care is determined by trained data abstractors at participating institutions in each study year. This includes medical, surgical, or radiation therapies performed with the explicit purpose of managing symptoms but not curing disease. Routine pain control is not included. A linear spline for a multilevel logistic regression model adjusted for comorbidities, age and demographics, with a facility level random intercept was used to estimate risk-adjusted probability of receiving in palliative care in each study year. Slopes pre- and post-2010 were compared.

Results: Our study cohort consisted of 52,803 men with metastatic prostate cancer diagnosed from 2006-2015. The average age was 71.3 (95% CI 71.0-71.5). Of these men, 5,885 (16.1%) received palliative care. On a univariate analysis, the probability of receiving palliative care in each study year increased significantly over the study period (p < 0.001). However, on our risk-adjusted analysis the association between year and receipt of palliative care was only significant post-2010 (p = 0.029). Advanced age and higher comorbidity score also increased the estimated probability of receiving palliative care (p < 0.01 for both). The risk-adjusted probabilities in each year are summarized in Figure 1 and ranged from 11.5 (95% CI 12.1-13.5) in 2013 to 17.8 (95% CI 12.1-15.9) in 2015.

Conclusions: In this study we show that the proportion of men receiving palliative care for metastatic prostate cancer gradually increased from 2006 to 2015, however the association between year and receipt of palliative care was only significant after 2010. Despite this apparently improvement only a small proportion of men with metastatic prostate cancer receive any palliative care.

Figure 1: Risk Adjusted Probability of Receiving Palliative Care for Men with Metastatic Prostate Cancer from 2006-2015

Endourology Survey on Radiation Exposure Reveals a Need for Clear Guidelines for Post Ureteroscopy Imaging

Ohad Kott, MD1, Osama Al-Alao, MD1, Jorge Pereira, MD2, Christopher Tucci, RN1, Cayan Farek, MD1
1Minimally Invasive Urology Institute, The Miriam Hospital, Department of Urology, The Warren Alpert Medical School of Brown University, Providence, RI; 2Columbia University Division of Urology, Mount Sinai Medical Center, Miami Beach, FL

Introduction: Nephrolithiasis patients undergo repeated imaging studies throughout their lives, exposing them to large doses of radiation, potentially leading to secondary malignancies. Studies have found that effective dose of radiation exceeded the recommended levels in up to 20% of nephrolithiasis patients throughout the evaluation and follow up period. Currently, guidelines only suggest recommendations regarding postoperative imaging following ureteroscopic lithotripsy (URSL) and strategies to minimize radiation exposure. There are no recommendations on the frequency and modality of imaging utilized in stone formers. The latter varies and depends on practitioner discretion. As such, we sought to elucidate the common imaging practices following URSL and current knowledge of radiation exposure among endourologists.

Materials & Methods: A 15-item web-based survey was conducted among active members of the Endourological Society. The survey evaluated knowledge and perception of best practice and patient radiation exposure in post URSL imaging. The survey also collected clinical volume, training, experience and location of practice.

Results: 204 endourologists completed the survey with a mean of 13.29 years in practice (IQR 6.75, 20 years). Routine postoperative follow up imaging is regularly performed by 91.7% of respondents using the following modalities: Ultrasound (US) - 76.4%, X-ray (KUB) - 44.7%, computerized tomography (CT) - 39.6%, 53.92% of respondents reported performing follow up imaging between 4-6 weeks, while 39.22% cite between 6-8 weeks and 71.08% reported between 8-12 weeks. 78.43% of respondents consider the imaging quality of low dose CT scan similar to standard dose renal stone protocol CT (SP CT). 48.53% of respondents would not use low dose CT scan on obese patients while only 12.25% correctly identified that streak effect is significant for BMI > 30 kg/m². 39.22% of respondents estimated correctly the radiation exposure of SP CT scan while 36.27% of respondents estimated correctly the radiation exposure of a low dose CT scan.

Conclusions: Our data reveals that urologists worldwide need better education on radiation exposure from diagnostic studies. Additionally, there appears to be a knowledge deficit with the timing and utilization of low dose CT. This deficit appears larger outside than within USA. Current guidelines appear to be discretionary, not supported with enough evidence and do not take into account the utilization of low-dose CT. Clear evidence-based guidelines may help alleviate these knowledge gaps and undue radiation exposure to nephrolithiasis patients.
Continued Feasibility and Success of a Non-Opioid Pathway for Postoperative Pain after Ureteroscopy

David W. Sobel, MD, Nikolus A. Moring, MS, Mohammad A. Awad, MD, Kevan M. Sternberg, MD
University of Vermont, Burlington, VT

Introduction: The opioid crisis continues to be a major focus in the United States. The contribution of physician prescribing patterns and the need for improvement in the community have been increasingly addressed in the literature. We have previously reported on the feasibility of implementing a non-opioid protocol for outpatient uroreteroscopy (URS) with stent placement. Our initial experience demonstrated the success of a non-opioid approach for pain control and stent-related symptoms. In this study, we report our extended experience over a 26 month period.

Materials & Methods: Charts of patients who underwent URS with stent placement by a single surgeon from November 2016 to February 2019 were retrospectively reviewed. During this time period, efforts were made to substitute opioid pain medications on discharge for either no prescription or diclofenac, a NSAID. All patients received similar adjunct medications including tamulosin, tylenol, and pyridium. Patients with an allergy to NSAIDS or CKD stage II or greater were excluded from the non-opioid pathway as they were unable to be prescribed NSAIDS. Frequency of postoperative adverse events including visits to the emergency room (ER) for stent-related symptoms, stent-related clinic telephone calls, and requests for prescription refills for pain medication were measured.

Results: Three hundred and sixty-three patients underwent URS with stent placement over the 26 month period. 31 with reported NSAID allergy or CKD stage II or greater were ineligible for the non-opioid pathway and excluded, and 32 were excluded for having other concurrent procedures such as cystolitholapaxy. 300 patients were included in the final analysis. A total of 271 patients were discharged without opioid medications (90.3%). 29 patients received opioids (9.7%). Of those discharged without an opioid, 216 received diclofenac and 24 received no pain medication (opioid or prescription NSAID). Both groups receiving opioids and non-opioids had a low number of postoperative visits to the ED for genitourinary-related concerns (2 patients receiving opioids [6.9%] and 23 patients without opioids [8.5%]). Telephone calls made to the urology clinic for concerning symptoms were made by 11 patients receiving opioids (37.9%) and 45 patients without opioids (16.6%). The number of pain medication refill requests was low for both groups: 13 patients receiving opioids (23.6%) and 11 patients without opioids (7.3%).

Conclusions: Our experience using a non-opioid pathway after URS and stent placement reveals an approximately 97% patients without opioids. Patients had a low number of visits to the ED for postoperative genitourinary symptoms, a low number of telephone calls to the clinic, and requested few pain medication refills regardless of whether they received opioids or not. We believe our experience will encourage others to reduce opioid prescriptions in this population in the future.

Incidence and Predictors of Repeated and Prolonged Opioid Prescriptions After Kidney Stone Event

Anna J. Vollstedt, MD1, William Meeks, MA2, Aesint Ngon, MA3, Brian Sites, MD, MS3, Vernon Pau, Jr., MD, MS3
1Dartmouth Hitchcock Medical Center, Lebanon, NH; 2American Urological Association, Department of Data Management and Statistical Analysis, Linthicum, MD

Introduction: Opioid analogs are often employed in the management of acute renal colic. However, prescription (Rx) opioids are recognized as the leading initial exposure for those suffering from chronic opioid use and abuse. We sought to determine the percent and characteristics of stone formers who were refilled an opioid prescription within 6 months of their incident stone event, as well as those who continued to have an opioid Rx one year after.

Materials & Methods: We assessed the cohort of US adults participating in the Medical Expenditure Panel Survey between 2005 and 2015. This nationally representative survey collects longitudinal data regarding medical diagnoses, encounters, and prescription drug use. Each participant is surveyed every 6 months over the course of 2 years. Those with an ICD-9 code for an incident kidney stone who also received an opioid Rx during the index 6-month period were included in the analysis. Patient characteristics were assessed for association with repeat opioid prescriptions within the same 6 months and for association with opioid use greater than 1 year after the incident stone.

Results: Of those stone formers receiving an opioid Rx, 49.8% received additional opioid prescriptions within the same 6-month period. Diabetes, lower income government insurance status, anxiety depression and alcohol-related disorders were significantly associated with additional opioid prescriptions within 6 months; Asian/Native Hawaiian/Pacific Islander survey participants were less likely to have additional opioid use on univariate and multivariate analysis (p = 0.05). Of those receiving an opioid Rx, 21.8% were still filling an opioid Rx the following year. On multivariate analysis, both anxiety and depression each increased the odds of prolonged opioid use by > 50% (OR 1.5 and 1.6, respectively, p < 0.001).

Conclusions: Our nationally-representative, longitudinal study reveals that of those stone formers receiving an opioid Rx, 30% received them repeatedly. Furthermore, over 20% have an opioid Rx one year later. Finally, we identified those stone formers who may be more susceptible to both repeated and prolonged opioid use. This information may be helpful when counseling our patients on both medical and peri-operative pain management of acute renal colic.

*Max K. Willeson Award Eligible

Economic Trends of Endourologic Surgery Reimbursement Demonstrates Increased Profitability for Healthcare Systems

Ohad Kott, MD, Christopher Tucc, RN, Gyan Pareek, MD
Minimally Invasive Urology Institute, The Miriam Hospital, Department of Urology, The Warren Alpert Medical School of Brown University, Providence, RI

Introduction: Nephrolithiasis afflicts 11% of the United States population. The utilization of endourological procedures for nephrolithiasis has increased in the past decade. Concurrently, the number of practicing urologists per capita is declining and practice trends are shifting towards large group practices and integration into large hospital systems. In these shifting settings, urologists need to know their value to a healthcare system. As such, we sought to evaluate the economic impact of endourological procedures on a healthcare system. By understanding these financial trends, urologists may better understand their downstream value and empower themselves during contractual negotiations.

Materials & Methods: We reviewed hospital records for ureteroscopy (URS) and percutaneous nephrolithotomy (PCNL) cases performed between January 1, 2013 - August 1, 2018. Medicare reimbursement for the years 2013 - 2016 was reviewed for URS CPT codes 52233, 52236 and DRG code 669 as well as PCNL CPT codes 50080, 50081 and DRG code 660. We combined Medicare reimbursement data with a model developed to evaluate non-Medicare reimbursement.

Results: Medicare reimbursement for outpatient URS increased 16% from $4375 in 2015 to $5027 in 2016, while inpatient reimbursement increased 12% from $69420 in 2015 to $61067 in 2018. Annual URS case volume at our institution increased 106% from 62 in 2013 to 143 in 2016. Annual gross reimbursement for URS procedures is expected to reach $33.12 million in 2018. Medicare reimbursement for outpatient PCNL increased 139% from $3457 in 2015 to $8254 in 2018. However, for inpatient cases it decreased 1% from $144067 to $139966 during the same time period. Annual PCNL case volume at our institution increased 78% from 77 in 2013 to 139 in 2016. Annual gross reimbursement for PCNL is expected to reach $124 million in 2018.

Conclusions: Our data demonstrates that approximately $6 million in reimbursement per year is being generated from endourological care alone at our institution. This figure does not include revenues generated downstream from endourological care like visits, diagnostic tests, consultations etc. It is critical for urologists to empower themselves with financial knowledge of their downstream value to the healthcare systems, especially during compensation discussions.
Ureteral Stenting After Routine Ureteroscopy: Is Earlier Stent Removal Feasible?  
Stephen C. Hill, BA1, Alexander Boyko, BA2, Samir Merheb, BS3, Michelle Hsu, BS2, Mark Biebel, MD1, Mark H. Katz, MD1, Richard K. Babayan, MD4, Shawn E. Wason, MD1, David S. Wang, MD1
1Boston University School of Medicine, Boston, MA; 2Boston University School of Public Health, Boston, MA; 3Boston Medical Center, Department of Urology, Boston, MA

Introduction: Ureterostomy is a standard treatment option for urinary tract calculi. Commonly, protocols do not place an internal ureteral stent after ureteroscopy. However, the timing of length of time required for stenting after ureterostomy is not well defined. Ureteral stents are associated with significant morbidity, including pain and discomfort. The objective of this study was to determine if there were any difference in postoperative unplanned clinic or ER visits based on duration of stent placement. We sought to determine if earlier stent removal was feasible.

Materials & Methods: This is a single-institution IRB approved retrospective review of 231 ureteroscopy cases with laser lithotripsy or basket extraction for ureteral calculus performed during 2018 by multiple surgeons. The main outcome measure was number of unplanned ED or outpatient visits within 30 days following surgery. Log rank test and Cox regression modeling (adjusted for sex, age, and presence of an impacted stone) were used to analyze if there were an association between unplanned visits and length of stent placement (number of days). The patients were separated into three groups based on stent duration: 1 (0-3 days), 2 (4-6 days), and 3 (>7 days).

Results: Of the 223 patients, there were 59 in group 1 (26.7%), 80 in group 2 (35.9%), and 84 in group 3 (37.5%). 218 (97.8%) were event free within the 30-day post-operative period. 3 (2.2%) patients had an unplanned visit after stent removal (2 in groups 1 and 2, in group 3). There was no statistically significant difference to all other groups (p = 0.663). Patients who had no association between duration of stent placement and unplanned visits, when adjusted for sex, age, and the presence of impacted stones (p-value = 0.674). 18 (8%) patients showed no association between duration of stent placement and unplanned visit, adjusted for sex, age, and, the presence of impacted stones (p-value = 0.610).

Conclusions: We found no difference in unplanned clinic or ER visits in patients based on the duration of stent placement following routine ureterostomy. Stent removal after 3 days appears to be sufficient to minimize morbidity and complications after uncomplicated ureteroscopy. Further prospective studies are required to further define optimal duration of stent placement.

Kidney Stones in Black Women in the United States: Data from the Black Women's Health Study  
María J. D'Amico, BA1, Shawn Wason, MD2, Lynn Rosenberg, ScD3, Yvette Cozier, DrSc3
1Boston University School of Medicine, Boston, MA; 2Boston Medical Center, Boston, MA; 3Boston University School of Public Health, Boston, MA

Introduction: Nephrolithiasis is a common urolithic condition and a significant source of patient morbidity and healthcare expenditure. There has been an increase in the prevalence of kidney stones among black women in Southern United States, but little is known about how these stones affect black and female patients. There are few epidemiologic studies of kidney stones focusing on black women. We present data on the prevalence, clinical characteristics, and diagnostic work up of women with self-reported kidney stones among participants in the Black Women’s Health Study (BWHS).

Materials & Methods: The BWHS, initiated in 1995, is a prospective, epidemiologic study of 59,910 US black women (age 21-69) followed via biannual postal and web questionnaires. The 2005 questionnaire asked whether participants had ever been diagnosed with kidney stones as well as data on patient characteristics (age, education, geographic region), health behavior, medical factors (body mass index, type-2 diabetes, hypertension, high cholesterol, gallstones), and use of medical care. In 2017, a subset of BWHS participants (n = 2,570) completed a web-based questionnaire focusing on urinary tract health (e.g., urinary incontinence, UTI), including conditions regarding undergoing metabolic work-up, imaging and surgical procedures related to the diagnosis of kidney stones. Chi-square tests were used to compare characteristics between participants with and without a history of nephrolithiasis.

Results: Among the 43,179 participants who completed the 2005 survey, 836 (2%) reported ever being diagnosed with kidney stones. Women with and without a history of kidney stones were similar in terms of geographic location, education level, and health insurance coverage. Respondents with a history of kidney stones were more likely to be older (P < 0.0001), to have smoked (P < 0.04), to be obese (P < 0.01), and to have been diagnosed with a comorbid condition (type-2 diabetes (P < 0.0001), hypertension (P < 0.01), hyperlipidemia (P < 0.001), gallstones (P < 0.01)). The 2,570 sub-sample participants in 2017 were slightly heavier, more educated, and more likely to reside in the Northeast than BWHS participants overall. Eight percent reported a history of kidney stones of which 40% experienced ≥ 2 stones in their lifetime. A meta-analysis of a non-workup, low, 70% had undergone a CT scan, and 29% had undergone a surgical procedure.

Conclusions: BWHS participants who reported a history of kidney stones were more likely to have other medical comorbidities, including key components of metabolic syndrome and other diseases. These data are important to understand the consequences of metabolic factors with nephrolithiasis and also confirm reports of lower rates of metabolic evaluation among African American women. Addressing the respondents’ metabolic risk factors for kidney stones. Further study is needed to establish the temporal sequence between nephrolithiasis and common comorbid conditions, including gallstones and diabetes, as well as to identify the barriers and facilitators of diagnostic work up of kidney stones in black women.
Using microRNA Expression from Biopsy Samples in Upper Tract Urothelial Carcinoma as a Predictive Model for Tumor Grade, Invasion and Survival
Aaron Berkenwald, MD, EP; Eric Katz, MD; Benjamin Browne, MD; Chritsan K. Patel, MD; Travis Sullivan, PhD; Eric J. Burrack, MD; Jay D. Raman, MD; Joshua Warrick, MD; David Canes, MD, MD; Kimberly M. Rieger-Christ, PhD 1
Lahey, Burlington, MA; 2Boston University, Boston, MA; 3Penn State, Hershey, PA

Introduction: Radical Nephroureterectomy (RNU) is the gold standard treatment for Upper Tract Urothelial Carcinoma (UTUC). However, low invasive treatment modalities exist for low grade (LG), non-invasive tumors. Determination of tumor characteristics are currently based on endoscopic biopsies, which often result in insufficient tissue for accurate diagnosis. Molecular analysis of UTUC biopsies may enable practitioners to make more informed clinical decisions and avoid overtreating less aggressive tumors. We propose that analyzing microRNA (miRNA) expression patterns from UTUC biopsies to predict final pathology on RNU samples may provide a framework for more effective diagnosis, and help predict survival.

Materials & Methods: Under an IRB-approved, study, total RNA was extracted from formalin-fixed, paraffin-embedded UTUC biopsy samples from 64 patients who subsequently underwent RNU from 2005-2018 at three high-volume institutions. Twenty screening samples were profiled via miRNA RT-qPCR array for 752 unique miRNAs. Differentially expressed miRNAs were then validation using 71 additional UTUC biopsy samples. In total, 39 high grade (HG), invasive tumors (p < 0.05 and FDR < 0.1). Of these, four were up-regulated and 22 were down-regulated in the HG, invasive tumors. Hierarchical clustering analysis yielded two distinct groups with miRNA expression patterns corresponding to final RNU pathology.

Results: Screening array analysis identified 26 miRNAs differentially expressed between LG and HG tumors (p < 0.05 and FDR < 0.1). Of these, four were up-regulated and 22 were down-regulated in the HG, invasive tumors. Hierarchical clustering analysis yielded two distinct groups with miRNA expression patterns corresponding to final RNU pathology (p = 0.029). Validation of these miRNA revealed correlation of miR-146b and 223-3p expression with invasive (p = 0.05) and HG tumors (p < 0.001). Predictive modeling of RNU invasion using miR-21-5p and 29c-3p in combination yielded sensitivity and specificity of 45.2% and 87.5% with a 0.74 AUC, compared to prediction from biopsy invasion sensitivity 32.1% and specificity 97.3% with an AUC 0.65. Survival analysis for miR-146b (HR 2.97, p = 0.032) and 223-3p (HR 1.18, p = 0.025) were statistically significant correlation with RNU tumor invasion and grade. We further suggest that targeting Lin28, a negative regulator of Let-7f-5p, represents a promising therapeutic strategy.

Conclusions: We present distinct miRNA expression profiles of UTUC biopsies that show a statistically significant correlation with RNU tumor invasion and grade. We further suggest the ability of these miRNA to predict final pathologic stage. Finally, we highlight a statistically significant correlation between specific miRNA expression and poor overall survival.

Materials & Methods: Two independent cohorts of NMIBC patients from the New Hampshire Population Cohort and Dartmouth Hitchcock Medical Center were analyzed using a biomarker discovery (n = 178) and validation (n = 38) approach, respectively. We isolated tumor tissue RNA using Qiagen RNeasy microRNA kit and RNAse free water. Reverse transcription (RT) and qPCR were performed using the TaqMan MicroRNA assay (Applied Biosystems). Survival analysis was performed using Kaplan-Meier survival analysis and the Cox proportional hazards model. The log-rank test was used to compare the survival distributions between subgroups.

Results: We identified microRNA-let-7f-5p (miRNA-let-7f-5p) as a statistically significant biomarker for recurrence and a potential therapeutic opportunity in NMIBC. In the discovery cohort, patients with high miRNA-let-7f-5p expression had a significantly shorter recurrence-free survival compared to patients with low expression (p = 0.039). This association was confirmed in the validation cohort (p = 0.031). In a multivariable Cox proportional hazards model, miRNA-let-7f-5p expression was significantly associated with recurrence-free survival (HR = 2.25, 95% CI: 1.06-4.77, p = 0.035). Interestingly, miRNA-let-7f-5p expression was not significantly associated with metastasis-free survival (HR = 1.18, 95% CI: 0.56-2.51, p = 0.668). In a subgroup analysis, we observed that patients with high miRNA-let-7f-5p expression had a significantly shorter recurrence-free survival compared to patients with low expression (p = 0.026). Interestingly, this association was more pronounced in patients with high recurrence risk (p = 0.007).

Conclusions: MicroRNA-let-7f-5p is a novel biomarker of recurrence and a potential therapeutic opportunity in NMIBC. It may provide a framework for more effective diagnosis, and help predict survival.

Introduction: Non-Muscle Invasive Bladder Cancer (NMIBC) is the most common form of bladder cancer and accounts for more than 70% of all bladder cancer cases. Despite the availability of effective treatments, recurrence and progression are high, and the 5-year relative survival rate is only 75%. The need to screen for these events every 3-6 months by cystoscopy makes bladder cancer one of the most expensive malignancies. 30% of tumors progress to muscle-invasive disease. The need to screen for these events every 3-6 months by cystoscopy makes bladder cancer one of the most expensive malignancies. The non-coding RNAs, particularly the microRNAs (miRNAs), have emerged as useful prognostic biomarkers. The objective of the current study was to identify reproducible miRNAs in select non-muscle invasive bladder tumor tissue that are predictive of the recurrent tumor phenotype as potential biomarkers and molecular therapeutic targets.

Materials & Methods: Two independent cohorts of NMIBC patients from the New Hampshire Population Cohort and Dartmouth Hitchcock Medical Center were analyzed using a biomarker discovery (n = 178) and validation (n = 38) approach, respectively. We isolated tumor tissue RNA using Qiagen RNeasy microRNA kit and RNAse free water. Reverse transcription (RT) and qPCR were performed using the TaqMan MicroRNA assay (Applied Biosystems). Survival analysis was performed using Kaplan-Meier survival analysis and the Cox proportional hazards model. The log-rank test was used to compare the survival distributions between subgroups.

Results: We identified microRNA-let-7f-5p (miRNA-let-7f-5p) as a statistically significant biomarker for recurrence and a potential therapeutic opportunity in NMIBC. In the discovery cohort, patients with high miRNA-let-7f-5p expression had a significantly shorter recurrence-free survival compared to patients with low expression (p = 0.039). This association was confirmed in the validation cohort (p = 0.031). In a multivariable Cox proportional hazards model, miRNA-let-7f-5p expression was significantly associated with recurrence-free survival (HR = 2.25, 95% CI: 1.06-4.77, p = 0.035). Interestingly, miRNA-let-7f-5p expression was not significantly associated with metastasis-free survival (HR = 1.18, 95% CI: 0.56-2.51, p = 0.668). In a subgroup analysis, we observed that patients with high miRNA-let-7f-5p expression had a significantly shorter recurrence-free survival compared to patients with low expression (p = 0.026). Interestingly, this association was more pronounced in patients with high recurrence risk (p = 0.007).

Conclusions: MicroRNA-let-7f-5p is a novel biomarker of recurrence and a potential therapeutic opportunity in NMIBC. It may provide a framework for more effective diagnosis, and help predict survival.
Outcomes of Pathologic Upstaging of Clinical T1b and T2 Renal Cell Carcinoma

Melissa J. Huynh, MD, Douglas M. Dahl, MD, MPH, Edouard Nicaise, BA, Naren Nimmagadda, MD, MPH, Alice X. Yu, MD, Yichuan Hsieh, PhD, Michael L. Blute, MD, Adam S. Feldman, MD, MPH

Massachusetts General Hospital, Boston, MA

Introduction: Partial nephrectomy is the gold standard for the treatment of clinical T1a renal masses according to the American Urological Association guidelines, while the European Association of Urology extends their recommendations to also include T1b renal masses in order to maximize postoperative renal function and minimize metabolic and cardiovascular morbidity. In this study, we investigate the outcomes of clinical T1b and T2 renal cell carcinoma (RCC) treated by partial nephrectomy (PN) and radical nephrectomy (RN).

Materials & Methods: This was a retrospective single-institutional study of patients with clinical T1b and T2 renal masses undergoing either PN or RN from 2010-2017. Patients with metastatic disease on preoperative imaging were excluded from the study. The rates of pathologic upstaging and clinical outcomes including margin status, local recurrence, distant metastasis, and survival were compared between the 2 treatment groups.

Results: There were 462 clinical T1b and T2 renal masses in 454 unique patients. The median follow-up of the whole cohort was 35.6 months. Partial nephrectomy was performed in 149 patients, and 315 underwent radical nephrectomy (Table 1). Ten tumors (6.7%), all cT1b, were upstaged to pT3a in the PN group, while 122 (40.0%) were upstaged in the RN group (p = 0.001). There was no statistically significant difference in the risk of positive margins or local recurrence, but there was an association of increased risk of metastasis in the RN group (p = 0.04). For the 18 patients who experienced an RCC recurrence, the median time to recurrence was 13.6 months for PN and 11 months for RN (p = 0.7703). There were more deaths in the radical nephrectomy group (12.4% vs. 6.0% for PN), although in the survival analysis, the difference in the overall survival between the 2 groups did not reach statistical significance (log rank p = 0.061). In patients who had patholigcal upstaging, there was no associated increased risk of death from RCC or death from all causes between the partial and radical nephrectomy groups (p = 0.198 and p = 0.267, respectively).

Conclusions: There is a significant risk of pathologic upstaging in cT1b and larger tumors. However, when appropriately selected, partial nephrectomy for these tumors does not appear to compromise clinical outcomes and does not result in decreased survival compared to radical nephrectomy even in patients with pathological upstaging. When technically achievable, partial nephrectomy should be considered for these larger clinically localized renal masses.

Table 1. Clinical outcomes of clinical T1b and T2 renal cell carcinoma treated by partial nephrectomy and radical nephrectomy.

<table>
<thead>
<tr>
<th>History</th>
<th>Partial Nephrectomy (PN)</th>
<th>Radical Nephrectomy (RN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients (n)</td>
<td>149</td>
<td>315</td>
</tr>
<tr>
<td>Urothelial</td>
<td>136 (91.9)</td>
<td>259 (82.2)</td>
</tr>
<tr>
<td>Signet ring</td>
<td>13 (8.1)</td>
<td>56 (17.8)</td>
</tr>
<tr>
<td>Median follow-up (m), IQR</td>
<td>36 (26-59)</td>
<td>31 (22-58)</td>
</tr>
<tr>
<td>Clinical T(n, I)</td>
<td>1b (6, 5)</td>
<td>1b (6, 5)</td>
</tr>
<tr>
<td>Distant metastases</td>
<td>7 (4.8)</td>
<td>15 (4.8)</td>
</tr>
<tr>
<td>Death due to RCC</td>
<td>13 (8.9)</td>
<td>44 (14.0)</td>
</tr>
<tr>
<td>Loco-regional recurrence</td>
<td>24 (16.5)</td>
<td>78 (24.7)</td>
</tr>
<tr>
<td>Urine incontinence</td>
<td>40 (27.1)</td>
<td>86 (27.4)</td>
</tr>
</tbody>
</table>

Outcomes of Pathologic Upstaging of Clinical T1b and T2 Renal Cell Carcinoma

Kristian Stensland, MD, MPH, David Canes, MD, Harras Zaid, MD

Lahey Hospital and Medical Center, Burlington, MA

Introduction: Non-urothelial variant bladder cancers may harbor more aggressive behaviors than pure urothelial cell carcinoma. As such, the AUA Guidelines on non-muscle invasive bladder cancer recommend consideration of timely cystectomy in patients with cT1 bladder cancer with variant histology, though this is provided as an “Expert Opinion”. The rationale for this recommendation is supposedly a high rate of upstaging at the time of cystectomy. However, the data on outcomes and upstaging for cT1 variant histologies are limited to small series. Herein, then, we sought to support this guideline statement with evidence from a large hospital based sample.

Materials & Methods: The National Cancer Database was queried for non-metastatic, cT1 cN0 bladder cancer patients diagnosed between 2006-2014. Cases were excluded if patients received neoadjuvant chemotherapy. Clinical staging was compared to pathologic staging for variant histologies and compared to conventional urothelial carcinoma. Variant histologies evaluated included the following: adenocarcinoma, small cell, spindle cell, squamous cell, signet ring cell, and micropapillary. Upstaging was defined as pathologic T2-T4 or pathologic node-positive disease. Rates of upstaging for each variant histology were compared to conventional urothelial carcinoma and the null hypothesis of no difference in upstaging tested by the chi-square test.

Results: A total of 22,722 cases of bladder cancer were included. A total of 21,855 (96%) cases were urothelial, and 867 (4%) were variant. The most common variant histology was SCC (n = 312), followed by adenocarcinoma (n = 250), spindle cell (n = 96), micropapillary (n = 92), small cell (n = 78), and signet ring cell carcinoma (n = 39). The rates of upstaging from clinical to pathologic staging were significantly higher for all 6 variant histologies evaluated compared to urothelial carcinoma, with rates ranging from 30.8% (adenocarcinoma) to 61.5% (signet ring cell carcinoma); see Table 1.

Conclusions: These data demonstrate significant rates of upstaging in cT1 bladder cancers with variant histologies, as high as 62%. The information provided here is in line with the “Expert Opinion” set forth in the AUA Guidelines for non-muscle invasive bladder cancer and lend further data for timely cystectomy in this high-risk population.

Table 1. Rates of Upstaging in Variant Histology Nonmuscle Invasive Bladder Cancer: Is There Evidence to Support the AUA Guidelines “Expert Opinion”?

<table>
<thead>
<tr>
<th>Histology</th>
<th>Upstaged</th>
<th>Same Stage</th>
<th>Downstaged</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urothelial</td>
<td>2,552 (11.7%)</td>
<td>18,147 (83.0%)</td>
<td>1,156 (5.3%)</td>
</tr>
<tr>
<td>Adenocarcinoma</td>
<td>77 (30.8%)</td>
<td>161 (64.4%)</td>
<td>12 (4.8%)</td>
</tr>
<tr>
<td>Small Cell</td>
<td>34 (43.6%)</td>
<td>39 (50.0%)</td>
<td>9 (6.4%)</td>
</tr>
<tr>
<td>Spindle Cell</td>
<td>43 (44.8%)</td>
<td>44 (45.8%)</td>
<td>9 (9.4%)</td>
</tr>
<tr>
<td>Squamous Cell</td>
<td>154 (49.9%)</td>
<td>148 (47.4%)</td>
<td>10 (3.2%)</td>
</tr>
<tr>
<td>Signet Ring Cell</td>
<td>24 (61.5%)</td>
<td>13 (53.3%)</td>
<td>2 (5.1%)</td>
</tr>
<tr>
<td>Micropapillary</td>
<td>37 (40.2%)</td>
<td>46 (50.0%)</td>
<td>8 (8.8%)</td>
</tr>
</tbody>
</table>
The Impact of Low- Versus High-Intensity Surveillance Cystoscopy on Surgical Care and Cancer Outcomes in Patients With High-Risk Non-Muscle-Invasive Bladder Cancer (NMIBC)

Michael E. Rezare, MD, MPH, Kristine E. Lynch, PhD, Zhongze Li, MS, Todd A. MacKenzie, PhD, John D. Seigne, MBChB, Douglas J. Robertson, MD, MPH, Brenda Szwedich, MD, MS, Philip P. Goodyear, MD, MS, Florian R. Schroeck, MD, MS

1Dartmouth-Hitchcock Medical Center, Lebanon, NH; 2University of Utah, Salt Lake City, UT; 3Geisel School of Medicine, Hanover, NH; 4Veterans Affairs Medical Center, White River Junction, VT; 5Veterans Affairs Medical Center, White River Junction, VT

Introduction: Surveillance guidelines for NMIBC are based on expert opinion and informed by limited evidence. We have previously found that about one third of patients with high-risk NMIBC undergo fewer surveillance cystoscopies than recommended (i.e., low-intensity surveillance). Our objective was to assess the association of low- vs. high-intensity cystoscopic surveillance with outcomes, including the frequency of transurethral resections, bladder cancer death, and progression of disease.

Materials & Methods: Retrospective national cohort study of patients diagnosed with high-risk (high grade Ta, T1, or carcinoma in situ) NMIBC from 2005 to 2011 within the Department of Veterans Affairs with follow-up through 2014. Patients were categorized by number of surveillance cystoscopies over two years following diagnosis into low- (1-5) vs. high-intensity (6 or more) surveillance. Propensity score adjusted Poisson regression was used to assess the association of low-intensity cystoscopic surveillance with frequency of transurethral resections (overall and resections with or without cancer in the specimen). Propensity score adjusted competing risks regression was used to assess the association of surveillance intensity with risk of bladder cancer death or progression to invasive disease, stratified by whether patients were diagnosed with non-invasive or invasive disease.

Results: Among 1,542 patients, 528 (33.7%) underwent low-intensity cystoscopic surveillance. Those receiving low-intensity surveillance over 2 years following diagnosis underwent a median of 4 cystoscopies, compared to a median of 7 for high-intensity surveillance. Patients undergoing low-intensity surveillance had fewer transurethral resections overall (27 vs. 99 per 100 person years; p < 0.001), resections with cancer in the specimen (28 vs. 77 per 100 person years, p < 0.001), and resections without cancer in the specimen (7.5 vs. 16 per 100 person years; p < 0.001). Low vs. high-intensity surveillance was not associated with risk of bladder cancer death among patients with non-invasive (cumulative incidence 5.8% vs. 8.3% at 5 years, p = 0.27) or with invasive disease at diagnosis (cumulative incidence 10.3% vs. 9.6% at 5 years, p = 0.75, Figure Panel A). Among patients with non-invasive disease, low-intensity surveillance was unexpectedly associated with a decreased risk of progression to bladder cancer death (cumulative incidence 20% vs. 31% at 5 years, p = 0.003, Figure Panel B).

Conclusions: Patients with high-risk NMIBC undergoing low- vs. high-intensity cystoscopic surveillance underwent fewer transurethral resections, but did not experience an increased risk of bladder cancer death. In fact, they had a lower risk of progression. These findings suggest that less intensive surveillance might be reasonable for patients with high-risk NMIBC. However, patients who underwent low-intensity surveillance likely had more favorable bladder cancer, because urologists used clinical information not available in our data to inform their decision making. Thus, these observational data provide a strong rationale for a prospective randomized study to assess whether the frequency of surveillance can be decreased among patients with high-risk NMIBC.

Renal Mass Biopsy for Cystic Renal Masses: Can We Challenge the Dogma?

Tammer Yamany, MD, Aileen O’Shea, MD, David Kuppermann, MD, Dmitar Zlatev, MD, Mukesh Harisinghani, MD, Ron Arellano, MD, Adam Feldman, MD

1Brigham & Women’s Hospital, Harvard Medical School, Boston, MA; 2Harvard Medical School, Boston, MA; 3Harvard School of Public Health, Boston, MA; 4University of Frankfurt, Frankfurt, Germany

Introduction: Renal mass biopsy (RMB) has been proven as a safe and effective method for diagnostic evaluation of small solid renal masses. However, routine biopsy of cystic renal masses has been advised against due to a high rate of non-diagnostic results. Diagnostic biopsy results may benefit clinical decision making when considering treatment options such as ablative therapy. Our objective is to identify predictive tumor and patient characteristics for a diagnostic biopsy of a complex cystic renal mass.

Materials & Methods: We performed a retrospective review of our database of 213 adult patients with cystic renal masses who underwent a RMB from 1998-2012. RMB was performed at the discretion of the urologist and patient. Any mass under consideration for ablative therapy was routinely biopsied. Core biopsies and fine needle aspirations (FNA) were performed. Non-diagnostic biopsies were considered biopsies with insufficient tissue or benign renal epithelial tissue felt not to be representative of the concerning lesion.

Results: A total of 213 cystic renal masses were biopsied from 1998-2012. 137 (64.3%) biopsies were non-diagnostic and 76 (35.7%) were diagnostic with 69 (32.4%) malignant and 7 (3.3%) benign neoplasms. There was no significant difference in age, gender, biopsy modality or imaging modality for biopsy in terms of diagnostic biopsy rates. The diagnostic rate increased with an increase in mass size (0-2 cm: 16.8%, 2-4 cm: 40.6%, 4-7 cm: 57.8%, > 7 cm: 90.0%, p = 0.003). Independent predictors of a diagnostic renal cystic mass biopsy included a mass diameter greater than 2 cm and differential contrast enhancement greater than 10 HU (p = 0.021 and < 0.001, respectively). Inclusion of only masses larger than 2 cm with differential contrast enhancement greater than 10 HU improves the diagnostic rate to 65.7%. Among patients with a nodular component, a nodule-to-mass ratio greater than 0.45 was significantly associated with a diagnostic biopsy (p = 0.027). Inclusion of only masses with a nodule-to-mass ratio greater than 0.45 improves the diagnostic rate to 85.7% from 41.9% for cystics with a nodular component.

Conclusions: Biopsy of cystic renal masses larger than 2 cm with differential contrast enhancement greater than 10 HU are more likely to result in a diagnostic biopsy result. Cystic masses with a larger nodule-to-mass diameter ratio are also more likely to result in diagnostic biopsy. Selective biopsy of cystic renal masses may benefit clinical decision making when considering available treatment options.

The Impact of Insurance Status on Outcomes for Bladder Cancer

Alexander P. Cole, MD,1 Sean Fletcher, BS, Chang Lu, MS, Marieke Krumpmohr, MD,2 Stuart Lipsitz, ScD,3 Quoc-Dien Trinh, MD,4

1Brigham & Women’s Hospital, Harvard Medical School, Boston, MA; 2Harvard Medical School, Boston, MA; 3Harvard School of Public Health, Boston, MA; 4University of Frankfurt, Frankfurt, Germany

Introduction: Health disparities in the United States are closely linked to patients’ ability to afford care. Bladder cancer is known to impart a substantial financial burden upon diagnosed individuals. We sought to determine the association between insurance status and clinical outcomes in bladder cancer.

Materials & Methods: We used the Surveillance, Epidemiology, and End Results (SEER) database and the National Cancer Database (NCDB) to identify men and women aged < 65 years who were diagnosed with bladder cancer from 2007 to 2014. With SEER, we evaluated the association between insurance status (private insurance, Medicaid insurance, and lack of insurance) and diagnosis with muscle-invasive bladder cancer as well as bladder cancer-specific survival. NCDB was used to identify those with localized muscle-invasive bladder cancer and evaluate the association between insurance status and receipt of neoadjuvant chemotherapy (among those who underwent radical cystectomy) as well as post-diagnosis delay of any treatment (surgery, radiation, or chemotherapy) > 3 months. Analyses were controlled for age, sex, race, year of diagnosis, income, education, geographical region, clinical TNM stage, and histologic type.

Results: There were 29,525 individuals in the SEER cohort and 6,069 in the NCDB cohort. Multivariable analyses (with private insurance holders as the reference group) demonstrated that uninsured individuals were nearly twice as likely to receive a diagnosis of muscle-invasive bladder cancer (OR: 1.90; 95% CI: 1.70-2.12). Medicaid-insured individuals had similarly increased odds of receiving this diagnosis (OR: 2.03; 95% CI: 1.87-2.20). Uninsured patients were also more likely to die of bladder cancer (adjusted hazard ratio [AHR]: 1.46; 95% CI: 1.31-1.71), as were those with Medicaid coverage (AHR: 1.61; CI: 1.46-1.79). Uninsured patients were less likely to receive neoadjuvant chemotherapy (OR: 0.76; 95% CI: 0.59-0.97) and more likely to experience a delay in treatment (OR: 1.56, 95% CI: 1.22-1.99). These outcomes were similar for Medicaid-insured individuals.

Conclusions: Individuals lacking insurance and those with Medicaid coverage are more likely to be diagnosed with muscle-invasive bladder cancer as well as die from the disease; they are also less likely to receive guideline-directed care. Expanding high-quality insurance coverage may help to reduce the burden of this disease.
Premature Termination of Genitourinary Cancer Trials: Assessing Trial Efficiency Using Novel Algorithms
Kristian Stensland, MD, MPH1, Krystal DePorto, BS2, James Ryan, BS2, Matthew Galsky, MD3,4
1Lahey Hospital and Medical Center, Burlington, MA; 2Tufts University School of Medicine, Boston, MA; 3Icahn School of Medicine at Mount Sinai, New York, NY

Introduction: Cancer clinical trials fail to reach their planned primary endpoint at a reportedly high rate. Trials which fail prematurely do not contribute maximally to the knowledgebase, if at all, and divert patients from other trials. Optimizing the conduct of cancer clinical trials through improved trial planning, and identifying trials at higher risk of failing to complete, could streamline the trials enterprise and hasten the investigation of new treatments while minimizing patient and investigator burdens. We identified associations with premature termination in genitourinary cancer trials using novel data extraction algorithms.

Materials & Methods: We extracted clinical trial data from ClinicalTrials.gov for prostate, bladder, kidney, testicular, and ureteral cancers. We included only Phase 2-3 interventional trials started in 2007 or later that had completed or terminated. We designed data extraction algorithms to generate previously unavailable data points for trials, including sponsor and trial information, anticipated and actual accrual numbers (method previously validated and published), and site number and location. We then manually coded reasons for premature termination from the provided free text in the trial record. We considered “toxicity,” “adverse events,” or “interim analysis” to be appropriate reasons for trial termination as these reasons provide useful information. We identified associations with premature termination via a logistic regression model, with covariates as detailed in Table 1.

Results: A total of 747 trials were included. Of these, 231 (30.9%) terminated early, and 193 (25.8%) terminated for a reason other than toxicity/efficacy. The most common reason for termination was poor accrual (43.3%). On multivariable logistic regression, trials with anticipated accrual <75% had odds of premature termination 6.5 (95% CI: 2.7-15.2) times higher than those with ≥75% accrual. On univariable logistic regression, trials with sites outside the USA and prostate cancer trials were less likely to prematurely terminate. For trials with <75% anticipated accrual, the rate of premature termination in genitourinary cancer trials is high, with more than 1 in 4 trials terminating prematurely for reasons other than toxicity or efficacy.

Conclusions: The rate of premature termination in genitourinary cancer trials is high, with more than 1 in 4 trials terminating prematurely for reasons other than toxicity or efficacy. Interventions are direly needed to optimize clinical trial conduct in order to decrease the drain on patient and investigator resources and hasten much-needed advances in genitourinary cancer care.

Table 1. Associations with Premature Termination for Reasons Unrelated to Toxicity or Efficacy

<table>
<thead>
<tr>
<th>Variable</th>
<th>OR</th>
<th>95% CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anticipated Accrual</td>
<td>1.0002</td>
<td>0.998-1.002</td>
<td>0.82</td>
</tr>
<tr>
<td>Multicenter Trial</td>
<td>0.82</td>
<td>0.57-1.17</td>
<td>0.27</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site Locations</th>
<th>Reference</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>USA Only</td>
<td>2.53</td>
<td>1.67-3.88</td>
</tr>
<tr>
<td>Both USA and international</td>
<td>0.96</td>
<td>0.28-3.09</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sponsor</th>
<th>Reference</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>0.86</td>
<td>0.52-1.41</td>
</tr>
<tr>
<td>US Government</td>
<td>0.89</td>
<td>0.56-1.41</td>
</tr>
<tr>
<td>NIH</td>
<td>0.70</td>
<td>0.43-1.17</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cancer Type</th>
<th>Reference</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bladder</td>
<td>0.86</td>
<td>0.49-1.55</td>
</tr>
<tr>
<td>Prostate</td>
<td>0.74</td>
<td>0.33-1.69</td>
</tr>
<tr>
<td>Kidney</td>
<td>0.55</td>
<td>0.33-0.93</td>
</tr>
<tr>
<td>Testicular</td>
<td>0.42</td>
<td>0.09-1.49</td>
</tr>
</tbody>
</table>

Contemporary Data on Incidence, Treatments and Outcomes of Tis, High-Grade Ta, and High-Grade T1 Non-Muscle Invasive Bladder Cancer Patients in the US
Jirun Song, PhD1, Mihaela V. Georgieva, PhD1, Iryna Bocharova, BA1, Eric Wu, PhD2, Amy Cao, PhD1, Sam Spigelman, MD1, Ashish M. Kamat, MD1
1Analysis Group, Inc., Los Angeles, CA; 2Analysis Group, Inc., Boston, MA; 3Terring Pharmaceuticals, Parsippany, NJ; 4Department of Urology, Division of Surgery, University of Texas MD Anderson Cancer Center, Houston, TX

Introduction: Intravesical immunotherapy with Bacillus Calmette-Guérin (BCG) therapy is the best treatment for patients with Tis, high-grade Ta, or high-grade T1 non-muscle invasive bladder cancer (NMIBC); for those who fail, options are limited other than radical cystectomy. This study examined SEER-Medicare data to provide a snapshot of the patterns of BCG use and outcomes in this patient population in the US.

Materials & Methods: We performed a retrospective analysis of the SEER-Medicare database to identify patients diagnosed with NMIBC between 2008 and 2015. Continuous enrollment in Medicare Parts A and B was required for ≥ 12 months prior to diagnosis and until death or end of Medicare claims availability (December 2016), whichever occurred first. Percentage of patients receiving BCG therapy was summarized. Proportions of patients who received cystectomy (partial or total) at 1, 3, and 5 years after BCG initiation were estimated among patients who received BCG using Kaplan-Meier analysis.

Results: Among the 54,444 patients diagnosed with bladder cancer, 39,789 (73.1%) had non-muscle invasive disease (Tis: 7.0%, Ta: 63.1%, T1: 29.9%) and 16,657 (30.9%) of the patients with NMIBC were Tis, high-grade Ta, or high-grade T1. Surprisingly, only slightly over half (56.5%) of these patients received at least one instillation of BCG therapy (median follow-up since first BCG was 32.2 months). The mean age at BCG initiation was 77.5 years (SD = 9.6), with 7,611 (80.0%) being male. The mean Charlson Comorbidity Index (CCI) score was 1.4 (SD = 1.7), with 5,797 (60.9%) of patients having CCI score ≥ 1. The most common comorbidities were diabetes (35.7%) and chronic pulmonary disease (33.7%). Approximately 4.4% of patients receiving BCG underwent cystectomy within 1 year of BCG initiation, 8.8% within 3 years, and 10.8% within 5 years.

Conclusions: In the contemporary era, approximately 40% of patients with NMIBC have Tis, high-grade Ta, or high-grade T1 disease at diagnosis. Only about half the patients receive BCG instillation therapy. Whether the low cystectomy rates seen at 1, 3, and 5 years after BCG initiation are due to comorbidity burden or other factors needs to be further studied.
Workplace Absenteeism Following Robotic and Open Kidney Surgery
Alexander P. Cole, MD1, Daniel Pucheril, MD1, Xu Chen, MSc, Prakash Dasgupta, MBBS2, Quoc-Dien Trinh, MD1
1Brigham & Women’s Hospital, Harvard Medical School, Boston, MA; 2Faculty of Life Sciences, Kings College London, London, United Kingdom

Introduction: Robotic surgery is increasingly employed for the management of renal tumors. However, the perioperative cost of robotic surgery is greater than open surgery. Our objective was to investigate differences in workplace absenteeism between open and robotic approaches amongst patients undergoing radical (RN) and partial nephrectomy (PN).

Materials & Methods: Patients aged 18-64, undergoing open or robotic RN or PN from 2012-17, and having data on workplace absenteeism were included within the Truven Health MarketScan® Database. This study periods was established relative to the date of surgery: baseline (-300 to -15 days), perioperative (-14 to -28 days), and postoperative (+28 to +52 days). The outcome of interest was the total number of days absent from work in the combined perioperative/postoperative period. This was calculated by summing daily days absent for vacation, sick leave, and short-term disability. The propensity score for controlling for baseline and propensity score.

Results: In total, 203 and 308 patients met inclusion criteria for RN (156 open, 47 robotic) and PN (145 open, 63 robotic), respectively. Aside from the distribution of age groups (p = 0.05), baseline characteristics were statistically similar between open and robotic patients undergoing RN. There were no statistical differences between open and robotic patients undergoing PN. In the fully adjusted model, patients undergoing robotic RN and PN missed 15.1 (95%CI 3.3-26.8) and 8.9 (95%CI 0.2-17.6) fewer days of work relative to their open counterparts, respectively.

Conclusions: Patients undergoing robotic kidney surgery return work sooner than patients undergoing open kidney surgery. The additional perioperative cost of robotic surgery may be offset by earlier return to work.

Between 1/2012 and 12/2018, a total of 15 patients underwent anastomotic posterior urethroplasty by a combined robotic transabdominal and open transperineal approach at 2 institutions. Mean follow-up was 388 (range 10-1487) days. Mean age was 58.2 (SD 19.1) years, median Charlson Comorbidity Index was 4 (range 0-6) for these men. 46.7% (n = 7) of the cohort had pre-existing stress urinary incontinence (SUI); an additional 33.3% (n = 5) developed de novo SUI after the index procedure. 40.0% (n = 6) of the cohort underwent salvage prostatectomy. Mean time from radiation therapy to diagnosis of postoperative urethral stricture was 8.2 (SD 5.6) years. 66.7% (n = 13), 13.3% (n = 3), and 6.7% (n = 1) of the cohort underwent previous procedures for urethral stricture, bladder outlet obstruction, and other urologic disease, respectively. Obstructive voiding management at presentation was with a suprapubic catheter for 53.3% (n = 8) and intermittent catheterization for 13.3% (n = 2) of the cohort. Reconstruction required prostatectomy and corporal splitting in 40.0% (n = 6) and 6.7% (n = 1) of the cohort, respectively. Gracilis muscle flaps were used in 26.7% (n = 4) of the cohort. Postoperative hematoma, wound closure, and corporal splitting in 40.0% (n = 6) and 6.7% (n = 1) of the cohort, respectively. Gracilis muscle flaps were used in 26.7% (n = 4) of the cohort.

Conclusions: Complex posterior urethroplasty by a combined robotic transabdominal and open transperineal approach is associated with a low rate of structural recurrence. Urinary incontinence is expected following this operation, and short-term results of AUS placement following reconstruction are encouraging. Further follow-up is needed to determine the long-term risk of urethral erosion in these high-risk patients.

### Table: Workplace Absenteeism

<table>
<thead>
<tr>
<th>Gender</th>
<th>RN</th>
<th>PN</th>
<th>p-value</th>
<th>RN</th>
<th>PN</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>55.5</td>
<td>61.7</td>
<td>0.56</td>
<td>66.7</td>
<td>66.7</td>
<td>0.70</td>
</tr>
<tr>
<td>Female</td>
<td>33.6</td>
<td>38.3</td>
<td>0.35</td>
<td>33.3</td>
<td>31.3</td>
<td>0.33</td>
</tr>
<tr>
<td>Mean Age (ES)</td>
<td>56.1 (7.6)</td>
<td>54.3 (7.9)</td>
<td>0.08</td>
<td>51.2 (7.1)</td>
<td>50.5 (6.9)</td>
<td>0.33</td>
</tr>
<tr>
<td>Age Group (%)</td>
<td>18-34</td>
<td>4</td>
<td>3</td>
<td>0.33</td>
<td>26</td>
<td>9.9</td>
</tr>
<tr>
<td>35-44</td>
<td>34.4</td>
<td>44.6</td>
<td>1.17</td>
<td>24.1</td>
<td>12.3</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>45-49</td>
<td>34.8</td>
<td>34.8</td>
<td>49.3</td>
<td>40.8</td>
<td>45.4</td>
<td>0.13</td>
</tr>
<tr>
<td>50-54</td>
<td>46.5</td>
<td>59.6</td>
<td>38.6</td>
<td>37.4</td>
<td>0.85</td>
<td></td>
</tr>
<tr>
<td>&lt;60</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1.00</td>
</tr>
<tr>
<td>&gt;60</td>
<td>7.7</td>
<td>72.3</td>
<td>66.0</td>
<td>60.8</td>
<td>0.86</td>
<td></td>
</tr>
<tr>
<td>Geographic Region (%)</td>
<td>0.29</td>
<td>0.36</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southeast</td>
<td>12.9</td>
<td>14.9</td>
<td>21.8</td>
<td>22.7</td>
<td>0.69</td>
<td></td>
</tr>
<tr>
<td>Northeast</td>
<td>20.0</td>
<td>34.0</td>
<td>24.3</td>
<td>32.5</td>
<td>0.45</td>
<td></td>
</tr>
<tr>
<td>South</td>
<td>40.4</td>
<td>34.0</td>
<td>36.2</td>
<td>31.6</td>
<td>0.77</td>
<td></td>
</tr>
<tr>
<td>West</td>
<td>2.9</td>
<td>13.9</td>
<td>16.0</td>
<td>13.6</td>
<td>0.66</td>
<td></td>
</tr>
<tr>
<td>Residence (%)</td>
<td>0.17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>6.4</td>
<td>6.4</td>
<td>10.4</td>
<td>6.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>91.6</td>
<td>93.6</td>
<td>89.2</td>
<td>90.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health Plan Type (%)</td>
<td>0.23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less Restricted</td>
<td>90.5</td>
<td>90.0</td>
<td>66.0</td>
<td>65.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>More Restricted</td>
<td>33.6</td>
<td>31.9</td>
<td>41.0</td>
<td>34.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baseline Days Absent (Mean)</td>
<td>0.38</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Differences in perioperative/postoperative days absent between patients undergoing robotic versus open radical and partial nephrectomy, adjusted for baseline absenteeism and for all covariates</td>
<td>0.31</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table:**

- **Radical Nephrectomy**
- **Partial Nephrectomy**

<table>
<thead>
<tr>
<th>p-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.004</td>
<td>0.028</td>
</tr>
</tbody>
</table>

**Table:**

- **Radical Nephrectomy**
- **Partial Nephrectomy**

<table>
<thead>
<tr>
<th>p-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.007</td>
<td>0.004</td>
</tr>
</tbody>
</table>

**Table:**

- **Radical Nephrectomy**
- **Partial Nephrectomy**

<table>
<thead>
<tr>
<th>p-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.94</td>
<td>0.28</td>
</tr>
</tbody>
</table>

**Table:**

- **Radical Nephrectomy**
- **Partial Nephrectomy**

<table>
<thead>
<tr>
<th>p-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.29</td>
<td>0.29</td>
</tr>
</tbody>
</table>
Characteristics and Clinical Outcomes of an Observational Patient Cohort Who Underwent Buried Penis Repair
Jaimie A. Cavalleo, MD, MPH1, Daniele Abela, BS, Rafael D. Tua-Caraccia, BFA, Elizabeth J. Pagura, BA2, Alex J. Vanni, MD3
1Dartmouth Hitchcock Medical Center, Burlington, MA; 2Tufts University School of Medicine, Boston, MA; 3Tufts University, Medford, MA

Introduction: Acquired buried penis (ABP) incurs significant health consequences including obstructive voiding, sexual dysfunction, and recurrent soft tissue and urinary tract infections. A paucity of data exists about the ABP population that pursues definitive treatment with buried penis repair (BPR). Our objective was to review the preoperative and intraoperative clinical variables and the postoperative outcomes of ABP patients who elect to undergo BPR.

Materials & Methods: The institutional database of a single reconstructive urologist was retrospectively reviewed for ABP patients who underwent BPR between 7/2011 and 12/2018. We reviewed preoperative demographics, medical history, associated urinary and sexual dysfunction, and previous treatment, as well as intraoperative time, estimated blood loss (EBL), and surgical techniques. Postoperative outcomes included residual urinary, sexual, and infectious BPR symptoms; wound complications; BPR failure; and death. Wound complications reviewed included hematoma, dehiscence, cellulitis, and surgical site infections. BPR failure was defined as recurrent ABP requiring repeat BPR.

Results: 48 ABP patients underwent BPR between 7/2011 and 12/2018. Mean follow-up was 343.3 (range 0.2-273) days. Mean age at presentation was 54.9 (range 27.0-82.1) years. Mean weight and BMI were 294.1 (range 206.0-492.1) lbs and 42.8 (range 28.0-72.1), respectively.

Median Charlson Comorbidity Index was 3 (range 0-14). 22.9% (n = 11) of the cohort had a urethral stricture, of which 14.6% (n = 7), 8.3% (n = 3), 2.1% (n = 1) had prior dilatation, direct vision internal urethrotomy; and urethroplasty, respectively. 10.4% (n = 5) of the cohort had a concurrent urethral stricture at the time of ABP evaluation. None of the penis was visible preoperatively for 52.1% (n = 25) of the cohort. 58.3% (n = 28) of the cohort had lichen sclerosus (LS) of the urethra or genital skin, 16.7% (n = 8) had genital lymphedema, 25% (n = 12) of the cohort had prior obesity-related surgery; 2.1% (n = 1) had prior BPR. 89.5% (n = 43, 60.4% (n = 29), and 62.5% (n = 30) of the cohort reported urinary dysfunction, sexual dysfunction, and skin or urinary infection reasons for pursuing BPR, respectively. Mean BPR surgical time was 181.4 (range 41-364) min; mean EBL was 84.3 (range 10-700) mL. BPR included escutcheonectomy, penile skin graft, and penile scar release with a plasty in 52.1% (n = 25), 60.4% (n = 29), and 10.4% (n = 5) of the cohort, respectively. Escutcheonectomy mean area was 229.6 (range 37.5-462.5) cm² and mean weight was 713.6 (range 82.5-3600) g; mean skin graft area was 167.2 (range 20-900) cm². 8.3% (n = 4) patients had a concurrent urethral stricture post-operatively, 0.9% had a superficial surgical site infection, 0.3% had a deep SSI, 0.2% required a transfusion intra- or post-op, 0.5% had a DVT requiring treatment, 0.9% had a wound disruption, 0.3% had an MI, and 0.2% had a PE. Zero patients experienced sepsis, stroke, acute renal failure or death. This constituted an overall complication rate of 6.8%.

As demonstrated above, for each post-operative complication recorded by NSQIP, less than 4% of the population exhibited the complication. Due to the low complication rates, models were only generated for UTL, Clavien-Dindo Grade 1, and overall complications. On multivariable logistic regression, after controlling for anesthesia type and race, there was no association between post-operative UTI (OR = 0.99; 95% CI = 0.76, 1.30; p = 0.96), Grade I (OR = 0.89; 95% CI = 0.69, 1.14; p = 0.36), or overall complication rate (OR 0.98, 95% CI = 0.82, 1.17, p = 0.82) and CCI scores. Similar results were observed for FI.

Conclusions: Urethroplasty with buccal grafting is a safe procedure with low complication rates, even in the comorbid population, and could therefore be considered a viable treatment option for stricture disease in this demographic.
The History of the Use of Colonic Muscosa in Urethral Reconstruction
Jaime A. Cavallo, MD, MPH1, Elizabeth J. Pagura, BA2, Leonard N. Zinman, MD1, Alex J. Vanni, MD1
1Lahey Hospital and Medical Center, Burlington, MA; 2Tufts University, Medford, MA

Introduction: Oral mucosa graft urethroplasty was first described by the Ukrainian surgeon Kirill Sapezhko in 1894. It was his protégé, I. A. Thyrmos, who pioneered substitution urethroplasty with rectal mucosa and published its first use in 1902. We describe the poorly-known evolution of colonic mucosa use in urethral reconstruction to its modern-day resurgence.

Materials & Methods: PubMed and the Journal of Urology archives were both systematically queried for all published literature using the combination of search terms “colonic mucosa” or “rectal mucosa” and “urethroplasty” or “urethral reconstruction”. All resulting literature matches were reviewed to describe the chronologic history of colonic mucosa use in urethral reconstruction.

Results: Thyrmos’ initial description of rectal mucosa substitution urethroplasty in the Eastern scientific literature in 1902 failed to gain the attention of the Western scientific community for the greater part of a century. Brief mention of rectal mucosa as a “feasible but unproven option for urethral reconstruction” in an abstract from the 1918 Urologic Congress in Paris indicates international communication but lack of adoption of the concept. Descriptions of urethroplasty using colonic mucosa grafts did not appear again in the medical literature until Paul Mitofanoff of France published his experimentation with appendicular mucosa grafts in rats beginning in 1994. Between 2002 and 2009, Yue-Min Xu, Chongrui Jin, Jie-Min Si, and Chao Feng of China applied the concept of colonic mucosa substitution grafts to the dilemma of long-segment complex urethral reconstruction in which oral mucosa grafts would be inadequate in length or unavailable. Their preclinical studies in a dog model and subsequent clinical series achieved colonic mucosa grafts up to 21 cm in length but required concurrent bowel resection. In 2016, Alex Vanni and Leonard Zinman described the first minimally-invasive harvest of rectal mucosa graft up to 15 cm in length for long-segment urethral reconstruction using a transanal endoscopic microsurgical technique. This approach circumvented the need for bowel resection and minimized associated gastrointestinal morbidity. In patients with long-segment urethral stricture or limited availability of oral mucosa for substitution grafting, rectal mucosa remains a viable alternative graft with minimal donor site morbidity to achieve a functional outcome in complex urethral reconstruction.

Conclusions: The use of colonic mucosa in urethral reconstruction follows a historic trajectory that parallels that of oral mucosa in urethroplasty. In modern reconstructive urology, the advent of minimally-invasive tissue harvest techniques has caused rectal mucosa grafts to re-emerge as a viable alternative to oral mucosa grafts in complex urethral reconstruction.