

THE SEVENTH ANNUAL STARS
(SURGICAL TRAINEES ADVANCING RESEARCH SYMPOSIAMIUM)

Thursday Night Dinner with the Stars

Featuring Invited Speaker Presentation and “Quickshots” from surgical trainees. May 9, 2019 from 5:30–8PM. Auditorium F

Ord.	Time	Author	Title
1	6:00	Ravinder Kang, MD, MS	Eliminating Opioids from Breast Surgery: A Retrospective Review of a Perioperative Breast Bundle
2	6:07	Eleah D. Porter, MD	Surgical Provider Attitudes Toward Etiology and Best Approach to Reduce Unnecessary Postoperative Lab Testing at Two Teaching Hospitals
3	6:14	Rob Allen, MD	Deep Sleep, Beeps and Creeps: A pilot assessment of in-hospital sleep quality in elective surgical patients.
4	6:21	Jenaya L. Goldwag, MD	Incidence of Fascial Defects at Prior Stoma Sites in Patients with Colorectal Cancer
5	6:28	Spencer W. Trooboff, MD, MBA	What Influences Patient Satisfaction after Cardiac Surgery? A Prospective Analysis of Predictors of Patient Hospital Experience
6	6:36	Jacob Greenberg, MD, EdM, FACS, University of Wisconsin	Surgical Psychology 101
7	7:21	Gina Tundo, MD	Safety of urethroplasty in the comorbid population
8	7:28	Kevin Krughoff, MD	Initial Experience of MRI-Fusion Biopsy in the Community Setting
9	7:35	Lael Reinstatler, MD	Re-examining an old trend: The Association of Human Papillomavirus and Bladder Cancer.
10	7:42	Olivia A. Sacks, BA	Streptococcus anginosus is associated with increased disease severity in patients with appendicitis

Friday Morning Rising Stars Presentations

Featuring Keynote Speaker and “Quickshots” from Surgical Trainees. May 10, 2019 from 6:30 – 8:30AM. Auditorium H

Ord.	Time	Author	Title
1	6:45	Kevin Krughoff, MD	Impact of a Multidisciplinary Kidney Stone Prevention Clinic
2	6:52	Allison R. Wilcox, MD	Gender representation at surgical conferences: the American and Australasian experiences
3	6:59	Jesse A. Columbo, MD, MS	Variation in ultrasound diagnostic thresholds for carotid stenosis in the United States.
4	7:07	Caprice Greenberg, MD, MPH, FACS, University of Wisconsin	Stop Fixing Women
5	7:53	J Aaron Barnes, MD	The Evolution of the Financial Delivery of EVR in Contemporary Practice
6	8:00	Kevin Shee, PhD	MicroRNA let-7f-5p is a novel biomarker of recurrence and a potential therapeutic opportunity in non-muscle invasive bladder cancer
7	8:07	Michael E. Rezaee, MD, MPH	The impact of low- versus high-intensity surveillance cystoscopy on surgical care and cancer outcomes in patients with high-risk non-muscle-invasive bladder cancer

Co-Directors: Philip P. Goodney, MD, MS and Kari M. Rosenkranz, MD

Prizes: \$500 / \$250 / \$100 (1st/2nd/3rd)

Judges: Christina V. Angeles, MD; Joshua Aronson, MD; Philip P. Goodney, MD, MS; Caprice Greenberg, MD, MPH; Jacob Greenberg, MD, EdM; Jennifer Hong, MD; Srinivas Joga Ivatury, MD, MHA; Rachel Moses, MD, MPH; Joseph Phillips, MD; Kari M. Rosenkranz, MD; Sandra L. Wong, MD, MS

Eliminating Opioids from Breast Surgery: A Retrospective Review of a Perioperative Breast Bundle

Ravinder Kang, MD, MS¹; Jackson T. Read, BS²; Adam C. Glaser, BA²; Richard J. Barth Jr, MD, FACS^{1,2}

¹ *Department of Surgery, Dartmouth-Hitchcock Medical Center, Lebanon, NH*

² *Geisel School of Medicine at Dartmouth, Hanover, NH*

Objective: Current opioid prescribing guidelines for partial mastectomy (PM) and PM with sentinel lymph node biopsy (SLNB) recommend 10-15 oxycodone pills for post-operative pain management. We sought to eliminate opioids following breast surgery by implementing a perioperative breast bundle.

Design: Retrospective review.

Setting: A tertiary medical center.

Patients/Participants: Patients who underwent either a PM or a PM with SLNB between 01/2017-12/2018.

Interventions: The breast bundle consisted of (1) preoperative acetaminophen, (2) pre-excisional administration of local anesthetic, (3) wound infiltration with bupivacaine, and (4) perioperative ketorolac. Adherence to the bundle was defined as receiving at least 3 elements. Further, all patients were counseling to manage their post-operative pain with acetaminophen and/or ibuprofen.

Main Outcome Measure(s): The percentage of patients who did not require an opioid prescription post-operatively.

Results: 265 patients (Age: 61.6±12.7 years, BMI: 27.6±6.5, Gender: 98.5% Female) underwent breast surgery in this time period, 47.9% underwent PM alone and 52.1% underwent PM and SLNB. We excluded 8 patients that suffered post-operative complications from the analysis. 90.3% of patients received at least 3 elements and 61.5% of the patients received all 4 elements of the perioperative bundle. Overall, 89.1% of patients (91.3% of PM patients & 87.0% of PM and SLNB patients) did not receive a narcotic prescription. Among the small percentage of patients who received a prescription 34.5% did not fill their script. Only 2 patients (0.8%) who were discharged without a prescription called within 7 days requesting opioids.

Conclusions: When multimodal non-opioid perioperative bundles are successfully implemented, more than 90% of patient undergoing breast surgery do not require postoperative narcotics.

Surgical Provider Attitudes Toward Etiology and Best Approach to Reduce Unnecessary Postoperative Lab Testing at Two Teaching Hospitals

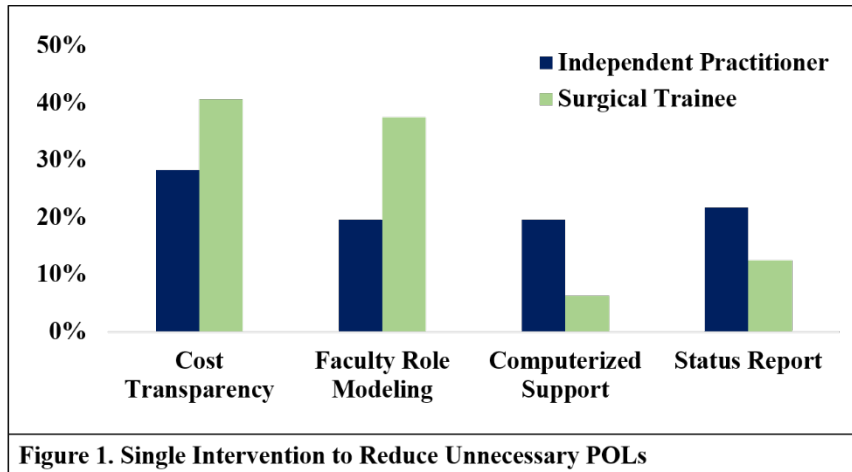
Eleah D. Porter, MD; Allison R. Wilcox, MD; Christina V. Angeles, MD

Introduction: Preliminary research at our institution revealed that routine postoperative lab (POL) testing is performed on ~90% of patients following elective general surgery. However, these labs rarely lead to a change in care. The goal of this study was to evaluate provider attitudes towards unnecessary routine POL testing and how to reduce its occurrence.

Methods: We adapted a previously administered questionnaire. An unnecessary lab was defined as ordered without a clinical concern or indication, or if its result would not change management. Our final survey consisted of 15-items exploring the extent of unnecessary POL testing, attitudes towards testing, and interventions to reduce practice. Most responses utilized a 5-point Likert scale. The survey was administered to a convenience sample of surgical residents (SR) and independent practitioners (IP), including attending surgeons and advanced practice providers, at our academic-center and a community-affiliated hospital.

Results: 78 providers completed the survey (32 SRs, 46 IPs). Overall, 86% agreed with the statement that unnecessary routine POLs are ordered and 85% attributed this practice to “habit.” However, SRs and IPs did not universally agree, as SRs were significantly more likely to attribute “concern a senior member will ask” in comparison to IPs (63% vs. 48%, $p=0.014$). There was also discordance between IPs, as community-affiliated IPs were significantly more likely to attribute “fear of litigation” than academic-center IPs (60% vs. 20%, respectively $p=0.006$). Overall, there was no consensus regarding a single intervention to reduce practice, but the most common answers were cost transparency (33%) and faculty role modeling (27%) (Figure 1).

Conclusions: Though surgical providers agree that unnecessary routine POLs are ordered, there is no consensus as to reasons for the unnecessary testing or how best to reduce its occurrence. Varied survey responses suggest that a multimodal quality initiative approach will be needed to reduce unnecessary POL testing.



Deep Sleep, Beeps and Creeps: a pilot assessment of in-hospital sleep quality in elective surgical patients

Robert W. Allen, MD; Srinivas Joga Ivatury, MD, MHA

Background

Sleep disturbance in the hospital is a common occurrence, well studied in the ICU population. There has been minimal research performed on in-hospital sleep disturbance in elective surgery patients.

Methods

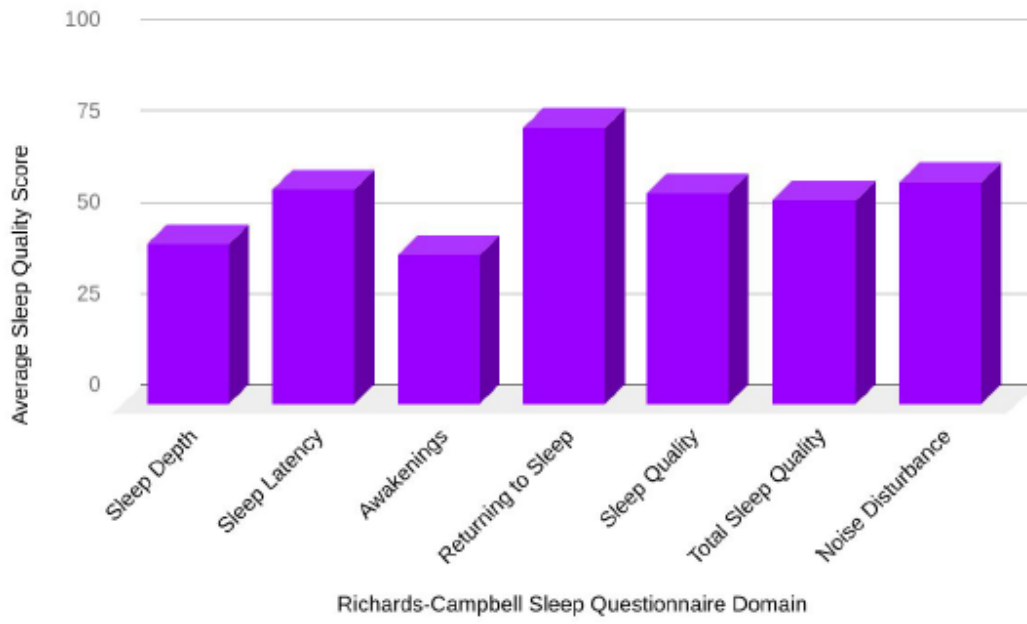
We included patients undergoing elective surgery, who spent at least one night in the hospital. Patients completed the Pittsburgh Sleep Quality Index (PSQI) prior to surgery to assess baseline sleep quality. Patients completed the Richards-Campbell Sleep Questionnaire (RCSQ) to measure in-hospital sleep quality. Sleep depth, sleep latency, awakenings, returning to sleep, overall subjective sleep quality and noise disturbance are the domains tested by the RCSQ. Each domain is represented by a 0-100 mm scale. A higher score suggests better sleep quality. The mean of the first five domain scores represents the total sleep quality. Noise disturbance is reported separately. We queried patients regarding perceived barriers to sleep at time of discharge. The primary outcomes were individual RCSQ domain scores and RCSQ total sleep quality scores. The secondary outcome was patient-reported barriers to sleep.

Results

Fifteen patients were included. Mean (SD) age was 59 (17) with 60% women. The median (IQR) number of nights in the hospital was 2 (1-6). Ten of 15 patients had PSQI scores greater than 5. The mean (SD) RCSQ total sleep quality score was 56 (24), with "Awakenings" and "Sleep Depth" domains having the poorest scores, and "Returning to Sleep" having the highest score. "Noise Disturbance" was 61%. Sleep barriers included nighttime noise pollution, and awakenings for vital signs or phlebotomy.

Conclusion

Patients experienced baseline sleep disturbance. In-hospital sleep quality was poor due to nightly awakenings and poor sleep depth. Patients perceived noise pollution and disturbances from vitals and phlebotomy as barriers to sleep.



Incidence of Fascial Defects at Prior Stoma Sites in Patients with Colorectal Cancer

Jenaya L. Goldwag MD; Lauren R. Wilson MD; Srinivas J. Ivatury MD, MHA; Michael J. Tsapakos MD; Matthew Z. Wilson MD, MS

Introduction:

Stoma reversal sites are a common location for incisional hernias. We aim to estimate the incidence and risk factors for fascial defects at previous stoma sites in patients with a history of colorectal cancer.

Methods:

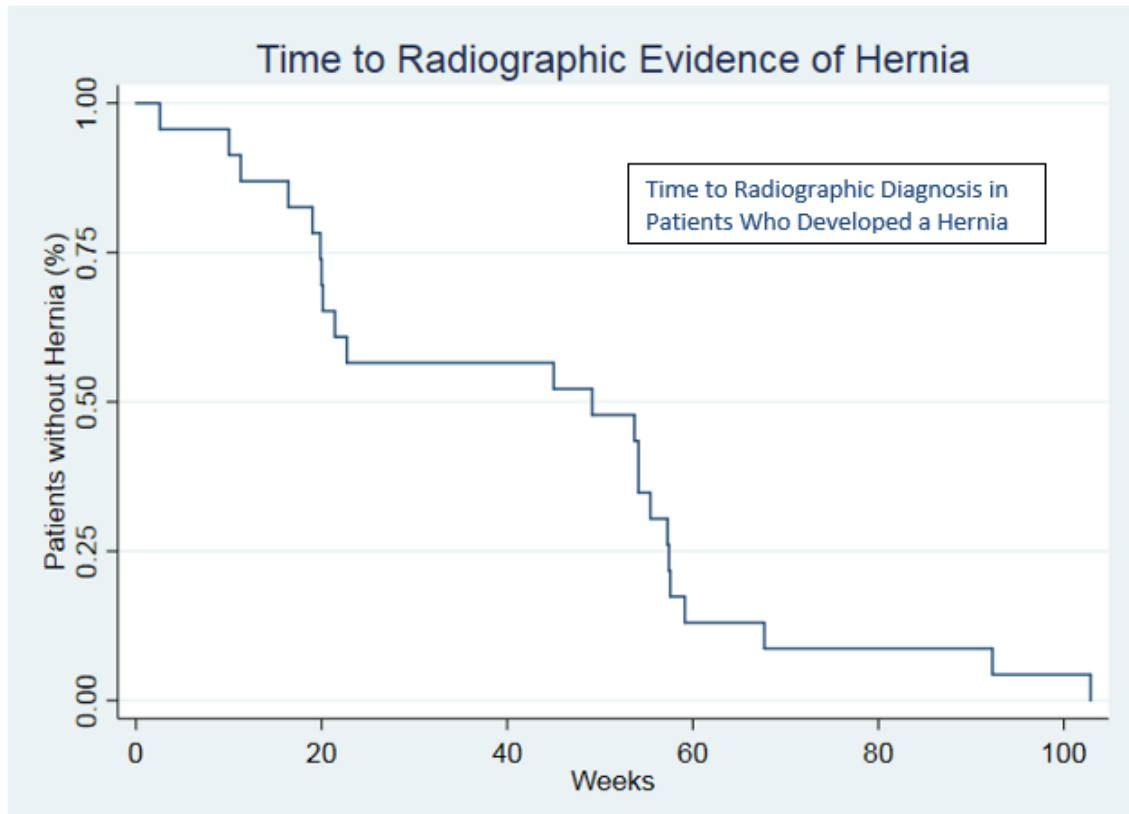
This is a retrospective cohort study at an academic tertiary referral center. We included adult patients diagnosed with colorectal cancer, identified by ICD9/10 codes, who underwent stoma reversal, identified by CPT codes, from 2011-2018 and had at least one post-operative CT scan performed. Our primary outcome was fascial defect at prior stoma site identified on post-operative CT scan.

Results:

Of 92 patients included, 52 (57%) were male, with mean age 58 years at stoma reversal, 81 (87%) were diagnosed with rectal cancer, and 11 (12%) with colon cancer. Fascial defects were noted in 45 (49%) patients, with stoma site hernias containing bowel or intraabdominal fat present in 24 (26%) patients. There were no differences in temporal occurrence of defect development, either posterior defect or hernia, after stoma reversal ($p=0.133$). Posterior sheath defects were not associated with subsequent hernia development and most hernias occurred within two years. BMI >30 was associated with significantly increased risk of stoma site hernia on multivariate analyses (OR 11.9, 95% CI 2.41-58.94, $p=0.002$), but smoking, hypertension, stoma type, pathologic stage, and chemotherapy within 90 days were not found to be significant.

Conclusion:

The incidence of stoma site hernias is high. Obesity appears to be a significant risk factor for development of these hernias and most hernias occur quickly following surgery.



What Influences Patient Satisfaction after Cardiac Surgery? A Prospective Analysis of Predictors of Patient Hospital Experience

Spencer W. Troboff, MD, MBA^{1,2,3}; Alexander Iribarne MD MS^{2,4}; Joseph P. DeSimone, MD; Anthony W. DiScipio, MD; Jock N. McCullough, MD⁴

- 1 VA National Quality Scholars Program, Veterans Health Administration, White River Junction, Vermont
- 2 The Dartmouth Institute for Health Policy and Clinical Practice, Hanover New Hampshire
- 3 Department of Surgery, Section of General Surgery, Dartmouth Hitchcock Medical Center, Lebanon New Hampshire
- 4 Department of Surgery, Section of Cardiac Surgery, Dartmouth Hitchcock Medical Center, Lebanon New Hampshire

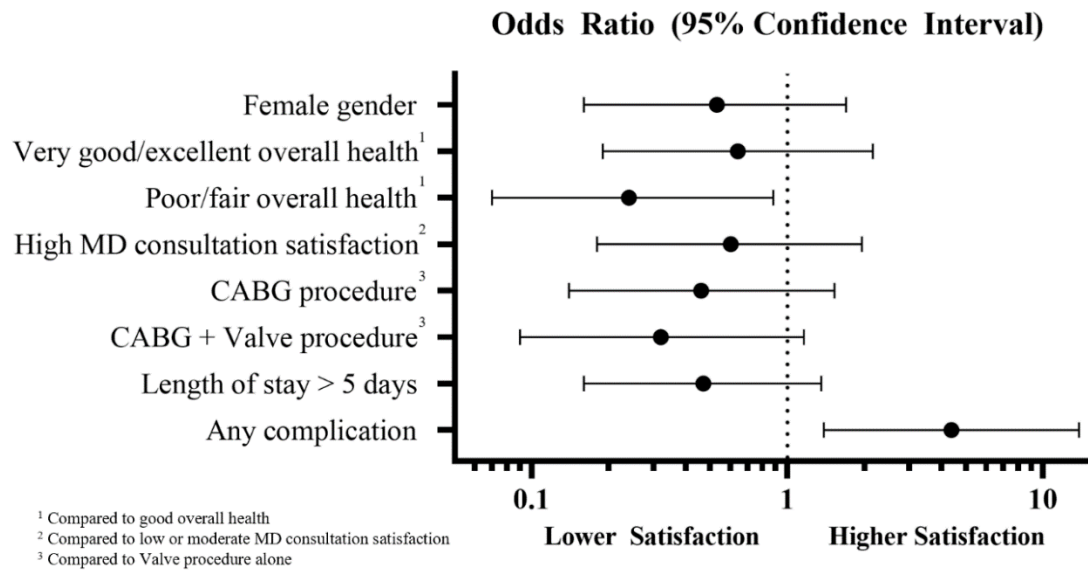
Introduction: Despite increased emphasis on improving patients' subjective hospital experience, limited data exist identifying what influences patient satisfaction. We sought to examine predictors of patient satisfaction following cardiac surgery as measured through the standardized Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey.

Methods: We prospectively enrolled patients undergoing elective cardiac surgery from January 2016-October 2017 (n=110). Participants completed a preoperative survey covering health status, demographics and surgeon satisfaction, followed by the HCAHPS survey at their 30-day postoperative visit. Survey data were linked to clinical outcomes including postoperative complications and length of stay. The primary outcome was a top-box global rating of hospital experience (10 out of 10). Multivariable logistic regression was used to evaluate independent predictors of top-box hospital rating.

Results: There were 107 patients who underwent surgery and 98 completed the postoperative survey (response rate = 91.6%). The rate of postoperative complications was 33.3% (n=33), the most common being atrial fibrillation (n=29). The only variable associated with top-box hospital rating on univariate analysis was atrial fibrillation (75.9% top-box rating with atrial fibrillation vs. 53.6% without, p=0.040). On multivariable regression, fair/poor overall health was independently associated with a lower likelihood of a top-box hospital rating (Odds Ratio (OR) 0.24, p=0.031) while having a postoperative complication was associated with higher satisfaction (OR 4.39, p=0.012).

Conclusions: Patient satisfaction was adversely affected by poor baseline health status yet improved for those with complications. Current application of patient experience as a measure of the quality of surgical care requires further examination.

Figure. Multivariable logistic model for factors associated with top-box hospital rating



6. Invited Speaker



Jacob Greenberg, MD, EdM

Associate Professor and Program Director, General Surgery Residency Program; Division of Minimally Invasive, Foregut and Bariatric Surgery, University of Wisconsin

"Surgical Psychology 101"

Bio

Dr. Jacob Greenberg, MD, EdM, is a graduate of the University of Pennsylvania School of Medicine. He completed his general surgical training at Brigham and Women's Hospital followed by a fellowship in Minimally Invasive and Bariatric Surgery at the University of Massachusetts Memorial Medical Center. Dr. Greenberg is currently an Associate Professor of Surgery, the General Surgery Residency Program Director, and the Director of the UW Comprehensive Hernia Center at the University of Wisconsin. He has expertise in MIS, Foregut and Bariatric Surgery. His clinical practice involves a high volume of complex abdominal wall reconstruction, laparoscopic inguinal hernia repair, as well as foregut and bariatric procedures. His principal research interests focus on clinical research in hernia repair as well as surgical education and training.

Safety of urethroplasty in the comorbid population

Gina Tundo MD; Andrew Peterson MD; Ramiro Madden-Fuentes MD

Introduction and Objectives: Management of urethral stricture disease has transitioned from repeated endoscopic procedures to urethroplasty given its long durability and superior success rates. There is often hesitation about the tolerability of a formal repair in the population with multiple medical co-morbidities. As such, we sought to understand whether increased comorbidities had an adverse impact in the clinical course of patients undergoing a urethroplasty. The Charlson Comorbidity Index (CCI) and Frailty Index (FI) were used to investigate the relationship between pre-operative comorbidity and immediate complications following urethroplasty with buccal grafting. We hypothesized that even high-risk patients do well with this surgery.

Methods: Using the 2007-2015 National Surgical Quality Improvement Program (NSQIP) dataset, patients with CPT codes for urethroplasty with buccal grafting were identified. A CCI was calculated for each patient based on ICD 9 codes. A FI score was also obtained based on ICD 9 codes. Complications were identified based on definitions in NSQIP and converted to Clavien-Dindo classification grades. Weighted multivariate logistic regression was used to examine the association between overall complications and CCI as well as FI.

Results: There were a total of 646 patents identified who underwent urethroplasty with a buccal graft. The average age was 48.7. 67.5% of the patients were white. Mean BMI was 30.5. 16.4% of patients had smoked within the past year. The average CCI was 1.9 +/- 1.8 (range 0-14). 60.2% of patients had no FI conditions, 24.9% had one, and 14.9% had two or more.

Of the 646 patients, 2.9% had a UTI post-operatively, 0.9% had a superficial SSI, 0.3% had a deep SSI, 0.2% required a transfusion intra or post-op, 0.5% had a DVT requiring treatment, 0.9% had a wound disruption, 0.3% had an MI, and 0.2% had a PE. Zero patients experienced sepsis, stroke, ARF or death. This constituted an overall complication rate of 6.8%.

For each post-operative complication recorded by NSQIP as demonstrated above, less than 4% of the population exhibited any of the complications. Due to the low complication rates, models were only generated for UTI, Clavien-Dindo grade I, and overall complications.

On multivariate logistic regression, after controlling for anesthesia type and race, there was no association between post-operative UTI (OR=0.99; 95% CI= 0.76, 1.30; p=0.96), Grade I (OR=0.89; 95% CI=0.69, 1.14; p=0.36), or overall complication rate (OR 0.98, 95% CI= 0.82, 1.17, p=0.82) based on CCI scores. Similar results were observed for FI.

Conclusion: Urethroplasty with buccal grafting is a safe procedure with low complication rates, even in the comorbid population, and could therefore be considered in this demographic.

Initial Experience of MRI-Fusion Biopsy in the Community Setting

Kevin Krughoff, MD; Lawrence Dagrosa, MD; Amichai Kilchevsky, MD

Introduction: The expanding role of MRI-fusion biopsy (FB) is well documented, however the reproducibility of outcomes in the community setting is unknown. We sought to determine if significant differences exist in FB outcomes between academic versus a non-academic (NA) settings.

Methods: We compared csPCa detection rates for the first consecutive 125 FB patients at an academic to the first 125 consecutive FB patients at a NA setting. All patients underwent multiparametric MRI and were scored using PIRADS v.2. Specimens were graded according to the International Society of Urological Pathology (ISUP) criteria. Grade Group >1 was considered clinically significant prostate cancer (csPCa). NA patients were matched to academic controls using Mahalanobis-distance kernel matching. Standard errors and the 95% CI were calculated from 3,000 bootstrap samples to determine the effect of NA setting on FB outcomes. Secondary analysis of imaging and pathology characteristics was performed using weighted samples t-tests or ordinal regression.

Results: 219 of the 250 included patients were successfully matched. Significant baseline differences in prior negative biopsy results and BMI were neutralized following matching. Reduction in standardized differences and variance ratios was achieved across all covariates. There was no significant effect of NA setting on the proportion of FB-detected csPCa, the proportion of template-detected csPCa, the rate of upgrading from prior biopsy results, or in the proportion of csPCa missed by fusion-directed or template-directed cores (Table 1). On average, lesions were given lower PIRADS ratings in the NA setting and template biopsies yielded lower GG diagnoses, however the maximum composite GG was not significantly different by practice setting.

Conclusion: Among the first consecutive patients enrolled in FB programs, there was no significant effect of practice setting on the detection of csPCa in a sample-matched analysis.

8. Krughoff, K

Table 1. Effect of non-academic setting on FB outcome

Treatment effect of NA setting	Effect	Std Error	P> z	95% CI	
Overall csPCa detection	3.93% increase	6.72%	0.58	-0.10	0.17
csPCa by FB cores	7.68% increase	6.86%	0.24	-0.06	0.22
csPCa by Template cores	8.32% decrease	6.81%	0.25	-0.22	0.06
Upgrade due to FB cores	0.88% increase	3.97%	0.99	-0.08	0.08
Upgrade due to template cores	1.37% increase	6.63%	0.92	-0.12	0.14
csPCa missed by template cores	7.86% increase	5.09%	0.11	-0.02	0.19
csPCa missed by FB cores	9.84% decrease	5.78%	0.07	-0.22	0.01

Re-examining an old trend: The Association of Human Papillomavirus and Bladder Cancer

Lael Reinstatler MD, MPH¹; Kevin Shee PhD¹; Kristian Stensland MD, MPH²; Lawrence Dagrosa MD¹; John D. Seigne, MB, BCh¹; Einar Sverrisson, MD¹

1 – Dartmouth-Hitchcock Medical Center Lebanon, NH

2 – Lahey Clinic Burlington MA

Introduction and Objective: The Human Papilloma Virus (HPV) is a recognized carcinogenic factor. Previous studies have shown a possible association between HPV and bladder cancer, however HPV serology has not been reported. In this study, we assessed the correlation between bladder cancer and HPV positive serology.

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

Results: Over the four-year period there was a weighted population of 155,650,000 Americans. The prevalence of HPV positive serology was as follows: HPV18 – 5.5%, HPV16 – 13.2%, HPV11 – 6.4%, HPV6 – 17.4%. There were 443,948 bladder cancer cases. Among cases there was a higher prevalence of male gender (80% vs 53%, $p = 0.0056$), Caucasian race (93% vs 66%, $p = 0.001$), and HPV6 positive serology (18.1% vs 17.6%, $p = 0.0005$). There was no difference among the other three HPV types. On logistic regression controlling for race, gender, and smoking status, increasing body weight (OR 1.01, $p < 0.0001$) and HPV6 positivity (OR 1.9, $p < 0.0001$) were associated with increased odds of bladder cancer diagnosis while HPV11 positivity (OR 0.23, $p < 0.0001$) was associated with a decreased odds of bladder cancer diagnosis.

Conclusion: Prior research has shown that there is a relationship between HPV and bladder cancer, but this relationship has previously been incompletely defined. In this large, nationally representative database, we describe a significant association of HPV6 positive serology with a diagnosis of bladder cancer. This finding is striking and might affect future investigation into the pathophysiologic basis of this relationship.

Rising Stars
Friday, May 10, 2019

1. Krughoff, K

Impact of a Multidisciplinary Kidney Stone Prevention Clinic

Kevin Krughoff, MD; Cassandra Delude, APRN; Kathy Burzynsky, RD; Scott Fabozzi, MD

Introduction: There are several benefits of a multidisciplinary approach to stone prevention, however the implementation of this model in the community setting has not been described. Our goal was to assess the feasibility of a stone prevention clinic in a community-based practice.

Materials and Methods:

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

Results:

77 patients were followed over an average of 1.76 follow up visits (275±143 days). Of the 63 surveys completed, 100% of patients found their visit with the RD helpful and 98.4% would recommend the clinic to friends/family. Of the 46 records with consecutive 24-hour urine studies, significant reductions were observed in the supersaturation profiles for uric acid (-0.301 ± 0.089 , $p < 0.01$) and calcium phosphate (-0.6416 ± 0.298 , $p = 0.04$). A significant decrease was seen in the trajectory of uric acid supersaturation following enrollment ($-.371 \pm 0.158$, $p = 0.02$) (Figure 1). Follow up KUB and renal US showed no stone growth in 95% of patients.

Conclusion:

This data supports the feasibility of a multidisciplinary stone prevention clinic given positive feedback, significant reduction in stone risk parameters and lack of stone growth on routine imaging.

1. Krughoff, K

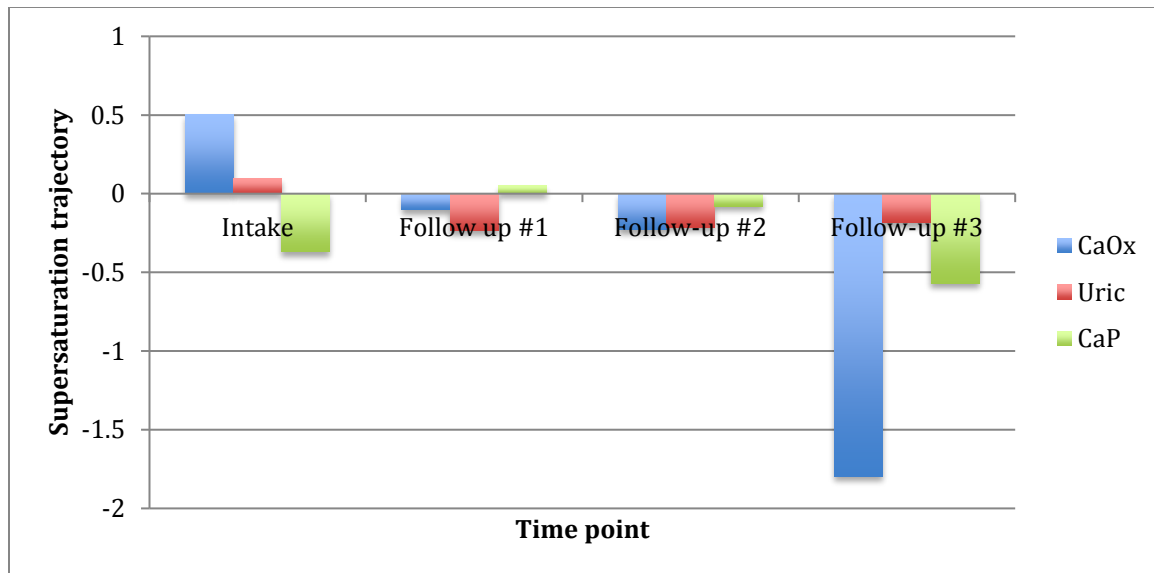


Figure 1. Change in supersaturation profile from most recent 24-hour urine collection

Gender representation at surgical conferences: the American and Australasian experiences

Allison R. Wilcox, MD; Christine S. Lai; Fellicia E. Stanzah; Jessica G. Farrar; Spencer W. Trooboff, MD, MBA; Patricia L. Turner; Sandra L. Wong, MD, MS

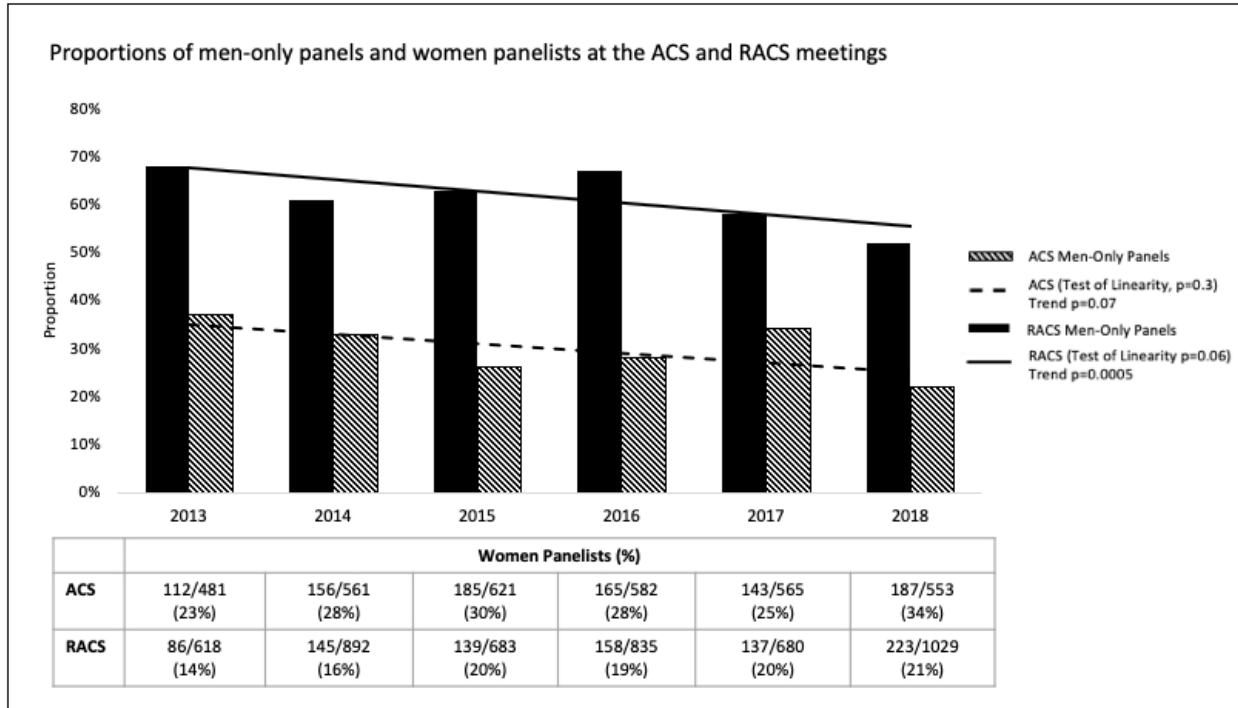
Introduction: A growing body of data demonstrates persistent disparities in gender representation at scientific conferences worldwide. We compared trends in representation of women panelists at two large, national, general interest surgical meetings, the American College of Surgeons (ACS) Clinical Congress and Royal Australasian College of Surgeons (RACS) Scientific Congress.

Methods: We performed comprehensive analyses of ACS and RACS meeting programs (2013-2018). Manual review was conducted to determine counts and proportions of invited panelists by gender. We made within and between meeting comparisons using trend analysis for proportions.

Results: 10% and 13% of ACS and RACS Fellows are women, respectively. However, women make up increasing numbers of trainee members of both groups: ACS 40% and RACS 28%. Overall proportions of women panelists have increased between 2013 and 2018 (ACS: 28 to 34% and RACS: 14 to 21%) (Figure). There has also been a decrease in the proportion of panels comprised entirely of men at ACS and RACS meetings, from 37% to 22% and 68% to 51%, respectively. These decreases in the proportion of men-only panels represent downward trends over time (ACS $p=0.07$ and RACS $p=0.0005$) (Figure). However, the rate of change (slope) is similar between ACS and RACS ($p=0.5$).

Conclusions: Both ACS and RACS meetings have high proportions of panelists who are men, as well as panels comprised entirely of men. However, progress has been made in decreasing the number of men-only panels and increasing the number of women panelists at both ACS and RACS annual meetings. Ongoing evaluation of trends will help determine the impact of intentional efforts such as the 2017 RACS Diversity & Inclusion Plan on gender representation at surgical meetings.

2. Wilcoxon, A



Variation in Ultrasound Diagnostic Thresholds for Carotid Stenosis in the United States

Jesse A. Columbo, MD, MS; Robert M. Zwolak, MD, PhD; Edward J. Arous, MD; Philip P. Goodney, MD, MS; Michael P. Lilly, MD; H. Gilbert Welch, MD, MPH

Introduction: Duplex ultrasound is the recommended imaging modality to assess carotid stenosis. Individuals diagnosed with moderate stenosis enter long-term surveillance, while those with severe stenosis are considered for surgery. However, there is variation in the diagnostic thresholds used to determine disease severity.

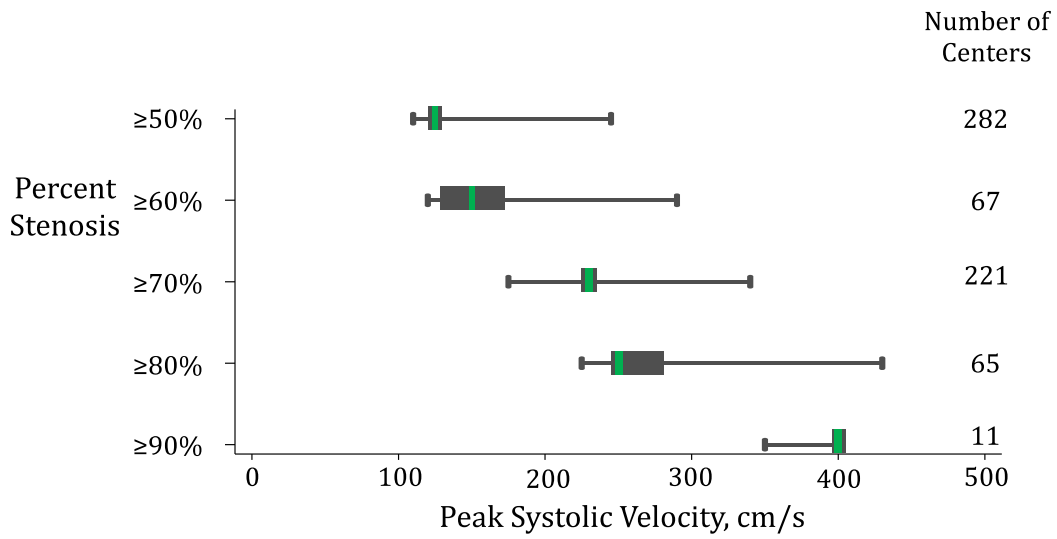
Methods: To describe the variation in carotid duplex ultrasound diagnostic thresholds, we examined the thresholds used by 338 vascular testing centers in the United States. To determine the clinical impact of this variation, we applied the thresholds to individuals in two groups: a population-based sample of participants aged 65 years and older in the Cardiovascular Health Study (n=4,791), and a cohort of patients who underwent carotid endarterectomy for asymptomatic carotid stenosis from the Vascular Quality Initiative (n=28,483).

Results: Internal carotid artery peak systolic velocity was used by all centers to determine the severity of stenosis, with 60 distinct thresholds in use. The velocity threshold for moderate ($\geq 50\%$) stenosis ranged from 110 – 245 cm/s (median 125); the threshold for severe ($\geq 70\%$) stenosis ranged from 175 – 340 cm/s (median 230; Figure). The diagnosis of moderate carotid stenosis was dependent on the testing center in 13% of the population-based sample (i.e. individuals with velocities between 110 and 245 cm/s). The diagnosis of severe carotid stenosis was dependent on the testing center in 36% of the surgical cohort (i.e. individuals with velocities between 175 and 340 cm/s). Findings were similar for end diastolic velocity, internal to common carotid peak velocity ratio, and a composite of all three velocity variables.

Conclusion: The diagnostic threshold for carotid stenosis varies considerably. 1 in 8 individuals may be diagnosed moderate carotid stenosis and enter long-term surveillance, and 1 in 3 patients may be diagnosed with severe stenosis and be considered for surgery, based upon which center performed their ultrasound.

3. Columbo, J

Figure: Distribution of Peak Systolic Velocity Thresholds for Various Degrees of Stenosis



Legend: The green bar represents the median velocity threshold, the black box represents the 25th and 75th percentiles, the whiskers represent the minimum and maximum threshold in use across the centers; cm/s, centimeters per second.

4. Keynote



Caprice Christian Greenberg, MD, MPH

Professor of Surgery with tenure, Morgridge Distinguished Chair in Health Services Research Director, Wisconsin Surgical Outcomes Research Program, Vice Chair of Research in the Department of Surgery, University of Wisconsin - Madison

"Stop Fixing Women"

Bio

Dr. Caprice C. Greenberg, MD, MPH, is a tenured Professor of Surgery and the Morgridge Distinguished Chair in Health Services Research at the University of Wisconsin. She is a surgical oncologist specializing in breast cancer and a health services researcher focused on improving patient safety and quality of care. She completed a general surgery residency at Brigham and Women's Hospital and Masters of Public Health at the Harvard School of Public Health in Boston, as well as a surgical oncology fellowship at the Partners-Dana Farber Cancer Center. Following her clinical and research fellowship training, she joined the faculty at Harvard Medical School, Brigham and Women's Hospital, and Dana-Farber Cancer Institute in 2007. While there, she served as the Associate Director and then Director of the Center for Surgery and Public Health at Brigham and Women's Hospital. She was recruited to the University of Wisconsin-Madison in 2011 to serve as Director for the Wisconsin Surgical Outcomes Research Program, where she also holds affiliate appointments in the Departments of Systems and Industrial Engineering and Population Health Sciences. Dr. Greenberg has served as Recorder and President of the Association for Academic Surgery and President of the Surgical Outcomes Club, which she helped to found.

The Evolution of the Financial Delivery of EVR in Contemporary Practice

J. Aaron Barnes, MD; Jeanwan Kang, MD; Bjoern D. Suckow, MD; Philip P. Goodney, MD, MS; Robert M. Zwolak, MD; Richard J. Powell, MD; David H. Stone, MD

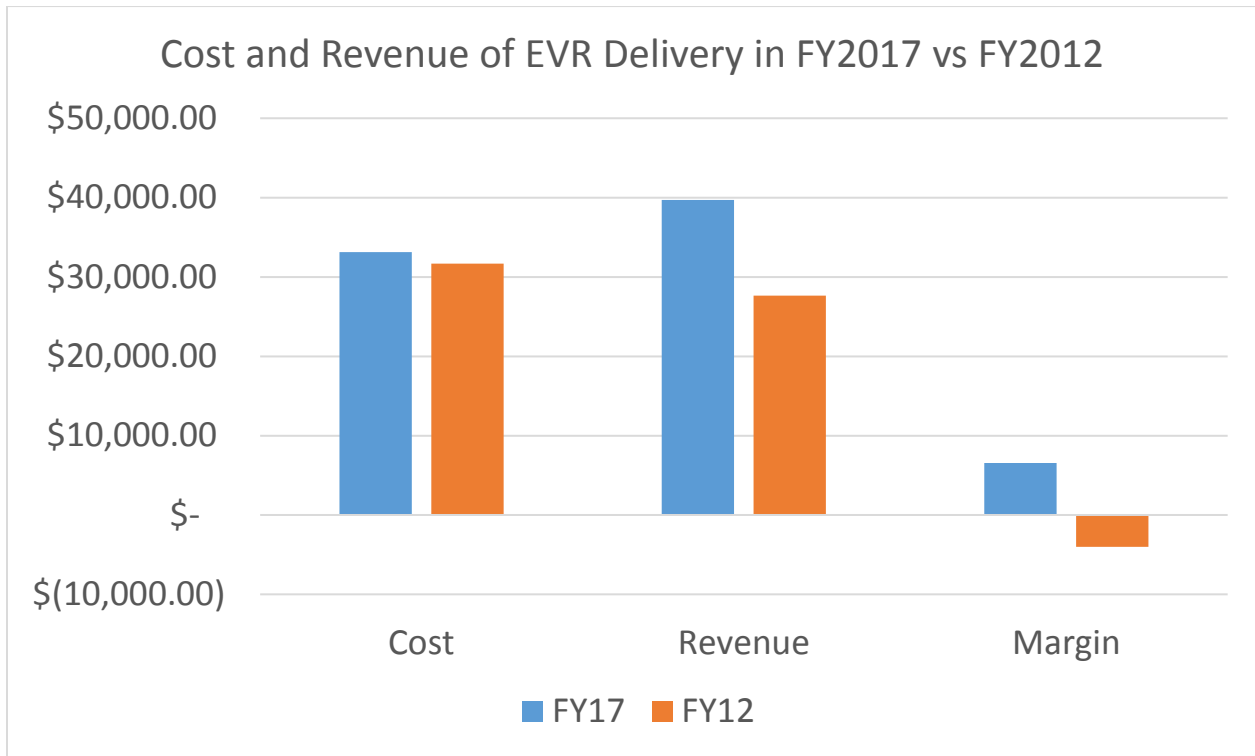
Introduction: Previous work documented the fiscal impact of device cost compared to reimbursement associated with endovascular aneurysm repair (EVR) at an academic institution. The Centers for Medicare & Medicaid Services (CMS) have since reclassified EVR with a new Medicare Severity Diagnosis-Related Group (MS-DRG) and increased reimbursement. We sought to compare the cost and revenue associated with EVR before and after this change.

Methods: All infrarenal EVRs performed in fiscal year (FY) 2017 were identified using the new DRG code 269(n=81). We then identified those who were treated according to the instructions for use guidelines using a single manufacturer device and billed to Medicare (n=13). From this cohort, we obtained total expenses with itemized costs, net revenue and net margin from the hospital finance department. Results were then compared to previous values from a similar EVR cohort in FY2012, prior to the CMS changes.

Results: The two cohorts had similar demographics and lengths of stay (LOS) (age 71 vs 75, 85% vs 82% male, mean LOS 1.4 vs 1.7 days in FY2017 vs FY2012 cohorts). Mean total expenses from the FY2017 cohort was similar to the FY2012 cohort (\$33,118 vs \$31,672). Graft implants continued to account for a significant portion of the total cost, with the device cost accounting for 40% of the total cost in the FY2017 group compared to 52% in the FY2012 group. Net revenue was higher in the FY2017 group by \$11,189 (\$39,685 vs \$27,657) resulting in higher overall margin in the FY2017 group compared to the FY2012 group (\$6,567 vs -\$4,015).

Conclusion: Device costs continue to be the single greatest cost driver associated with EVR. DRG reclassification of EVR to address procedure and implant costs should permit fiscal sustainability. Surgeons should continue to play an active role in EVR delivery and negotiating competitive device pricing to reflect EVR reclassified DRG reimbursement rates.

Figure 1. Comparison of EVR cost, revenue, and net margin for FY2017 compared to FY2012.



MicroRNA let-7f-5p is a novel biomarker of recurrence and a potential therapeutic opportunity in non-muscle invasive bladder cancer

Kevin Shee, PhD; Carmen J. Marsit PhD; Alan R. Schned, MD; Jason Pettus, MD; David Armstrong; Margaret R. Karagas, PhD; Todd W. Miller, PhD; John D. Seigne, MB, BCh; Angeline S. Andrew, PhD

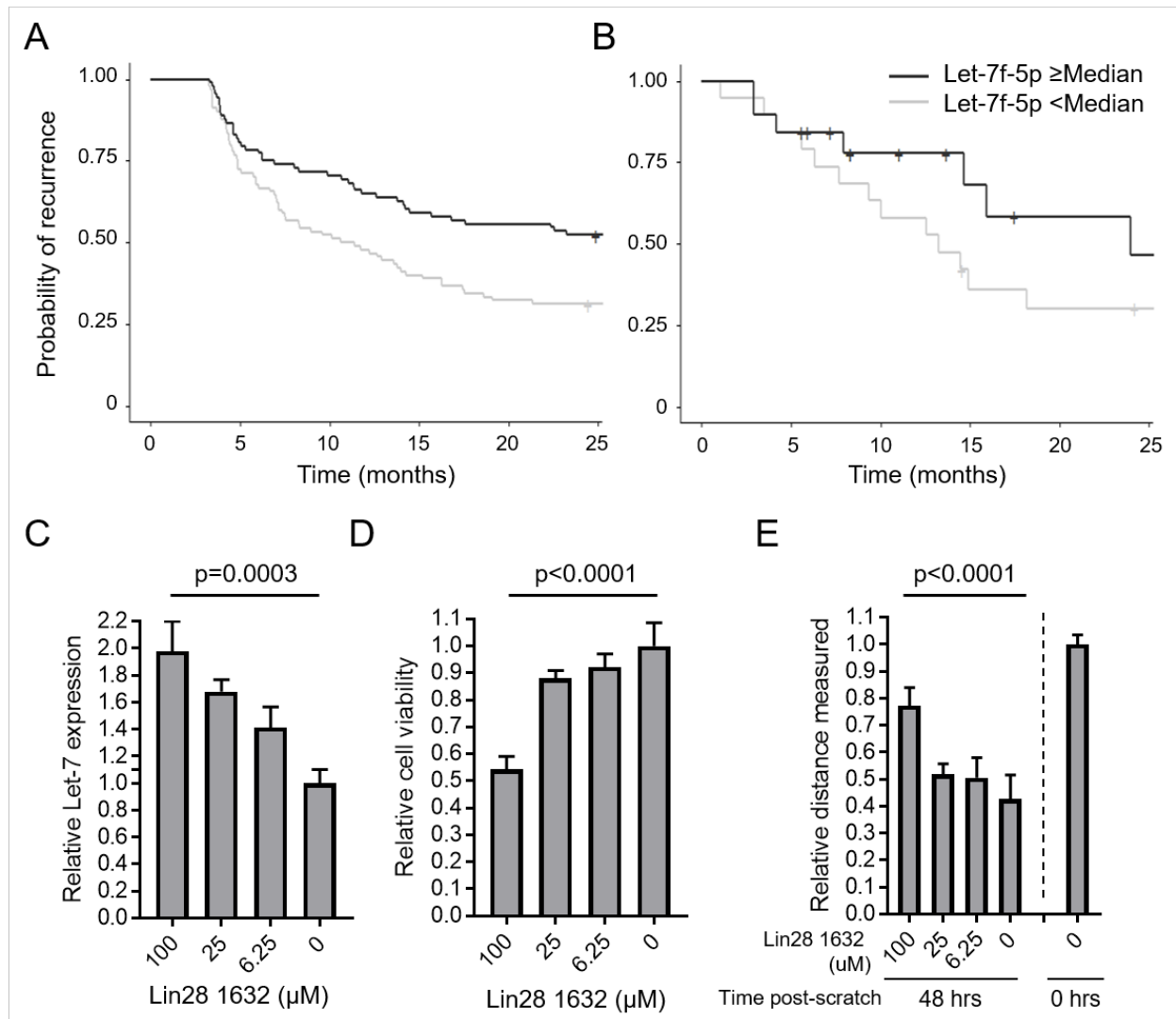
Introduction: Among patients diagnosed with non-muscle invasive bladder cancer (NMIBC), 50% to 75% experience recurrences within 6 to 12 years of diagnosis, and 10% to 30% of tumors progress to muscle-invasive disease. Non-coding RNAs, particularly the microRNAs (miRNAs), have emerged as useful prognostic biomarkers in cancer. The objective of this study was to identify reproducible prognostic miRNAs in resected non-muscle invasive bladder tumor tissue that are predictive of the recurrent tumor phenotype as potential biomarkers and molecular therapeutic targets.

Materials & Methods: Two independent cohorts of NMIBC patients from the New Hampshire Population Cohort (n=178) and Dartmouth Hitchcock Medical Center (n=38) were analyzed. Expression was assessed for ~800 miRNAs, and recurrence free survival (RFS) analyses was performed using a multivariable model adjusted for sex, age, multiplicity, tumor size, stage, and grade. Urine and plasma were obtained from available patients from the validation cohort and analyzed for miRNA expression. Lin28, a known negative regulator of Let-7f-5p, was assayed using RT-PCR, cell viability, and scratch assays in NMIBC cell line HTB-2.

Results: Survival analyses confirmed longer RFS in patients with high Let-7f-5p for both discovery and validation cohorts (p=0.011 and 0.065; **Figure 1A/B**). Let-7f-5p was found to have potential clinical utility as a biomarker, and levels in urine and plasma were both found to be significantly correlated with levels in tumor tissue (P=0.0004 and 0.014, respectively). Finally, inhibition of Lin28 significantly increased levels of Let-7f-5p expression (p=0.0003; **Figure 1C**) and led to significant inhibition of viability and migration of HTB-2 cells (both p<0.0001; **Figures 1D/E**).

Conclusions: In this study, we have identified Let-7f-5p as a novel miRNA biomarker of recurrence in NMIBC tumors, and show that patients with high Let-7f-5p have longer RFS. We further show that targeting Lin28, a negative regulator of Let-7f-5p, represents a novel therapeutic opportunity in NMIBC.

Figure 1



The impact of low- versus high-intensity surveillance cystoscopy on surgical care and cancer outcomes in patients with high-risk non-muscle-invasive bladder cancer (NMIBC)

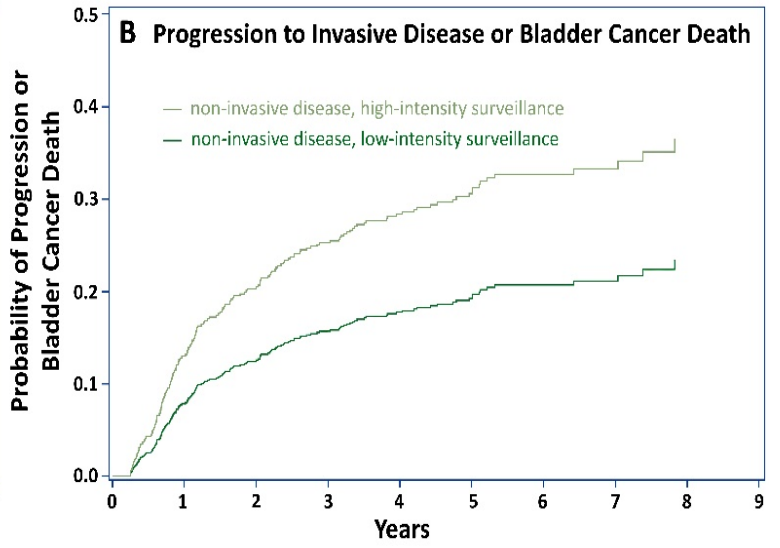
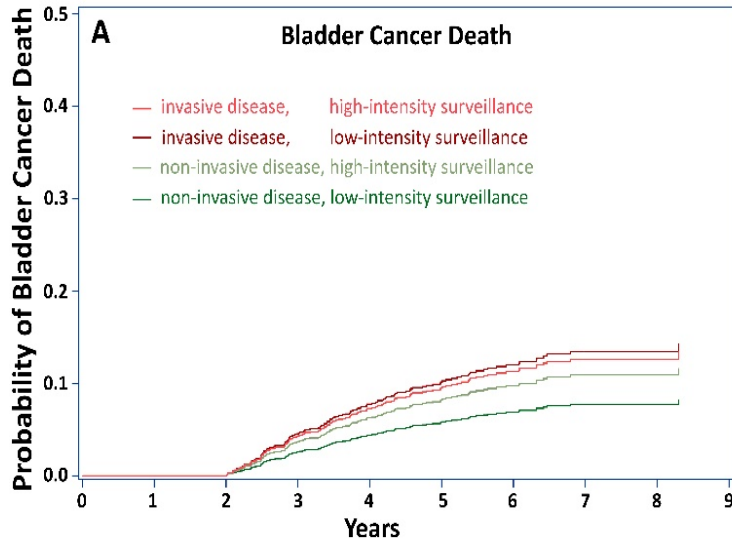
Michael E. Rezaee, MD, MPH; Kristine E. Lynch, PhD; Zhongze Li, MS; Todd A. MacKenzie, PhD; John D. Seigne, MB, BCh; Douglas J. Robertson, MD, MPH; Brenda Sirovich, MD, MS; Philip P. Goodney, MD, MS; Florian R. Schroeck, MD, MS

Introduction: Surveillance guidelines for NMIBC are based on expert opinion and informed by limited evidence. Our objective was to assess the association of low- vs. the guideline-recommended high-intensity cystoscopic surveillance with outcomes.

Methods: Retrospective cohort study of Veterans Affairs patients diagnosed with high-risk NMIBC between 2005 and 2011 with follow-up through 2014. Patients were categorized by number of surveillance cystoscopies over two years following diagnosis: low- (1-5) vs. high-intensity (6 or more) surveillance. Propensity score adjusted regression models were used to assess the association of low-intensity cystoscopic surveillance with outcomes, including frequency of transurethral resections, risk of bladder cancer death, and risk of progression to invasive disease.

Results: Among 1,542 patients, 520 (33.7%) underwent low-intensity cystoscopic surveillance. Patients undergoing low-intensity surveillance had fewer transurethral resections overall (37 vs. 99 per 100 person years; $p < 0.001$), resections with cancer in the specimen (28 vs. 77 per 100 person years, $p < 0.001$), and resections without cancer in the specimen (7.5 vs. 16 per 100 person years; $p < 0.001$). Low vs. high-intensity surveillance was not associated with risk of bladder cancer death among patients with non-invasive (cumulative incidence [CI] 5.8% vs. 8.3% at 5 years, $p = 0.27$) or with invasive disease at diagnosis (CI 10.3% vs. 9.6% at 5 years, $p = 0.75$, Figure A). Among patients with non-invasive disease, low-intensity surveillance was associated with a decreased risk of progression or bladder cancer death (CI 20% vs. 31% at 5 years, $p = 0.003$, Figure B).

Conclusions: Patients with high-risk NMIBC undergoing low- vs. high-intensity cystoscopic surveillance underwent fewer transurethral resections, but did not experience an increased risk of progression or bladder cancer death. These findings suggest that less intensive surveillance might be reasonable for patients with high-risk NMIBC. However, a prospective randomized study is needed to assess whether decreasing the surveillance frequency among patients with high-risk NMIBC is safe.



7. Rezaee, M