Scientific Session I - Oncology Except Prostate Cancer

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Variability in Growth Kinetics of Small Renal Masses on Active Surveillance
Andrew A. Wagner, MD1, Arjun Khosla, MD2, Michael H. Johnson, MD3, Helen D. Patel, MD2, Mark Ruffin, MD2, Michael A. Gorin, MD2, Christian Pavlovich, MD2, Peter Chang, MD2, James M. McKiernan, MD2, Bruce J. Trock, MD2, Mohamad E. Allaf, MD2, Philip M. Pierorazio, MD2
1Division of Urology, Beth Israel Deaconess Medical Center, Boston, MA, 2James Buchanan Brady Urological Institute, Johns Hopkins Hospital, Baltimore, MD, 3Department of Urology, Columbia University Medical Center, New York, NY

Introduction: Active surveillance (AS) of small renal masses (SRM) is emerging as a safe and effective strategy. To date, there is a paucity of robust, prospective data on growth rates of these masses as they pertain to clinical outcomes.

Materials & Methods: From 2009-2015, a prospective multi-institutional registry of patients with small renal masses (tumor diameter < 4 cm) was collected. Patients electing active surveillance received regularly scheduled imaging, with tumor characteristics collected throughout their enrollment in the registry.

Results: 518 patients were prospectively enrolled, of which 236 patients (45.6%) elected AS. 186 had follow up imaging at time of this analysis, with a mean follow up of 23.7 months. Overall mean growth rate was 0.29 ± 1.81 cm/year (median: 0.10 cm/year). Growth rate and variability decreased with time, with the mean growth rates at 6, 12, 24, and 48 months of 0.22 ± 0.57, 0.12 ± 0.38, 0.13 ± 0.27, and 0.09 ± 0.25 cm/year, respectively. Twenty-one patients (8.9%) crossed over to delayed intervention, with a mean growth rate of 0.56 ± 1.07 cm/year (median: 0.39 cm/year). Progression-free survival (tumor size < 4 cm and growth rate ≤ 0.5 cm/year) was 94.9% and 80.1% at 2 and 4 years, respectively.

Conclusions: Growth kinetics of SRM are highly variable upon entrance into AS, with both growth rate and growth rate variability decreasing with time. Early in AS, worrisome growth rates may warrant re-assessment of risk stratification with additional imaging or consideration of biopsy prior to treatment. As patients progress on AS, the growth rate may be an acceptable parameter for decision-making on intervention.

Efficacy of High Intensity Local Treatment for Metastatic Bladder Cancer
Alexander P. Cole, MD1, Thomas Seisen, MD2, Francisco Gelpí-Hammerschmidt, MD3, Navar Hanna, MD2, Mark A. Preston, MD, MPH4, MPFV, Quoc-Dien Trinh, MD1
1Harvard Medical School, Brigham and Women’s Hospital, Boston, MA, 2Harvard Medical School, Brigham and Women’s Hospital, Baltimore, MD, 3Department for Surgery and Public Health, Boston, MA

Introduction: There is evidence from other malignancies about the benefit of aggressive local treatment (LT) even in the setting of metastatic disease. Against a backdrop of stagnant mortality rates for metastatic Bladder Cancer (mBCa), we hypothesized that high-intensity LT of primary tumor, defined as the receipt of radical cystectomy or > 50 Gy of radiation therapy to the bladder, may impact overall survival (OS).

Materials & Methods: Within the National Cancer Data Base (NCDB), we identified 3,753 patients who received a multi-agent systemic chemotherapy combined with either high-intensity vs. conservative LT for primary mBCa. We defined as high intensity localized therapy those, patients who received radical cystectomy (RC) or > 50 Gy of radiation therapy (RT) to the pelvis. The conservative LT included patients who did not receive LT, or patients who received TURBT alone and/or palliative RT < 50 Gy to the pelvis. Inverse probability of treatment weighting (IPTW) adjusted Kaplan Meier curves and Cox regression analyses were used to compare the overall survival (OS) of patients who received high-intensity vs. conservative LT.

Results: Overall, 297 (7.91%) and 3,456 (92.09%) patients with mBCa underwent high-intensity and conservative LT. Following IPTW adjustment of all variables, the distribution of baseline patient characteristics was similar. IPTW-adjusted Kaplan-Meier curves showed that median OS was longer in the high-intensity LT group (14.92 months [95% CI: 8.32-20.19 months] vs. 9.95 months [95% CI: 8.26-10.78 months]; P < 0.001). Furthermore, in IPTW-adjusted Cox regression analysis, high-intensity LT was associated with a significant OS benefit (HR = 0.56, 95% CI: 0.48-0.65, P < 0.001).

Conclusions: We report an OS benefit for individuals presenting with mBCa treated with high-intensity LT, compared with their counterparts treated with conservative LT. While the findings are analogous to the societal biases related to the observational study design, our preliminary data warrant further consideration for randomized clinical trials to explore this question, particularly given the poor prognosis associated with mBCa.

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National Trends of Perioperative Outcomes and Costs for Open, Laparoscopic and Robotic Cytoreductive Nephrectomy
Manuel Ozambela, MD1, Michael Zavaski, MD2, Ye Wang, PhD2, Nawar Hanna, MD2, Valary T. Kaup, MD2, Albert Ha, BA2, Steven L. Chang, MD2, MSF1
1Harvard Medical School, Brigham and Women’s Hospital, Boston, MA, 2Brigham and Women’s Hospital, Boston, MA

Introduction: The adoption of minimally invasive surgery (MIS) has changed the management of metastatic renal cell carcinoma (mRCC). We aimed to perform a population-based study comparing national trends of perioperative outcomes and costs for robotic surgery.

Materials & Methods: Using the Premier Hospital Database (Premier Inc, Charlotte, NC), we identified a large amount of costs for robotic surgery was due to operating room time and supplies.

Results: The cohort was comprised of 304,055 patients, with 3044 (1.0%) receiving aspirin use for surgery may place undue risk of perioperative cardiovascular or cerebrovascular complications. We utilized a contemporary nationally representative database to assess the safety of preoperative aspirin use for patients undergoing renal surgery.

Materials & Methods: Using the Premier Hospital Database (Premier Inc, Charlotte, NC), which is a hospital discharge database including over 600 hospitals in the United States, we captured patients undergoing elective radical or partial nephrectomy for the management of kidney cancer or renal mass from 2003 to 2013, and divided the cohort by aspirin use on the day of surgery. We excluded patients from hospitals with no record of any perioperative aspirin use during the study period and those who had a possible cardiovascular or cerebrovascular event on the day of surgery. Multivariable regression analyses, controlling for patient and hospital factors as well as surgical approach, were used to assess the association between aspirin use and perioperative outcomes. Sampling weights and hospital clustering were employed to achieve a nationally representative estimate.

Results: The cohort was comprised of 304,055 patients, with 3044 (1.0%) receiving aspirin on the day of surgery. 79,661 (26.2%) underwent a partial nephrectomy. There were no significant differences between the two groups regarding intraoperative and post-operative complications (Table), there was a significantly increased odds for 30-day myocardial infarction in the aspirin group (OR 2.5, P = 0.04). The same associations were seen with subgroup analyses for radical and partial nephrectomy.

Conclusions: We did not find that aspirin use was associated with an increase in surgical morbidity for renal surgery even though the patients on aspirin in our cohort potentially had an elevated cardiovascular risk, as reflected by the higher incidence of post-operative myocardial infarction. Continuing aspirin among patients undergoing renal surgery appears to be safe.

The Safety of Preoperative Aspirin for Patients Undergoing Renal Surgery: A Population-Based Analysis
Philip J. Cheng, MD1,Adam B. Althaus, MD2, Steven L. Chang, MD3 Brigham and Women’s Hospital, Boston, MA

Introduction: Urologic guidelines recommend discontinuing aspirin prior to major urologic surgery due to the perceived risk of hemothorax. However, in certain high-risk patients holding aspirin for surgery may place undue risk of perioperative cardiovascular or cerebrovascular complications. We utilized a contemporary nationally representative database to assess the safety of preoperative aspirin for patients undergoing renal surgery.

Materials & Methods: Using the Premier Hospital Database (Premier Inc, Charlotte, NC), which is a hospital discharge database including over 600 hospitals in the United States, we captured patients undergoing elective radical or partial nephrectomy for the management of kidney cancer or renal mass from 2003 to 2013, and divided the cohort by aspirin use on the day of surgery. We excluded patients from hospitals with no record of any perioperative aspirin use during the study period and those who had a possible cardiovascular or cerebrovascular event on the day of surgery. Multivariable regression analyses, controlling for patient and hospital factors as well as surgical approach, were used to assess the association between aspirin use and perioperative outcomes. Sampling weights and hospital clustering were employed to achieve a nationally representative estimate.

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Synchronous Metastases in Upper Tract Urothelial Carcinoma Has Doubled in the Last 10 Years: An Analysis of Staging and Treatment Trends Using the National Cancer Database

Brendan M. Brownie, MD; Kristian Stensland, MD; Matthew Moynihan, MD; David Caralez, MD; Lahey Hospital and Medical Center, Burlington, MA

**Introduction:** Upper tract urothelial carcinoma (UTUC) is a relatively rare malignancy, accounting for approximately 5,000 new diagnoses per year. Nephrectomy (NU) and nephroureterectomy (NUx) are the most common treatments for organ-confined disease, but survival is significantly lower in patients with metastases. Chemotherapy can also be employed for metastatic or systemic disease, with increasing attention to neoadjuvant use as this post-NUx/CNDX may be limiting. The National Cancer Database (NCDB), which captures 75% of all cancer diagnoses in the US, allows analysis of diagnosis and treatment trends that may not be apparent in smaller single-center series.

**Materials & Methods:** Using the NCDB, we identified all patients diagnosed with urothelial carcinoma of the renal pelvis or ureter between 2004-2013. Data comprising baseline tumor (e.g., staging), patient (e.g., age, gender) and facility (e.g., region) factors were extracted from the database. Treatment data including surgery and chemotherapy were also extracted. Data on timing of chemotherapy were available after 2005. Comparisons were conducted using the chi-squared test.

**Results:** A total of 48,845 cases of UTUC were included and analyzed. Over the ten-year capture period of the NCDB, the gender and age distribution of new UTUC diagnoses were stable at 60% male, with median age at diagnosis 72 years. The proportion of patients diagnosed with T1/T2 increased over 10 years (60% to 9%, p < 0.001), and the proportion of cT2 decreased from 35% to 28% (p < 0.001). However, presentation with metastatic disease (clinical CT1) rose from 4.6% to 8.9% (p < 0.001). The rate of nephrectomy/nephroureterectomy was stable at 99% for cT2 and 51%-52% for cT2 disease. Similarly, the rate of adjuvant therapy was stable at 11% (9% for cT2). The rate of neoadjuvant chemotherapy, however, increased from 0.8% in 2006 to 2.3% in 2014 for all stages, and from 0.6% to 4.4% in cT2 disease (p < 0.001). Overall, patients with cT2 were more likely to undergo NU than patients with cT ≥ 2 (60.8% vs. 39.2%, p < 0.001). T1 disease was more common in cT2 than ≥ cT2 (18.3% vs. 3.7%, p < 0.001). Patients older than 65 years were more likely to not receive chemotherapy (16.1% vs. 11.6%, p < 0.001) or to undergo ablation (excision (12.4% vs. 8.6%, p < 0.001) compared with younger individuals, who remained stable. Men were more likely than women to undergo surgery of any kind (94.3% vs. 91.4%, p < 0.001) by a small margin.

**Conclusions:** While UTUC demonstrates largely stable basic demographic trends over the past ten years, the rate of synchronous metastatic disease has increased despite a decrease in cT2 diagnoses. An apparent concomitant rise in utilization of neoadjuvant chemotherapy and potential utilization of adjuvant chemotherapy is notable. Observations from any administrative data are hypothesis-drawers, and potential for reporting bias exists. Further investigation into etiology of the increased rate of metastasis is warranted, as this is the first such report. Additionally, variables predicting management, including age and gender, and subsequent survival, as well as comparative effectiveness of UTUC surgical and adjuvant therapies are forthcoming.

**Type 2 Diabetes and Risk of Renal Cell Carcinoma in Two Prospective Cohorts**

Alejandro Sanchez, MD,1 Rebecca Graff, ScD,2 Jed-Sian Cheng, MD, MPH,1 Glen W. Barrattes, MD, MFM,1 Dayron Rodriguez, MD, MFM,1 Seth K. Beich, MD, MSc,1 Michael L. Bliue, MD,1 Mei St Ample, MD, MPH,1 Mark A. Presten, MD, MPH,2 Kathryn M. Wilson, ScD,1 Eunyoung Cho, ScD,1

1Department of Urology, Massachusetts General Hospital, Boston, MA; 2Department of Epidemiology, Harvard T.H. Chan School of Public Health and Department of Epidemiology and Biostatistics, University of California, San Francisco, Boston, MA. 1Department of Urology, Cooper University Hospital, Camden, NJ; 2Department of Urology, Kaiser Permanente, Santa Rosa Medical Center, Santa Rosa, CA. 1Department of Epidemiology, Harvard T.H. Chan School of Public Health and Channing Division of Network Medicine, Department of Medicine, Harvard T.H. Chan School of Public Health, Boston, MA. 1Division of Urology, Brigham and Women’s Hospital, Boston, MA. 2Department of Epidemiology, Harvard T.H. Chan School of Public Health and Division of Network Medicine, Department of Medicine, Brigham and Women’s Hospital; Department of Dermatology and Epidemiology, Brown University, Providence, RI.

**Introduction:** Studies of association between type 2 diabetes (T2D) and renal cell carcinoma (RCC) risk have yielded conflicting results.

**Materials & Methods:** We utilized two prospective cohorts, 117,616 women from the Nurses’ Health Study (NHS) and 46,816 men from the Health Professionals Follow-up Study (HPFS) to evaluate the association between T2D and RCC. Multivariable Cox proportional hazards models were used to calculate hazard ratios (HRs) and 95% confidence intervals (CIs).

**Results:** During 36 years of follow-up in the NHS we confirmed 357 RCC cases, including 106 fatal cases. During 26 years of follow-up in the HPFS we confirmed 228 RCC cases, including 48 fatal cases. Women with T2D had a significantly increased risk of RCC compared to women without T2D (adjusted HR 1.62; 95% CI 1.18-2.23). RCC was not associated with RCC among men (HR 0.94; 95% CI 0.86-1.03). There was a non-significant increased risk of fatal RCC among women (HR 1.48; 95% CI 0.76-2.86) and men (HR 1.34, 95% CI 0.94-1.90) with T2D. Among women, there was a suggestion that the association was stronger for ≤ 5 vs. > 5 years duration of T2D (p for interaction = 0.06).

**Conclusions:** We found that T2D was associated with a significantly increased risk of total RCC in women, but not in men. T2D was suggestively associated with an increased risk of fatal RCC in both men and women.
Racial Disparities in the Receipt of Quality Metrics Among Patients Undergoing Radical Cystectomy for Muscle-Invasive Urothelial Carcinoma of the Bladder

Adam S. Feldman, MD, MPH1
Testing and Validation Cohorts
Prognostic Utility of a Multi-Gene Signature (The Cell Cycle Proliferation Score) in that underlying differences in tumor biology, environmental risk factors or other unknown is small and does not fully account for the racial disparities in BCa outcomes. This suggests likely multifactorial. While our study confirms that there may be statistically significant a worse overall survival. The well-documented race-based disparities in BCa outcomes are

Even after accounting for comorbidities and treatment disparities, blacks have significant in sensitivity analyses accounting for receipt of quality metrics (OR: 1.22 [CI: 1.12-1.36], p < 0.001). These findings remained were more (OR: 1.43 [CI: 1.02-2.00], p = 0.039). Blacks had significantly worse overall survival after adjustment for confounders (OR: 1.23 [CI: 1.12-1.36], p < 0.001). These findings remained sensitive in significance analyses accounting for receipt of quality metrics (OR: 1.22 [CI: 1.11-1.33], p < 0.001).

Conclusions: Even after accounting for comorbidities and treatment disparities, blacks have a worse overall survival. The well-documented race-based disparities in BCa outcomes are likely multifactorial. While our study confirms that there may be statistically significant racial differences in some important quality metrics, the magnitude of the differences is small and does not fully account for the racial disparities in BCa outcomes. This suggests that underlying differences in tumor biology, environmental risk factors or other unknown and unmeasured aspects of care may account for the marked race-based survival disparity.

Prognostic Utility of a Multi-Gene Signature (The Cell Cycle Proliferation Score) in Patients With Renal Cell Carcinoma (RCC) After Radical Nephrectomy: Analysis in Testing and Validation Cohorts
Adam S. Feldman, MD, MPH1, Rohit Mehra, MD2, Placencio Fouso, MS3, J. Stuart Wolf, MD4, A. A. Ohr, MD2, Shuh-Wu, PhD2, Zaina Sangale, MD2, Steven Stone, PhD2, Chin-Lee Wu, MD, PhD3, Todd Morgan, MD2
1Massachusetts General Hospital, Boston, MA, 2University of Michigan, Ann Arbor, MI, 3Myriad Genetics, Inc, Salt Lake City, UT

Introduction: There are currently no RCC biomarkers being routinely used in the clinic, and prognostic nomograms rely almost entirely on tumor size, stage and age. There is a critical need for improved prognostic discrimination given the increasing awareness that some patients may be managed with active surveillance, while others with higher risk disease might benefit from adjuvant therapy following surgery. We hypothesized that a previously developed multi-gene proliferation signature would predict long-term oncologic outcomes in surgically resected RCC.

Materials & Methods: The cell cycle proliferation (CCP) score was derived after radical nephrectomy in 305 patients who were treated at a single institution from 2000 to 2007 for clear cell, papillary or chromophobe RCC with localized disease (N0M0). Sixty-four percent of the cohort had stage I disease. The primary endpoint was disease-specific survival (DSS), and disease recurrence (local or metastatic) was a secondary endpoint. Association with outcomes was evaluated by CoxPH survival analysis and likelihood ratio tests. Hazard ratios (HR) are given for one-unit increase in CCP score (equivalent to a doubling of gene expression). CCP score was then compared with current clinical nomograms for prediction of recurrence and survival. A second cohort of 262 patients with similar baseline characteristics, and from a separate institution was used as a validation cohort.

Results: Patient data were censored at 5-years of follow-up, by which time 68 patients (12%) recurred and 32 (6%) died of disease. In the development cohort, the median CCP score was 0.095 (IQR: 0.50 to 0.66). In univariable analysis, CCP score was a significant prognostic variable for recurrence (p = 0.001) and DSS (p = 0.001). After adjusting for clinical variables including tumor size, stage, and grade, the CCP score HR for recurrence was 1.74 (95% CI: 1.14-2.65), and for DSS was 2.59 (95% CI: 1.43-4.67). There was no interaction between CCP and any clinical variable. Comparative bivariate analysis demonstrated that CCP score added significant predictive value to the Karakiewicz nomogram for DSS. The validation cohort demonstrated a consistent and significant prediction of recurrence and DSS, with the strongest association being for DSS. Kaplan-Meier analyses for DSS in both cohorts are shown in Figure 1.

Conclusions: The CCP score appears to be a significant and independent predictor of key long-term oncologic outcomes in patients who have undergone nephrectomy for RCC, providing prognostic information beyond what is available from clinical parameters. With further validation, the CCP score may have utility in the clinical management of patients with RCC.
Introduction: While serial biopsies are a key component of most active surveillance (AS) programs, surveillance protocols differ as to when the first surveillance biopsy should be performed. Some protocols mandate a confirmatory biopsy while in others, the first surveillance biopsy is performed at 1 year. In the present study we sought to determine differential impact of obtaining the first surveillance biopsy either within 6 months or at 9-15 months after diagnosis.

Materials & Methods: We retrospectively identified patients who enrolled in a prostate cancer active surveillance (AS) program during 2004-2015 and underwent a biopsy either between ≤ 1-6 months or 9-15 months after their initial diagnostic biopsy. Eligibility for enrollment in AS was defined according to NCCN criteria (biopsy Gleason ≤ 6; biopsy T stage: cT1c or cT2a, diagnostic PSA 12, then number of positive cores ≤ 25% of the total cores). We compared Nkx-defined eligibility for AS in patients who received a biopsy at either ≤ 1 or 9-15 months after their initial diagnostic biopsy.

Results: 62 (53.9) and 53 (46.1%) of patients underwent a second biopsy at ≤ 1-6 or 9-15 months after their initial diagnostic biopsy, respectively (table). Delaying re-biopsy to 9-15 months was associated with a significantly increased likelihood of positive biopsy defined by the Nkx criteria (69.4 vs. 47.2%; p = 0.022). Patients originally AS eligible rebiopsied at 9-15 months were more apt to be reclassified as ineligible than patients rebiopsied at ≤ 1-6 months (42.9 vs. 25.0%, p = 0.082).

Conclusions: Surveillance protocols differ as to when the first surveillance biopsy is performed. 25% of AS patients are deemed ineligible on confirmatory biopsy at ≤ 1-6 months. Waiting until ≥ 15 months resulted in 42.5% of patients becoming ineligible. These data may be helpful in patient counseling prior to AS enrollment.

Gene Expression and Risk Refinement within Gleason Score 7 (GS7) Prostate Cancer at Biopsy Using a Validated 17 Gene Genomic Prostate Score

David Albala, MD1, Michael Bonham, MD, PhD, Debbie McCullough, MS, Ruxiu Lu, PhD, John Bennett, MPH, Phillip Febo, MD2

1Associate Medical Professionals, Syracuse, NY2Department of Urology, University of Connecticut, Farmington, CT

Introduction: The Genomic Prostate Score (GPS) is clinically validated as an independent predictor of both adverse pathology (AP) at surgery and biochemical recurrence (BCR) in men with NCCN low and intermediate risk prostate cancer. A higher percentage of Gleason pattern 4 (GP4) disease and specific GP4 histological subtypes have each been associated with adverse long term outcomes in men with biopsy Gleason score 7 (GS7) prostate cancer. However, men with GS7 cancer on biopsy are downgraded at prostatectomy and outcomes for men with organ confined Gleason 3+4 cancer is considered favorable.

Materials & Methods: 1,143 GS7 prostate biopsies received at the Genomic Health Inc. clinical lab were centrally reviewed for percentage GP4 (%GP4) and GP4 morphologic subtype. The GPS was calculated based on the validated algorithm of 12 cancer-related and 5 reference gene expression. Specifications were subdivided based on %GP4 and morphologic subtype. The GPS was calculated based on the validated algorithm of 12 cancer-related and 5 reference gene expression for each specimen, median GPS was calculated for each sub-group.

Results: 1085 (88%) and 138 (12%) of GS7 biopsies were 3+4 and 4+3, respectively. The median GPS value for 3+4 was 31 (IQR 23-46) and for 4+3 was 37 (IQR 27-47). Among cases with 3+4, the median GPS was 29 (IQR 22-38), 33 (IQR 26-43), and 35 (IQR 27-46) for men with a percentage of GP4 of 1%-10%, 11%-25%, and 26%-50%, respectively. Poorly formed glands was the most common GP4 morphologic type (PFG, 54%, n = 619), followed by fused glands (FG, 24%, n = 270), cribriform (19%, n = 214), and glomeruloid (3%, n = 40). Overall, 78 (7%) of GS7 prostate biopsies were found to have unfavorable pathology more consistent with NCCN low risk after incorporation of GPS. A more favorable risk of adverse pathology consistent with NCCN low was identified within all %GP4 and GP4 morphologic categories.

Conclusions: There is a positive association between GPS and higher %GP4. However, widely overlapping GPS values across %GP4 and GP4 morphologies suggest a biologic continuum beyond what can be determined by traditional pathologic measures. The GPS is able to refine risk classification in men within all GS7 categories, helping to identify more appropriate treatment options in NCCN Intermediate patients.
Revisiting Prostate Cancer Screening Practices among Vermont Primary Care Physicians
Laura K. Donnelly, BA, Takamari Ashikaga, PhD, Kevan M. Sternberg, MD, Francis G. Cause, IV, BS, Brian H. Irwin, MD, MPH, mango, MD, Scott D. Ferrantano, MD
University of Vermont College of Medicine, Burlington, VT

Introduction: The role of prostate-specific antigen (PSA) testing as a screening tool for prostate cancer has been a controversial issue. The United States Preventive Services Task Force (USPSTF) determined that the potential benefit did not outweigh the harm, and thus recommended against PSA-based screening in 2012. However, no consensus has been reached regarding clinical practice guidelines. We assessed the use of PSA testing and digital rectal examination (DRE) as tools to screen for prostate cancer by primary care physicians in Vermont.

Materials & Methods: Surveys were emailed to practicing primary care physicians in Vermont. Completed surveys were received from 27% of physicians. The percentage of primary care physicians using PSA testing and DRE to screen for prostate cancer was determined. Data was stratified based on number of years in practice. The results were compared with a prior study performed in 2011.

Results: 27.7% of physicians in practice < 10 years recommended PSA testing, compared with 55.0% of physicians in practice ≥ 10 years (p = 0.01). 34.6% of physicians in practice < 10 years recommended DRE, compared with 58.3% of physicians in practice ≥ 10 years (p = 0.01). Of those who changed their prostate cancer screening recommendations in the past five years, 96.1% reported that the USPSTF statement influenced their decision. Of the physicians using DRE, respondents were less likely to recommend retesting after age 80 than those previously surveyed (p = 0.01). Physicians using PSA testing were also less likely to stop screening after age 80 compared with prior respondents (p = 0.01).

Conclusions: The use of DRE and PSA by Vermont primary care providers in an effort to detect clinically significant prostate cancer (screening in the context of the American Urological Association, American Cancer Society, international guidelines, and USPSTF recommendations demonstrated significant practice variations between physicians in practice < 10 years and those in practice ≥ 10 years. These disparities became more significant when present practice patterns were compared with those in 2001. Physicians in practice less than 10 years are less likely to recommend PSA screening, suggesting that they are more likely to adapt their practice in accordance with changing guidelines than those in practice for 10 or more years. Nationally, PSA screening has declined among men older than age 50 years since 2012. Despite this, one-third of men aged 75 and older continue to be screened. Improved informational and educational processes for evolving prostate cancer early detection (screening) nomograms must be developed to improve men’s health in light of these discrepancies.


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Multidisciplinary care (MDC) holds the promise of facilitating optimal patient care (PCa) management. MDC teams of trained specialists from different oncological disciplines have been developed to address these concerns and provide an objective, shared decision-making strategy to patient care. A number of single institution studies have shown that MDC leads to better diagnostic evaluation and disease classification, improved adherence to NCCN guidelines, improved patient outcomes as well as improved clinician and patient satisfaction. To our knowledge, no prior study has assessed the clinical impact of MDC in PCa care across multiple institutions for important outcome measures. This study assessed whether MDC resulted in improved oncological outcomes and quality of care (QOC) for those men treated for PCa.

Materials & Methods: Men treated for localized PCa between 1992 and 2009 were identified from the latest SEER-Medicare database. Patients were stratified according to MDC. MDC men were younger, married, white, had higher educational attainment and incomes and treated by high volume clinicians. MDC patients chose radiation therapy (RT) primarily (98%). For all men, receipt of MDC was associated with decreased all-cause mortality (HR 0.84, 95% CI 0.81-0.88, p < 0.0001) and specifically for those treated by Observation (HR 0.75, 95% CI 0.70-0.82, p < 0.0001). However, MDC was associated with increased PCa-specific mortality (HR 1.37, 95% CI 1.23-1.53, p < 0.0001), especially amongst those receiving androgen deprivation therapy (HR 1.74 [95% CI 1.46-2.06], p < 0.0001). They were nearly twice as likely to receive follow up with their treating physician. MDC patients receiving radical prostatectomy (RP) were more likely to receive adjuvant androgen deprivation therapy (ADT) (OR 2.4, p < 0.0001) and adjuvant RT (OR 7.8, p < 0.0001). MDC patients ≥ 75 with low risk disease and life expectancy < 10 years were more likely to receive definitive treatment (OR 16.1, p < 0.0001).

Conclusions: Overall, MDC was associated with decreased all-cause mortality but an increased PCa-specific mortality. Patients receiving MDC for their localized PCa are more likely to choose RT, receive definitive treatment and adjuvant therapy. They are more likely to be treated by high volume physicians and receive appropriate follow up with them. MDC, however, results in an increased risk of potentially inappropriate over-treatment in a select cohort of patients.
Introduction: While models predicting survival after prostate cancer (PC) treatment are prevalent, few predict post-treatment quality of life outcomes. We previously developed and externally validated models predictive of functional outcomes sufficient for intercourse two years following radical prostatectomy (RP), external beam radiation (EBRT) or brachytherapy (BT) using EPIC-26 (Alemozaffar et al, JAMA 2011). However, challenges with using EPIC-26 in clinical practice may preclude realistic use of these models. EPIC for Clinical Practice (EPIC-CP) is a one-page, 16-item questionnaire validated to measure health related quality of life in PC patients in the clinical setting (Chang et al J Urol 2011). We aimed to recalibrate the models for use with EPIC-CP to better enable point of care prognostication of sexual function in clinical practice.

Materials & Methods: Using a previously described multicenter longitudinal cohort, we identified 403 men treated with RP, 217 with EBRT and 230 with BT with complete sexual domain and model covariate information. We used the established covariates in the EPIC-26-based models to recalibrate the multivariable logistic regression models for use with EPIC-CP. We examined Pearson residuals to determine goodness of fit and compared the individual predictions based on the revised models with those generated by the EPIC-26-based models.

Results: The recalibrated EPIC-CP-based models are presented in Tables 1, 2, and 3 for RP, EBRT, and BT, respectively. The models demonstrated excellent discrimination (AUC of 0.76 for RP; 0.81 for EBRT, and 0.87 for BT). Odds ratios estimates for the EPIC-CP models changed by no more than 0.2 from their EPIC-26 counterparts, and remained significant. EPIC-CP and EPIC-26-based predictions had good concordance: the mean ± SD difference in predicted probability between EPIC-26 and EPIC-CP models was 0.0 ± 0.08 in each treatment group. Predicted probabilities were within 10%, 15.4%, and 15.8% for 95% of the RP, EBRT and BT subjects, respectively.

Conclusions: EPIC-CP-based nomograms predicting erectile function two years after RP, EBRT, and BT are in good agreement with established EPIC-26-based tools and offer an easily applied and accurate prediction regarding a common and impactful side effect of PC treatment. Their use in clinical practice may help adjust patient expectations for different treatment options and facilitate patient-centered care.

Maximal Tumor Diameter, Biochemical Recurrence in Organ Confined High-Grade Prostate Cancer

Stephen T. Ryan, MD, Christine Duarte, PhD, Moritz Hansen, MD, Patrick Murray, MD
Maine Medical Center, Portland, ME

Introduction: With MRI criteria developed for the identification of high-grade prostate cancer (Gleason score ≥ 7 = HGPCa), there is a potential to detect the small tumors of uncertain clinical significance. Studies suggest that high-grade cancers are clinically significant if their volume is > 5 cc, corresponding to a maximum tumor diameter (MTD) of 1 cm. However, this prior work has predominantly focused on low-grade prostate cancers with a Gleason score ≤ 6 (LGPCa). Our intent is to investigate the relationship between biochemical recurrence (BCR) and MTD to determine if this relationship varies between biochemical recurrence (BCR) and MTD to determine if this relationship varies based on the presence of HGPCa.

Materials & Methods: Pathologic data and BCR rates were obtained prospectively from 1999 to 2012 from a single tertiary care center’s prostatectomy database. Inclusion criteria were organ-confined pathology (pT2a-T3a), negative surgical margins, and minimum of 12 months follow-up. Exclusion criteria were androgen deprivation therapy, prior TURP, seminal vesicle invasion, or nodal metastases. Two groups were compared; LGPCa versus HGPCa.

Results: 1048 men were followed for a median period of 54 months (12-156 months). 73 (6.9%) men with organ-confined disease had a BCR. Median time to BCR was 22.5 months. Rates of BCR for LGPCa and HGPCa were 2.7% and 9% respectively (p = 0.0002). Overall the relationship between BCR vs. MTD was significant (p = 0.03), but not for either the LGPCa vs. HGPCa groups independently. The Cochran-Mantel-Haenszel statistic for difference in trend for high vs. low grade was also not significant.

Conclusions: In a large contemporary cohort of patients with organ confined prostate cancer, MTD is a predictor of BCR. HGPCa lesions have BCR rates significantly greater than for LGPCa lesions. There is evidence that a small MTD of < 1 cm has a lower BCR than a larger HGPCa. This suggests that MRI identified high-grade lesions in 0.5-1 cm range should undergo targeted biopsy.
**Introduction:** The goal of robot-assisted laparoscopic prostatectomy (RALP) is to completely excise the prostate cancer and gland while maximizing the postoperative erectile function by preserving the neurovascular bundles (NVB) and urinary function by preserving the external urinary sphincter (EUS). The objective of this study is to evaluate the impact of patient-specific 3D models, generated from MRI, on intraoperative decision-making.

**Materials & Methods:** Twenty-six subjects underwent a RALP by a single surgeon and pre-operative 3 tesla MRI under IRB-approved protocol. The following structures were segmented manually using the 3D slicer (open source software: www.3Dlicer.org) to generate the individual's 3D prostate model (see figure): whole gland, NVBs, EUS, and all tumors. At 3 different time points, (1) before reviewing the MRI, (2) after reviewing the MRI and (3) after reviewing the 3D model, the surgeon provided (A) decision regarding NVB sparing for each case, (B) likelihood of extracapsular extension (ECE) and (C) likelihood of seminal vesicle involvement (SVI). For (A), the surgeon also scored the confidence in his answer (1-5; 5 is highest). The decisions regarding NVB sparing were also correlated with left posterior and right posterior margins in the histopathology. Confidence scores were compared with the final decision, while (B) and (C) were compared with the histopathology.

**Results:** Among 52 NVBs, 39 were spared and 13 were resected. 6 were changed from non-nerve-sparing (NNS) to nerve-sparing (NS) after reviewing the 3D model. 4 of these cases had negative margins on pathology, which shows that change in management was correct in 67% of the cases. None were changed from NS to NNS. Following review of the 3D prostate model, the surgeon was more confident in sparing the NVB (p < 0.001) when compared to confidence scores before reviewing the MRI. The surgeon also reported a lower pre-operative likelihood of ECE and SVI in patients with negative pathology (p = 0.04 for ECE, p < 0.001 for SVI).

**Conclusions:** The confidence in the decision to spare the NVB increased significantly after reviewing the 3D model. Review of the 3D model provided better prediction of negative ECE and SVI. The 3D model can help surgeons make decisions regarding NVB sparing.

**Acknowledgements:** This work is supported in part by R01CA112288, 2P41EB015898-11, P01CA067165, U01CA151261, US4EBO05149 from NIH, and Center for Integration of Medicine and Innovative Technology (CIMIT11-325).

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**Multimodality MRI/US Fusion Biopsy Improves but does not Replace Standard Template Biopsy for the Detection of Prostate Cancer**

Nawar Hanna, MD, Matthew F. Waselez, MD, Francisco J. Gelpi-Hammenschmidt, MD, Keyvan Solari, MD, MPH, Muktesh Harsimipanjari, MD, Douglas M. Dahl, MD, Michael L. Blute, MD, Adam S. Feldman, MD, MPH

1 Massachusetts General Hospital, Department of Urology, Boston, MA
2 Massachusetts General Hospital, Department of Radiology, Boston, MA

**Introduction:** Multiparametric MRI (mp-MRI) with fusion transrectal ultrasound (US) guided prostate biopsy is a recent technology, which may improve the accuracy of TRUS prostate biopsy in select patients. There exists a growing debate as to whether mp-MRI targeted biopsy alone without standard template is sufficient for evaluation of patients. We investigate and describe our experience with fusion biopsy.

**Materials & Methods:** We retrospectively reviewed medical charts of patients undergoing fusion transrectal US-guided biopsy from July 2014 through February 2016. Patients eligible for fusion biopsy had identifiable lesions on mp-MRI compatible to the fusion biopsy system. Each lesion was graded according to the Prostate Imaging Reporting and Data System version 2 (PIRADSv2) by a radiologist. The fusion biopsy procedure included a minimum of 2 core biopsies for each target lesion. After targeted lesions are obtained, the targeting software is turned off and standard 12 core template biopsies are then taken. Patients on active surveillance for low-risk prostate cancer periodically also have 2-4 anteriorly directed cores and these were included in our analysis. Data including biopsy indications, baseline patient characteristics, and pathologic biopsy results were extracted from the medical record. Clinically significant disease was defined as Gleason Score 7 or higher adenocarcinoma of the prostate.

**Results:** A total of 255 patients with a mp-MRI-identified lesion underwent fusion and standard template biopsy. Indications included elevated PSA (29), raising PSA with prior negative biopsy (134), active surveillance for prostate cancer (85) and isolated abnormal digital rectal exam (7). Within our cohort, mean age was 65.4 (range 46-84), mean was PSA 9.0 ng/mL (range 0.7-96.2 ng/mL), and mean prostate volume 55 cc (range 15-232 cc). Of patients with available PIRADS-score (n = 227), 7.0%, 29.1%, 41.0%, and 22.9% had PIRADS 1, 2, 3, and 4 or 5 lesions, respectively. Pathologic results of the fusion-targeted biopsy were compared to those of the concomitantly performed standard template biopsies, and are summarized in Table 1. Of patients with PIRADSv2 4 or 5 lesions (n = 145), 40.0% had no cancer, 25.5% had Gleason 6, 25.5% had Gleason 7, and 9.0%, had Gleason 8-10 on final histopathology. Fusion Biopsy of PIRADSv2 3 lesions (n = 66) revealed no cancer in 65.2%, Gleason 6 in 15.2%, Gleason 7 in 19.7% and Gleason 8-10 in 0% of patients. Of 83 patients with clinically significant cancer, 26 (31.3%) would have been missed on standard biopsy and 12 (14.5%) would have been missed using fusion biopsy alone. Concordance between both biopsy modalities was 63.1%.

**Conclusions:** The technology of mp-MRI/US transrectal fusion biopsy improves the detection of clinically significant prostate cancer in select patients. However, our results demonstrate that a significant proportion of Gleason Score 7 or higher lesions will not be detected by targeted biopsy alone. Therefore, standard template biopsies should remain an integral component of any fusion biopsy program.
In Contrast to Prior Study, New Data Shows Bacteria Found at Revision IPP Surgery Differs from Previously Identified Biofilm

In 1995, Licht et al introduced the idea that organisms found at removal and replacement of an IPP for non-infectious reasons were subsequently responsible for those patients at later IPP infection if it occurred. Even though their culture positive patients later became infected and higher colony counts of the same organism were found at time of exploitation. None of their IPP patients with a negative culture at reoperation developed a subsequent prosthetic infection. This is the only study to our knowledge that compares cultures at removal and replacement with cultures at later surgery. We reviewed our cases of similar surgical IPP patients undergoing removal and replacement to see if this remains true today.

Materials & Methods: We identified 304 patients at our four institutions that had undergone revision of an IPP between June 2001 and December 2012. Eleven later underwent another IPP revision surgery and additional cultures were drawn. Complications leading to revision surgery included mechanical failure (6), autoinflation (1), floppy glans (1), hematoma formation (1), loss of fluid (1), and retained components (1). These patients then later underwent IPP revision surgery for infection (7), autoinflation (2), bladder laceration (1), and erosion (1). We reviewed patient charts to compile appropriate perioperative and follow up data.

Results: Eight cultures taken at the time of removal and replacement were negative, and three cultures yielded Staphylococcus warneri. All IPPs had been in place for an average of 4.4 years (range 1 month to 12 years). Mean patient age was 69 (range 53-72). Three patients developed a subsequent prosthetic infection. This is the only study to our knowledge that specifically looked at late IPP infection if it occurred. Three of their culture positive patients became infected, and the causative agent was identified as S. warneri. All IPPs had been in place for an average of 4.4 years (range 1 month to 12 years). Mean patient age was 69 (range 53-72). Three patients developed a subsequent prosthetic infection. This is the only study to our knowledge that specifically looked at late IPP infection if it occurred. Three of their culture positive patients became infected, and the causative agent was identified as S. warneri.
Multicenter Investigation of the Microorganisms Involved in Penile Prosthesis Infection: Are the AUA and EUA Guidelines Appropriate for Penile Prosthesis Infection and Infection Management?

Martin S. Gross, MD, Elizabeth A. Phillips, MD, Robert J. Carraquillo, MD, Amanda Thornton, MD, Jason M. Greenfield, MD, Laurence A. Levine, MD, Joseph Alukai, MD, William P. Conners, Ill, MD, Sidney Cline, MD, Carl Jan Tartakow, MD, Stanton C. Hong, MD, Edwardo F. Beller, MD, Nelson F. Bennett, MD, Ross Wang, MD, Paul E. Petrus, MD, Peter J. Noren, MD, Joseph Babcock, MD, José C. Orozco Cendón, MD, Edward G. Cheider, MD, Ondarayo Kalajevy, MD, David J. Ralph, MD, Tobias Kropp, MD, Donn S. Morgenstern, MD, Rafael E. Carrondo, MD, Pedro Maria, MD, William O. Brooks, MD, PhD, Michael L. Hoot, MD, Michael Pocock, MD, A. Arthur L. Burnett, MD, J. Francois Esh, MD, Gerard D. Henry, MD, Ricardo M. Munarriz, MD

Introduction: Despite advancements in surgical technique, device improvements and adoptations of antibiotic prophylaxis guidelines, penile prostheses infections continue to be a significant problem. The aim of this study was to investigate the microbiology of penile prosthesis infections to better understand and ultimately decrease infection rates.

Materials & Methods: This is a retrospective IRB-exempt multi-institution study of 200 patients with infected IVPs from who underwent implant or Malchay salvage procedure with device replacement. Intraoperative cultures were obtained in all cases. Antibiotics were recorded at implantation, preoperative hospitalization, and surgery.

Results: Between 2002 and 2015, 200 intraoperative cultures were obtained at the time of surgery or explant. Antibiotic regimens for all patients at implantation were generally consistent with AUA guidelines. No culture growth occurred in 35% of cases and gram-positive and negative organisms were found in 40% and 20% of cultures respectively. In addition, candida species and anaerobes were identified in 8% and 7% of total cultures respectively. Candida species (12.3%) and anaerobes (11.5%) comprised nearly one quarter of all identified pathogens. swim.

Conclusions: This study has revealed a high incidence of anaerobic and candida infections, which are not covered by current antibiotic prophylaxis guidelines. In addition, over 1/3 of penile prosthesis cases had negative cultures. These findings suggest a need to broaden antibiotic prophylaxis with current guidelines as well as create a management algorithm for penile prosthesis infections.
Adverse Effects of Testosterone Replacement Therapy for Men
Alexander P. Cole, MD1, Julian Hanske, MD3, Wei Jiang, MD2, Jesse D. Sammon, DO4, Quoc-Dien Trinh, MD3
1Harvard Medical School, Brigham and Women’s Hospital, Boston, MA, 2Department of Urology, Mariken Hospital Kuhnt-University Bochum, Herne, Germany, 3Harvard Medical School, Center for Surgery and Public Health, Boston, MA, 4Vattikuti Urology Institute, Henry Ford Health System, Detroit, MI

Introduction: The past decades have thus seen dramatic increase in the use of testosterone replacement therapy (TRT) for middle-aged men with testosterone levels below reference ranges for young men. While TRT may increase libido, reduce adiposity, increase muscle mass and improve bone density, some high profile studies suggest increased risk of cardiovascular, thromboembolic and prostate related complications. Much of this research was performed with older populations that are not representative of men most commonly using TRT in community settings. Given this uncertainty, we designed a study using a large national database to examine the risk prostate cancer, hepatotoxicity, thromboembolic and cardiovascular events, and obstructive sleep apnea (OSA) in a sample of adult men treated with TRT.

Materials & Methods: We utilized the TRICARE military database. TRICARE is the health care program of active members of the US Uniformed Services, retirees, and their relatives. It incorporates men using direct care (salaried military physicians) as well as purchased care (in a fee-for-service system paid for by travelers). We identified 36,882 men age 18-65, diagnosed with hypogonadism who received at least one dose of TRT between 2006-2010. We defined a matched cohort of controls who did not receive TRT. We compared event free survival and absolute risk of above complications between men using TRT and matched controls.

Results: As shown in Figure 1 there was no significant difference in event free survival for prostate cancer (p = 0.259), hepatotoxic (p = 0.343), and thromboembolic events (p = 0.229). Relative to controls, patients treated with TRT had better cardiovascular event free survival (p = 0.004) but were more likely to develop OSA (p = 0.003). The 2-year absolute risk of prostate cancer was 0.93% in the TRT cohort and 1.0% in controls (95%CI: 0.6% - 1.4% vs. 0.7% - 1.4%). The risk of cardiovascular events was 6.0% in TRT group versus 7.0% in controls (95%CI: 4.9% - 6.7% vs. 6.2% - 8.0%). The only significant difference in 2-year absolute risk was OSA, which occurred in 1.7% of the TRT men compared to 1.2% of controls (95% CI: 1.56% - 1.84% vs. 1.1% - 1.4%).

Conclusions: In contrast to recent high profile trials assessing TRT use in relatively elderly (age > 60) and comorbid populations, in our cohort of younger and generally healthy men using TRT in military and community based settings, there was no significant difference in the risk of prostate cancer, hepatotoxicity, thromboembolic or cardiovascular events. Prior studies performed in older and more comorbid populations suggesting adverse effects may be less generalizable to healthy, younger men using these medications in a community setting.

Differences in the Internal Consistency of the AUA Symptom Index in an Unselected Population of Males and Females
Jason Frankel, MD1, Gail Mancuso, RN2, Edward Myer, MD3
1University of Connecticut, Farmington, CT, 2Middlesex Hospital, Middletown, CT

Introduction: Since the AUA symptom index (AUASI) was developed in 1992, it has served as the gold standard for measurement of symptoms of BPH and as the model for subsequent symptom indices. Its features include content validity and internal consistency. The purpose of this study is to evaluate how the internal consistency of the AUASI is maintained in an unselected population of males and females.

Materials & Methods: This is a cross-sectional study of 254 consecutive patients who underwent joint replacement between 1/1/13 and 5/30/14. The AUASI was administered as part of a standardized pre-operative evaluation by a single nurse practitioner. A total of 103 males and 151 females completed the AUASI. The mean ages of males and females were 65.7 and 68.3 years. Median AUASI was 5 (range 0-34) with no significant difference in scores between males and females (p = 0.93). The internal consistency of the index was confirmed to be similar to historical results (Cronbach’s alpha = 0.79) for all respondents (Table). When separated by gender, reliability estimates were similar for both males and females (Cronhah’s alpha = 0.82 for males and = 0.77 for females). The strength of the internal correlations differed depending on gender. Factor analysis showed mathematical support for a 2 factor solution along the lines of the traditional distinction between obstructive (voiding) and irritative (storage) categories (Cronbach alpha = 0.74) for all cases. When analyzed by gender, symptoms separated into 2 factors which correlated differently for males and females: among females, the obstructive and irritative categories were maintained, while among males, the symptom of incomplete emptying correlated to both obstructive and irritative categories.

Conclusions: The symptoms of the AUA symptom index are not specific for pathological conditions of the prostate. The test is internally consistent in both males and females. Statistical analysis confirms distinct internal correlations among subjectively irritative and obstructive symptoms. Symptoms correlate differently in men and in women both by 1-factor and 2-factor analysis. Correlation Matrix, All Respondents
**Review of the Most Commonly Used Herbal Supplements for Prostate Enlargement: Where is the Evidence?**

Mahdi Zangi, MD, Michelle Kim, MD, Reza Nabavizadeh, BS, Maryam Yavari Bejestani, BA, Shahin Tabatabaei, MD

Massachusetts General Hospital, Boston, MA

**Introduction:** Herbal supplements are widely used by patients with BPH, yet little is known about the efficacy of these products and their scientific evidence. We describe the ingredients of herbal supplements marketed for BPH and review its scientific evidence.

**Materials & Methods:** We conducted a search of all Amazon products using the search term “prostate enlargement.” Out of the 85 products found, 41 were identified as herbal supplements claiming to relieve BPH symptoms. Information including product name, company, price, claimed effects, consumer satisfaction, active and inactive ingredients were extracted from each product. 2,400 pages of Google Scholar were used to research for evidence behind ingredients (4 pages per ingredient). We categorized scientific evidence for each ingredient into human (systematic reviews, randomized-control trials, cohorts, case-controls, epidemiology), animal, and in vitro (cellular/molecular) studies.

**Results:** Out of 41 products, 34 (82.9%) were produced by American companies. The price per month of supply ranged from $2.63 to $319.98 (Median: $26.47). Less than half (46.3%) had a money back guarantee. Thirty-six products were reviewed by customers with satisfaction ranged from 3.1 to 5 out of 5 (mean: 4.38 ± 0.55). 15 (34.1%) products did not even list ingredients on the nutrition fact table and therefore were excluded from this study because of lack of data. 11 (26.8%) products did not list inactive ingredients. The most commonly used ingredients were Saw palmetto (74.1%), zinc (74.1%), Pygeum africanum (44.4%), and Stinging Nettle (44.4%). A total of 61 different ingredients were identified, out of which 10 showed clinical efficacy in human studies (8 RCTs, 1 systematic review, and 1 case-control). 9 showed benefits in animal study models and 1 product had ingredients with only molecular and in vitro evidence of efficacy. 35 ingredients had no scientific evidence and 5 had conflicting evidence. Out of the 27 products that listed their ingredients, 25 had at least one scientifically proven ingredient based on human studies. Only 1 product had an ingredient with systematic review level of evidence and all other 24 products had at least one ingredient with RCT level of evidence. One product had ingredients only shown to be effective based on animal studies. One product did not contain any ingredient known to be effective for BPH. For these 27 products, the average number of ingredients scientifically proven to be effective based on human, animal, and in vitro/molecular studies was 2.93 (± 1.36), 1.3 (± 1.44), and 0.07 (± 0.27), respectively. There was no statistically significant correlation between the number of effective ingredients and monthly supply cost or consumer satisfaction.

**Conclusions:** Herbal supplements are widely available and heavily advertised to patients with BPH symptoms. They enjoy the lack of scrutiny and accountability that are mandatory for FDA-approved medical therapies. These products are quite diverse in their active and inactive ingredients with scant scientific evidence supporting their efficacy. Physicians, specially urologists, should be more familiar with these products given their widespread use and play a more active role in educating their patients in this regard.
Introduction: The steroid-5α-reductase type 2 gene (SRD5A2) and protein play a significant role in the development and growth of prostate tissue. As a result, strategies to block SRD5A2 using 5α-reductase inhibitors remain a mainstay in the treatment of benign prostatic hyperplasia (BPH). Our previous studies show that 30% of adult prostates do not express the SRD5A2 gene or protein due to methylation of the promoter region of the SRD5A2 gene. We hypothesized that in the absence of prostate SRD5A2 there may be alternate pathways driving growth of prostate tissue. Here, we performed molecular profiling of prostatic tissue with and without SRD5A2 promoter methylation to determine whether molecular targets of clinical relevance could be identified.

Materials & Methods: Prostatic tissue specimens were obtained from 22 patients with symptomatic BPH undergoing prostate debulking surgery. SRD5A2 promoter methylation status was determined by PCR. RNA was extracted from each specimen and whole-transcriptome profiling was performed using Illumina Human Beadchip Arrays. Supervised analysis of gene expression data was performed using Gene Set Enrichment Analysis (GSEA). Gene expression profiles of SRD5A2-methylated vs unmethylated patients harboring SRD5A2 promoter methylation. To validate these results and define the relationship between androgen vs. estrogen signaling, we measured SRD5A2 protein expression and aromatase in a panel of six BPH patients by Western blot, immunohistochemistry (IHC), and ELISA assays.

Results: We performed whole-transcriptome profiling of prostatic tissue from 22 patients with symptomatic BPH. By GSEA, we compared the gene expression profiles of SRD5A2-methylated vs. unmethylated patients and found that estrogen response genes are among the most significantly upregulated genes in patients harboring SRD5A2 promoter methylation. To validate these results and define the relationship between androgen vs. estrogen signaling, we measured SRD5A2 protein expression and aromatase in a panel of six BPH patients with and without SRD5A2 methylation. We demonstrate that when SRD5A2 is absent, there are increased levels of aromatase and phosphorylated ERα (p-ERα). Aromatase enzyme levels were quantitated by ELISA and found to be significantly elevated in prostate samples lacking SRD5A2 expression.

Conclusions: Our study identifies for the first time that there are distinct molecular subtypes of BPH corresponding to the presence or absence of SRD5A2 methylation and protein expression, and we find that estrogen response genes are a key distinguishing feature of the two molecular subtypes. Our findings of elevated aromatase and p-ERα levels in samples lacking SRD5A2 expression suggests an "androgenic to estrogenic switch" that modulates prostatic growth. With this alternate growth pathway activated, targeting the aromatase-estrogen-ERα axis may serve as an effective treatment strategy in carefully selected patients who lack SRD5A2 expression.

Poster Session 1 - Translational Research/Oncology

P1

Methylation of 5α-Reductase May Trigger an Androgenic to Estrogenic Switch in Prostatic Tissue Growth

Keynote: Lin, MD, PhD; Rongbin Ge, MD, PhD; Zongwei Wang, PhD; Seth K. Bechar, MD; Jinhong Li, MD, PhD; Alexandra Otsevod, MD; Chuan-Lee Wu, MD, PhD; Shahan Tabatabaie, MD; Aria F. Okumi, MD

Massachusetts General Hospital, Boston, MA

Introduction: The steroid-5α-reductase type 2 gene (SRD5A2) and protein play a significant role in the development and growth of prostate tissue. As a result, strategies to block SRD5A2 using 5α-reductase inhibitors remain a mainstay in the treatment of benign prostatic hyperplasia (BPH). Our previous studies show that 30% of adult prostates do not express the SRD5A2 gene or protein due to methylation of the promoter region of the SRD5A2 gene. We hypothesized that in the absence of prostate SRD5A2 there may be alternate pathways driving growth of prostate tissue. Here, we performed molecular profiling of prostatic tissue with and without SRD5A2 promoter methylation to determine whether molecular targets of clinical relevance could be identified.

Materials & Methods: Prostatic tissue specimens were obtained from 22 patients with symptomatic BPH undergoing prostate debulking surgery. SRD5A2 promoter methylation status was determined by PCR. RNA was extracted from each specimen and whole-transcriptome profiling was performed using Illumina Human Beadchip Arrays. Supervised analysis of gene expression data was performed using Gene Set Enrichment Analysis (GSEA). Gene expression profiles of SRD5A2-methylated vs unmethylated patients harboring SRD5A2 promoter methylation. To validate these results and define the relationship between androgen vs. estrogen signaling, we measured SRD5A2 protein expression and aromatase in a panel of six BPH patients by Western blot, immunohistochemistry (IHC), and ELISA assays.

Results: We performed whole-transcriptome profiling of prostatic tissue from 22 patients with symptomatic BPH. By GSEA, we compared the gene expression profiles of SRD5A2-methylated vs. unmethylated patients and found that estrogen response genes are among the most significantly upregulated genes in patients harboring SRD5A2 promoter methylation. To validate these results and define the relationship between androgen vs. estrogen signaling, we measured SRD5A2 protein expression and aromatase in a panel of six BPH patients with and without SRD5A2 methylation. We demonstrate that when SRD5A2 is absent, there are increased levels of aromatase and phosphorylated ERα (p-ERα). Aromatase enzyme levels were quantitated by ELISA and found to be significantly elevated in prostate samples lacking SRD5A2 expression.

Conclusions: Our study identifies for the first time that there are distinct molecular subtypes of BPH corresponding to the presence or absence of SRD5A2 methylation and protein expression, and we find that estrogen response genes are a key distinguishing feature of the two molecular subtypes. Our findings of elevated aromatase and p-ERα levels in samples lacking SRD5A2 expression suggests an "androgenic to estrogenic switch" that modulates prostatic growth. With this alternate growth pathway activated, targeting the aromatase-estrogen-ERα axis may serve as an effective treatment strategy in carefully selected patients who lack SRD5A2 expression.

P2

RNA-seq analysis Revealed the upregulation of p21 gene Expression in Neuroblastoma Cells Treated with FTY720 and Fenretinide

Mei-Hong Li, PhD, Carol Built, PhD, Kathy Herbst, MS, Linda Shapiro, PhD, Fernando Ferrer, MD

University of Connecticut Health Center, Farmington, CT; The Jackson Laboratory, Bar Harbor, ME; Connecticut Children’s Medical Center, Hartford, CT

Introduction: Neuroblastoma (NB) is the most common extra-cranial solid tumor in various cancers including NB. However, FTY720 as a combination therapy with fenretinide (4-HPR), a prevalent anti-cancer drug in current clinical trial for NB, has not been reported. In this study, we examined whether FTY720 and 4-HPR had strong anti-cancer activity in NB cells via induction of p21 expression, which suggests that p21 might be a potential anti-cancer target for NB.

Materials & Methods: Neuroblastoma cell lines were cultured in 96-well plates. FTY720 and 4-HPR were used at an equimolar concentration of 1 μM each. Cell viability was estimated using the CellTiter 96 AQueous One Solution and the 3-(4,5)-dimethylthiazol-2-yl)-2,5-diphenyl tetrazolium bromide (MTT) assay. The cells were analyzed using the Enzyme-Linked Immunosorbent Assay (ELISA) to determine p21 protein levels.

Results: FTY720 and 4-HPR had strong anti-cancer activity in NB cells via induction of p21 expression, significantly induced by either FTY720 or 4-HPR and the combination therapy further enhanced its expression in both NB cell lines.

Conclusions: Our data for the first time demonstrated that combination therapy with FTY720 and 4-HPR had strong anti-cancer activity in NB cells via induction of p21 expression, which suggests that p21 might be a potential anti-cancer target for NB.

P3

Ensuring Evidence-Based Practice: A Study of Factors Associated with Non-Utilization of AUA Guidelines

Lael Reinisch, MD, MPH, Florian Schnack, MD, Elias Hyams, MD

Dartmouth Hitchcock Medical Center, Lebanon, NH

Introduction: The American Urologic Association (AUA) publishes evidence-based guidelines to improve the quality and consistency of urological care. The 2014 AUA Census reported a unique field regarding providers’ utilization of AUA guidelines (AUG). We sought to identify factors associated with non-utilization of AUG to understand how education and dissemination of these guidelines might be improved.

Materials & Methods: Using 2014 AUA census data, providers were stratified based on self-reported utilization or non-utilization of AUG. Bivariate analyses and multivariable logistic regression analysis was performed to identify factors associated with non-utilization. Post-stratification weights were used to calculate national estimates

Poster Session 1 - Translational Research/Oncology

P4

Preop vs. Postop Penile Length Maintenance and Satisfaction Following AMS 700 LGX Inflatable Penile Prosthesis Implantation

Martin S. Gross, MD, Gerad D. Henry, MD, Run Wang, MD

Dartmouth-Hitchcock Medical Center/Dartmouth-Hitchcock Keene, Keene, NH; Regional Urology, Shrewsbury, LA; Urology, Houston, TX

Introduction: Loss of penile length after IPP implantation is a concern for many patients with ED who choose surgical treatment. The purpose of the study was to evaluate the effectiveness of the American Medical Systems (Minnetonka, MN, now Boston Scientific) 700™ LGX™ cylinders in maintaining penile length post-IPP implantation in patients treated for ED utilizing a modified method of cylinder sizing during implantation and a max-inflate technique after implantation. Success was defined as the distal length of a patient’s penis at 12 months post-implant being greater than the length of that patient’s penis at baseline pre-implant.

Materials & Methods: A single armed, prospective, two-center study was conducted with patients selected from the existing population experiencing ED without previous prosthetic implantation. The patients were seen periodically between implant and the 24 month visit. The distal length of a patient’s penis at 12 months post-implant as measured using the International Index of Erectile Function (IIEF). Penile Prosthesis Patient Satisfaction Survey (PPPSS), and improvement in ED was measured using the International Index of Erectile Function (IIEF).

Results: All patients were implanted using the penoscrotal approach. Twenty-six patients, with a mean age of 60.3 ± 7.7, were enrolled. Increases in the width and the circumferences and 84.5% were satisfied with their ability to have intercourse. No surgical complications were reported.

Conclusions: Despite continued publication and dissemination of AUG, about 5% of urologists do not utilize guidelines. Later career status and rural geography were associated with non-utilization. These data may inform efforts to improve dissemination and education regarding evidence-based practice.
Association of PSA and Number of Cores Positive to Likelihood of Adverse Pathology at Radical Prostatectomy Based on a 17 Gene Expression Assay

David Alba, MD1, Michael Brasham, MD1, PhD2, Brooke Nightengale, BS2, Anson Tharayanil, BS2, Bela Deses2, MD2, Megan Rothney, PhD2, Debbie McCullough, MS2, John Bennett, MDF2, Phillip Felbo, MD2, Athanasios Iatitas, MD2

Introduction: The over-treatment of prostate cancer and underutilization of active surveillance (AS) in men with Gleason 6 (GS6) cancer on biopsy stems from the uncertainty with current risk instruments. Volume of GS6 tumor and PSA > 10 ng/mL are commonly thought to be correlated with risk and drive treatment decisions. The Genomic Prostate Score (GPS) is a 17-gene biopsy-based RT-PCR assay analytically and clinically validated as an independent predictor of adverse pathology at prostatectomy. We report on the impact of volume of GS6 disease and PSA at biopsy on the biologic aggressiveness of the disease as measured by GPS.

Materials & Methods: 1,055 pathology reports received at the Genomic Health Inc. clinical lab were retrospectively reviewed to record submitted Gleason score, number of cores positive, and PSA (if available on path report). The GPS was calculated for a single specimen for each case with an associated path report using the validated algorithm of 17 cancer-related and 5 reference genes; median GPS was calculated for each sub-group (≤ 2 cores positive, > 4 cores positive, PSA <4 ng/mL, PSA 4-10 ng/mL, PSA > 10 ng/mL).

Results: 801 cases (76%) were submitted as GS6. 66% of cases utilized standard 12 core biopsy; 4% of cases had less than 12 cores and 30% of cases had more than 12 cores. The median GPS for GS6 cases with ≤ 2 cores positive was 24 (IQR 16.5 to 30.5) compared to a median GPS of 26 (IQR 20 to 34) for 4 or more cores positive. After incorporating the GPS, risk refinement, a change in categorical risk assessment was seen in 24% of cases with ≤ 2 cores positive and 26% of cases with > 4 cores positive. 294 of cases with GS6 also reported a PSA value. 25% of GS6 cases had a PSA 4-6%, 42% were 4-10%, and 8% were > 10 ng/mL. No significant correlation was seen between PSA and GPS. The median GPS for GS6 cases with ≤ 2 cores positive was 25 (IQR 16 to 31) compared to > 10 cores positive, PSA <4 ng/mL, PSA < 10 ng/mL.

Conclusions: The GPS results highlight the broad spectrum of tumor aggressiveness in a series of 801 biopsies containing GS6 independent of % cores positive and PSA. The degree of risk refinement among all GS6 cases independent of tumor volume or PSA highlight the utility of the GPS to provide predictive information beyond traditional clinical variables used for risk stratification in the management of men with GS6 disease at the time of diagnosis.

Renal Function Decline in Patients Undergoing Partial Nephrectomy

Scott V. Wiener, MD1, Peter Haddock, PhD2, Ilene Staff, PhD2, Anoop Meany, MD2

1University of Connecticut, Farmington, CT, 2Hartford Hospital, Hartford, CT

Introduction: Both active surveillance (AS) and partial nephrectomy (PN) are being increasingly utilized in the clinical management of patients with small renal masses (SRM). Patients selected for AS are typically older and with significant comorbid conditions compared to patients undergoing PN. However, both patient groups experience a decline in renal function at follow-up that is related to increasing age, comorbid conditions and/or surgical resection. The aim of our study was to identify individual risk factors responsible for this decline in renal function, and to compare the impact of surgical and non-surgical risk factors on worsening CKD scores in the patient populations.

Materials & Methods: We retrospectively identified all patients with a small renal mass who underwent either PN or AS between 1999 to 2015 at our clinical center. Patients were excluded if they had multiple tumors or crossed over from AS to PN. Partial nephrectomies were performed under warm or cold ischemia based on surgeon discretion. As most cases were performed utilizing warm ischemia, a statistical comparison could not be performed. Univariate and multivariate analysis compared age, BMI, Charlson Comorbidity Index (CCI), Tumor Size, CKD stage and “worsening of CKD stage” based on an increase in disease as measured by GPS.

Results: 52 (13.3%) and 339 (86.7%) patients underwent AS or PN, respectively. Follow up times were 1.7 (0.8-2.8) and 1.5 (0.5-3.0) years for AS and PN patients, respectively (p = 0.28). While AS patients were older than their PN counterparts (p = 0.004) and had higher initial CKD stage (p = 0.001), there was no significant difference in CCI score between groups (p = 0.195). In multivariable analyses, age and PN were associated with a worsening of CKD stage (p = 0.011, 0.013). In multivariable analyses, patients aged ≥ 65, CCI score, better initial renal function (CKD 1 or 2), and PN were associated with a worsening of CKD stage (p = 0.027, 0.010, 0.001, 0.029). Ischemia types [cold (n = 44), warm (n = 231), and no ischemia (n = 64)] did not predict CKD worsening on univariate and multivariate analysis.

Conclusions: PN is a significant risk factor for a decline in renal function. Older patients with preserved renal function at baseline are at the highest risk for a post-PN decline in renal function.

Poster Session 1 - Translational Research/Oncology
Micro-RNA Expression Profiles in Upper Tract Urothelial Carcinoma Differentiate Stage and Tumor Progression: A Tool for Clinical Decision Making

Ariel Fredrick, MD, Travis Sullivan, MS, Kimberly Rieger-Christ, PhD
Lahey Hospital and Medical Center, Burlington, MA

Materials & Methods: Total RNA was isolated from formalin fixed paraffin embedded partial or radical nephrectomy specimens from patients with pT1a ccRCC. 11 patients with eventual progression to metastatic disease and 14 patients with localized disease were analyzed. Expression levels of miR-NAs were determined by qRT-PCR.

Results: Expression levels of miRs 30b and 145 were significantly associated with time to recurrence comparing the localized and metastatic ccRCC groups. Levels of miRs 30b, 145, and 199 were significantly associated with cancer specific survival, and discriminated patients with metastatic disease as a prognostic tool.

Conclusions: Tissue samples from patients with pT1a ccRCC showed significant differences in miRNA expression levels. The miRNA identifiers in this study are consistent with previously published literature concerning progression to metastatic disease in ccRCC. Our goal was to identify a miRNA profile in SRMs predictive of metastasis as a diagnostic tool.

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Poster Session 1 - Translational Research/Oncology

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Table I. Results from logistic regression for detecting invasive UTUC: screening cohort

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Sphingosine Kinase-2 Inhibition Enhances Macrophage Polarization toward the M2 Phenotype

Fernando Ferrer, MD
1, Chintan Patel, MD1, Travis Sullivan, MS1, Eric Burks, MD1, Jay Raman, MD, Joshua Warrick, MD, David Canes, MD, Kimberly Rieger-Christ, PhD
1Lahey Hospital and Medical Center, Burlington, MA, 2Penn State Milton S. Hershey Medical Center, Hershey, PA

Introduction: Accurate staging of upper tract urothelial carcinoma (UTUC) often proves challenging secondary to inadequate tissue sampling during endoscopic biopsy. Furthermore, accurate prediction of tumor biology would allow tailored treatment for patients who are not candidates for nephroureterectomy (NU) or who could benefit from less radical treatment. MicroRNAs (miRNAs) are promising cancer biomarkers measurable in tissue, serum and urine; however, miRNA profiling of UTUC tumors remains largely unexplored. We aimed to identify miRNA expression profiles with potential to differentiate invasive and non-invasive UTUC and that may identify tumors that will progress following NU.

Materials & Methods: Total RNA was extracted from formalin-fixed, paraffin-embedded NU samples from 2005 to 2013 under an IRB-approved study. Thirty-six unique tumors with diverse pathologies were profiled in the screening cohort using RT-qPCR array for 752 unique miRNA. Subsequently, evaluation of 27 differentially expressed miRNA was performed on a validation cohort of 123 additional NU tissue specimens, including 34 samples from a unique patient population at a collaborating institution.

Results: The miRNA profile of the screening cohort identified 31 miRNA differentially expressed between invasive and non-invasive tumors (<0.05). Twelve were up-regulated and 19 were down-regulated in the invasive specimens. Predicted probabilities from logistic regression analysis of the screening cohort revealed four miRNA with AUC > 0.8 and an additional six with an AUC ≥ 0.7 (Table 1). Testing of selected miRNA on the validation cohort confirmed differential expression of 14 miRNA in invasive tumors. Clinical follow up data for progression following surgery also showed miRNA that correlate with progression of disease. Complete logistical regression modeling is currently in process for the validation cohort.

Conclusions: UTUC miRNA profiles of NU specimens can discriminate invasive versus non-invasive disease as well as predict patients who will display tumor progression following surgery. Thus miRNA could instruct decision making for follow up or adjuvant therapy pathways based on likelihood of progression. Furthermore, we are prospectively analyzing these miRNA in urine to develop a non-invasive assay for detection, surveillance, and risk stratification of UTUC. miRNA expression profiles may also aid in personalizing treatment decisions based on UTUC tumor biology.

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Differential MicroRNA Expression Levels in Patients with Small Renal Masses: Predictors of Progression to Metastatic Disease

Ariel Fredrick, MD, Travis Sullivan, MS, Kimberly Rieger-Christ, PhD
Lahey Hospital and Medical Center, Burlington, MA

Introduction: The increase in use of cross-sectional imaging has resulted in an increased incidence of incidentally discovered small renal masses (SRMs) < 4 cm in size. Active surveillance for these lesions is becoming an accepted management strategy, but there is still a small risk of metastatic progression. Previous studies have shown microRNA (miRNA) profiles to differentiate between localized and metastatic clear cell renal cell carcinoma (ccRCC). Our objective was to identify a miRNA profile in SRMs predictive of metastases as a diagnostic tool.

Materials & Methods: Total RNA was isolated from formalin-fixed paraffin-embedded partial or radical nephrectomy specimens from patients with pT1a ccRCC. 11 patients with eventual progression to metastatic disease and 14 patients with localized disease were analyzed. Expression levels of miR-NAs were determined by qRT-PCR.

Results: Expression levels of miRs 30b and 145 were significantly associated with time to recurrence comparing the localized and metastatic ccRCC groups. Levels of miRs 30b, 145, and 199 were significantly associated with cancer specific survival, and discriminated between localized and metastatic ccRCC (areas under the curve of 0.866, 0.860, and 0.851 respectively). Patient age and tumor size did not differ significantly between the two groups. miRs 30b and 145 were downregulated in the metastatic group, while miR-199 was upregulated.

Conclusions: Tissue samples from patients with pT1a ccRCC showed significant differences in miRNA expression levels. The miRNA identifiers in this study are consistent with previously published literature concerning progression to metastatic disease in ccRCC. Our goal will be to expand the sample size and compare expression levels in serum of patients on active surveillance as a potential decision-making tool for patients diagnosed with SRMs.

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Determinants of PSA Screening among Black Men in the United States in the Contemporary Era

Jesse Sammon, DO1, Deepanash Dasla2, MD2, Firas Abdollah2, MD3, Paul Han2, MD2, Moritz Hansen, MD3, Marii Merion, MD2, Quoc-Dien Trinh2, MD3

Maine Medical Center, Portland, ME; Henry Ford Hospital, Detroit, MI; Maine Medical Center Research Institute, Portland, ME; Henry Ford Hospital, Detroit, MI; Center for Surgery and Public Health, Brigham and Women’s Hospital, Boston, MA

Introduction: Black men have a substantially higher PCa incidence than White men (~220 vs. 133 cases per 100,000 men) and a mortality rate that is more than twice their White counterparts. Early identification of PCa in Black men may therefore be of benefit in forstalling consequent morbidity and mortality. While guidelines issued by major professional bodies do identify Black men as high-risk population for PCa, significant uncertainty exists for patients and their HCP’s alike. This uncertainty may be further compounded by the USPSTF recommendation against PSA screening in all men irrespective of age. The substantive questions surrounding PSA screening in Black vs. White men are reflected in previous reports showing contradictory findings. A contemporary analysis thus becomes imperative to provide a heuristic framework for identifying the baseline prevalence and predictors of PSA screening amongst Black men, not least because of its potential implications in healthcare policy.

Materials & Methods: We compared the rate of self-reported PSA screening in Black men relative to non-Hispanic Whites (NHW). The Behavioral Risk Factor Surveillance System (BRFSS) 2012 dataset was used to identify asymptomatic men (aged 40-99) who reported undergoing PSA screening in the past 12 months. Age, education, income, residence location, marital status, health insurance, regular access to health care provider (HCP) and HCP’s recommendation to undergo screening were extracted. Subgroup analyses by race and age were performed using complex samples logistic regression models to assess the odds of undergoing PSA screening. Results: In 2012, there were 122,309 survey respondents (weighted estimate 54.5 million) in the studied population; of these, 29% of Black and 32% of NHW men reported undergoing PSA screening. Younger black males had higher rates and odds of screening than similarly aged NHW (1.6, 1.58 and 1.36 for men aged 45-49, 50-54 and 55-59 respectively). Among Black men, only higher education level (odds ratio [OR] = 2.12 for men who were graduates vs. not), regular access to HCP (OR = 2.05) and HCP’s recommendation for screening (OR = 8.43) were independently associated with PSA screening. The association between race receipt of PSA screening was moderated by HCP recommendation, age, educational and insurance status (p for all interaction terms < 0.05), but not by regular access to HCP (p > 0.2).

Conclusions: Against the backdrop of higher morbidity and mortality of PCa in Black men, and the possible benefit afforded by early PSA screening in alleviating these disparities, our study provides evidence of the increased prevalence and odds of PSA screening in young (aged 45-60) Black males. While all parameters of higher socioeconomic status are predictive of screening behavior in Whites, only higher education, regular access to healthcare provider and physician recommendation were significantly associated with the likelihood of undergoing PSA screening in Black men. Future research to explore the complex gestalt of systemic factors (specifically, the association between race, socioeconomic achievements and educational status in predicting screening behavior) may aid in optimizing PSA screening in this high-risk subpopulation.

Limited Accuracy of Pre-Operative MRI for Evaluation of Extra-Prostatic Extension and Seminal Vesicle Invasion in Prostate Cancer Patients Undergoing Radical Prostatectomy

Urszula Kowalik, MD1, Peter A. Holoch, MD2, Scott D. Pettap plein, DO3, Brian Irisn, MD2, Mark K. Plante, MD2, FACS2, FACS3

University of Vermont Medical Center, Burlington, VT

Introduction: MRI is increasingly being used to stage patients with prostate cancer to better define disease state in patients deemed candidates for radical prostatectomy. We evaluated the accuracy and predictive value (NPV and PPV) of pre-operative MRI for extra-prostatic extension (EPE) and seminal vesicle invasion (SVI) based on post-operative pathology results in a sample of prostate cancer patients who underwent radical prostatectomy.

Materials & Methods: Between 2013 and 2015, 224 patients underwent robotic-assisted laparoscopic prostatectomy (RALP) at the University of Vermont Medical Center. Of those, 62 underwent a pre-operative dedicated prostate MRI. Indications for MRI included both patients who met criteria for pre-operative staging imaging by NCCN guidelines and patients with a prior biopsy and persistently elevated or rising PSA. One patient was excluded, having had the MRI within 4 weeks of biopsy, as the evaluation of EPE could have been confounded by immediate post-biopsy changes. MRI reports were considered positive for EPE or SVI if findings were reported as suspicious or positive. EPE and SVI reported on whole-mount pathology reports were used to determine the negative predictive value and accuracy of MRI.

Results: Of the 61 patients, 9 were found to have EPE on MRI. Comparison with whole-mount specimens revealed a NPV of 38%, with a sensitivity of 18% and specificity of 90%. Accuracy of MRI for predicting EPE was calculated at 44%. Regarding SVI, the NPV was 69%, with a sensitivity of 30% and specificity of 95%. Although our sample of patients with positive EPE on MRI was small (n = 9), the PPV was 78%.

Conclusions: Our findings suggest that MRI prediction of EPE may not be as universally accurate as described in prior reports where NPV has been estimated as high as 95%. This may be related to the relatively recent adoption of PI RADS criteria and new protocols for prostate MRI at our institution. While there may be a role for MRI in the diagnosis of significant prostate cancer, its role in the pre-operative evaluation of patients undergoing RALP warrants further investigation.

MRI Targeted TRUS Guided Fusion Biopsy: Are Systematic Transrectal Ultrasonic Biopsy Still Necessary Now that we Have Targeting Technology?

Michael Geffin, MD1, James Lin2, MD3, Michael Curran2, MD1

1Greater Boston Urology, Framingham, MA, 2Greater Boston Urology, Milton, MA, 3Greater Boston Urology, Natick, MA

Introduction: MRI imaging of prostate lesions have improved significantly in recent years. With computer aided drafting models we are now able to perform targeted biopsies of these lesions by overlaying MRI images on live ultrasound images. We assess whether adding systematic sampling to targeted biopsies increases our ability to diagnose prostate cancer.

Materials & Methods: This retrospective study of patient from a single large practice urology group who underwent MRI fused Ultrasound guided TRUS biopsy with no previous diagnosis of prostate between July 2015 and January 2016. All patients underwent multiparametric prostate MRI including T2 weighted, diffusion weighted, and dynamic contrast image sequencing. A single radiology group read all MRIs using PI RADS v2 to score lesions. To be included in this study each patient had the standard 12 core systematic biopsies and each targeted lesion must of had 1-2 cores

Results: There were 103 patient meeting inclusion criteria who underwent MRI fused Ultrasound guided TRUS biopsy with no previous diagnosis of prostate between July 2015 and January 2016. All patients underwent multiparametric prostate MRI including T2 weighted, diffusion weighted, and dynamic contrast image sequencing. A single radiology group read all MRIs using PI RADS v2 to score lesions. To be included in this study each patient had the standard 12 core systematic biopsies and each targeted lesion must of had 1-2 cores

Conclusions: Prostate cancer is found independently in both targeted biopsies and systematic biopsies. In our series, if systematic biopsies were not performed then 26.8% of men with prostate cancers would have gone undiagnosed.
Reversal of Castrate Resistant Prostate Cancer by Extracellular Vesicle Therapy

Joseph F. Benzaudi, MD, Michael DeTatto, MD, Devlin N. Chatterjee, MD, Peter J. Quinlan, MD

The Miriam Hospital, Providence, MA; Rhode Island Hospital, Providence, MA

Introduction: Castrate resistant prostate cancer (CRPC) is the second leading cause of cancer-related death in men in the developed world. While androgen deprivation therapy is effective at the onset of treatment, nearly all men develop castrate resistance. Several new therapies, including enzalutamide (Enz)-based chemotherapy, have improved outcomes for CRPC. However, resistance to Enz develops in over 40% of patients. New therapeutic regimens and rational targets are needed in order to continue to improve prostate cancer (PCa) patient survival. Tumor cells release extracellular vesicles (EV), which can alter the tumor microenvironment and promote disease progression. We have shown EV isolated from non-malignant cells can inhibit the malignant phenotype. We investigated the role of EV isolated from human mesenchymal stem cells (hMSC EV) reversing the malignant phenotype and Enz resistance and in PCa.

Materials & Methods: EV were isolated from human mesenchymal stem cells as reported. EVs were co-cultured with Enz sensitive or resistant cells after which: the induction or transfer of proteins was determined via mass spectrometry and Western blot analysis; and anchorage independent tumor xenograft growth were assessed and sensitivity to Enz was monitored via MTT assay.

Results: We used Enz sensitive (C4-2B) and resistant (C4-2BR) PCa cells for our studies. hMSC EV treatment of C4-2BR cells restored sensitivity to Enz. Treatment of C4-2BR cells with hMSC EV resulted in PARP cleavage (a marker of apoptosis induction) and RKIP induction. hMSC EV were examined to determine if RKIP was part of the cargo. hMSC EV were isolated and fractionated into the exosome, microvesicle and total (EV) (exosome and microvesicle) compartments. RKIP was detected in the EV (T) fraction. We reported that RKIP inhibits STAT3 activation. STAT3 activation was measured by luciferase reporter assay and was inhibited by hMSC EV treatment. C4-2BR endogenous RKIP protein levels were diminished by RKIP siRNA and the cells treated with hMSC EV (T). hMSC EV treatment resulted in the induction of C4-2B STAT3 reporter luciferase activity. This indicates that hMSC EV carry cargo, including RKIP, which can inhibit STAT3 oncogenic activity in C4-2BR cells. STAT3 activation was determined after ICP-1 stimulation and we found hMSC EV and HA-RKIP transient transfection inhibited STAT3 activation and STAT3 phosphorylation. hMSC EV inhibited PCa cell line tumor xenograft growth. C4-2B/C4-2BR growth and anchorage independence growth. Exosomes isolated from malignant cells can educate bone marrow cells and create a metastatic niche. EV isolated from malignant cells can promote anchorage independent growth of non-malignant prostate cells. This is inhibited when non-malignant prostate cells co-cultured with C4-2B EV and hMSC EV. In addition, hMSC EV were able to inhibit the growth of PCa cells that had acquired a neuroendocrine phenotype.

Conclusions: hMSC EV can reverse the malignant ‘education’ of recipient cells and provide the promising basis to investigate the therapeutic utility of hMSC EV for the treatment of CRPC, and further provide a novel platform for PCa.

Evolving Pathologic Outcomes in a Contemporary Cohort of Patients Undergoing RALP at a Small Academic Institution

Urszula Kowalik, MD, SC Scott D. Perrapato, DO, Brian Irwin, MD, Mark K. Plante, MD, FRCS(C), FACS
University of Vermont Medical Center, Burlington, VT

Introduction: Robotic-assisted laparoscopic radical prostatectomy (RALP) is currently the standard surgical approach for the treatment of clinically localized prostate cancer. We sought to evaluate the resultant pathologic findings in patients undergoing RALP with a focus on Gleason grade, positive surgical margins, and features of pathologically locally advanced disease including extra-prostatic extension (EPE) or pT3a or seminal vesicle invasion (SVI) or pT3b at our academic center.

Materials & Methods: An IRB approved retrospective review of 224 consecutive patients who underwent RALP at University of Vermont Medical Center (UVMMC) from 2013 to 2015 was completed examining both pre-operative biopsy and post-operative whole-mount pathologic specimen assessments.

Results: Post-operative pathologic review revealed that 58% (129/224) of patients had organ-confined disease (pT1a, pT1b, or pT2a), while 42% (95/224) of patients were staged as pT3a or pT3b. Two patients were excluded from Gleason grading because they received prior androgen deprivation therapy. Overall Gleason grading showed that 8% (19/222) had Gleason 6, 80% (177/222) had Gleason 7, 5% (11/222) had Gleason 8 and 7% (15/222) had Gleason 9 disease on final pathologic review. In comparison with pre-operative biopsy, a total of 40 patients were down-graded (23 from G6 to G7, 14 from G7 to G6, 2 from G9 to G8 and one from G6 to G9) and 22 were up-graded (14 from G6 to G7, 5 from G7 to G8, and 3 from G8 to G9). Among the entire cohort, 59 patients were found to have tertiary pattern 5 disease. Of the 42% of patients with features of locally advanced disease, 41% (99/241) had EPE; overall, 85% (193/224) of patients had EPE. A total of 39 patients were found to have positive surgical margins. Only 8% of patients with organ-confined disease were found to have a positive surgical margin compared to 48% in patients with locally advanced disease.

Conclusions: Pathologic review of the past three years of patients undergoing RALP at UVMMC suggest a paradigm shift away from primary surgical treatment of patients with low risk disease, with 93% (206/222) of patients undergoing RALP meeting criteria for intermediate and high risk disease. This shift toward operating on higher risk patients does not appear to compromise our rates of surgical margin positivity when compared with previous reports ranging from 6.5%–32% in series with larger percentages of low risk patients.

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Unprofessional Content on Social Media Among New England and U.S. Urology Residency Graduates

Introduction: The AUA has encouraged social media engagement by urologists and published best practices for online professionalism. Facebook is a popular platform that was introduced to most current trainees prior to medical school and can now be accessed by anyone, including patients and employees. As trainees graduate to clinical practice, potentially unprofessional behavior on social media is a concern. This study characterizes the social media content of a national sample of urology residency graduates.

Materials & Methods: Facebook was queried in 7/2015 with the names of all 2015 U.S. urology residency graduates to identify public profiles accessible without being "friends." Profiles were assessed for unprofessional (UP) or potentially objectionable (PO) content using a rubric with 65 content categories based on guidelines by the ACGME, AMA, and AUA. We noted references to urology/urological services and determined whether UP/PO content was self-authored by the urologist or posted by another party. Assessments were conducted by two independent reviewers with excellent concordance (κ>0.90). A subgroup analysis was conducted for graduates of programs in the New England Section of the AUA.

Results: Of 281 graduates, 223 (79%) were men and 267 (95%) held MDs. 201 (72%) had publishable Facebook profiles. Of these, 85 profiles (42%) included Facebook profiles that were publicly-visible or potentially objectionable content, including 27 profiles (13%) with explicitly UP behavior (Table). Common examples of UP content included images of and references to intoxication, images of being unprofessional at work, explicit profanity, and protected health information. PO content included images of possessions or consumption of alcohol, images or posts about political, religious, or controversial topics, and references to sexual behavior. UP/PO content was self-authored in 82% of cases. 30% of profiles contained self-identification as urologists or had references to urological organizations like the AUA, but among these, 47% contained UP/PO content. Presence of UP/PO content did not differ significantly between sexes, MD vs. DO allopaths vs. osteopaths/medical residents, age groups, or without identifying as urologists (all p>0.05). Among the 22 graduates of New England programs, 16 (73%) had publicly-visible profiles. Of these, seven (44%) contained self-authored UP/PO content. Seven profiles contained references to urology or identification as a urologist, and three of these (43%) contained UP/PO content. No statistical difference was found between New England vs. all U.S. residents with respect to having a publicly-visible identifiable profile, authoring UP/PO content, or self-identifying as a urologist with UP/PO content (all p>0.05).

Conclusions: The majority of recent residency graduates had public Facebook profiles, and a substantial proportion contained self-authored, unprofessional content. Of those residents identifying as urologists, about half violated AUA guidelines on online professionalism. The social media behavior of graduates of New England programs was similar to their counterparts nationally. Greater awareness of trainees’ online identities is needed.

Table 1. Baseline survey characteristics, health information national trends survey 4, cycle 4, 2014

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Table 2. Logistic regression for association between UP and PO content

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</tr>
<tr>
<td>Income Source</td>
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<td>ref</td>
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<tr>
<td>Cancer Research Graduated</td>
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</table>

Contemporary Perceptions of Human Papillomavirus and Penile Cancer - Perspectives from a National Survey

Introduction: Penile cancer is a deadly yet rarely discussed genitourinary cancer with more than half of cases in the United States (US) associated with HPV (Human Papillomavirus). Our goal was to investigate contemporary knowledge of HPV and its association with penile cancer in a nationwide cohort from the US.

Materials & Methods: We utilized the 2014 Health Information National Trends Survey (HINTS), a cross-sectional telephone survey performed in the US initiated by the National Cancer Institute. Our primary endpoints included knowledge of HPV and its cal relationship to penile cancer. Baseline characteristics included sex, age, education, race & ethnicity, income, residency, personal or family history of cancer, health insurance status, and internet use. Adjusted analyses were used to identify predictors of HPV knowledge.

Results: An unweighted sample of 3,376 respondents was extracted from HINTS. Whereas 65.0% of respondents had heard of HPV, only 29.5% of these were aware that it could cause penile cancer. Men were significantly less likely to have heard of HPV than women (65.0% vs. 79.5%, p<0.01). Older age, African-American, Chinese, “other race,” being married, from a lower education bracket, having a personal cancer history, and those without internet were significantly less likely to have heard of HPV. We did not identify any independent predictors for the knowledge of the association of penile cancer and HPV.

Conclusions: A large, nationally representative survey demonstrates that the majority of the American public is familiar with HPV but lack a meaningful understanding between this virus and penis cancer. Urologists and primary care providers should be encouraged to intensify counseling about this significant association as a primary preventive measure for this potentially fatal disease.
Development of a Successful International Outreach Program: Project Health Cape Verde, a 501c3 Non-profit
Sally Tan, BS; Alexander Cole, MD, PhB, Brony Warda, MD, William Dewolf, MD, Amurag K. Das, MD, Michael Kearney, MD 1

1Harvard Medical School, Boston, MA; Brigham and Women’s Hospital, Boston, MA; Beth Israel Deaconess Medical Center, Boston, MA, Boston, MA

Introduction: We present a model for a successful international outreach program developed at our institution over the last six years. We discuss the factors, some unique to our local circumstances, that helped initiate the program and how others may learn from our experience and start similar but unique rewarding experiences. Cape Verde is an island nation 350 miles from the eastern coast of Senegal. Since the country has only one urologist serving its entire population of half a million, the well to do, the good in Cape Verde have increased by 56% from 2009-2013. The number of urological procedures performed each year has decreased by 27% due to the focus on training local physicians. However, the number of patients with urologic cancers, prostate, and bladder cancer that have increased, and that they continue to grow.}

Materials & Methods: Starting with an initial visit to provide urologic care, an expanding team now including urologists, gynecologists, general surgeons, anesthesiologists and medical interpreters from Beth Israel Deaconess Medical Center (BIDMC) in Boston, MA provided clinical care and training at two hospitals in Cape Verde on 8 visits from 2010-2015. Interviews were conducted with 9 clinical staff to elicit health delivery barriers specific to this setting. Surgical care logs were maintained to measure clinical productivity and training was performed for local providers in basic urologic care.

Results: Since 2010, BIDMC surgeons in partnership with Cape Verdean physicians have treated a total of 1604 patients and completed 77 operations, including the nation’s first transurethral resection of the prostate. Three Cape Verdean surgeons have been trained in 15 procedures, and 3 of them have completed a surgical training course at BIDMC. Likewise, 14 surgeons from BIDMC and volunteers in Cape Verde have increased by 56% from 2009-2013. The number of urological procedures performed each year has decreased by 27% due to the focus on training local physicians. Project Health CV recently launched a new research platform to develop best-practices in urologic care for resource-limited settings 4) Expose surgical trainees to providing care in the global health setting.

Conclusions: We present a model for a successful international outreach program developed over a decade and highlight the factors, some unique to our local circumstances, that helped initiate the program and how others may learn from our experience and start similar but unique rewarding experiences. Cape Verde is an island nation 350 miles from the eastern coast of Senegal. Since the country has only one urologist serving its entire population of half a million, the well to do, the good in Cape Verde have increased by 56% from 2009-2013. The number of urological procedures performed each year has decreased by 27% due to the focus on training local physicians. However, the number of patients with urologic cancers, prostate, and bladder cancer that have increased, and that they continue to grow.

Average TTA during the Weekends

Average TTA during the Weekends

Table 1: Average Total Time Asleep (minutes) for each resident and all residents in 3 categories

<table>
<thead>
<tr>
<th>Resident</th>
<th>Baseline +/- SD</th>
<th>Not Fatigued +/- SD</th>
<th>Fatigued +/- SD (where applicable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1285 ± 93</td>
<td>1095 ± 192</td>
<td>1072</td>
</tr>
<tr>
<td>B</td>
<td>1385 ± 134</td>
<td>1195 ± 82</td>
<td>870</td>
</tr>
<tr>
<td>C</td>
<td>1475 ± 181</td>
<td>1278 ± 130</td>
<td>942</td>
</tr>
<tr>
<td>D</td>
<td>1352 ± 137</td>
<td>1258 ± 61</td>
<td>1369</td>
</tr>
<tr>
<td>All (model estimated)</td>
<td>1564 ± 79</td>
<td>1195 ± 90</td>
<td>1057 ± 135</td>
</tr>
</tbody>
</table>

Conclusion: Project Health CV demonstrates how through creation of a 501c3 non-profit, medical care can be provided in an academic medical center when the need exists. Project Health CV is a model of global health outreach that can be applied to the treatment and prevention of urologic diseases.
Scientific Session IV - Best Practices

Patient Outcomes Using an Enhanced Recovery Protocol After Radical Cystectomy: A Retrospective Cohort Study

Philip J. Chung, MD; Jacqueline M. Speed, MD; Graeme S. Steele, MD; Quoc-Dien Trinh, MD; Jianjun R. Evans, MD; Steven L. Chang, MD; Steven L. Chang, MD; Adam S. Kibel, MD; Matthias F. Stopfkuchen-Evans, MD; Mark A. Preston, MD
Bruigton Women’s Hospital, Boston, MA

Introduction: The goal of the Enhanced Recovery after Surgery (ERAS) protocol is to reduce length of stay (LOS) and improve patient outcomes by decreasing ileus, surgical infections, and fluid overload. We evaluated our ERAS protocol for patients undergoing radical cystectomy, focusing on LOS, complication rates, and readmission.

Materials & Methods: From May to December 2015 an ERAS protocol was utilized in 62 patients who underwent open or robotic radical cystectomy and urinary diversion at our institution. 11 patients who underwent additional surgery were excluded from the study. The protocol focuses on avoidance of preoperative fasting and bowel preparation, opioid-minimizing multimodal pain management, goal-directed fluid therapy, and early postoperative feeding. Alvimopan, a peripherally acting μ-opioid antagonist, was given when available. Outcomes were compared to a cohort of patients who underwent radical cystectomy prior to instituting the ERAS protocol.

Results: A total of 51 patients with a median age of 66 years were analyzed and compared to a pre-ERAS cohort of 125 patients. The median LOS was compared to 6 days for the pre-ERAS patients. Only 4% (2 patients) of the ERAS cohort had a LOS longer than 7 days versus 32% (40 patients) of the pre-ERAS cohort. By postoperative day (POD) 3, 84% of the patients had passed flatus and 65% had a bowel movement. For the ERAS cohort, the 30-day minor and major complication rates were 55% and 12%, respectively. The most common minor complications were urinary tract infection (UTI) in 23.5% (12 patients), superficial wound infection in 16% (8 patients), and dehiscence in 12% (6 patients). UTI and dehiscence were the 2 most common reasons for readmission. The 30-day readmission rate was 39% (20 patients). The 39% of ERAS patients that received alvimopan had the same median LOS (5 days) as those that did not, but had an earlier median POD of flatus (2 days vs. 3 days) and bowel movement (2.5 days vs. 3 days).

Conclusion: Our ERAS protocol for radical cystectomy patients accelerates return of bowel function and decreases hospital length of stay compared to traditional management.

Table 1: Patient characteristics, postoperative outcomes, and complications

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>ERAS (n=51)</th>
<th>Pre-ERAS (n=125)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median age (years)</td>
<td>66 (45-80)</td>
<td>66 (45-80)</td>
</tr>
<tr>
<td>Male (%)</td>
<td>36 (70.4%)</td>
<td>71 (56.8%)</td>
</tr>
<tr>
<td>Black (%)</td>
<td>22 (43.1%)</td>
<td>43 (34.4%)</td>
</tr>
<tr>
<td>Median body mass index (BMI)</td>
<td>29 (21-41)</td>
<td>29 (21-41)</td>
</tr>
<tr>
<td>No. of chronic diseases (%)</td>
<td>14 (27%)</td>
<td>27 (50%)</td>
</tr>
<tr>
<td>No. of prior EGS (%)</td>
<td>17 (33%)</td>
<td>15 (20%)</td>
</tr>
<tr>
<td>No. of minor complications (%)</td>
<td>31 (61%)</td>
<td>21 (68%)</td>
</tr>
<tr>
<td>No. of major complications (%)</td>
<td>1 (2%)</td>
<td>2 (7%)</td>
</tr>
<tr>
<td>No. of postoperative day (POD) of flatus</td>
<td>3 (1-5)</td>
<td>7 (3-14)</td>
</tr>
<tr>
<td>No. of postoperative day (POD) of bowel movement</td>
<td>3 (1-5)</td>
<td>7 (3-14)</td>
</tr>
<tr>
<td>No. of hospital readmissions (%)</td>
<td>4 (8%)</td>
<td>19 (15%)</td>
</tr>
<tr>
<td>No. of patients discharged (%)</td>
<td>77 (150)</td>
<td>125 (125)</td>
</tr>
<tr>
<td>No. of patients deceased (%)</td>
<td>1 (2%)</td>
<td>1 (0.8%)</td>
</tr>
<tr>
<td>No. of patients with UTI (%)</td>
<td>8 (16%)</td>
<td>12 (9.6%)</td>
</tr>
<tr>
<td>No. of patients with superficial wound infection (%)</td>
<td>8 (16%)</td>
<td>12 (9.6%)</td>
</tr>
<tr>
<td>No. of patients with dehiscence (%)</td>
<td>6 (12%)</td>
<td>6 (4.8%)</td>
</tr>
<tr>
<td>No. of patients with UTI (%)</td>
<td>2 (4%)</td>
<td>2 (1.6%)</td>
</tr>
<tr>
<td>No. of patients with superficial wound infection (%)</td>
<td>2 (4%)</td>
<td>2 (1.6%)</td>
</tr>
<tr>
<td>No. of patients with dehiscence (%)</td>
<td>2 (4%)</td>
<td>2 (1.6%)</td>
</tr>
</tbody>
</table>

Optimizing Percutaneous Nephrolithotomy (PCNL) Surgical Scheduling using Lean Methodology and Principles

Mitchell H. Bamberger, MD, MBA
UMass Memorial Medical Center, Worcester, MA

Introduction: Percutaneous Nephrolithotomy (PCNL) scheduling is a labor intensive process requiring coordination amongst Urology (U), Anesthesia, and frequently Interventional Radiology (IR). This process can be cumbersome with frequent delays while each specialty has specific requirements before the scheduling can be completed. As a result, this inefficiency may cause delays and cancellations resulting in poor job satisfaction for both administrative and clinical staff, as well as patient dissatisfaction. By applying lean principles, the scheduling process can be improved with more efficiency, higher job satisfaction for staff, as well as improved patient satisfaction.

Materials & Methods: The process for scheduling PCNL surgery at UMass Memorial Medical Center was evaluated by a team of administrative and clinical staff. This consisted of U and IR schedulers along with IR and U clinicians. A survey of U schedulers was performed to assess the issues regarding coordination between services. The protocol focuses on avoidance of preoperative fasting and bowel preparation, opioid-minimizing multimodal pain management, goal-directed fluid therapy, and early postoperative feeding. Alvimopan, a peripherally acting μ-opioid antagonist, was given when available. Process mapping of the current condition and a root cause analysis (RCA) was undertaken to re-engineer this process.

Results: The current condition revealed there was a minimum of 9 steps to schedule a patient for PCNL surgery. IR requests for further diagnostic radiographic studies were required to be scheduled by U administrative staff. Additionally, U administrative staff were required to obtain insurance prior authorization. One case required 21 emails between IR and U schedulers to coordinate a preoperative CT scan. Each U secretary had their own method of scheduling surgery. A RCA was conducted to identify areas to be changed or eliminated. An electronic worksheet was created within the electronic health record that could be accessed by all staff involved with the scheduling process. This allowed for parallel processing to occur instead of a sequential process. IR staff were empowered to order and obtain all necessary preoperative imaging as requested by IR clinicians.

Conclusions: The RCA allowed for identification of an inconsistent method of booking surgery. In addition, creating parallel processing improved efficiency by allowing both IR and U administrative staff to work simultaneously instead of sequentially. As a result, overall scheduling improved, administrative and clinical job satisfaction rose, and patients were able to be scheduled in a more timely manner without any cancellations. Physicians and staff should be familiar with lean principles and methodology to enhance overall urologic office practice efficiency and job satisfaction.

Fishbone Diagram

- People
- Method
- Measurement
- Machine
- Environment
- Materials

Note: Diagram not fully visible in text representation.
Survey Assessment of the Role of Stent Experience on Future Stone Treatments

Vernon M. Pias, Jr, MD1, Jennifer Bales, MPH1, Elizabeth Stedina, MBA1, Rebecca Smith, BS2, David C. Bledsoe, MD2, Vernon M. Pias, Jr, MD1, Kevin M. Stamm, MD3, Vernon M. Pias, Jr, MD1, MS4

Introduction: Ureteroscopy for treatment of nephrolithiasis has become the procedure of choice for removal of ureteral calculi. Despite the growing popularity of ureteroscopy, stenting for pain and infection is still a common practice. Our objective was to systematically review and meta-analyze the body of literature comparing the risk of unplanned visit for pain and infection in stented versus unstented patients following ureteroscopy for nephrolithiasis.

Methods: A systematic review and meta-analysis were conducted using the following eligibility criteria: RCTs, non-RCTs, before-after studies and cohort studies comparing stent omission versus stent placement following ureteroscopy for nephrolithiasis in adults, and reporting unplanned visits at 30 days. Two reviewers, including a clinical expert, independently extracted data and assessed methodological quality using a standardized tool. We calculated standardized mean differences (SMD) using random effects models. We calculated Peto odds for our primary outcome using fixed effects; considered I2 > 50% to indicate substantial heterogeneity; and evaluated reporting bias using funnel plots.

Results: Of 3418 abstracts, 435 articles were found eligible for review. One thousand seven hundred and forty-two (1742) patients were included in 22 studies. Stenting was associated with an increased risk of unplanned medical visits, despite lower rates of disparity compared to stented patients. These tradeoffs should be weighed by patients and physicians when considering post-ureteroscopic stent experience.

Conclusions: Stent omission following ureteroscopy for the treatment of a future asymptomatic stone. Given internal consistency and suggestion of discriminant construct validity, this survey may be utilized in the future to assess the role of stent experience in future treatment decisions.
Development of a Ray Tracing Method for Modeling Shock Wave Focusing in a Lithotripter

George E. Haleblian, MD1, Xavier Jackson, MS2, Martin Ochmann, PhD3, Sergey Makarov, PhD2
1Relevant Medical Group, Worcester, MA; 2Worcester Polytechnic Institute, Worcester, MA; 3Beuth University of Applied Sciences, Berlin, Germany

Introduction: Shock wave lithotripsy has been used since 1980 to treat kidney and ureteral stones. Newer generation machines have been developed with higher peak pressures and smaller focal zones. The lithotripter produces high amplitude acoustic pulses (or shock waves) that are weakly non-linear. The focus of this research is to outline a computational method that can potentially be performed in real time.

Materials & Methods: A novel method for modeling shock waves in a shock wave lithotripter is developed using a ray tracing and a realistic 3D CAD human model. The 3D CAD model is a validated model that has the ability to represent actual tissue and organ density and impedance. During wave transmission, every individual ray undergoes distortion and shock wave focus, which can potentially be performed in real time.

Results: Preliminary simulation results are reported and reveal a shift of the focal point in the focal plane. In addition, one can simulate the impact of body habitus and composition on shock wave propagation and pressure. The impact of tissue density and acoustic impedance on the focus of the lithotripter was determined to have a 4mm deviation when compared to a homogenous model (figure 1). The impact of increasing the overall fat distance traversed by a sample shockwave by 4 cm results in a corresponding decrease in the focal plane. In addition, one can simulate the impact of body size and composition on shock wave focusing in a lithotripter using 3D CAD model is a validated model that has the ability to represent actual tissue and organ density and impedance. During wave transmission, every individual ray undergoes distortion and shock wave focus, which can potentially be performed in real time.

Conclusion: The rate of uric acid stone formation has long been known to increase as a function of glucose control among diabetics and those with the metabolic syndrome. It is not known, however, if uric acid nephrolithiasis can also be a presenting sign of undiagnosed diabetes mellitus. In this multi-institutional pilot study, we seek to determine the prevalence of undiagnosed Diabetes and Pre-diabetes among uric acid stone formers.

Materials & Methods: Data from prospectively maintained clinical databases of stone formers were retrospectively acquired from 2008 onward by participating institutions. Patients forming $>50\%$ uric acid stones were identified and charts were assessed for a diagnosis of diabetes at the time of initial urologic encounter for stones. Those non-diabetic patients who underwent Hemoglobin A1c testing within 24 months form the study group. Patients were categorized as Pre-diabetic or Diabetic based on an A1c value of $5.7-6.4 \text{mmol/L}$ or $6.5-7.4 \text{mmol/L}$ respectively.

Results: We identified a $71\%$ rate of undiagnosed Pre-diabetes and Diabetes amongst a population of non-diabetic uric acid stone formers. Uric acid stone formation may be a harbinger of Diabetes Mellitus and further work is needed to determine if Hemoglobin A1c screening is appropriate in this population. The passage of an uric acid stone may be a critical opportunity for intervention and Diabetes prevention.
Patients that present to the emergency department with intractable symptoms from acute urolithiasis are admitted and administered a trial of medical expulsive therapy (MET). Failure of MET prompts surgical intervention. Definitive stone treatment is oftentimes deferred owing to concerns for diminished treatment efficacy and higher complication rates in the setting of acute ureteral inflammation. Pre-operative factors that may predict treatment success have not been clearly defined. We review our recent multi-institutional experience with emergency ureteroscopy (URS).

Materials & Methods: A retrospective review was performed of all patients that underwent urgent URS from 2010 to 2015. Inclusion criteria were presented to the Emergency Department with acute renal colic, age > 18, non-contrast CT (NCCT) with ureteral stone and no evidence of sepsis. Laboratory and radiographic data were analyzed. Statistical difference was assessed with Student’s t-test.

Results: 187 of 223 patients (83.8%) were stone free. Two patients (0.8%) had an intraoperative complication (both with extravasation on retrograde pyelogram). Periureteral density (PUD) and rise in serum creatinine (ΔCr) were statistically different between patients that were stone-free and those that were not (1.2 versus 19.9 HU, p < 0.01 and 0.20 versus 0.56 mg/dL, p < 0.01, respectively). Patients that received an alpha-blocker prior to surgery were more likely to have successful treatment (90% vs. 11%, p < 0.01). No difference in patient age, duration of pain prior to surgery, the number of visits to the emergency department or degree of leukocytosis was observed between those that were successfully treated and those that were not. Success rates were not different between surgeons with and without endourology fellowship training (84.7% vs. 83.2%, p = 0.59).

Conclusions: URS in the setting of acute renal colic for symptomatic urolithiasis is safe and effective. Treatment success does not appear to require advanced endourology training. Consideration of PUD and ΔCr pre-operatively can facilitate identification of ideal candidates for definitive treatment.

Can Ultrasonography be Used to Guide the Diagnosis and Management of Nephrolithiasis?

Troy R. Larson, BS1, Natalia Hernandez, MD2, Brian Eisner, MD3, Juliette Han, BS4, Vernon M. Pais, Jr., MD5, Kevan M. Sternberg, MD5
1University of Vermont Medical Center, Burlington, VT, 2Massachusetts General Hospital, Boston, MA, 3Dartmouth-Hitchcock Medical Center, Lebanon, NH

Introduction: Non-Contrast Computed Tomography (NCCT) has the highest sensitivity and specificity for detection of nephrolithiasis and the greatest accuracy for determination of stone size. Renal ultrasound (US) may have advantages over NCCT insofar as it is lower cost with no ionizing radiation. However, the ability to make judgments about endourologic intervention for stones based on US has not been proven. Herein we compare findings on NCCT and US which were obtained within 1 day of one another in order to evaluate the concordance between the two studies.

Materials & Methods: A retrospective review was conducted at three academic institutions of patients who were evaluated for flank pain with both renal US and NCCT from 2012-2015. Patients receiving both imaging modalities within 1 day were included. Imaging was obtained through both the emergency department and outpatient settings. Stone presence and size were reviewed and compared between imaging modalities. Stone size was determined by largest measured diameter. Stones were then grouped into 3 size categories (1-5 mm, 6-10 mm, and > 10 mm) based on NCCT measurement and compared with US. Statistical analysis was performed using 2-sided t-tests.

Results: 185 patients received an US and NCCT within a 1 day period and in 79 patients (51.0%), both US and CT identified a stone for size comparison. When comparing the average largest stone diameter for US (9.08 mm) vs. NCCT (6.92 mm), US overestimated stone size by 2.16 mm (p < 0.001). US overestimated stone size by 10.6% for stones 1.5 mm, 63.6% for stones 6-10 mm, and 27.3% for stones > 10 mm (Table 1).

Conclusions: Renal ultrasound significantly overestimated stone size when compared to contrast Computed Tomography. This was most pronounced in the estimation of small (1-5 mm) and intermediate (6-10 mm) sized stones. While ultrasound offers a radiation free means of evaluating and monitoring nephrolithiasis, it may not always provide adequate information on stone size to correctly inform urologic management decisions. The potential for systematic over-estimation of stone size with standard ultrasound techniques should be taken into consideration when evaluating treatment options.
Poster Session II – Stones/Trends/Other

P16

HoLEP in Patients with Low Risk Prostate Cancer is Safe and Effective
Kristian Stensland, MD, Daniel Pelzman, BS, Alireira Moznadzeh, MD, David Canes, MD, Jessica Mandlee, MD
Lahey Hospital and Medical Center, Burlington, MA

Introduction: When a man with otherwise surveillance-appropriate low risk prostate cancer has significantly bothersome BPH in a large gland, this typically tips the scales in favor of treatment with standard of care, either radical prostatectomy or radiation therapy. However this presumes the prostate cancer is the more threatening of his coexisting conditions. Incidentally discovered (T1a/b) prostate cancer following Holmium Laser Enucleation of the Prostate (HoLEP) is a well known phenomenon. However, performing HoLEP in the setting of a prostate cancer harboring gland has not yet been described. Herein, we describe outcomes of HoLEP in a select cohort of patients with significant lower urinary symptoms, and known low risk prostate cancer.

Materials & Methods: Data were collected retrospectively on patients undergoing HoLEP by a single surgeon. A select group of well informed patients with large symptomatic glands and low risk cancer were carefully counseled that HoLEP was an option to address the obstructive BPH, would predictably remove the cancer (all, part, or none), emphasizing they were not undergoing a cancer operation, and that HoLEP would be followed by continued surveillance. Pre- and post-operative clinical and laboratory data were collected.

Results: In total, 7 men were included. All men had Gleason 3+3 cancer in at most 20% of at least 3 cores on biopsy. Other preoperative characteristics are described in Table 1. All men tolerated the procedure well without intraoperative complications. The mean amount of tissue removed was 48.8g. Mean pre- to post- hemiacrict drop was 3.8 points; no patients required transfusion or nephrectomy. Median length of hospital stay was 24.5 hours, and median length of catheterization was 19 hours. On final pathology, 3 of 7 of patients had cancer in the specimen, of which were Gleason 3+3. Postoperatively patients recovered well. At postoperative visits, all flow rates improved, PVR improved or remained appropriately low, and PSA significantly decreased in all patients (Table 1). By the time of most recent follow-up, no patient had developed stricture, bladder neck contracture, urge or stress incontinence, or required reoperation. Median time from surgery to last follow-up was 4 months (range 4-24 months). Notably, 2 patients had prostate MRI within 2 years of HoLEP, neither of which showed suspicion for prostate cancer.

Conclusions: We have offered HoLEP judiciously to select patients on surveillance for low risk prostate cancer and significant symptomatic BPH, a complex and increasingly common scenario, with acceptable short term outcomes. Further investigations into long-term cancer-specific outcomes, as well as strategies for continued surveillance in these patients, will be crucial in order to further evaluate and refine this new approach.

P17

Robotic Urethrovaginal Anastomotic Simulator: Improvements to a Validated Model
Scott V Wiener, MD, Steven Shichman, MD, Ryan Deen, MD
1University of Connecticut, Farmington, CT, 2Hartford Hospital, Hartford, CT

Introduction: Resident training is shifting with the widespread use of robotics. Validated simulation tools must continually be improved in order to provide the most realistic training possible. Here we assess content and face validity of a modification to a urethrovaginal anastomotastic simulator (UVA) simulator with established construct validity.

Materials & Methods: A UVA simulator was constructed with a 1 inch and ½ inch penrose drains, surgical tape, a towel, and a 20 Fr council tip catheter. This simulator previously used a 5 points Likert scale survey assessing the usefulness, anatomic realism, and surgical steps for each model. Scores were compared using t-tests.

Results: 7 residents completed both models. Excluding the author, 5 completed the post-test survey. The mean anatomic realism was rated 3.2 vs. 4.4 (p = 0.035), surgical steps 7.0 vs. 8.3 (p = 0.007), and usefulness was rated 3.8 vs. 4.6 (p = 0.008) for the unmodified and modified model respectively.

Conclusions: A simple, low cost, modification to a validated vesicourethral simulator provides significant improvements in usefulness, anatomic realism, and simulation of surgical steps.

P18

Tunica Vaginalis Flap for the Repair of Ruptured Testis
Pamela Ellsworth, MD1, Steven Shichman, MD2
1University of Massachusetts Memorial Medical Center, Worcester, MA, 2University of Massachusetts Medical School, Worcester, MA

Introduction: The standard management of testicular rupture is debridement of devitalized tissue and re-approximation of the tunica albuginea. In the setting of a large defect, primary closure may not be feasible without excision of viable testicular tissue. We describe our experience with a tunica vaginalis vascularized graft for coverage in the setting of a large defect in four patients.

Materials & Methods: In 4 patients, the defect in the tunica albuginea was too large for primary closure without debridement of viable testicular tissue. A vascularized tunica vaginalis graft was used to cover the defect, without debriding viable tissue. We review these 4 cases, 3 traumatic and 1 iatrogenic, of testicular rupture in adolescent males, all of whom had postoperative follow-up with scrotal ultrasound and/or physical examination.

Results: We present a series of four patients with testicular rupture with a large defect. In 3 patients, the cause of rupture was traumatic, in the 4th, it was iatrogenic. Intraoperative assessment in all 4 cases revealed a defect too large for primary closure without debridement of viable testicular tissue. In order to cover the defect, a vascularized tunica vaginalis graft was used in all patients. A viable testis with good flow and volume of 80% or greater than that of the contralateral testis on ultrasound was noted on follow up in 2 cases (Table 1). Two of the four patients did not follow-up for post-operative ultrasound evaluation, one of which did not have contralateral tests. Post-operative physical exam revealed normal appearance in 75% of patients, but one had a previously small, undescended testis, therefore was noted to have a small testis on good physical examination.

Conclusions: In the case of testicular rupture associated with large defects, the use of vascularized tunica vaginalis graft helps preserve testicular volume and normal physical appearance. This approach should be considered in cases of a large defect, especially with any compromise or absence of contralateral tests.

<table>
<thead>
<tr>
<th>Test</th>
<th>Physical exam</th>
<th>Test</th>
<th>Test</th>
<th>Test</th>
</tr>
</thead>
</table>
| 1    | Normal appearance | 15 cm² | No postoperative 
| 2    | Normal appearance | 15 cm² | No postoperative 
| 3    | Small testis in good position | No postoperative 
| 4    | Testis in good position | No postoperative |

Table 1. Post-operative physical exam and ultrasonographic characteristics
Dietary Zinc Intake and Male Reproductive Function in Young Men

Guilherme J. Wood, MD; Joseph S. Gabrieleos, MD, PhD; Audrey J. Gaskins, ScD; Shanna H. Swan, PhD; Jaime Mendola, PhD; Niels Jorgensen, MD, PhD; Jorge E. Chavarro, MD, ScD; Cigdem Tanrikut, MD

Introduction: Zinc is an essential mineral obtained solely from dietary intake and is involved in the activity of over 200 enzymes in the human body. Zinc is particularly important for spermatogenesis: it facilitates DNA replication, stabilizes chromatin, and regulates steroid receptor expression. Zinc concentration is very high in prostatic secretions and seminal plasma, and alterations in these concentrations have been associated with changes in semen parameters in men. The effect of dietary zinc intake on global testicular function, however, has not been reported in humans. We, therefore, sought to examine whether zinc intake is associated with reproductive hormones and semen parameters in young men.

Materials & Methods: Healthy male volunteers ages 18-22 (n = 189) recruited in 2009-2010 completed a validated 131-item food frequency questionnaire and provided serum and semen samples. Nutrient intakes were estimated by summing the nutrient contribution of all food and supplement items reported in the questionnaire. Serum reproductive hormones were measured using standard assays. Sperm analyses were performed according to WHO guidelines. Linear regression was used to analyze the relation between zinc intake (in quartiles) and reproductive hormones and semen parameters adjusting for total calorie intake, body mass index, smoking status, physical activity, meat and dairy intake, overall dietary patterns, abstinence time (for semen parameters only), and time of blood sample collection (for serum samples only).

Results: Zinc intake was inversely associated with serum concentrations of sex hormone binding globulin (SHBG) (Table 1). On average, men in the highest quartile of zinc intake had SHBG levels that were 32% lower than men in the lowest quartile of intake (26.3 vs. 39.3 nmol/L, p = 0.001). Men in the highest quartile of zinc intake also had significantly lower concentrations of inhibin B and total testosterone in calorie-adjusted analyses compared to men in the lowest quartile of intake; however, after multivariate adjustment, these associations did not reach statistical significance (p for trend across quartiles = 0.07 and 0.06, respectively). Zinc intake was not significantly associated with other reproductive hormones or semen parameters (Table 2).

Conclusions: Higher dietary zinc intake was associated with lower serum levels of SHBG and possibly lower levels of inhibin B and testosterone in healthy, young men. Zinc intake was not associated with any of the examined semen quality parameters. The testosterone findings should be interpreted with caution as we did not observe any association between zinc intake and calculated free testosterone, suggesting that differences in total testosterone could be solely attributable to the differences in SHBG. The inverse associations we observed between zinc intake and serum reproductive hormones may reflect altered function of zinc-containing enzymes involved in the regulation of steroid receptors and oxidative stress.
Trends in the Gender Distribution of U.S. Urology Residency Programs Compared to Other Surgical Specialties

Manuel Ozambela, MD1, Valary T. Raup, MD2, Nawar Hanna, MD2, Michael Zavaski, MD2, Ye Wang, PhD2, Lori Lerner, MD2, Douglas S. Smink, MD2, MPH2, Steven L. Chang, MD, MS2
1Harvard Medical School, Boston, MA, 2Brigham and Women’s Hospital, Boston, MA

Introduction: In the United States, urology, like many other surgical specialties, has historically been a male-dominated field. However, this is quickly changing. In the last quarter century, multiple medical and surgical specialties have observed a rise in women within the field of medicine. Thus, we set out to examine this trend within the field of urology.

Materials & Methods: Applicants, trainees, and graduates of urology residency programs were stratified by gender. Data was obtained from the American Urological Association (AUA) match statistics from 1996 to 2015 for applicants, annual U.S. graduate medical education reports published in the Journal of the American Medical Association from 1990 to 2013 for trainees, and the 2014 AUA Census Public Microdata file for graduates.

Results: The proportion of female applicants in urology increased between 1996 and 2015 (13.6% to 25.9%), but the overall match rate for males (68%) and females (67%) were similar when averaged over the study period (p = 0.58). Among trainees, the proportion of female urology residents rose from 5.3% to 22.7%, for a relative percent increase of 429%. Excluding obstetrics and gynecology, urology had the greatest annual percent increase in female residents (13.6% to 25.9%), but the overall match rate for males (68%) and females (67%) were similar when averaged over the study period (p = 0.58). Among graduates, the proportion of female urology graduates over time for each phase of training. Among graduates, crude and adjusted logistic regression models were performed to estimate the relationship between gender and likelihood of entering fellowship training and academic practice.

Conclusions: While urology remains a male-dominated field, there has been a dramatic rise in the proportion of women over the last 25 years. This trend may in part be explained by a disproportionate number of women entering fellowships and academic practice, allowing them to serve as role models and mentors for female trainees. Further investigation should be directed at determining how this change in the demographic composition of the urologic workforce will continue to impact the delivery of health care in the United States.
Development and Validation of an Ex Vivo Trainer for Robotic Vesicourethral Anastomosis
Kevin Koo, MD, MPH, MPHill1, Xiaotian Wu, BEng2, Ryan J. Halter, PhD1, Fady M. Chali, BS2, Elias S. Hyams, MD1
1Dartmouth-Hitchcock Medical Center, Lebanon, NH, 2Thayer School of Engineering, Hanover, NH

Introduction: The vesicourethral anastomosis (VUA) in robotic prostatectomy is a challenging task for novices due to delicate tissues and difficult suturing angles. Though digital simulation is useful for developing certain robotic skills, there are no viable digital models for anastomotic suturing. We developed and validated a 3D-printed model of the VUA for ex vivo training.

Materials & Methods: VUA Model: A dome-shaped shell (12 × 12 × 5.5 cm) with a tapered opening for the bladder neck (2 cm) and urethral cylinder (0.5 cm thick, 1 cm protrusion, on a 5 cm base) were developed. The models were molded with Smooth-On Ecoflex Supersoft two part inverse ABS plastic molds designed on SolidWorks and printed with the Stratasys Mojo Desktop 3D printer. The bladder shell and urethra were attached to a rigid but adjustable acrylic/polycarbonate frame (Figure). Subjects: Ten junior surgical residents (PGY 1-3) naive to robotic surgery were enrolled. Five completed a curriculum on the da Vinci simulator and five did not, matched by PGY. Four faculty fellowship-trained in robotic uro- oncology were enrolled. All subjects attempted a VUA on the model. Non-simulator trained subjects were given a 10-minute practice period to familiarize with the robotic controls. Percentage completion of the anastomosis within 15 minutes was recorded. Integrity of the anastomosis was graded (excellent, moderate, or poor). Face (realism) and content (training utility) validity were assessed via 1-10 scoring by subjects. Construct validity (differentiation in performance) was assessed by comparison of scores between groups.

Results: Mean (range) percentage completion of the anastomosis was 20% (10%-30%), 54% (40%-70%), and 96% (85%-100%) by non-simulator-trained, simulator-trained, and expert surgeons, respectively (p < 0.05). Integrity was similar between groups with one “poor” grade in the non-simulator-trained group. Face validity was rated 8 by all expert surgeons. Content validity was rated 10 by all subjects.

Conclusions: We demonstrated face, content, and construct validity of a 3D-printed model for the VUA. Digital simulation significantly improved trainees’ performance on the ex vivo model. While digital simulation is likely to become more sophisticated, ex vivo models can be realistic and useful training tools for novice robotic surgeons prior to in vivo performance.
The Costs and Benefits of Fellowship Training: Analysis of the 2014 AUA Census
Philipp J. Cheng, MD, Michael E. Zazaski, MD, Nawar Hanna, MD, David F. Friedlander, MD, MD PH, Michael Oazarska, MD, Steven L. Chang, MD
Brighton and Women’s Hospital, Boston, MA

Introduction: For urology residents, pursuing fellowship training requires making early decisions that can have a dramatic impact on long-term job satisfaction. Therefore, it is important to characterize the clinical profiles of fellowship-trained (FT) and non-fellowship-trained (NFT) urologists.

Materials & Methods: We performed a weighted analysis of the 2014 AUA Annual Census Dataset. The cohort was divided into FT and NFT urologists and further divided into 3 groups based on the year in which they graduated from residency (<1980, 1980s, 1990s, 2000s, 2010-2014). We evaluated, with descriptive statistics and regression analysis, outcomes including primary practice setting, clinical hours, non-clinical hours, total work hours, number of patient visits, region of employment, and rurality of practice location.

Results: The survey was completed by 2,204 urologists representing 11,703 practicing urologists in the U.S. The percentage of FT urologists has increased with every decade of residency graduation with over 50% of graduates after 2010 entering fellowship training; approximately half of FT urologists practice in academic institutions (Figure). Compared to NFT, FT urologists work equal clinical hours (45.6 vs 44.4, p = 0.320), see fewer patients per week (87.2 vs 98.1, p = 0.002), have longer non-clinical hours (10.9 vs 6.8, p < 0.001) and longer total hours (56.9 vs 52.0, p < 0.001). FT urologists are less likely to practice in a rural setting (OR 0.8, p = 0.035), but more likely to practice in New England (OR 1.77, p = 0.012).

Conclusions: Urology residents are increasingly pursuing fellowships with over half of residents electing this option. Approximately half of FT urologists practice in a non-academic setting and they have a noticeably smaller effort in patient care. Additional studies are necessary to clarify the impact of different types of fellowship training and the potential impact of changes in health care on the clinical profile of FT urologists.

Are Men and Women Really that Different? An Analysis of Gender Differences among Urological Providers in the AUA Census
Lael Reinsteinat, MD, MPH, Elias Hyams, MD
Dartmouth Hitchcock Medical Center, Lebanon, NH

Introduction: The proportion of female urologists in training has steadily increased in recent years, reflecting cultural changes in the discipline and surgery overall. Background and practice differences between male and female urologists, however, are not well characterized. In this study, we sought to characterize the backgrounds and practices of female urologists and compare them with male peers within the 2014 AUA Census, a large representative sample of practicing urologists in the United States.

Materials & Methods: Using 2014 AUA Census data, providers were stratified based on gender. Bivariate analysis was used to assess differences in clinical and practice characteristics. Multivariable analysis was conducted using a priori variables hypothesized to differ by gender. In all analyses, post-stratification weights provided with the Census data were used to calculate national estimates (SAS 9.4, Cary, NC).

Results: There were 2204 survey respondents representing 11,703 practicing urologists. Almost 8% were female. There were no differences in race, country of origin, or practice setting (metropolitan vs. rural) based on gender. Female urologists had more often completed a fellowship (55% vs. 37%, p = 0.0003) and had fewer years in practice (68% practicing < 10 years vs. 29% of men, p = 0.0001). Female urologists reported treating a lower proportion of male patients (< 25% male patients reported in 23% of women vs. 4% of men, p < 0.0001). Women more frequently reported specializing in female pelvic reconstruction and transplant/ laparoscopic (24% vs. 3% p = 0.001 and 12% vs. 5% p = 0.004, respectively). Men more often reported practicing General Urology (66% vs. 44%, p < 0.0001) and Male Sexual Health/ Reproduction (5.7% vs. 5.6%, p < 0.0001). When analyzing clinic hours per week, women were more often noted to work < 40 hours (p = 0.088), however total work hours were not different between men and women. There was no difference in other practice characteristics such as practice setting and ownership interests. On multivariable logistic regression, female gender was associated with fewer years in practice, pelvic/pelvic reconstruction or transplant/laparoscopic as a specialty area, and lower proportion of male patients seen (p < 0.05). Female gender was not associated with fewer work hours on multivariable analysis.

Conclusions: While female urologists are growing in proportion, they still represent a small percentage of active providers. As female physicians increasingly enter urology and older urologists retire, this proportion will certainly grow. While we report expected differences in practice based on gender (e.g. focus in pelvic medicine), it is notable that female urologists are more likely to practice less hours than their male peers. As our field evolves further, both the trend of increasing female urologists and the potential impact of changes in health care on the clinical profile of FT urologists.
Tobias Goodman and the New England Origins of Ureteroscopy

Joseph E. Yared, MD, Vernon M. Pais, MD
Dartmouth Hitchcock Medical Center, Lebanon, NH

Introduction: Ureteroscopy is one of the most commonly performed procedures in current urologic practice, although its origins in modern urology were obscure until the very recent past. Its origins highlight the creative spark that is critical to advance in medical science and has direct New England ties. Although the first documented “ureteroscopy” is attributed to Hugh Hampton Young who performed inadvertent endoscopy of the ureter in a 2 month old child with posterior urethral valves, this 1929 report was essentially relegated to anecdote that lacked any practical application. However, 50 years later in a small New England town, diagnostic and therapeutic ureteroscopy were born with the first planned rigid ureteroscopy and the introduction of ureteroscopic guided intervention.

Materials & Methods: A comprehensive search of Medline was undertaken to assess all published articles describing ureteroscopy prior to 1998. References of identified papers were also reviewed to identify the earliest published accounts of rigid ureteroscopy. Upon identifying the initial reported ureteroscopy, the author was interviewed to better understand the context surrounding the inception of ureteroscopy.

Results: The first report of planned rigid ureteroscopy was in 1977. The procedure was performed by Dr. Tobias M. Goodman at Westerly Hospital. Dr. Goodman attended Brown and Nicholas school in Cambridge, MA, then matriculated to Harvard College where he was an accomplished scholar in Classic Languages. He was in fact selected to deliver the Latin Oration at its 1962 commencement. After graduating from residence at Boston Medical Center, he started solo practice in Westerly, Rhode Island. At the time, blind-stonebasketing was standard practice, but he recounts unease with the imprecise nature of blind manipulations. Thirty years prior to the AUA recommendation against blind-baskets, he proposed to several patients an improved, directly visualized approach to management of urethral pathology. With a reputation as a physician who “knew how to stay out of trouble,” his patients eagerly sought to share in his accomplishments. He developed techniques for diagnostic ureteroscopy and stone extraction, publishing the first series of rigid ureteroscopy in 1977. He subsequently developed patents for a ureteroscope, a 3-way endoscopic valve and Unshock for treatment of bladder cancer. He remained in Westerly for his entire career, and since retirement has authored 2 non-medical books. Of the Arctic and Ancient peoples. He still resides in Westerly, RI where he is a guest columnist for the Westerly Sun.

Conclusions: Dr. Tobias Goodman is a urologic pioneer who serves as an example of the creative thinking that has allowed the dramatic progress we continue to enjoy. Dr. Goodman’s contributions point to the very beginning of endourology, years before the term had even been coined.

Ureteroscopic Laser Endopyelotomy: A Minimally Invasive Option for Short-Segment UPJ Stricture Following Pediatric Pyeloplasty?

Paul Smith, III, MD, Katherine W. Herbst, MS, Melinda Carpenter, MS, Christina Kim, MD
Connecticut Children’s Medical Center, Hartford, CT

Introduction: Disemboweled pyeloplasty by open, robotic, or laparoscopic approaches is a highly effective procedure for treatment of ureteropelvic junction (UPJ) obstruction in children. Recurrent or persistent UPJ obstruction following pyeloplasty is an uncommon event, for which reoperative pyeloplasty is generally considered the gold standard treatment. We reviewed our 10 years’ experience with retrograde ureteroscopy laser endopyelotomy as a minimally invasive treatment for failed pediatric disemboweled pyeloplasty in selected patients.

Materials & Methods: We identified all pediatric patients undergoing retrograde ureteroscopy laser endopyelotomy for treatment of failed pyeloplasty at our institution between January 2006 and June 2016. Patient demographic, operative, radiographic, and clinical data were abstracted from the medical record. Successful endopyelotomy was defined by absence of clinical or radiographic evidence of recurrent or persistent obstruction at last follow up with a minimum duration of 12 months follow up after endopyelotomy.

Results: Five patients who underwent retrograde ureteroscopy holmium laser endopyelotomy met inclusion criteria (Table). The initial pyeloplasty was performed by an open (1), robotic (2), or laparoscopic (1) approach. The primary pyeloplasty was performed at a median age of 17 months (IQR = 6–24). The median interval between primary pyeloplasty and laser endopyelotomy was 11 months (IQR = 3–84). Endopyelotomy was performed by deep peritoneal laser incision to the level of peripelvic fat followed by balloon dilation to 12Fr in all patients. An internalized ureteric stent was left in place for an average 61 days following endopyelotomy. Three patients showed no evidence of recurrent obstruction at mean follow up of 42 months. All patients with successful endoscopic treatment were found to have normal orientation of the UPJ and short segment (~2 mm) stenosis at the time of endopyelotomy. Of the patients who failed endopyelotomy, one was noted to have a malrotated kidney and the other was noted to have an abnormal insertion of the ureter into the UPJ that resulted in a kinking phenomenon. Patients who failed endoscopic management were subsequently treated with reoperative pyeloplasty.

Conclusions: Because recurrent obstruction following pediatric pyeloplasty is uncommon, the optimal management of these patients remains unclear. Advances in holmium laser and endouroscopic equipment allow this retrograde ureteroscopy laser endopyelotomy as a technically feasible option for treatment of the failed pediatric pyeloplasty. We show that retrograde ureteroscopy laser endopyelotomy may be a successful treatment option for the failed pyeloplasty in selected patients with short segment UPJ stricture and otherwise normal UPJ configuration.

Bladder Debris on Renal and Bladder Ultrasound: A Poor Predictor of Positive Urine Cultures

Joseph P. McQuaid, MD, Michael F. Kurtz, MD, MPH, Tanya Logvinenko, PhD, Caleb P. Nelson, MD, MPH
Boston Children’s Hospital, Boston, MA

Introduction: Renal and bladder ultrasound (RBUS) is recommended in the evaluation of children after an initial, febrile urinary tract infection. While it is not uncommon to observe debris within the bladder lumen on sonography, the significance of this finding is uncertain. In some cases, debris in interpreted as an indication of ongoing infection, but there have been no studies to date demonstrating this association. The aim of this study is to evaluate the association of bladder debris noted at time of RBUS with positive urine culture results from a catheterized specimen, among patients undergoing RBUS and voiding cystourethrogram (VCUG) on the same day.

Materials & Methods: A total of 3995 patients were identified with RBUS and VCUG performed on the same day. RBUS reports were reviewed for the presence of bladder debris, and analysis was limited to patients under 60 months of age with a catheterized urine specimen sent for culture at the time of the studies. Those with prior postural imaging or a diagnosis of prenatual hydronephrosis were excluded. 33 subjects with bladder debris on RBUS were identified and matched to 153 controls based upon age, gender, circumcision status, and presence of hydronephrosis. A positive urine culture was defined as > 50,000 colony forming units per ml, of at least one organism. A conditional logistic regression model was used to evaluate the association between debris on RBUS and positive urine culture results.

Results: The median age of the cohort was 17 months (IQR = 5–34) and 68% were female. No statistically significant association between debris on RBUS and positive urine culture result was detected (OR = 2.03, 95% CI 0.42–9.79, p = 0.3791). In a multivariate model adjusting for age, presence of debris on RBUS was still not significantly associated with positive urine culture; however, age had a significant association with positive urine culture. Our results suggest that debris on RBUS may be a marker of positive urine culture but it is not a sensitive predictor of the presence of urinary tract infection.

Conclusions: The presence of bladder debris on RBUS is not predictive of a positive urine culture at time of evaluation for an initial urinary tract infection. Whether these conclusions may be applied more broadly to all children, including those presenting with clinical signs or symptoms of urinary tract infection, remains to be determined. However, this is the only study to date to consider the predictive value of echogenic bladder debris on ultrasound.
Nationally there has been a marked decrease in the incidence of ureteral reimplantation among children with primary VUR. The potential factors contributing to this are broad, including changes in diagnostic patterns, treatment recommendations, or the rise of endoscopic intervention. Regardless of the cause, this has a great impact on the patients treated, and on the practice and training of pediatric urologists.
Combined Parameter Surveillance Protocol for High Grade Congenital Hydronephrosis
Brian Stetler, MD, Rachael Engelberg, MD, Jeramy Wiygul, MD
Tufts Medical Center, Boston, MA

Introduction: The optimal management algorithm for congenital high grade hydronephrosis is still unclear. We present a surveillance protocol for patients with high grade unilateral congenital hydronephrosis that uses a combination of clinical and radiologic parameters.

Materials & Methods: Since 2012, our institution with congenital unilateral hydronephrosis have been managed according to a protocol that includes both periodic renal ultrasonography and a mercaptacetyltriglycine (MAG-3) renal scan obtained at baseline, as well as urine protein/creatinine ratios, serum creatinine and blood pressure measurements. Repeat MAG-3 was obtained after 12 months if SFU grade 3 or higher hydronephrosis persisted. Pyeloplasty was indicated if there was evidence of deterioration on serial images of more than 10% and/or high grade obstruction noted by a drainage time of greater than 20 minutes on either the initial or followup MAG-3, with the presence of at least one of the following: hypertension, elevated serum creatinine, failure of growth of the ipsilateral kidney, or proteinuria. For our purposes, only infants with SFU grade 3 or 4 were included.

Results: A total of 31 infants were included in the study, with a mean follow up of 14 months. 12 patients (39%) presented with SFU grade 4, 18 (56%) with SFU grade 3, and one with SFU grade 2 that then increased to grade 4. 25 patients underwent baseline MAG-3, with five patients’ hydronephrosis resolving before the initial MAG-3, and one family declining any MAG-3, despite persistent SFU grade 3 hydronephrosis at over 3 years of follow up. Out of these 25, 9 patients underwent repeat MAG-3 scan (with a mean time between MAG-3 scans of 15 months), 8 experienced lessening of hydronephrosis to SFU grade II or less in the interval, 6 patients with high grade hydronephrosis are awaiting repeat MAG-3 and 2 others were lost to follow up. 13 patients presented with high grade obstruction on initial MAG-3, with another patient having a T1/2 of 19 subsequently increasing to 26 on follow up MAG-3. Eight then underwent at least one follow up MAG-3 scan due to persistent high grade hydronephrosis (Table), with obstruction persisting in seven (including the one patient that developed obstruction on follow up renal scan) and resolving in one. No obstructed kidney experienced a drop in differential function greater than 5.6% on repeat scan, and average change in the affected kidney in this group was 1%. 12 patients had a non-obstructive pattern on initial renal scan (though one was subsequently reclassified to obstructed), and eight were followed for more than 8 months, with all 8 experiencing lessening of the hydronephrosis to SFU Grade II or less. No child fulfilled criteria for surgical intervention, and one child underwent pyeloplasty due to parental desire.

Conclusions: Although larger numbers of patients are needed to confirm, even highly obstructed kidneys do not appear to lose significant function early in life, and most unobstructed kidneys experience eventual improvement of hydronephrosis.

Impact of Urodynamic Testing in the First Year of Life on Management of Posterior Urethral Valve
Paul Smith, II, MD, Sara Valente, MD, Abdulkadir Izcii, BS, Katherine W. Herbst, MS, Melinda Carpenter, MS, Miriam Harel, MD
Connecticut Children’s Medical Center, Hartford, CT

Introduction: Abnormal and often hostile bladder function is well documented in patients with posterior urethral valve (PUV). Early management of the lower urinary tract is considered a critical component in the management of these patients to prevent ongoing renal injury during a time of rapid renal development. However, optimal timing for assessment of the lower urinary tract with urodynamics in patients with PUV remains unclear. We report the impact of urodynamic testing in the first year of life on clinical management in patients with PUV at our center.

Materials & Methods: At our institution, initial urodynamic testing is routinely performed within the first year of life for patients with PUV. A retrospective review was performed for patients with PUV undergoing initial urodynamic evaluation within the first year of life between 2007 and 2015. Urodynamic findings were documented, including bladder capacity, compliance, detrusor overactivity, voiding pattern, postvoid residual volume, and fluoroscopic findings. Clinical decision making based on urodynamic findings was assessed by review of clinician notes.

Results: After excluding patients with complicating factors or without one-year follow-up data, nine patients with PUV (Table) were identified who underwent initial urodynamic testing within the first year of life at a mean age of 5.8 months (SD = 3.15). Urodynamic findings were notable for detrusor overactivity in six patients, impaired bladder capacity in one patient, and a non-compliant bladder in one patient. No patients were observed to have an elevated post-void residual volume. Anticholinergic medication was started in three patients due to urodynamic findings of high amplitude detrusor overactivity, impaired compliance, and small capacity bladder. The remaining six patients were recommended for continued clinical and radiographic surveillance. No other pharmaceutical or surgical interventions were prompted by urodynamic findings.

Conclusions: Establishing a safe lower urinary tract is a critical element in management of PUV. Routine use of early urodynamic evaluation is useful in defining the baseline lower urinary tract function in patients with PUV. Despite our limited sample size, we observed that clinical management changed as the result of findings on early urodynamic evaluation in nearly one-third of patients.

Table: Initial and follow up renal scans for obstructed kidneys

<table>
<thead>
<tr>
<th>Initial % Function / T 1/2</th>
<th>Final % Function / T 1/2</th>
<th>Time between scans (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient 1: 47% / 33 min</td>
<td>53% / 55 min</td>
<td>47</td>
</tr>
<tr>
<td>Patient 2: 49% / 31 min</td>
<td>44.5% / 42 min</td>
<td>1096</td>
</tr>
<tr>
<td>Patient 3: 33% / 19 min</td>
<td>59% / 26 min</td>
<td>261</td>
</tr>
<tr>
<td>Patient 4: 53% / 20 min</td>
<td>50.4% / 50 min</td>
<td>482</td>
</tr>
<tr>
<td>Patient 5: 52% / 31 min</td>
<td>53.6% / 10 min</td>
<td>511</td>
</tr>
<tr>
<td>Patient 6: 47.5% / 72 min</td>
<td>45.3% / 24 min</td>
<td>402</td>
</tr>
<tr>
<td>Patient 7: 29% / 84 min</td>
<td>26.3% / 45 min</td>
<td>411</td>
</tr>
<tr>
<td>Patient 8: 55% / 28 min</td>
<td>49.4% / 33 min</td>
<td>306</td>
</tr>
</tbody>
</table>

Table: Number of patients

| Hydronephrosis | 9 (100%) |
| Mild           | 1 (11.2%) |
| Reflex         |          |
| Unilateral     | 4 (44.4%) |
| Bilateral      | 1 (11.2%) |
| Avg. creatinine prior to valve ablation | 1.03 mg/dl (SD=0.65) |
| Avg. nadir creatinine at 1 year | 0.5 mg/dl (SD=0.27) |
Urethroplasty after Transurethral Resections of the Prostate: A Multi-Institutional Report
Kevin Yang, MD1, Bryan B. Voelzke, MD2, Sean P. Elliott, MD3, Jeremy B. Myers, MD4, Christopher D. McClung, MD5, Benjamin N. Breyer, MD6, Alex J. Varni, MD7, Madeline Cancian, MD8, Martin S. Gross, MD9, Kevin Yang, MD2, Sean Elliott, MD3, Bradley Erickson, MD10, Jeremy Myers, MD11, Bryan Voelzke, MD12, Thomas Smith, III, MD13, Benjamin Breyer, MD14, Christopher McClung, MD15, Nejal Aliskah, MD16, Alex Varni, MD17, Dartmouth-Hitchcock Medical Center, Keene, NH, 2Regional Urology, Shreveport, LA, 3University of Iowa, Iowa City, IA, 4Ohio State University, Columbus, OH, 5University of California, San Francisco, CA, 6University of Iowa, Iowa City, IA, 7University of Utah, Salt Lake City, UT, 8University of California San Francisco, San Francisco, CA, 9Ohio State University, Columbus, OH, 10Loyola University, Maywood, IL

Introduction: Urethral strictures after transurethral resection of the prostate (TURP) occur in up to 10% of patients. In a large-scale study regarding optimal reconstructive management, we found that patients with stricture length, location of stricture, smoking status, number of previous procedures, and cardiovascular and peripheral vascular disease in the elderly were predictive of repeat procedures or anatomic recurrence. We sought to determine the effect of age on bulbar urethroplasty success.

Materials & Methods: A retrospective review of post-TURP strictures was performed from 2008-2014 to identify patients with post-TURP urethral strictures who underwent subsequent urethroplasty. The ability to pass a 17-Fr cystoscope defined operative success. Subjective quality of life questionnaires were recorded.

Results: We identified 45 patients from 7 surgeons who underwent urethral reconstructions after TURP. 33 had complete follow-up data. Mean age and stricture length were 62.3 years and 4.27 cm (range 1 to 20 cm). A total of 12 patients (32%) patients had crossing vessels present. 11 presented with an incidental finding on imaging of which 31% had crossing vessels present. Surgical approach was open in 99 cases, laparoscopic in 24 cases and robotic in 55 cases. The first robotic case was in 12/2007 and the last laparoscopic case was completed in 6/2013.

Conclusions: Patients less than 5 years old who underwent pyeloplasty were less likely to have an associated crossing vessel found at the time of repair. There was no trend in crossing vessel incidence of crossing vessels if patient was older than 4 years. Patients who present with incidental finding of hydroureter is less likely to have a crossing vessel present, however this was not statistically significant in the older age group.

Researchers' Location | Institution | Urology, Shreveport, LA, 2Regional Urology, Shreveport, LA, 3University of Iowa, Iowa City, IA, 4Ohio State University, Columbus, OH, 5University of California, San Francisco, CA, 6University of Iowa, Iowa City, IA, 7University of Utah, Salt Lake City, UT, 8University of California San Francisco, San Francisco, CA, 9Ohio State University, Columbus, OH, 10Loyola University, Maywood, IL

The Impact of Age on Transecting vs. Non-Transecting Bulbar Urethroplasty
Kristian Strendand, MD1, Mya Levy, MD2, Sean Elliott, MD3, Bradley Erickson, MD4, Jeremy Myers, MD5, Bryan Voelzke, MD6, Thomas Smith, III, MD7, Benjamin Breyer, MD8, Christopher McClung, MD9, Nejal Aliskah, MD10, Alex Varni, MD11, Dartmouth-Hitchcock Medical Center, Keene, NH, 2Regional Urology, Shreveport, LA, 3University of Iowa, Iowa City, IA, 4Ohio State University, Columbus, OH, 5University of California, San Francisco, San Francisco, CA, 6University of Iowa, Iowa City, IA, 7University of Utah, Salt Lake City, UT, 8University of California San Francisco, San Francisco, CA, 9Ohio State University, Columbus, OH, 10Loyola University, Maywood, IL

Introduction: A successful transcutaneous bulbar urethroplasty by excision and primary anastomosis (EPA) depends on collateral blood flow. A successful non-transecting bulbar urethroplasty by ventral or dorsal buccal mucosa graft augmentation (BMG) likewise depends on neovascularization of the BMG. Older patients have increased incidence of comorbid conditions including peripheral vascular disease that are associated with reduced penile blood flow. We sought to determine the effect of age on bulbar urethroplasty success in general and, specifically, in transecting vs. non-transecting.

Materials & Methods: Bulbar urethroplasties were retrospectively reviewed from 11 institutions that collaborate on a multi-institutional reconstructive urology database (TURNs). We limited patients to those with at least 12 months of follow-up after transecting EPA or non-transecting BMG. Our primary outcome was anatomic success (dilation, urethrotomy or urethroplasty), our secondary outcome was anatomic success defined by urethral caliber greater than 17 F confirmed by cystoscopy. We compared results stratified by age.

Results: In total, 322 patients were included, with 258 patients younger than 60 years and 64 patients older than 60 years. Median follow-up was 1.8 years; there was no difference in follow-up time between the two groups. The following were not statistically significantly different between groups: stricture length, location of stricture, smoking status, number of previous dilations/urethrotomies, and type of urethroplasty. The following comorbidities were statistically significantly more common in the age < 60 group: diabetes, hypertension, hyperlipidemia, coronary artery and peripheral vascular disease, chronic obstructive pulmonary disease, and cancer. There was no statistically significant difference between age groups with regard to receipt of repeat procedures or anatomic recurrence, both overall and when stratified by urethroplasty type (Table 1).

Conclusions: Both transecting and non-transecting bulbar urethroplasty can be performed with similar success rates regardless of age. This is despite a higher incidence of diabetes, cardiovascular and peripheral vascular disease in the elderly.
Preoperative Evaluation Protocol for Genitourinary Vasculature Composite Allotransplantation

Kari P, MD, Bae Schel, BS, Garry Chej, MD, MBA, Tessa Drijkoningen, MD, Raymond W. Liu, MD, Cytem Tanrikut, MD, Paul Holzer, USNR, Curtis L. Cetrulo, MD, Dicken S. Ko, MD, FRUCS
Massachusetts General Hospital, Boston, MA

Introduction: Genitourinary vasculature composite allotransplantation (GUVCA) potentially represents the next step in improving both urinary and sexual function as well as cosmetic appearance following genitourinary tissue loss. The preoperative evaluation of donors and recipients is multi-modal and multi-disciplinary. Many factors need to be considered including recipient eligibility from a medical and anatomic standpoint as well as appropriate donor selection. To date, the literature that discusses the preoperative considerations of GUVCA is limited. At our institution, we have developed a pre-operative evaluation protocol for potential GUVCA recipients including pre-operative imaging, donor selection, and consultation with multi-disciplinary team. We also describe the critical neurovascular anatomy for allotransplantation with our cadaveric experience.

Materials & Methods: We constructed a multidisciplinary GUVCA team composed of transplant surgeons, urologists, plastic surgeons, psychiatrists, transplant coordinators, nurses, social workers, dieticians, and financial coordinators. Evaluation of the recipient begins with education and consent. Laboratory testing was obtained including routine CBC, chemistries, LFTs, coagulation panel, blood typing, as well as infectious disease screening and panel reactive antibody for HLA. Routine chest X-ray and EKG are obtained. The patient then undergoes our preoperative imaging protocol: high-resolution computed tomography angiography (CTA), diagnostic angiography, and pelvic and penile magnetic resonance imaging (MRI). From the donor perspective, we worked closely with the New England Organ Bank for recipient listing, donor selection, and donor procurement planning. Using anatomic dissections, we identified the appropriate vascularized pedicles from freshly deceased donor pelvic specimens.

Results: In our pilot experience, we evaluated two potential recipients that underwent the preoperative evaluation protocol. Our imaging protocol assessed for adequacy of recipient anatomy for implantation of the GUVCA graft. Using MRI with high-resolution isotropic sequences, we identified neural bundles alongside the internal pudendal artery in the region immediately posterior to the pubic symphysis. MRI with contrast suggested corporal body viability. CTA with vascular and multiplanar analysis of arterial vasculature was critical for assessing vessel adequacy. CTA 3-dimensional rendering of vessel coverage was performed for enhanced spatial assessment [figure 1]. Diagnostic angiography held advantage over CTA in situations with suboptimal characterization of smaller vessels, e.g. dorsal penile arteries [figure 2]. From our dissection experience, we identified all critical nerves and vessels necessary for anastomosis including the superficial and deep dorsal penile veins, dorsal penile arteries, dorsal penile nerves, cavernosal arteries, and external pudendal vessels [figures 3 and 4].

Conclusions: The preoperative protocol presented in this study represents an essential roadmap to surgical planning for GUVCA.

Critical Analysis of Bulbospongious Sparing Bulbar Urethroplasty on Ejaculatory Function and Post-Void Dribbling

Ariel Fredrick, MD, Bradley Erickson, MD, Kristian Stensland, MD, Alex Vanni, MD
Lahey Hospital and Medical Center, Burlington, MA, University of Iowa College of Medicine, Iowa City, IA.

Introduction: Traditional bulbar urethroplasty techniques call for splitting of the bulbospongious muscle to gain access to the strictured segment of urethra. Bulbar urethroplasty outcomes studies have shown low but significant rates of post-void dribbling (PVD) and ejaculatory dysfunction, and because the bulbospongious muscle is involved with expulsion of seminal fluid and urine from the bulbar urethra, we hypothesized that performing urethroplasty utilizing a technique that does not split the muscle may result in better post-operative patient reported ejaculatory function (EF) and less PVD.

Materials & Methods: Beginning in 2014 a bulbospongious sparing (BS) technique was implemented in all primary bulbar urethroplasties by two surgeons from different academic institutions. To analyze the effectiveness of BS on preservation of EF and avoidance of PVD, we performed a matched, case-control analysis comparing men who underwent the BS technique to men that had undergone the traditional non-bulbospongious sparing (NBS) technique immediately before the switch in technique was made. Pre- and post-operatively (3-12 months) EF was assessed using the 4 ejaculatory questions of the Male Sexual Health Questionnaire (MSHQ) short form, as well as with a patient perception questionnaire. Post-void dribbling was assessed using a validated urethral pressure questionnaire.

Results: We compared 16 BS and 16 NBS patients that were matched by total pre-operative MSHQ score, age and performance of EPA. Median time of post-operative questionnaire completion was 4.26 months, which is similar between the two groups (p = 0.76). Comorbidity rates and stricture length were similar between each group. BS and NBS groups had similar post-operative total MSHQ scores (14.25 vs. 15.06 respectively, p = 0.53) and there were no significant post-operative MSHQ changes in either group (BS, 14.25 to 14.69, p = 0.65; NBS, 15.06 to 15.81, p = 0.59). Individual MSHQ questions were analyzed between groups and not found to have a statistically significant difference. Rates of post-operative PVD and perception of EF were similar between the two groups (table).

Conclusions: Sparing the bulbospongious muscle during urethroplasty does not seem to have a significant impact on patient reported EF or PVD compared with non-bulbospongious sparing urethroplasty at early follow up.
Urethral Stricture Outcomes after AUS Cuff Erosion: Results from a Multicenter Retrospective Analysis

Martin S. Gross, MD1, Marto A. Cleves, PhD2, Melissa R. Kaufman, MD3, Douglas F. Milam, MD4, Travis W. Dun, MD5, Joshua A. Bringhammer, MD6, William O. Brant, MD7, LeKory A. Jones, MD8, Chris McClung, MD9, Jeffrey D. Brady, MD6, Gerard D. Henry, MD10, Dartmouth-Hitchcock Medical Center/Dartmouth-Hitchcock Keene, Keene, NH; 1University of Arkansas for Medical Sciences, Little Rock, AR; 2Vanderbilt University Medical Center, Nashville, TN; 3University of Kansas Medical Center, Kansas City, KS; 4University of Utah Hospital, Salt Lake City, UT; 5Urology San Antonio, San Antonio, TX; 6Central Ohio Urology Group, Columbus, OH; 7Florida Urology Associates, Orlando, FL; 8Regional Urology, Shreveport, LA

Introduction: There are few studies in the literature regarding patient outcomes after AUS cuff erosion. In this review, seven surgeons from six high-volume male continence centers compiled a comprehensive database of post-erosion patients. The goal was to evaluate the influence of both repair type and degree of cuff erosion on post-operative urethral stricture rate.

Materials & Methods: This is a retrospective multi-institution study of 80 patients who had AUS cuff erosions and underwent subsequent treatment. Seventy-eight patients had specific information regarding post-cuff erosion urethral structures. Patients underwent one of three types of repair: catheter only, single-layer capsule to capsule repair (urethrorrhaphy), and formal urethroplasty. Patients’ operative notes and charts were extensively reviewed to collect study data.

Results: Twenty-five of 78 patients had a urethral stricture after AUS cuff erosion (32.1%). More strictures occurred among patients who underwent urethrorrhaphy repair (39.5% vs. 28.6% for catheter only and 14.3% for urethroplasty), but stricture rates did not vary significantly by repair type (p = 0.32). Structures occurred significantly more frequently in patients with complete cuff erosions (58.3%) as compared to patients with partial erosions (25%; p = 0.007, see Figure 1). Patients with partial erosions were more likely to undergo urethrorrhaphy repair (60%, p = 0.002). There was no difference in repair type performed on patients with complete erosion. A trend was seen regarding increased percentage of erosion and increased stricture rate, but it did not reach significance (p = 0.007). Although only 12 patients had a complete erosion, strictures occurred more frequently among patients with complete erosion that underwent either catheter only repair or urethrorrhaphy (75%), compared to patients that underwent urethroplasty (25%). However, Fisher’s exact p-value for this finding was not significant (p = 0.223).

Conclusions: Urethral stricture was more likely to occur after complete cuff erosion as opposed to partial erosion in this multi-center retrospective population. Repair type, whether catheter only, urethrorrhaphy, or formal urethroplasty, did not appear to influence post-operative stricture rate.

Table 1. Change in SHIM scores from pre- to post-operative by structure location in EPA patients (p = 0.43).

<table>
<thead>
<tr>
<th>Stricture Location</th>
<th>Median Change in SHIM</th>
<th>Mean Change in SHIM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most Proximal</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>Bulbomembranous Urethra</td>
<td>0</td>
<td>-0.2</td>
</tr>
<tr>
<td>Proximal Bulbar Urethra</td>
<td>0</td>
<td>-0.3</td>
</tr>
<tr>
<td>Mid-Bulbar Urethra</td>
<td>0</td>
<td>-0.5</td>
</tr>
<tr>
<td>Distant Bulbar Urethra</td>
<td>0</td>
<td>-0.5</td>
</tr>
</tbody>
</table>

Table 1. Change in SHIM scores from pre- to post-operative by structure location in EPA patients (p = 0.43).