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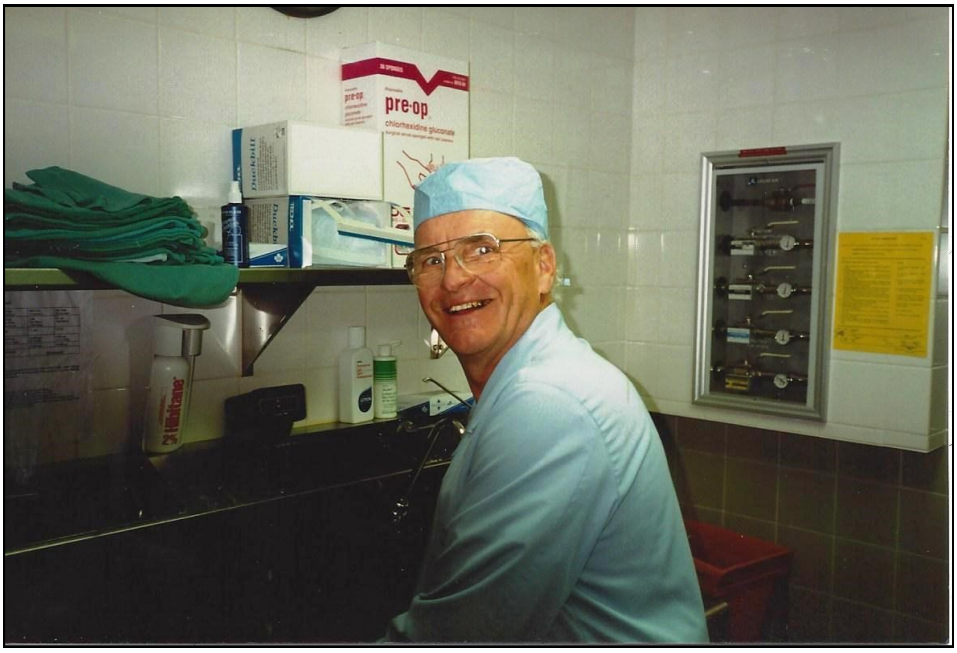
JACK WYATT UROLOGY RESIDENTS' RESEARCH DAY

April 29, 2016

Syllabus

Western

Dr. John Kenneth Wyatt



John Kenneth Wyatt was born in Detroit, Michigan and grew up in London, Ontario where he attended the University of Western Ontario, graduating in Medicine in 1954. While an undergraduate at Western, Jack excelled in many sports and was captain of the Western Mustangs football team.

Dr. Wyatt completed his General Surgery and Urology training in London and joined the small Urology faculty here in 1960. He published one of the first papers on the beneficial effects of chemotherapy for testis cancer. Dr. Wyatt steadily built the UWO Urology Program, serving as the Program Director and Division Chair for 15 years. He was best known for his clinical acumen and his caring attitude towards his patients as well as his residents. An excellent clinical teacher, Dr. Wyatt was well-known for his common touch and sense of humor, whether he was lecturing to medical students, doing bedside or operating room teaching, or chatting with the janitor. Dr. Wyatt was an active contributor to the Royal College and the Canadian Urological Association, serving as CUA President in 1984.

Dr. Wyatt passed away December 6, 2004. We continue to honor his memory through our Annual Residents' Research Day.

Western University
Jack Wyatt Urology Residents' Research Day 2016

RESIDENTS:

PGY5
Adiel Mamut
Stephanie Tatzel

PGY4
Jeffrey Campbell
Victor McPherson
Siobhan Telfer

PGY3
Garson Chan
Melissa Huynh
David Mikhail

PGY2
Justin Kwong
Nahid Punjani
Wen Yan Xie

PGY1
Harmenjit Brar
Roderick Clark
Alex Jiang

FELLOWS

Raidh Alzubaidi — Andrology

Husain Alenezi — EndoUrology
Marie Dion — EndoUrology
Daniel OlveraPosada — EndoUrology

Omar Ali — Transplant
Bijad Alharbi — Transplant

Khurram Siddiqui — Uro-Oncology
Kim-Chi Tran — Uro-Oncology

GUEST PROFESSOR 2016

Philipp Dahm

M.D.

Dr. Philipp Dahm completed his residency training at Duke University Medical Center (1996-2002) where he went on to join the faculty (2002-2006) and completed a Masters degree for Health Services in Clinical Research. After eight years at the University of Florida in Gainesville, Florida as Associate Professor (2006-2011), Professor of Urology (2011-2014) and Program Director (2011-2014) he joined the Minneapolis Veterans Administration Medical Center as Director of Research and Education for Surgical Services and the Department of Urology at the University of Minnesota as Professor of Urology and Vice Chair of Veterans Affairs in 7/2014.

His clinical and research focus are in urological oncology. He has a longstanding interest in promoting evidence-based medicine and has been a faculty of the renowned workshops at Duke, McMaster, and Oxford University on how to teach evidence-based clinical practice. He serves as the Coordinating Editor of the Urology Review Group for the Cochrane Collaboration (http://www.cochrane.org) and is an inaugural member of the US GRADE Network for the GRADE Working Group (http://www.gradeworkinggroup.org). Lastly, he is Steering Group Member and the Urology Lead of the IDEAL Collaboration (http://www.ideal-collaboration.net/) that strives to improve how surgeons conduct clinical research.

Western University
Jack Wyatt Urology Residents' Research Day 2016

This program was supported in part by educational grants from the following:

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JK Wyatt Urology Residents' Research Day

Friday, April 29, 2016
at the: Double Tree by Hilton, 300 King St., London, ON

AGENDA

7:00 – 8:00	Registration and Continental Breakfast	
8:00 – 8:15	Welcome and Introductions: Dr. H. Razvi and Dr. S. Dave	
SESSION I	**Oncology Moderator: Dr. Joseph Chin**	
8:15 – 8:30	A.Mamut:	Pathologic Evaluation of Non-Tumor Renal Tissue Predicts Renal Function Post Radical Nephrectomy
8:30 – 8:45	D.OlveraPosada:	The Impact of Multiple Prostate Biopsies on Radical Prostatectomy Outcomes: A Population-Based Analysis
8:45 – 9:00	G.Chan:	Use of Cumulative Summation (CUSUM) as a Tool for Early Feedback and Monitoring in Robot Assisted Radical Prostatectomy Outcomes and Performance
9:00 – 9:15	S.Tatzel:	The Impact of Teaching on the Duration of Common Urologic Operations
9:15 – 9:45	K.Siddiqui:	Invadopodia are Critical for Prostate Cancer Metastasis
9:45 – 10:15	Refreshment/Health Break	
SESSION II	**Endourology/Stone Disease Moderator: Dr. Stephen Pautler**	
10:15 – 10:30	M.Dion:	The Impact of Dietary Sodium on 24-Hour Urinary Indices in Patients at a Metabolic Stone Clinic
10:30 – 10:45	H.Alenezi:	Is the Prolonged Use of a Ureteral Access Sheath Safe?
10:45 – 11:00	S. Telfer:	Impact of Percutaneous Nephrolithotripsy on Early and Long-term Renal Function in Patients with a Solitary Kidney
11:00 – 11:15	S. Ali:	The Development of Novel Drosophila Melanogaster Models for Human Nephrolithiasis
11:15 – 11:30	M. Huynh:	Risk Factors for and the Prognosis of Nephrocalcinosis and Renal Stones in Infants
11:30 – 12:30	**Guest Professor: Dr.Philipp Dahm** *Trials, Systematic Reviews and Clinical Practice Guidelines on Medical Expulsive Therapy: What to Believe in 2016?*	
12:30 – 1:30	LUNCH	
1:30 – 2:00	**Jeremy Burton:**	Why Should Urologists Care About the Microbiome?

SESSION III **Reconstruction and Pediatrics Moderator: Dr. Sumit Dave**

2:00 – 2:15	R. Clark:	The Impact of Steroid Use on Artificial Urinary Sphincter Reoperation
2:15 – 2:30	J. Kwong:	Quality of Administrative Data Studies in Urology: A Review
2:30 – 2:45	N. Punjani:	Does Post-Operative Urinary Retention Predict Future Mid-Urethral Sling Complications?
2:45 – 3:00	Debate - A. Jiang vs H.Brar: Antibiotic Prophylaxis for VUR: Is it Necessary or Harmful?	
3:00 – 3:30	Refreshment/Health Break	
3:30 – 4:15	**Guest Professor: Dr. Philipp Dahm** *Evidence-Based Medicine in Urological Research and Education*	

SESSION IV **Basic Science and Transplantation Moderator: Dr. Patrick Luke**

4:15 – 4:30	D.Mikhail:	Clinical Significance of Isolated v1 Arteritis in Renal Transplantation
4:30 – 4:45	M. Elshatoury:	Development of Novel Botox Delivery Mechanisms in a Rat Model
4:45 – 5:00	W. Xie:	Elevated C-peptide Levels are Associated with Acute Rejection in Patients Undergoing Simultaneous Kidney- Pancreas Transplantation
5:00 – 5:15	J.Campbell:	Matrix Metalloproteinases and Tissue Inhibitors of Matrix Metalloproteinases in the Pathogenesis of Peyronie's Disease
5:15 – 5:30	B. Alharbi:	Neuromuscular Stimulation Leads to Improved Lower Limb Edema and Blood Flow Compared to Standard Compression Devices Following Kidney and Pancreatic Transplantation
5:30		Wrap Up and Evaluations

6:30 pm Resident and Faculty Dinner (by invitation)

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*Note: Guidelines = 15 minute presentations = 10 minute presentation, 5 minute Q & A
30 minute presentations = 20 minute presentation, 10 minute Q & A
45 minute presentations = 30 minute presentation, 15 minute Q & A

This event is an Accredited Group Learning Activity (Section 1) as defined by the Maintenance of Certification program of The Royal College of Physicians and Surgeons of Canada and approved by Continuing Professional Development, Schulich School of Medicine & Dentistry, Western University (7.75 hours). Each participant should claim only those hours of credit that he/she actually spent participating in the educational program.

This year's program is intended to provide participants with:

Update on the role of the microbiome on urological health and disease
2. Incorporating evidence-based medicine into resident education and research
3. Making sense of meta-analyses findings and the impact of study results on clinical practice e.g. medical expulsive therapy for ureteral stones
4. Results of clinical and basic science research projects of the resident staff from Western University in the following subspecialty areas:
   a. Oncology b. Andrology
   c. Endourology d. Urinary voiding dysfunction
   e. Transplantation

This program was supported in part by an educational grant from the following: (list organization name(s): Abbvie Corporation, Allergan Inc., Amgen Canada Inc, Astellas Pharma Canada, Inc., AstraZeneca Canada Inc., Boston Scientific, Coloplast Canada, Janssen Inc, Karl Storz Endoscopy Canada Inc, Mylan EPD, Novartis, Olympus Medical Systems Group, Paladin, Pendopharm, Pfizer, Sanofi Aventis Canada Inc., Takeda Canada Inc., Trudell Medical Marketing Limited

PATHOLOGIC EVALUATION OF NON-TUMOR RENAL TISSUE PREDICTS RENAL FUNCTION POST RADICAL NEPHRECTOMY

A Mamut, R Clark, G Abrahim, F Cui, N Rowe, P Luke, M Gabril, M Moussa

Introduction and Objective:
Recent studies have demonstrated that the evaluation of non-neoplastic renal parenchymal tissue post partial nephrectomy may predict future renal function. We assessed the predictive role of non-neoplastic renal pathology in a cohort of patients with normal pre-operative renal function who underwent radical nephrectomy for a renal mass.

Methods:
All local patients with a normal contralateral kidney who underwent radical nephrectomy between April 2002 and May 2008 were identified. Patients with missing clinical data or pre-operative chronic kidney disease (CKD), defined as Glomerular Filtration Rate (GFR) $<60mL/min/1.73m^2$) were excluded. Pathology slides were re-reviewed by a genitourinary pathologist (MM) for presence of Glomerulosclerosis (GS), Interstitial Fibrosis (IF), Tubular atrophy (TA), and arterial narrowing (AN) which were correlated with pre and post-op renal function. Student's t test and logistic regression were used to assess statistical significance.

Results:
Ninety seven patients met inclusion criteria and had tissue available for pathology review. GS, IF, TA and AN was present in 70%, 44%, 44% and 96% of patients, respectively. The presence of IF and TA was associated with relatively reduced renal function both pre-op and at one year ($p<0.0001$). Patients with GS demonstrated significant decline in renal function at 1 year ($p<0.0001$) despite normal pre-operative renal function. Of the assessed clinical conditions, only hypertension and coronary artery disease were associated with poor post-op renal function on logistic Regression ($p=0.04$ and 0.04). Evaluation of non-tumor renal tissue at the time of radical nephrectomy offers valuable predictive information regarding post-operative renal function.

Conclusion:
Significant pathological findings were common in our patient cohort. Our data suggest an ongoing role for pathological evaluation of non-neoplastic renal tissue in nephrectomy specimens. The overall impact of pathological evaluation needs to be evaluated in a larger cohort using multi-variable analysis.

THE IMPACT OF MULTIPLE PROSTATE BIOPSIES ON RADICAL PROSTATECTOMY OUTCOMES: A POPULATION-BASED ANALYSIS

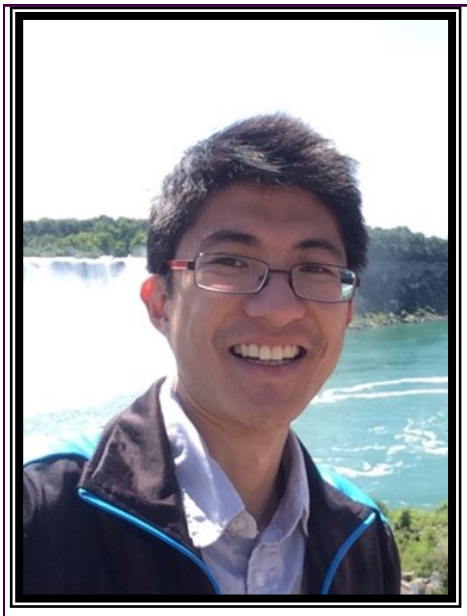
D Olvera-Posada, B Welk, JA McClure, J Winick-Ng, J Izawa, S E. Pautler

Background:
The impact of multiple transrectal ultrasound-guided prostate biopsies (TRUS-Bx) on the complexity of radical prostatectomy (RP) remains unknown. Data analyzing the effect of multiple previous biopsies in surgical outcomes is sparse and no information about immediate postoperative outcomes is available. We evaluated the impact of repeated TRUS-Bx before RP on surgical outcomes.

Methods:
A population-based cohort study was designed to compare surgical outcomes between patients with one previous biopsy to patients with ≥ 2 biopsies before RP. All patients who had a RP performed in the province of Ontario from April 1, 2002 to March 31, 2013 were categorized a ccording to the number of prior TRUS-Bx. The primary end point was a composite complication index encompassing the need of postoperative treatment of urinary or rectourethral fistula, intestinal diversion, upper urinary tract obstruction or ureteral injury. Secondary outcomes included functional and health care related. Follow-up time for all outcomes ranged from 12-24 months.

Results:
Among 27,637 patients, 4780 (17.3%) had ≥ 2 biopsies performed before RP. The proportion of cases who experienced the composite end point was similar between patients with one TRUS-Bx compared to those with ≥ 2 TRUS-Bx (1.1% vs 1.2%, $p = 0.38$). Patients with ≥ 2 biopsies were more likely to have a blood transfusion during RP hospitalization compared to patients with only one biopsy (15.5% vs 12.8%, OR 1.25 95% CI 1.15-1.37, $p < 0.01$), while readmission rate and 30 -day mortality were similar (3.6% vs 3.3% $p = 0.35$, 0.2 vs 0.1% $p = 0.43$). Patients with multiple TRUS-Bx were more likely to require post RP urodynamic evaluation (OR 1.53, 95% CI 1.23-1.91, $p < 0.01$) but were not at increased risk of incontinence or erectile dysfunction invasive therapies.

Conclusions:
Perioperative outcomes after RP are similar between men with single or mutiple TRUS-Bx. Multiple TRUS-Bx before RP is associated with slightly increased risk of perioperative blood transfusion and postoperative urodynamic evaluation. This information can be used to counsel patients about similar postoperative outcomes after RP despite having multiple biopsies, including those under AS protocols.



USE OF CUMULATIVE SUMMATION (CUSUM) AS A TOOL FOR EARLY FEEDBACK AND MONITORING IN ROBOT ASSISTED RADICAL PROSTATECTOMY OUTCOMES AND PERFORMANCE

G Chan, MS Dion, SE Pautler

Background:
The modern clinical surgical practice has evolved under the increasing scrutiny of objective, continuous and transparent measures of quality assurance in all surgical procedures. Many forms of objective monitoring have been suggested, but it may often be impractical or difficult to implement. Cumulative Summation (CUSUM) techniques are a simple and adaptable method to provide rapid analysis of trends in contemporary surgical procedures before significant quality issues arise. This method-ology has only recently been applied to medicine with limited reports in the urological literature.

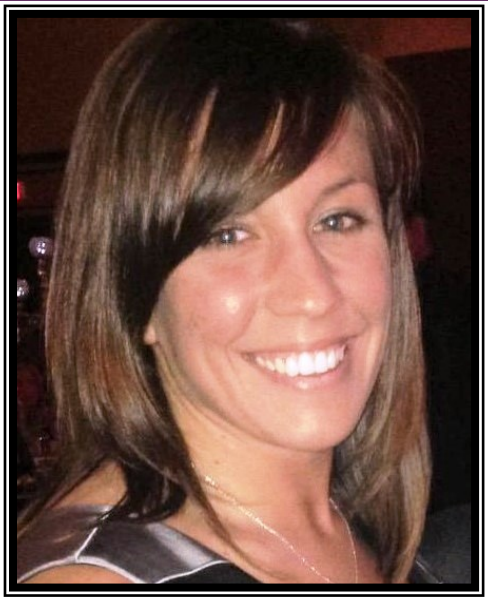
Aims:
To accurately evaluate, and benchmark the ongoing performance and identify the response of performance to changes in technique or intervention on a single surgeon basis.

Methods:
CUSUM analysis was applied to a retrospective analysis of prospectively collected database of 577 sequential patients who have undergone robot-assisted radical prostatectomy (RARP) for prostate cancer from single surgeon over a 10 year period. Outcomes and performance measures were identified and collected to be analysed including a composite complication score, continence rates, length of hospital stay, biochemical recurrence, and need for adjuvant radiation. CUSUM charting was used to assess surgeon performance and outcomes in comparison to acceptable standards from the literature. If performance is unacceptable, the CUSUM slopes upward. Any sustained slope changes are signals providing early identification that a quality issue might exist.

Results:
CUSUM chart plotting for over 500 patients demonstrated an initial upward followed by either flattening trends or a downward slope to a new safety limit. There was an initial upward slope overall in the CUSUM outcomes followed by a flattening trend and then a downward slope. This reflects the initial learning curve for RARP and then an indication of ongoing maintenance and improvement in performance. Length of stay outcomes approached and crossed the upper limits followed by a decreasing slope. This could be attributable to the post operative patient care adjustment of this new procedure at the hospital. This trend was also seen in outcomes for adjuvant radiation as well. The downward slope for biochemical recurrence was maintained throughout the 10 year period. Incontinence outcomes predictably had an initial upward slope seen during the learning curve and several subsequent downward slopes consistent with new implementation of surgical techniques. These trends were useful as alerts and indicators to ensure adequate patient selection. This affirmed desirable competency of surgeon performance and patient selection despite complex patients at a high volume tertiary referral centre.

Conclusion:
CUSUM is a dynamic and versatile technique that allows for early identification and continuous measurement in surgical outcomes that can be applied to many procedures. It allows accountability to our patients and health resources and timely response to changes in quality and patient safety outcomes.

THE IMPACT OF TEACHING ON THE DURATION OF COMMON UROLOGIC OPERATIONS



B Welk, J Winick-Ng, A McClure, **S Tatzel**, C Vinden, S Dave, S E Pautler

Introduction:
The ability of academic (teaching) hospitals to offer the same level of efficiency as non-teaching hospitals is unknown. Our objective was to compare the operative duration of general urology procedures between teaching and non-teaching hospitals.

Methods:
We used administrative data from the province of Ontario to conduct a retrospective cohort study of all adults who underwent a specified elective urology procedure (2002-2013). Primary outcome was duration of surgical procedure. Primary exposure was the type of hospital (academic or non-teaching). Negative binomial regression was used for adjusted relative time estimates.

Results:
114,225 procedures were included (midurethral sling=15,707, transurethral prostatectomy=56,066, hydrocele repair=7,221, circumcision=12,280, and open radical prostatectomy=22,951). These procedures were performed in an academic hospital in 21%, 17%, 13%, 15%, and 29% of cases, respectively. The mean operative times for all procedures was higher in academic centers; the additional operative time ranged from 8.3 minutes (circumcision), to 29.2 minutes (radical prostatectomy). In adjusted analysis (accounting for age, comorbidity, obesity, anesthetic, and surgeon/ hospital case volume), the patients treated in academic hospitals continued to have procedures that were significantly longer (by 10-21%). These results were the similar in sensitivity analyses which adjusted for the potential effect of more complex patients being referred to tertiary academic centers.

Conclusions:
Five common general urology operations take significantly longer to perform in academic hospitals, and this should be accounted for in hospital funding models. The reason for this may be due to the combined effect of teaching students and residents, or due to inherent systematic inefficiencies within large academic hospitals

INVADOPODIA ARE CRITICAL FOR PROSTATE CANCER METASTASIS

K Siddiqui, M Arora, Y Kim, P Telmer, D DiSantis, E Jardine, J Chin, J Izawa, H Leong

Introduction and Objectives:
Cancer cell extravasation may be a targetable step in the metastatic cascade in prostate cancer patients. If the mechanisms responsible for this key step of cancer metastasis were elucidated then antagonizing this step with small molecules could halt further spread of prostate cancer metastases, delaying onset to tertiary and quaternary metastases which are responsible for patient death. We have shown previously that inhibition of Tks4 and Tks5 expression can block invadopodia formation in metastatic cancer cells, leading to the inability of these cells to undergo trans-endothelial migration and hence cancer cell extravasation, abrogating metastatic colony formation in vivo. We sought to determine if this was also the case in metastatic prostate cancer cells.

Methods:
We used commercially available metastatic prostate cancer cell line (PC3MLN4 and LNCAP). The genes expressing Tks4 and Tks5 were identified by using primers which were tested for efficiency using PCR. Lentiviral infection was performed to knockdown 4 clones each for Tks4 and Tks 5 for both the cell lines. We assessed the gene knock down efficiency by the standard qRT-PCR technique. Using CAM-model we then assessed the extravasation efficiency of these cells (labeled with green fluorescent protein) using confocal microscopy.

Results: Using PC-3M-LN4 and LNCaP metastatic prostate cancer cells, we knocked down Tks4 and Tks5 mRNA levels with RNAi to 64% and 78% of control levels respectively. In our model of in vivo cancer cell extravasation, we determined that extravasation rates dropped to 12+/-3% and 3.4+/-1.6% compared to 37.3+/-5.8% in empty vector controls with the PC-3M-LN4 cell line. When the same cells were used to understand the impact on metastatic colony formation, 12.3+/-4.6 and 0.4+/-1.2 colonies were observed (N>8/group) for shTks4 and shTks5 PC-3M-LN4 cells compared to 47+/-9 in shLUC control cells. However, when in vitro gelatin-Alexa594 ECM degradation assays were performed, no degradation signal voids were observed in any of the cell lines including the controls. Instead, we performed intravital imaging experiments to determine the incidence of cell protrusions at t=5 hours post injection, revealing few to no cells forming protrusions in vivo whereas the control cells formed protrusions in 10% of cells at that time point.

Conclusions: Blocking the expression of Tks4/5 in prostate cancer cells abrogated cancer cell extravasation leading to no metastatic colonies formed in vivo. These findings suggest that targeting key steps of the metastatic cascade may be a realistic approach for advanced prostate cancer treatment.

THE IMPACT OF DIETARY SODIUM ON 24-HOUR URINARY INDICES IN PATIENTS AT A METBOLIC STONE CLINIC

M Dion, D Olvera-Posada, H Alenezi, J Denstedt, H Razvi

Introduction and Objectives:
Dietary sodium restriction has been demonstrated in clinical trials to reduce the risk of nephrolithiasis. Urinary sodium as measured by 24-hour urine analysis correlates with daily sodium intake. High sodium intake is associated with hypercalciuria, hyperoxaluria, and hypocitraturia. The purpose of our study was to determine the impact of elevated urinary sodium levels on hypercalciuria in patients at metabolic stone clinic.

Methods:
A prospectively collected database of metabolic stone clinic patients from September 2001 to October 2015 was reviewed. Patients were excluded if they had incomplete 24-hour urine collections based on urinary creatinine levels or missing data. The proportion of patients with elevated urinary sodium was determined. In patients with a second 24-hour urine collection we assessed the proportion of patients with resolution of hypercalciuria based on normalized urinary sodium levels. A multivariate logistic regression was completed to assess variables which significantly impacted hypercalciuria.

Results:
In 914 patients with initial 24-hour urine analyses 189 (20.7%) had elevated urinary sodium levels. Of these patients 81 (42.9%) also demonstrated hypercalciuria which was twice as high as the rate of hypercalciuria in the overall population (21.9%). In 393 patients with two initial 24-hour urine analyses 66 patients had elevated urinary sodium. On the second collection 32 (48.5%) of these patients had normalized urinary sodium levels and the rate of hypercalciuria decreased from 32.3% to 19.3%. In patients with an initial normal sodium 31 (9.5%) had sodium elevation on subsequent 24-hour urine resulting in an increased rate of hypercalciuria from 13.6 to 35.5%. On multivariate logistic regression of 1229 24-hour urine samples elevated urinary sodium resulted in a statistically significant increase in hypercalciuria with an odds ratio of 2.54 (95% CI 1.74 – 3.70, $p<0.001$).

Conclusions:
Elevated urinary sodium is a common finding at metabolic stone clinic and can have a significant impact on hypercalciuria and subsequent recurrence of stone disease. Patients should be counselled regarding the importance of dietary salt restriction and a significant rate of resolution of hypercalciuria anticipated in those patients able to decrease salt intake.

IS PROLONGED USE OF URETERAL ACCESS SHEATH SAFE?

H Alenezi, C Howlett, A El-Warrak, D Olvera-Posada, M Dion, H Razvi, J Denstedt

Introduction:
Flexible ureteroscopy (fURS) utilization in the treatment of large and complex upper tract urolithiasis is rising, leading to longer operative times. Ureteral access sheath (UAS) is a widely used ancillary instrument during fURS. UAS can be associated with direct trauma to the ureter together with decreased blood supply due to compression of the ureteral wall. The safety of using UAS for more than 70 minutes is unknown. Our objective is to study the long-term effects of the prolonged use of UAS in an animal model.

Methods:
Twenty-two female farm pigs (weight 25- 30 kg) with a total of 44 ureters were subjected to an endoscopic procedure under general anesthesia, starting with bilateral retrograde pyelography (RGP) to exclude preexisting ureteral abnormality, followed by insertion of 35 cm 12/14 Fr UAS for 1 hour in one ureter (group 1) then for 3 hours into the contralateral ureter (group 2). Random allocation of the ureters into the groups was performed preoperatively. A single operator performed all procedures and the perceived resistance to UAS insertion was noted. After 4 weeks, bilateral RGP was performed followed by harvesting bilateral ureters, kidneys and bladder and finally euthanasia. Assessment of the RGP and gross pathological appearance of the ureters was performed to identify any ureteral stricture.

Results:
Eighteen animals survived to trial completion (36 ureters). Ureteral stricture was evident in 1 ureter (5.5%) and 5 ureters (27.7%), in groups 1 (1hr) and 2 (3hr) respectively (p= 0.177). However the strictured ureter in group 1 was found to be part of a duplex system on cross-sectioning, thus the difference in stricture rate becomes significant (p= 0.044, OR 1.417,CI 95% 1.042-1.925) when that ureter is excluded. Most of the strictures involved the lower third of ureters (n=5) and the remaining one involved the middle third of the ureter. No resistance was encountered during UAS insertion in 14 ureters (38.9%), while mild and moderate resistance were encountered in 20 ureters (55.6%) and 2 ureters (5.6%), respectively. The likelihood ratio of ureteral stricture was 7.174 with increasing resistance (p=0.028). In univariate analysis, resistance to UAS was the only significant predictor of stricture formation (p= 0.049, OR 8.9, CI 95% 1.01-78.47).

Conclusion:
In this study, the prolonged indwelling time of UAS was associated with increased rate of ureteral strictures, while resistance to UAS was a predictor of increased risk of ureteral strictures. Therefore, we recommend limiting the time of UAS use and avoiding UAS insertion if any resistance is encountered.

IMPACT OF PERCUTANEOUS NEPHROLITHOTRIPSY ON EARLY AND LONG-TERM RENAL FUNCTION IN PATIENTS WITH A SOLITARY KIDNEY

S Telfer, H Alenezi, M Dion, D Olvera-Posada, JD Denstedt, H Razvi

Introduction:
The impact of percutaneous nephrolithotripsy (PCNL) on renal function is an especially important consideration in stone formers with solitary kidneys. The objectives of this study were to evaluate the effect of PCNL on kidney function and further characterize patient demographics and perioperative outcomes of this unique cohort.

Methods:
A retrospective review of medical records was performed on patients with a solitary or single functioning renal unit who underwent PCNL at a single institution between 1990 and 2013. Data on early and long-term post-operative renal function were collected and analyzed. Patient demographics and perioperative factors were compared to our larger cohort of PCNL patients and evaluated as potential predictors of post-operative renal function.

Results:
Of 2318 patients, there were 76 PCNL events for patients with a solitary renal unit (40 female and 36 male). Long-term data (over 2 years post-operatively) was available for 48 PCNL events (24 female and 24 male).

Estimated glomerular function (eGFR) slightly worsened in the early post-operative period, from 51 ± 2.9 to 47 ± 2.7 ml/min/1.73m^2 ($p < 0.01$). In the long-term however, eGFR improved, from 48 ± 3.7 to 57 ± 5.9 ml/min/1.73m^2 ($p < 0.02$). Predominant stone compositions included 19.7% cysteine, 19.7% calcium oxalate monohydrate and 11.8% and struvite.

Compared to the larger cohort of PCNL patients, age, sex, complications, and stone free rates were consistent. Patients with solitary kidneys had more medical co-morbidities (64.7% vs 45%), with higher rates of diabetes (18.4% vs 13%) and pre-existing renal impairment (18.4% vs 3%).

Univariate analyses of patient age, sex, comorbidities, stone composition, stone size, number of tracts and stone free rates were unable to identify a significant predictor of early and long-term post-operative renal function.

Conclusions:
These results show that while in the early post-operative period renal function slightly declines, it recovers in the long-term post PCNL for patients with solitary kidneys. Based on these findings, PCNL correlates with overall improved long-term renal function in patients with solitary kidneys.

Given the higher rate of pre-existing medical co-morbidity and likely history of recurrent stone disease (high rates of cysteine and struvite stones), this solitary kidney cohort is presumably a high-risk population for future renal impairment. This further emphasizes the need to preserve renal function with PCNL in stone formers with solitary kidneys.

THE DEVELOPMENT OF NOVEL DROSOPHILA MELANOGASTER MODELS FOR HUMAN NEPHROLITHIASIS

S Naushad Ali, J Kim, D Kim, T Tailly, H Razvi, HS Leong

Background:
Nephrolithiasis is a common urological disorder, however, research is limited due to lack of viable preclinical models. Recently, *Drosophila Melanogaster* (DM), has emerged as a powerful trans-lational model. Here, we describe the development of novel DM models for calcium oxalate, uric acid and cystine nephrolithiasis including innovative applications such as intravital imaging and large scale high throughput drug screening.

Materials & Methods:
DM models for calcium oxalate, uric acid and cystine were developed using simple dietary manipulation, genetic knockdown of *uricase* enzyme and SLC7A9 co-transporter respectively. Survival analyses, SEM/EDX to characterize stone morphology and composition plus intravital imaging studies were carried out using confocal microscopy in all DM models. Each model was subjected to high throughput drug screening with an experimental library of 360 using a novel indirect platform.

Results:
We have successfully developed DM models for calcium oxalate, uric acid and cystine nephron-lithiasis. All models have been verified via survival and SEM/EDX analysis. *Ex vivo* and *in vivo* visualization of stone formation was successful in the calcium oxalate, uric acid and cystine models. 7 drug candidates that reduce calcium oxalate stone formation in DM have been identified.

Conclusions:
DM is a viable model for human nephrolithiasis. All developed models are robust and reproducible. We describe unique imaging modalities to study stone formation both *ex vivo* and *in vivo*. We have also developed an innovative high throughput platform for large scale library drug screening and demonstrate the potential for translational research in this unique model.

RISK FACTORS FOR AND THE PROGNOSIS OF NEPHROCALCINOSIS AND RENAL STONES IN INFANTS

M Huynh, R Clark, J Li, S Dave

Purpose:
To identify risk factors associated with nephrocalcinosis and/or urolithiasis in neonates and to determine the outcome of these conditions.

Methods:
After obtaining ethics approval from the institutional REB, we performed a case control study using the NICU database to identify all cases of nephrocalcinosis or renal calculi in infants between January 2002 and December 2014. The diagnosis of nephrocalcinosis or renal calculi was confirmed on ultrasound reports. Age and gender matched controls were obtained from the same database, and controls had at least 1 renal/abdominal ultrasound performed during the same time period. The following parameters, identified on a literature review, were examined as potential risk factors for nephrocalcinosis and/or renal calculi: prematurity (gestational age less than 37 weeks), low birth weight (less than 2500 g), small for gestational age (less than 10^{th} percentile), use of nephrotoxic drugs, respiratory factors (duration of ventilation, oxygen requirements, surfactant and antenatal steroid use), TPN, any surgeries, history of UTIs, biochemical profile in the neonatal period (creatinine, urinary creatinine, urinary calcium, urinary Ca/Cr ratio at presentation and most recent values), and history of maternal hypertension. Unadjusted odds ratios will be estimated for these risk factors. Time to resolution of nephrocalcinosis and/or renal calculi, as eventual renal function and blood pressure status on last follow up was assessed.

Results:
We identified 26 cases of nephrocalcinosis or renal calculi during our study duration (NC- 16, Calculi-14). Twenty-two of the 26 index cases had corresponding controls, which met our matching criteria. 8 of the index cases developed hypertension, and 6 resolved. 18 of the patients with nephrocalcinosis or renal calculi had resolution documented on ultrasound, with a median time of 13 months to resolution (range 0.5-50). Risk factor analysis results are pending and will be added to the presentation.

Conclusion:
The majority of renal calcification in neonates resolves spontaneously without surgical intervention. The mean time to resolution is 13 months, without untoward long-term consequences in terms of hypertension or renal function impairment. Risk factor analysis results are pending.

THE IMPACT OF STEROID USE ON ARTIFICIAL URINARY SPHINCTER REOPERATION

R Clark, J Winick-Ng, A McClure, B Welk

Introduction and Objectives:
Artificial urinary sphincters (AUS) are used treat male stress incontinence, often following radical prostatectomy. Previous research has suggested that 1 in 4 men require a second AUS-related operation after 5 years, due to AUS complications or recurrent incontinence. Corticosteroids are associated with impaired wound healing and infections in the surgical setting, and are commonly used in the treatment of metastatic prostate cancer, and for various inflammatory diseases. The objective of this study was to determine if oral corticosteroid use was associated with an increased risk of AUS related reoperation.

Methods:
We used administrative data from the province of Ontario, Canada to conduct a retrospective cohort study. Our population was men >65 years of age, who underwent implantation of an incident AUS between April 1st 2002 and December 31st 2013. Our primary outcome was the first reoperation on the AUS for any reason. Our primary exposure was defined as a filled prescription for an oral corticosteroid at the time of AUS implantation, or during follow-up (but prior to any AUS reoperation); we considered men to be exposed from the first day of the prescription to 180 days after the last day of medication. Our primary analysis was a cox proportional hazards model with steroid usage as a time varying covariate.

Results:
We identified 747 men, (median age 71, IQR 68-75), of which 592 (79.3%) had a prior radical prostatectomy, and 29 (3.9%) had prior primary radiation therapy for prostate cancer. The median cohort follow-up was 3.2 (IQR 1.3-5.9) years. 175/747 (23.4%) were exposed to corticosteroids during the study period (median duration of prescription was 22.0 days, IQR 5.0-133.0). We identified an initial AUS reoperation in 176/747 men (23.5%) a median of 1.4 years (IQR 0.4-3.0) after implantation. In our primary analysis, with adjustment for age, radiation exposure, and year of implantation, the hazard ratio for subsequent reoperation on the AUS among steroid users was 1.75 (95% CI 1.08-2.84, p=0.02).

Conclusions:
To our knowledge this is the first observational study to demonstrate the significant increased risk in reoperation among men taking oral corticosteroid. This risk factor should be considered in patient counselling, and further studies evaluating the specific utilization patterns of steroids and their association with AUS complications may be warranted. Given the potential cost and morbidity associated with AUS reoperation, potential strategies for reducing the harmful effects of steroids on wound healing (such as retinoid supplementation) could be further studied among AUS patients on corticosteroid therapy.

QUALITY OF ADMINISTRATIVE DATA STUDIES IN UROLOGY: A REVIEW

J Kwong, B Welk

Introduction and Objective:
Administrative data is a powerful tool for researchers. Using this data to conduct studies is often rapid, cost efficient, and pop-ulation based. In urology, the use of administrative databases for research has grown substantially over the last several years. However, there are important aspects of these administrative data studies that should be considered in judging their quality and validity. In 2015, the Reporting of studies Conducted using Observational Routinely-collected health Data (RECORD) checklist was published as a guideline to improve the reporting of administrative data studies. Using the RECORD checklist as a guideline, we assessed the current status of administrative studies in the urologic literature.

Methods:
We manually identified all administrative data studies published in Journal of Urology (J Urol), European Urology (EU) and New England Journal of Medicine (NEJM) in 2014. Data from J Urol and EU were combined, representing a cross section of the urologic literature from two well respected journals. Using the RECORD checklist, we assessed the level of reporting of each administrative data study. Data was summarized using descriptive statistics.

Results:
Of 839 articles reviewed, 73 administrative data studies were identified (41 J Urol, 16 EU, 16 NEJM). On average, J Urol and EU articles reported 53.7% of all items on the RECORD checklist while NEJM articles reported 45.7% of all items on the RECORD checklist. Among all checklist items, J Urol and EU articles most consistently reported the study time frame (94.7%) and extent to which the authors could access the population database (86.0%). NEJM most consistently reported the study time frame (93.8%) and access to supplemental information (93.8%). Few articles explained data linkage or discussed data cleaning.

Conclusion:
To our knowledge, this is the first study to quantify and assess the current status of administrative data studies in the urologic literature. Our review indicates specific areas that should be considered for those reading or reviewing studies based on administrative data.

DOES POST-OPERATIVE URINARY RETENTION PREDICT FUTURE MID-URETHRAL SLING COMPLICATIONS?

N Punjani, J Winick-Ng, B Welk

Introduction and Objective:
Midurethral slings are the gold standard for treatment of stress urinary incontinence. Transvaginal mesh has received significant attention with respect to future complications which may necessitate future intervention and/or removal. Limited data exists regarding predictive factors, and therefore the goal of our study was to look at post-operative urinary retention and also urinary tract infection as predictors of future mesh complications requiring surgical intervention.

Methods:
Administrative data in Ontario, Canada between 2002 and 2013, was used to identify all women who underwent a mesh-based midurethral sling. The primary outcome was future transvaginal mesh complications including erosion, fistula, removal or urethrolysis. The primary exposure was post-operative urinary retention (within 30 days of procedure) and secondary exposure was the number of post-operative serious urinary tract infections (requiring emergency room visit or hospital admission).

Results:
A total of 59,556 women with a median age of 52 (IQR 45-63) years had a midurethral sling. Of these, 1598 (2.7%) required reoperation for mesh complications. A total of 2025 (3.4%) of patients presented to the emergency department or required hospital admission for post-operative urinary retention, and of these 212 (10.5%) had future complications. A total of 11747 (19.7%) women experienced UTI requiring hospital admission or emergency department presentation, and of these 366 (3.1%) had future complications. Post-operative urinary retention was predictive of future sling reoperation on both univariate and multivariate analysis (HR 3.33, 95%CI 2.86-3.8). Similarly, post-operative serious urinary tract infections were associated with future sling reoperation, with increasing magnitude with number of UTIs both univariate and multivariate analysis (1 UTI: HR 2.41, 95%CI 2.07-2.79; 2 UTI: HR 3.32, 95%CI 2.57-4.29; 3 UTI: HR 4.01, 95%CI 3.03-5.32).

Conclusions:
Transvaginal mesh complications requiring reoperation after a midurethral sling are significantly more common among women with post-operative urinary retention as well as frequent urinary tract infections. These patients may need closer follow-up and monitoring.

A Jiang

H.Brar

ANTIBIOTIC PROPHYLAXIS FOR VUR: IS IT NECESSARY OR HARMFUL?

Dr. Alex Jiang and Dr. Harmen Brar will provide a comprehensive debate on the benefits versus risks of antibiotic prophylaxis in VUR of the paediatric population. Through a review of the literature we will defend either side with a chance to rebuttal each other's point.

CLINICAL SIGNIFICANCE OF ISOLATED V1 ARTERITIS IN RENAL TRANSPLANTATION

DM Mikhail, J Wei, D Kleinsteuber, M Gabril, A Sener, M Moussa, PP Luke

Introduction And Objective:
The presence of intimal arteritis (v) in kidney transplant biopsies establishes Grade II-III AVR (Acute Vascular Rejection) according to the Banff Classification. The clinical significance of "isolated v" lesions (v1) in this group, characterized by arteritis alone vs lesions of arteritis with tubulointerstitial inflammation (i-t-v) is unknown.

Methods:
In patients undergoing kidney transplantation between 2005-2013, 'for cause' transplant biopsies were retrospectively reviewed at our center utilizing Banff Classification. Those with Grade IIa AVR were separated into groups with isolated v1 arteritis and i-t-v. Clinical outcomes including renal function prior to and after treatment, patient graft and overall survival and post-treatment biopsy results were assessed. Statistical analysis was performed using t-test, chi-square test and z-test where appropriate.

Results:
In our review, 613 biopsies in 280 patients were performed. Of these, 110 biopsies demonstrated Grade IIa rejection in 83 patients. Fifty-one (61%) were isolated v1, while 29 (35%) were i-t-v. There were no significant differences in recipient age (46 vs 40, p=NS), donor age (42 vs 40, p=NS), PRA pre-transplant, donor status with regards to living, expanded criteria or donor brain death status between groups. Mean time from transplant to biopsy proven arteritis was not statistically significant (8mo vs 13mo, p=NS). Patients in the v1 group were more likely to have associated C4d+ (32% vs. 17%). All patients with v1 received pulsed steroids (methylprednisolone 250 mg daily x 3) only, whereas 76% i-t-v patients received thymoglobulin or IVIG in adjunct to steroids. Within the first year post-transplant, 50% of total death or graft failure events occurred in the i-t-v group, while none occurred in the v1 group. Mean time from biopsy to death or graft failure was 8mo vs. 22 mo (p=NS). At a median follow-up time of 41 months from transplant, death censored graft survival was 92% (v1) compared to 79% (i-t-v) (p=0.04) and overall survival was 98% vs 79% (p<0.004).

Conclusion:
Despite having the same Banff Classification of IIa AVR, graft survival in patients with isolated v1 rejection is markedly superior compare to those with tubulointerstitial inflammation. Modification of the Banff Criteria Grading scheme should be considered if these findings are corroborated in a larger multi-center study.

DEVELOPMENT OF NOVEL BOTOX DELIVERY MECHANISMS IN A RAT MODEL

M ElShatoury, S Dave

Introduction:
The prevalence of bladder dysfunction associated with detrusor over activity (DO) is 12-19% in patients with neurological disorders. DO leads to a reduction in patient quality of life and increases the risk of urinary tract infections. Botulinum toxin (BTX), a well described treatment for DO, is a neurotoxin produced by the bacterium *Clostridium botulinum* that inhibits acetylcholine release resulting in bladder muscle relaxation. Currently, the standard of care is intra-detrusor BTX injection. This project aims develop unique methods for BTX delivery by utilizing hydrophilic polysaccharides such a hyaluronic acid linked to phospholipid chains that coats and penetrates the bladder mucosa, increasing the efficiency of BTX delivery.

Material & Methods:
60 female Sprague Dawley rats (200-250g) were divided into 6 groups. Group 1, 2 & 3 were control groups, with group 1 & 2 receiving Botox and HA-PE instillations respectively, and group 3 receiving Botox intra-detrusor injections without instillation. In the treatment groups 4, 5 & 6, group 5 & 6 received a Botox-HA-PE combo instillation at varying doses for 60 minutes. Group 4 animals received Botox-HA-PE instillation conjugated with Alexa594. Urodynamic studies were performed pre-treatment and 2-weeks post-treatment to access response to treatment. Harvested bladder sections of animals from all groups were assessed for the presence of Botox using immunohistochemical analysis of SNAP 25 cleavage. Bladder sections of group 4 animals were analyzed with confocal microscopy.

Results:
On immunohistochemical analysis group 1 & 2 animals showed extensive staining for SNAP 25 which indicated no BTX activity. Group 3 animals showed minimal staining, which indicates SNAP 25 cleavage and the presence of BTX. In the treatment group, all groups showed varying levels of SNAP 25 cleavage, however, group 5 animals showed maximum SNAP 25 cleavage with a 1-hour instillation compared to group 6 with a higher concentration of BTX with a 30-minute instillation. Confocal microscopy of group 4 animals is currently underway. In urodynamic studies, the maximum detrusor pressure and leak point pressure were similar pre and post treatment in group 3 animals. Group 5 animals that received 5U BTX-HA-PE for 1 hour showed the best urodynamic response and was comparable to the injection group.

Conclusions:
Our study describes a novel method for delivery of BTX to the bladder in a rat model. Instillation of BTX-HA-PE shows a promising level of BTX delivery to the bladder as compared to injection, while avoiding complications associated with anesthesia and injection of BTX, such as bleeding, infection, pain at the injection site and extra-vesical injection/leakage. This study has a potential translational impact in improving the administration of BTX and treatment of patients with DO.

ELEVATED C-PEPTIDE LEVELS ARE ASSOCIATED WITH ACUTE REJECTION IN PATIENT UNDERGOING SIMULTANEOUS KIDNEY PANCREAS TRANSPLANTATION

W Xie, V McAlister, K Fiorini, A Sener, PP Luke

Introduction And Objectives:
There are few biomarkers that can predict rejection or organ failure in simultaneous kidney pancreas (SPK) transplant recipients. We hypothesized that stability of insulin or C-peptide production from the transplanted pancreas could predict impending graft rejection or failure.

Methods:
Patients who had undergone SPK transplantation with a minimum of 5 years of follow-up were identified. C-peptide levels were routinely obtained during clinic visits. Return to dependence on insulin therapy or return to dialysis was used to define pancreas and kidney graft failure respectively. Protocol biopsies of the kidneys were performed at 3-6 and 12 months as a routine. For cause biopsies were also performed. Renal allograft biopsy results were categorized as no rejection/ borderline changes, or acute rejection.

Results:
Between January 2004 and December 2010, 38 SPK transplants were performed. Eight patients were excluded due to early graft failures (thrombosis, leaks), death, and inadequate data. Eleven patients had acute rejections detected on biopsy. C-peptide levels drawn prior to documented rejections were significantly higher in patients with acute rejection than in patients with borderline/no rejection ($p=0.007$). Mean time period between C-peptide level and biopsy was 49 days for acute rejections and 55 days for borderline/ no rejections. In addition, patients who has had at least one episode of acute rejection continued to have higher c-peptide levels at 1 and 5 years post-transplant ($p<0.001$, $p<0.001$) vs. borderline/ no rejection. C-peptide instability as measured by high delta C-peptide levels was also predictive of rejection ($p<0.001$). In total, 4 patients had graft losses over the follow-up period. Four patients suffered 5 graft losses (1 kidney, 2 pancreas and 1 combined). No difference in Cpeptide level or differences in C-peptide variability were noted in patients with functional grafts vs. those suffering graft losses.

Conclusions:
SPK patients with acute rejection had higher C-peptide levels prior to biopsy vs. non-rejectors. Patients demonstrating C-peptide variability were associated with a higher risk of rejection. Further study is required to determine whether C-peptide levels can be used as a biomarker to predict rejection.

MATRIX METALLOPROTEINASES AND TISSUE INHIBITORS OF MATRIX METALLOPROTEINASES IN THE PATHOGENESIS OF PEYRONIE'S DISEASE

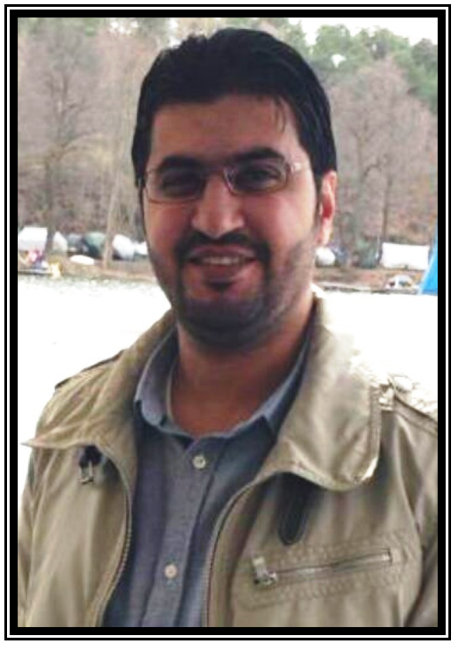
J Campbell, L DeYoung, E Chung, G Brock

Objectives:
Peyronie's disease (PD) is a fibrotic condition of penile tunica albuginea (TA). Current medical treatments lack efficacy and many men affected by this disease are dissatisfied by their outcomes. The dense plaques identified in PD result from abnormal wound healing caused by an imbalance of fibrosis and fibrinolysis. Matrix metalloproteinases (MMPs) and tissue inhibitors of matrix metalloproteinases (TIMPs) play a central role in the regulation of this dynamic process. There is a paucity of research using human penile tissue to investigate the role of fibrosis in the development of a PD plaque and the poor outcomes with current therapies mandate that we understand the true pathophysiology to help remedy this morbid disease. To investigate the role of specific proteases in PD, we examined the concentrations of MMPs, TIMPs and inflammatory cytokines expressed in cell culture media of human PD cells compared to control TA cells.

Methods:
Human tissue samples from PD plaques and normal TA where collected intraoperatively. The third passage of the primary cell cultures of PD and controls were sub-cultured on Bio Flex-Pro Nectin plates. Media obtained from these final cell cultures were collected and analyzed. We measured Interleukin-1 (IL-6) levels with aliquots of cell culture media using an enzyme-linked immunosorbent assay. The protein concentrations of MMP1, 2, 3, 7, 8, 9, 10, 11 and 12; TIMPS 1, 2, 3, and 4; and TGF β1, 2 and 3 were measured in the cell culture media using multiplexed immunoassay kits.

Results: Nine PD plaque cultures and six TA control cultures were analyzed. We found significantly lower concentrations of MMP2, MMP12 and MMP13 in PD cells compared to the controls. There were significantly higher amounts of TIMP1, and TIMP2 in the PD cells. No significant measureable differences were detected in TGF-B or IL-6 concentrations from the two groups.

Conclusions:
A fine balance between the levels of MMPs and TIMPs control the extent of local ECM disorganization and collagen deposition in PD. MMPs are profibrotic and are pathologically down regulated in our patients, whereas TIMPs are elevated and therefore encourage fibrosis. We need to accurately target the correct cytokines with an agent able to increase fibrinolysis or reduce collagen deposition through the MMP or TIMP pathways in order to successfully treat PD. Now that we have a more thorough understanding of the fibrosis cascade, many potential treatment options for PD are proposed and need to be investigated further.



NEUROMUSCULAR STIMULATION LEADS TO IMPROVED LOWER LIMB EDEMA AND BLOOD FLOW COMPARED TO STANDARD COMPRESSION DEVICES FOLLOWING KIDNEY TRANSPLANTATION

B AlHarbi, O Ali, M Saha, M May, P Luke, A Sener

Introduction:
Kidney transplant recipients undergo significant fluid shifts in the post-operative period leading to significant lower limb edema, weight gain and are at high risk for thromboembolism due to immobility. Many institutions utilize intermittent pneumatic compression (IPC) devices to mitigate these risks, however improper fitting, inappropriate use of device, peroneal nerve injury, discomfort, excessive heat and sweating under the inflatable cuffs limit the use of IPC units. The Geko device, is a novel, internally powered calf neuromuscular stimulator, which has previously been shown to have beneficial effects in improving blood flow and skin capillary perfusion. Its role in transplantation has not previously been assessed.

Objective:
To prospectively evaluate the effects of IPC+TED stocking and Geko devices on lower limb edema in renal transplant patients.

Methods:
We performed a prospective, randomized, controlled, single-centre, study where 50 patients were randomly assigned to wear IPC+TED (Group1, n= 27) or the Geko device (Group 2, n=23) post-operatively until day 6 after surgery. We measured patient weight and lower leg and thigh circum-ferences daily. Ultrasound Doppler of the allograft and of the lower limbs was carried out on post-operative days 1 and 5 to assess venous flow and velocity in the femoral vein. Also, we monitored total urine output, serum creatinine levels.

Results:
Median age of the recipients was 50 (24-72) years and 66% were male. 50 patients underwent kidney transplantation. There were no differences in the BMI of the recipients in either group. Donor type were as follows: Group 1: 5 DCD, 12 NDD, 10 LD and Group 2: 7 DCD,9 NDD,7 LD. We observed a significant increase in calf circumference following transplantation in Group 1 by 7.2% (2.3 +/- 2cm) compared to Group 2 which showed no change from baseline (0.13%, 0.05 +/- 0.95 cm, $p < 0.0001$). Thigh circumference also followed a similar trend with only Group 1 showing a significant increase (5.5%,2.4 +/- 2cm) from baseline compared to Group 2 ($p < 0.001$). Doppler ultrasound showed a remarkable increase in mean flow velocity in the Geko patients of 19cm/s whereas the IPC+TED patients showed lower velocities 11cm/s ($p < 0.0005$). There was no significant difference between groups in serum creatinine, weight change, urine output, and resistive index of the allograft. There were no complications in either group.

Conclusion:
We report, for the first time, that the use of the Geko device in the immediate post-operative period leads to an improvement in lower limb edema and in venous flow in kidney transplant recipients compared to standard IPC+ TED stocking.

PAST RESIDENTS' DAY GUEST PROFESSORS: 1984 – 2015

2015	Dr. E. Ann Gormley
2014	Dr. Joel B. Nelson
2013	Dr. Stephen Nakada
2012	Dr. Lawrence Klotz
2011	Dr. Gerald Andriole
2010	Dr. John Michael Fitzpatrick
2009	Dr. Antoine Khoury
2008	Dr. Margaret Pearle
2007	Dr. Martin Gleave
2006	Dr. Leonard Zinman
2005	Dr. Joseph A. Smith Jr.
2004	Dr. Anthony Atala
2003	Dr. Peter T. Scardino
2002	Dr. Inderbir Gill
2001	Dr. Shlomo Raz
2000	Dr. Donald Lamm
1999	CUA in London, no Residents' Day
1998	Dr. Patrick Walsh
1997	Dr. Joseph Oesterling
1996	Dr. Michael Marberger
1995	Dr. E. Darracott Vaughan
1994	Dr. Martin Resnick
1993	Dr. Andrew Novick
1992	Dr. Howard Winfield
1991	Dr. Moneer Hanna
1990	Dr. Drogo Montague
1989	Dr. Ralph Clayman
1988	Dr. Gerald Sufrin
1987	Dr. Alvaro Morales
1986	Dr. J. Edson Pontes
1985	Dr. Alan Perlmutter
1984	Dr. Alan Bennett

NOTES