Poster Exhibit 2: Non-prostate Genitourinary Cancers

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UP-27

Uptake of a second transurethral resection of the bladder tumor in T1 bladder cancer in Ontario: An interrupted time series analysis involving 15 years of observation

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Introduction: A second transurethral resection of the bladder tumor (reTUR) within 2–6 weeks after initial resection is thought to have diagnostic, therapeutic, and prognostic benefits in T1 bladder cancer. However, little is known about the real-world uptake of this guideline-endorsed intervention. We aimed to: 1) measure reTUR rates over time; 2) investigate if a guideline revision (April 2008) explicitly endorsing reTUR within 2–6 weeks in all T1 bladder cancer patients led to an increase in reTUR rates; and 3) investigate the uptake among different groups of surgeons.

Methods: Province-wide bladder cancer pathology reports (January 2001 to December 2015; Ontario, Canada) were manually abstracted and linked with health administrative data to: 1) identify primary cases of T1 bladder cancer and 2) ascertain whether these patients received reTUR. The resulting patients were then aggregated into quarterly time series and investigated by descriptive analysis, ARIMA modeling, and Poisson regression analysis.

Results: A cohort of 7373 patients was aggregated into a time series. We observed a linear increase in reTUR rates from 8.4% in 2001 to 28.3% in 2015. An actual effect of the guideline revision in April 2008 on reTUR rates could not be detected (p=0.41). However, we observed a rather heterogeneous uptake behavior among different groups of surgeons. Specifically, female surgeons, more junior surgeons, high-volume surgeons, Canadian graduates, and surgeons without an academic affiliation were all independently more likely to perform reTUR (all $p<0.05$ in adjusted analysis).

Conclusions: ReTUR rates in primary T1 bladder cancer increased between 2001 and 2015 in Ontario regardless of the guideline revision in April 2008. Our study demonstrates that the uptake of this guideline-endorsed intervention varies among different groups of surgeons and therefore warrants further research to identify barriers to change that can be addressed by tailored interventions.

UP-28

Adherence to guidelines in the management of high-risk non-muscle-invasive bladder cancer: Are patients receiving intravesical Bacillus Calmette-Guérin therapy appropriately?

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Introduction: High-risk non-muscle-invasive bladder cancer (HR-NMIBC) is defined as all tumors with T1 stage, carcinoma in situ (CIS), or high grade (HG). In this setting, Bacillus Calmette-Guérin (BCG) intravesical therapy is the standard of care, which comprises of both an induction course over six weeks, with a maintenance course over three years. We aim to determine the adherence to this level 1A recommendation in our center, and to identify predictors associated with BCG use.

Methods: We performed a retrospective review of patients receiving transurethral resection of bladder tumors (TURBT) between November 2009 and November 2014. Patients were included if they had HR-NMIBC. We determined whether these patients received BCG and if so, the duration of treatment. We also collected relevant clinical variables that were felt could potentially influence the use of BCG. These included patient factors, such as age and gender, as well as disease factors, such as stage, grade, presence of variant histology, and history of prior interventions. We performed a multivariable analysis using logistic regression models to identify any correlation between BCG use and any of the clinical variables.

Results: A total of 608 patients were identified as having HR-NMIBC; 76% of patients had no prior surgery for their bladder cancer and 91% of patients never received prior BCG. Of all patients with HR-NMIBC, 59% of patients received BCG. Using multivariate logistic regression models, age, T-stage, and surgeon volume were associated with BCG therapy. Number of prior TURBTs and history of prior BCG therapy was not associated with BCG therapy.

Conclusions: In summary, data showed that 59% of patients with HR-NMIBC received some duration of BCG. Age, T-stage, and surgeon were identified as predictors of BCG therapy. Given this data, we have identified a gap for future quality improvement. More work is needed to help improve uptake of BCG therapy in the clinically appropriate patient.

UP-29

Safety and efficacy of transurethral resection of bladder tumor comparing spinal anesthesia to spinal anesthesia with an obturator nerve block: A systematic review and meta-analysis

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Introduction: We aimed to investigate whether spinal anesthesia with an obturator nerve block (SA+ONB) can be effectively employed for transurethral resection of bladder tumors (TURBT) during the COVID-19 pandemic to improve patient outcomes, while also avoiding aerosol-generating procedures. Our goal was to compare outcomes of TURBT using spinal anesthesia (SA) alone vs. SA+ONB in terms of rates of obturator reflex, bladder perforation, incomplete tumor resection, tumor recurrence, and local anesthetic toxicity.

Methods: We conducted a comprehensive search of electronic databases, identifying studies comparing the outcomes of TURBT using SA vs. SA+ONB. The Cochrane risk-of-bias tool for randomized controlled trials (RCTs) and the Newcastle-Ottawa scale for observational studies were used to assess the included studies. Random effects modelling was used to calculate pooled outcome data.

Results: Four RCTs and three cohort studies were identified, enrolling 448 patients. The use of SA+ONB was associated with a significantly reduced risk of obturator reflex ($p<0.00001$), bladder perforation ($p=0.02$), incomplete resection ($p<0.0001$), and 12-month tumor recurrence ($p=0.005$). ONB was not associated with an increased risk of local anesthetic toxicity (0/159).

Conclusions: Our meta-analysis suggests that TURBT employing SA+ONB is superior to the use of SA alone. During the COVID-19 pandemic, where

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avoidance of aerosol-generating procedures such as a general anesthesia is paramount, the use of an ONB with SA is essential for the safety of both patients and staff without compromising care. Further high-quality RCTs with adequate sample sizes are required to compare the different techniques of ONB, as well as comparing this method to general anesthesia with complete neuromuscular blockade.

UP-30

Impaired emotional, physical, and social well-being in radical cystectomy patients

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Introduction: Radical cystectomy (RC) can have a negative impact on the patient's emotional, physical, and social well-being along the illness trajectory. There is a paucity of studies examining the health-related quality of life (HRQOL) of bladder cancer patients before RC. This study evaluated the HRQOL of RC patients before and after surgery.
Methods: RC patients were enrolled in the Diana Wood Cancer Survivorship Clinic at the Ottawa Hospital from January 2019. Questionnaires were completed prior to and 2–3 months post-RC. Validated HRQOL instruments were used: FACT-BI, SF-36 and Distress Thermometer (DT). Wilcoxon matched pairs signed Rank Tests were performed to determine changes in HRQOL scores.
Results: Fifty-four RC patients completed HRQOL measures before and after RC. Mean age was 67 years (standard deviation [SD] 9.7); 67% were men and 61% underwent an ileal conduit diversion. Clinically significant pre-post differences were seen in medians for four SF-36 scale scores. Lower post-cystectomy scores were obtained in: physical functioning (p=0.00), role limitations due to physical health (p=0.00), energy/fatigue (p=0.01), and social well-being (p=0.02). Clinically significant differences were also found for DT scores. Patients exhibited more emotional distress before RC (p=0.005) and more physical concerns after RC (p=0.007). FACT-BI results correspond with those obtained with SF-36 and DT. Moreover, after RC, younger patients (<65 years) were less content with their social life and the older ones (≥65 years) exhibited more fatigue. Neo-bladder patients cited more physical problems after RC, including urinary, sexual, gastrointestinal concerns and fatigue.
Conclusions: Emotional distress is often reported before RC and physical concerns are frequently identified after RC. Older patients and neo-bladder diversions encountered more physical problems after RC. Cancer survivorship needs in RC patients must be tailored to patients' age and urinary diversion to optimize HRQOL outcomes.

UP-31

Sex differences among those with bladder cancer post-cystectomy: A retrospective, population-based study

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Introduction: Current dogma would suggest differential outcomes for women with bladder cancer post-cystectomy, although the evidence is controversial. The purpose of this study is to determine whether there is a difference in early or late outcomes between males and females among those who underwent radical cystectomy for bladder cancer.
Methods: This retrospective, population-based study reports on all patients that underwent radical cystectomy in Ontario using electronic records of treatment recorded in the ICES database. The primary outcome is to determine if both overall and cancer-specific survival differed between males and females among those who needed radical cystectomy upon initial presentation or those who progressed to needing radical cystectomy. Secondary outcomes include early postoperative mortality and readmission rates. A Cox proportional-hazards regression model was used to adjust for known confounders.
Results: There were 645 males and 248 females who underwent cystectomy for bladder cancer de novo; 538 males and 142 females were progressors. Analysis of these cases revealed that there were no sex differences in either overall survival (hazard ratio [HR] 1.16, 95% confidence interval [CI] 0.98–1.38) or cancer-specific survival (HR 1.14, 95% CI 0.95–1.38) among those who present with aggressive disease de novo. Similarly, there were no sex differences among those who progressed to cystectomy in both overall survival (HR 1.02, 95% CI 0.80–1.29) and cancer-specific survival (HR 1.06, 95% CI 0.81–1.39). Additionally, there were no sex-associated differences in mortality or readmission at either 30 or 90 days postoperatively.
Conclusions: Based on this review of all patients in Ontario undergoing cystectomy for bladder cancer, there were no clinically significant differences in early or late morbidity or mortality outcomes between men and women.

UP-32

Molecular subtyping to stratify the treatment of muscle-invasive bladder cancer: A cost-effectiveness analysis

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Introduction: The gold standard treatment for muscle-invasive bladder cancer (MIBC) is neoadjuvant chemotherapy (NAC) followed by radical cystectomy. However, response to NAC is unpredictable. Molecular subtypes allow for an improved ability to select a tailored treatment course. Our study aims to assess the cost-effectiveness of molecular subtyping in the management of MIBC.
Methods: A two-dimensional Markov microsimulation model was developed using TreeAge Pro comparing three strategies: NAC at current usage rates (36%), universal NAC usage, and molecular subtype-directed care. Model probabilities and utilities were derived from the published literature. Cost of each phase of care was obtained from primary data and the Canadian Institute for Health Information patient cost estimator. The primary outcomes were quality-adjusted life years (QALYs), cost, overall survival (OS), and the incremental cost-effectiveness ratio (ICER).
Results: The predicted QALYs were 8.34, 8.73, and 9.14, with costs of $62 478, $76 962, and $62 579 for NAC at current usage rates, universal NAC usage, and subtype-directed care, respectively. OS at 10 years was 39.2%, 40.8%, and 42.8% for NAC at current usage rates, universal NAC usage, and subtype-directed care, respectively. When comparing subtype-directed care to current rates of NAC usage, the ICER was $127/QALY. Subtype-directed care dominated universal NAC usage.
Conclusion: We demonstrated that in patients with MIBC, a molecular subtype-directed approach to the administration of NAC can result in improved OS, greater QALYs, and be cost-effective within a single-payer healthcare system. A push to the universal use of NAC will result in improved survival compared with what our current rates of use achieve but is likely not the best approach considering the drawbacks of chemotherapy, including toxicity and unequal response. This model is built upon the available literature and requires validation prior to clinical implementation.

UP-33

The University of Alberta experience with radical cystectomy via minimally invasive approaches

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Introduction: Radical cystectomy is the standard of care treatment for muscle-invasive bladder cancer. It is associated with high morbidity and significant risk of peri- and postoperative complications. Minimally invasive (MI) approaches seek to lessen the morbidity without sacrificing oncological outcomes. Due to limited resources and the technical challenges involved, MI radical cystectomy (MIRC) has had limited uptake in Canada. Herein, we present, to our knowledge, the largest case series of MIRC in a Canadian setting.

Methods: A retrospective review was performed. We identified all patients undergoing MIRC for bladder cancer at our center from 2006–2020. We collected data on demographics, oncological staging, peri- and postoperative outcomes, length of stay (LOS), perioperative blood transfusions, uretero-ileal anastomotic stricture occurrence, recurrence-free survival, and overall survival (OS). Descriptive statistics and Kaplan-Meir survival analysis were used to assess outcomes.
Results: Overall, 29 patients underwent MIRC, 10 using a laparoscopic approach and 19 using robotic-assisted laparoscopic approach. Median age at time of MIRC was 66.5 years. Ileal conduit urinary diversion was performed in 23/29, neobladder in 5/29, and one patient was left without urinary diversion (hemodialysis). Median LOS was eight days (range 3–89). Three patients received blood transfusions within 90 days of MIRC. Uretero-ileal anastomotic stricture occurred in 6/28 (21.4%). In total, seven patients had recurrence of their cancer, with the median time to recurrence of 9.8 months (range 4.6 months to 4.9 years). Predicted five-year OS of the group was 57.3% (confidence interval 37.2–73.1%).
Conclusions: We present the University of Alberta experience with MIRC for bladder cancer. Outcomes were modest and may reflect the learning curve of these technically challenging procedures. Further study is required to elucidate the role MI vs. open approach to radical cystectomy, especially in the resource-limited Canadian setting.

UP-34

Evaluation of financial toxicity in Canadian patients undergoing radical cystectomy

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Introduction: Financial toxicity (FT) describes the financial consequences of cancer and its treatment. It has been associated with worse patient-reported outcomes, such as quality of life and symptom burden. FT in patients undergoing radical cystectomy (RC) has not been well-examined. The objective of this study was to evaluate FT in RC patients.
Methods: Patients were recruited from the Diana Wood Cancer Survivorship Clinic at The Ottawa Hospital between January 2019 and October 2020. The validated 11-item Comprehensive Score for Financial Toxicity (COST) questionnaire was administered twice: before RC and 2–3 months after RC. Higher scores (0–44) represent less FT and they are presented as medians. Wilcoxon matched pairs signed rank tests were used to compare pre-and post-RC COST scores.
Results: Fifty-four patients completed the COST questionnaire at both time points. The mean age was 67 years (standard deviation [SD] 9.7); 67% were male and 61% underwent an ileal conduit urinary diversion. There was a clinically significant difference between pre- and post-RC COST scores, with lower post-RC scores (p=0.001; medians: 37.2 vs. 30.4). This difference was maintained regardless of the patients' gender and type of urinary diversion (p<0.05). As for the patients' age, a clinically significant difference in COST scores was only found for older patients (≥65 years) (p=0.001; medians: 38.8 vs. 32.0). Younger patients' (<65 years) pre-post-COST scores didn't differ significantly (p=0.28; medians: 32.5 vs. 25.0).
Conclusions: This is the first study to report COST scores for Canadian patients undergoing RC. RC patients experience more FT after surgery, except for younger patients, who tend to display more FT both before and after surgery. These findings provide useful information for implementing patient-centered financial assessment and counselling in patients undergoing RC. Further studies are required to better understand FT after RC and in younger patients.

UP-35

Visual prediction of urothelial cell carcinoma grade and stage: A prospective clinical trial

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Introduction: Urothelial cell carcinoma (UC) is most commonly diagnosed via cystoscopy, followed by transurethral resection of the bladder tumor (TURBT). At the time of TURBT, intravesical instillation of chemotherapy is a recommended treatment for patients felt to have solitary low-grade lesions.[1,2] This requires the urologist to make assumptions about the pathology results before histological confirmation. Few studies have examined the accuracy of urologists' predictions on bladder tumor histology based on its endoscopic appearance.[1,3,4] We sought to study the accuracy of urologists' predictions of grade, stage, and presence of carcinoma in situ (CIS) at the time of initial TURBT.
Methods: We performed a prospective clinical trial of patents with newly diagnosed bladder tumor(s) felt to be UC, who underwent TURBT. Urologists were asked to predict tumor stage, grade, and presence of CIS based on white light cystoscopy. They were not blinded to any preoperative evaluations. Predictions were compared to pathologist assessments.
Results: Early results include predictions on 21 patients with a new diagnosis of a bladder tumor felt to be UC. Final pathology confirmed one lesion as solely CIS, 10 lesions as Ta, five lesions as T1, three lesions as T2, and two as benign lesions. The positive predictive value (PPV) and negative predictive value (NPV) for low-grade tumors were 28.6% and 75.0%, respectively. For high-grade, the PPV and NPV were 85.7% and 57.1%, respectively. For concurrent CIS, the PPV was 33.3% and the NPV was 100%. Table 1 displays the full results.
Conclusions: Herein, we present early results from our study evaluating the accuracy of urologists in predicting the stage of newly diagnosed bladder tumors. Urologists are better at predicting high-grade tumors than they are at low-grade, as suggested by our predictive values. These findings have implications when selecting patients for immediate postoperative instillations and when triaging the urgency of postoperative followup.

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UP-35. Table 1. Predictive values, specificities, and sensitivities of histology predictions

	Low-grade	High-grade	Concurrent CIS	Stage TA	Stage T1	Stage T2+
Positive predictive value	28.6	85.7	33.3	81.8	33.3	0
Negative predictive value	75	57.1	100	90	80	84.2
Sensitivity	50	80	100	90	40	0
Specificity	35.3	66.7	21.1	81.8	75	88.9

UP-36

The prognostic value of urinary cytology after trimodal therapy for muscle-invasive bladder cancer

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Introduction: Complete response after trimodal therapy (TMT) for muscle-invasive bladder cancer (MIBC) includes a negative urine cytology (NC), no visible tumor, and negative biopsies. The significance of positive urinary cytology (PC) post-TMT (pTMT) without lesions in the upper tract or intravesical clinical/pathological recurrence is unknown. Altered cytology pTMT may represent recurrence, treatment effects, or a marker of de novo urothelial lesions. Rates and temporal trends of PC pTMT were analyzed to determine its potential use as a prognostic marker for bladder cancer recurrence pTMT.

Methods: This is a retrospective study of 150 patients who had TMT for MIBC at a single academic institution from 2002–2017. Available cytology results (NC vs. PC/equivocal) pTMT were evaluated for association with recurrence-free survival (RFS) (n=128). Time to recurrence, stratified by first cytology pTMT, and time to NC were assessed by the Kaplan-Meier method. Differences between groups were evaluated with the log rank test.

Results: We observed 61 recurrences in 128 patients with a median followup of 3.6 years (range 0.3–14.2): 13 (21%) local, 11 (18%) urinary tract, 13 (21%) metastasis, 24 (39%) other. PC pTMT occurred in 41(32%) patients at first followup; NC occurred in 115 (90%) patients at any point. Median RFS was shorter with PC vs. NC at first followup pTMT (21.3 vs. 78.1 months, p=0.047), with an increase in cumulative recurrence rate at 3.3 years (PC n=24 [60%] vs. NC n=37 [42%], p=0.085). Persistence of PC (≥4 months pTMT, n=33, 22%) had a median time to NC of 3.22 months (95% confidence interval [CI] 2.99–5.80). Longer time to NC was associated with recurrence (3.68 months [95% CI 3.22–8.96] vs. 2.76 months [95% CI 0.69–2.99]).

Conclusions: NC post-TMT and shorter interval to NC is associated with improved RFS and potentially lower rates of recurrence. Defining the role of cytology post-TMT is warranted as an available and inexpensive biomarker to guide survivorship and salvage protocols.

UP-37

Prehabilitation body mass index (BMI) target for complication risk reduction following radical cystectomy

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Introduction: Surgical morbidity after radical cystectomy (RC) for muscle-invasive bladder cancer (MIBC) is significant, particularly in patients with an elevated body mass index (BMI). Prehabilitation is a multimodal, preoperative optimization program reported to reduce complications after major cancer surgery. Nutritional optimization and weight loss are the cornerstone of prehabilitation, especially for patients with an above-normal BMI. This study proposes identifying the optimum BMI range for overweight and obese patients undergoing RC to aim for during prehabilitation and to reduce their risk of perioperative (≤90 days) surgical morbidity.

Methods: Data were extracted from the Canadian Bladder Cancer information system for this study. A retrospective analysis was performed on 589 patients who underwent RC for MIBC and NMIBC. Perioperative (≤90 days) Complications were classified by type and severity according to the Clavien-Dindo classification (CDC). Logistic regression analysis was performed to determine the association between patient BMI at time of RC and the risk of surgical morbidity.

Results: In this cohort, 168 (29%), 225 (38%), 125 (21%), and 71 (12%) patients had a normal, overweight (OW), obese (OB), and morbidly obese (MO) BMI, respectively. Overall, complications occurred in 233 (40%) patients; those with an OW BMI had significantly more CDC grade 3b complications (OW: n=14 (54%), p=0.37), while those with an MO BMI had significantly more grade 4 complications (MO: n=4 (80%), p<0.001). Grade 3b (p=0.037) and 4 (p<0.0001) complications occurred more frequently in those with an above-normal BMI on analysis of the sub-cohort with CDC information available. The most reported complications were ileus in 71 (12%), wound infection in 48 (8%), urine leak in 30 (5%), and fascial dehiscence in 22 (4%) patients. Patients in the OW and MO category were 1.8 (95% confidence interval [CI] 1.2–2.9, p=0.008) and 3.6 (95% CI 2.0–6.6, p<0.0001) times more likely to develop complications. The risk of urine leak was significantly higher in both OW (odds ratio [OR] 5.34, 95% CI 1.16–24.4, p=0.031) and MO (OR 5.32, 95% CI 1.0–28.59, p=0.051) categories. A similar trend was observed in MO BMI patients, who were at significantly increased risk of both wound infection (OR 5.98, 95% CI 2.29–15.61, p<0.0001) and fascial dehiscence (OR 5.61, 95% CI 1.23–25.56, p=0.026).

Conclusions: This study demonstrates the feasibility of using a national bladder cancer database to record and evaluate RC complications. Patients with an OW and MO BMI were at significantly increased risk of perioperative morbidity following RC. Patients with an OW and MO BMI could substantially reduce their risk of surgical morbidity by lowering their BMI by one category during prehabilitation.

UP-38

Pathological upstaging in patients undergoing radical cystectomy for clinically localized de novo muscle-invasive bladder cancer

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Introduction: The aim of this study was to compare the concordance of pathological staging between transurethral resection of bladder tumor (TURBT) and radical cystectomy. The secondary aim was to look for the final pathological outcome of patients with clinically localized muscle-invasive bladder carcinoma (MIBC.

Methods: Fifty-nine patients underwent radical cystectomy for organ-confined de novo T2 MIBC over a two-year period. Clinical and pathological characteristics of TUTBT and cystectomy specimen were collected and statistically analyzed. The possibility of the delay in receiving neoadjuvant chemotherapy was tested as a possible contributing factor to final pathological outcome.

Results: Of the 59 patients, 80% were male and 20% were female, with mean age 67+8.8 years. All patients had preoperative T2 transitional cell carcinoma. Upstaging was noted in 59% (T3 in 27.1% and T4 in 32.2%). Thirty-six percent of all patients had node-positive disease. Prostate adenocarcinoma was incidentally discovered in 20 (34%) patients. Among patients who had neoadjuvant chemotherapy, 11(78.5 %) had T2 disease, while only 3 (21.6%) had T3/T4 disease (p=0.001).

Conclusions: Pathological upstaging was detected in more than half of patients undergoing radical cystectomy for clinically localized disease. Neoadjuvant chemotherapy was underused and was significantly correlated with no upstaging.

UP-39

Infantile Bacillus Calmette-Guérin vaccination and bladder cancer incidence: Preliminary analysis

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Introduction: The Bacillus Calmette-Guérin (BCG) vaccine has long been used for the prevention of tuberculosis (TB) around the world. BCG is also used as an immunotherapy agent for the treatment of non-muscle-invasive urinary bladder cancer. This preliminary analysis aims to analyze the available data for infantile BCG vaccination worldwide with the future development of bladder cancer.

Methods: Studies were identified by a formal literature search of MEDLINE and Cochrane Central. Preliminary data analysis was conducted on publicly accessible data summarizing the impact of gender, BCG vaccination, and socioeconomic effects on crude and age-standardized rates of bladder cancer.

Results: As part of our analysis, preliminary regression models demonstrated BCG vaccination status, gender, and socioeconomic status to have statistically significant effects on crude and age-standardized rates of bladder cancer incidence. BCG vaccination was associated with a 35–37% lower age-standardized rate of bladder cancer incidence.

Conclusions: There is very little literature examining the relationship between prior BCG vaccination and rates of bladder cancer incidence. Our limited data analysis indicates that a relationship does exist between infantile BCG vaccination and later bladder cancer development, although extensive future investigation is needed in this area.

UP-40

Clinical utility of serial creatinine measurements in patients undergoing radical cystectomy for urothelial cell carcinoma

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Introduction: Routine daily blood testing, including serial creatinine (sCr) measurement, is commonly performed in postoperative patients. However, prolonging serial measurements may lead to unnecessary healthcare spending, prolonged hospital stay, and patient discomfort and anxiety. We examined the rates of clinical actions (CAs) as a result of sCr values, as well as postoperative creatinine trends in order to assess the utility of sCr measurements on radical cystectomy (RC) patients.

Methods: We performed a retrospective chart review using our institution's database on all patients who underwent a RC for urothelial carcinoma (UC) from 2009–2019. Preoperative and all postoperative inpatient creatinine values were recorded. Minor CAs included fluid boluses, fluid rate changes, and medication changes. Major CAs included operating room take-backs for stent repositioning, nephrostomy tube placement, nephrology consultation, and hemodialysis.

Results: A total of 237 RCs were performed with a total of 2952 sCr measurements. The median number of sCr measurements per patient was nine and the median length of hospital stay was 10 days. There were 92 minor and 13 major CAs representing 3% and 0.44% of sCr measurements, respectively. All major CAs were seen in patients experiencing a complicated postoperative course. The most common minor and major CA were fluid bolus (57) and nephrology consultation (5), respectively. There was no incidence of postoperative dialysis. The median postoperative day with the highest creatinine was day 2.

Conclusions: SCr measurements remain a clinically valuable tool in postoperative management. Nonetheless, this study suggests that prolonged serial measurement of sCr is of limited clinical utility. As such, discontinuing sCr checks after postoperative day 2 in patients experiencing an uncomplicated postoperative course is safe and may lead to both cost savings and decreased patient discomfort.

UP-41

Bladder cancer guideline adherence in an Australian tertiary hospital

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Introduction: Bladder cancer is the 10th most common cancer worldwide and has the highest lifetime treatment cost of all cancers. Overall, literature demonstrates poor guideline adherence, which may lead to suboptimal patient outcomes.

Methods: Eleven common recommendations identified from four major international guidelines were assessed for all patients with bladder cancer managed at our multidisciplinary uro-oncology cancer clinic between January 1, 2017 and August 31, 2019.

Results: Two hundred and eleven eligible patients were included, of which 79% were male. A total of 90 transurethral resection of bladder tumor (TURBT) operations were performed in 70 patients over the study period. Complete clearance was achieved in 81%, single-dose postoperative chemotherapy was administered in 47%, and re-resection was performed in 81% of eligible patients. Postoperative risk-stratification was documented in 21%. Of the patients who received adjuvant intravesical Bacillus Calmette-Guérin (BCG), 83% completed the full induction course and 39% completed maintenance treatment. Cystoscopic surveillance for high-risk, non-muscle-invasive bladder cancer (NMIBC) was performed within satisfactory interval in 103 of 151 encounters (68.2%), urine cytology was performed in 20 of 151 (13.2%). Computed tomography of the chest, abdomen, and pelvis staging was performed in 98% of patients with muscle-invasive disease and neoadjuvant chemotherapy was administered to 71% of eligible patients, with 100% receiving cisplatin-based regimens. Adjuvant chemotherapy was administered in 57%.

Conclusions: This is the largest and most comprehensive study investigating bladder cancer guideline adherence in Australia. High adherence rates were found for TURBT criteria, staging imaging, and neoadjuvant chemotherapy, but low for high-risk NMIBC surveillance and use of intravesical chemotherapy.

UP-42

Opioid use after uro-oncologic surgeries in time of opioids crisis: The Quebec experience

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Introduction: Opioid overdose and addiction are two contemporary growing problems. As health providers, we have an important role in this problem. Recent literature emphasizes overprescription and its link to opioid-related harms. We conducted a prospective, observational study to find how many opioids uro-oncologic patients really need after surgery in our regional and tertiary center.

Methods: This monocentric study included four oncologic uncomplicated surgeries: open retropubic radical prostatectomy, robot-assisted laparoscopic radical prostatectomy, laparoscopic radical nephrectomy, and laparoscopic partial nephrectomy. The primary outcome was the dose of opioid consumed (in oral morphine-equivalent [MEq]), and secondary outcomes included the amount of overprescribed opioids, the amount of opioid requirement for 80% of patients, management of unused opioids, and others. Patients were invited to fill out three home questionnaires at zero, one and three months postoperative.

Results: Between October 2019 and August 2020, 60 patients were recruited and included for analysis. Patients used a mean of 30 MEq (six tablets) at home and 80% of patients used 50 MEq (10 tablets) or less. There was no significant difference in opioid consumption between different surgeries in our study (p=0.68). Patients who consumed less than 27.5 MEq during hospitalization were 4.46 times more prone to consume no opioid at home (p=0.01). A total of 2220 MEq was overprescribed (the equivalent of 444 morphine 5 mg tablets) in only 55 responders. Half of the patients or more kept the remaining opioids at home and only 13% of them returned the remaining opioids to their pharmacy.

Conclusions: This study emphasizes the importance of prescribing opioids wisely, as too many tablets are still being prescribed. We should encourage a diminution in total MEq after uro-oncologic surgeries and we could probably decrease it more with optimization of co-analgesia, which was not optimized in this observational study.

UP-43

Utilization of lymphadenectomy and predictors of lymph node yield in upper tract urothelial carcinoma

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Introduction: Lymph node (LN) dissection (LND) in high-risk upper tract urothelial carcinoma (UTUC) currently remains underperformed compared to other cancers, partly due to a lack of high-quality evidence. We sought to examine current trends in LND for UTUC, as well as patient factors contributing to the performance and omission of LND. We further sought to examine factors predicting higher LN yields.

Methods: A large, national, hospital-based database (The National Cancer Database) was used to identify all patients from 2004–2016 with non-metastatic UTUC with urothelial histology who underwent extirpative surgery in the form of either radical nephroureterectomy (RNU) or segmental ureterectomy (SU). Rates of LND were examined, with subgroup analysis performed based on high-risk features (high-grade tumor, tumor over 2 cm, pT2-4 disease). Univariate linear regression and multivariate logistic regression were performed to identify clinical variables that predict LN yield.

Results: A total of 30 861 patients with UTUC were identified from 2004–2016 who underwent extirpative surgery. Overall, 7377 (23.9%) of these patients had a LND performed and 23 484 (76.1%) had no LND (Table 1). Only 27.3% of high-grade tumors, 24.0% of tumors over 2 cm, 29.4% of pT2 tumors, 32.6% of pT3 tumors, and 44.7% of pT4 tumors had LND performed (Table 2). LND was more likely to be omitted in older patients, higher Charlson comorbidity index (CCI) score, community hospitals, lower clinical T and N stage disease, lower pathological T stage disease, low-grade tumor, laparoscopic surgery, and with RNU ($p<0.001$ for all). Patients with LND performed were more likely to have positive margins and lymphovascular invasion present, and to undergo chemotherapy and radiation ($p<0.001$ for all). In multivariate analysis, predictors of higher LN yield were time from diagnosis to definitive surgery, academic/research hospital, open surgery, and high-grade disease ($p<0.05$ for all). The strongest predictor was academic/research hospital (odds ratio [OR] 3.45, $p=0.002$). Predictors of lower LN yield were increased age, CCI 1/2, and laparoscopic surgery (Table 3).

Conclusions: LND remains underperformed by surgeons for high-risk UTUC tumors (high-grade tumor, tumor over 2 cm, pT2-4 disease). LND was more likely to be omitted in older patients with increased comorbidities, lower-stage disease, low-grade tumor, with laparoscopic approaches, with RNU, and at community hospitals. Predictors of higher LN yield were time from diagnosis to definitive surgery, academic/research hospital, open surgery, and high-grade disease, with the strongest predictor being academic/research hospital setting.

UP-43. Table 1. Demographics of overall cohort by lymph node dissection status

	LND performed	No LND performed	p
Age	71.0 (62.0–78.0)	73.0 (65.0–80.0)	<0.0001
Female sex	2 863 (38.8%)	9467 (40.3%)	0.022
Charlson comorbidity score			<0.0001
0	5040 (68.3%)	15 069 (64.2%)	
1	1609 (21.8%)	5789 (24.7%)	
2	499 (6.8%)	1834 (7.8%)	
≥3	229 (3.1%)	792 (3.4%)	
Facility type			<0.0001
Community cancer program	413 (5.6%)	1843 (7.9%)	
Comprehensive community cancer program	2270 (31.0%)	10 213 (43.7%)	
Academic/research program	3794 (51.9%)	7805 (33.4%)	
Integrated network cancer program	834 (11.4%)	3513 (15.0%)	
cT stage			<0.0001
cT0	14 (0.2%)	70 (0.3%)	
cTa	921 (12.5%)	4569 (19.5%)	
cTis	141 (1.9%)	497 (2.1%)	
cT1	980 (13.3%)	3456 (14.7%)	
cT2	352 (4.8%)	1048 (4.5%)	
cT3	807 (10.9%)	2,159 (9.2%)	
cT4	188 (2.5%)	310 (1.3%)	
cTX	3466 (47.0%)	9983 (42.5%)	
cN stage			<0.0001
cN0	4362 (59.1%)	16 669 (71.0%)	
cN1	373 (5.1%)	140 (0.6%)	
cN2	330 (4.5%)	154 (0.7%)	
cN3	15 (0.2%)	13 (0.1%)	
cNX	1997 (27.1%)	5861 (25.0%)	
pT stage			<0.0001
pT0	42 (0.6%)	70 (0.3%)	
pTa	1134 (15.4%)	5221 (22.2%)	
pTis	162 (2.2%)	577 (2.5%)	
pT1	1030 (14.0%)	3759 (16.0%)	
pT2	744 (10.1%)	1787 (7.6%)	
pT3	2403 (32.6%)	4976 (21.2%)	
pT4	638 (8.6%)	789 (3.4%)	
pX	1136 (15.4%)	5795 (24.7%)	
pN stage			<0.0001
pN0	4,534 (61.5%)	7,539 (32.1%)	
pN1	733 (9.9%)	45 (0.2%)	
pN2	835 (11.3%)	78 (0.3%)	
pN3	44 (0.6%)	15 (0.1%)	
pNX	1,140 (15.5%)	13,676 (58.2%)	
pM+	158 (2.1%)	175 (0.7%)	<0.0001

UP-43. Table 1 (cont'd). Demographics of overall cohort by lymph node dissection status

	LND performed	No LND performed	p
Lymph node yield			<0.0001
0	0 (0.0%)	22 855 (100.0%)	
1–5	4852 (65.8%)	0 (0.0%)	
6–10	1325 (18.0%)	0 (0.0%)	
11–15	621 (8.4%)	0 (0.0%)	
16–20	279 (3.8%)	0 (0.0%)	
21–25	132 (1.8%)	0 (0.0%)	
26–30	75 (1.0%)	0 (0.0%)	
31–35	31 (0.4%)	0 (0.0%)	
36–40	23 (0.3%)	0 (0.0%)	
41–45	11 (0.1%)	0 (0.0%)	
46–50	16 (0.2%)	0 (0.0%)	
Over 51	12 (0.2%)	0 (0.0%)	
High-grade tumor	6091 (82.6%)	16 231 (69.1%)	<0.0001
Positive margins	802 (11.1%)	1512 (6.6%)	<0.0001
Surgical approach			<0.0001
Robotic	1594 (35.4%)	3301 (26.1%)	
Laparoscopic	1270 (28.2%)	5365 (42.3%)	
Open	1633 (36.3%)	4003 (31.6%)	
LVI present	1238 (31.9%)	2134 (20.3%)	<0.0001
XRT given	202 (2.7%)	368 (1.6%)	<0.0001
Chemotherapy			<0.0001
No chemo	5222 (72.3%)	20 404 (88.8%)	
Underwent chemo	1939 (26.9%)	2305 (10.0%)	
Unknown if recommended or administered	58 (0.8%)	280 (1.2%)	

UP-44

Comparison of radical nephroureterectomy and segmental ureterectomy in upper tract urothelial carcinoma

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Introduction: Radical nephroureterectomy (RNU) is widely considered the gold standard in high-risk upper tract urothelial carcinoma (UTUC). Segmental ureterectomy (SU) has had increased adoption for high-risk UTUC, particularly for distal ureteric tumors, but its oncological equivalence remains unclear. We sought to examine current trends in RNU and SU for UTUC, patient factors contributing to the performance of SU, compare the rates of lymph node dissection (LND), and examine survival for RNU and SU in high-risk disease.

Methods: A large, national, hospital-based database (The National Cancer Database) was used to identify all patients from 2004–2016 with non-metastatic UTUC with urothelial histology who underwent extirpative surgery (either RNU or SU). Patient factors and rates of LND were compared, with subgroup analysis performed based on high-risk features (high-grade tumor, tumor over 2 cm, pT2-4 disease). Kaplan-Meier methods and log rank testing were used for survival analysis overall and across high-risk subgroups.

Results: A total of 30 861 patients with UTUC were identified from 2004–2016 who underwent extirpative surgery; 26 153 (84.7%) of these patients underwent RNU and 4708 (15.3%) underwent SU. SU patients were older, more likely to have surgery at an academic/research hospital, have lower cT, cN, pT, and pN stages, have pM0 disease, have low-grade tumor, be done through open surgery, and have a higher rate of positive margins (p<0.001 for all) (Table 1). LND was more likely to be performed with SU (32.2%) vs. RNU (23.0%) (p<0.001). This was consistent across high-grade tumors, tumors over 2 cm, and pT2-3 disease (Table 2). When patients had a LND, SU had higher nodal yields, with a mean of 6.07 nodes and median of four nodes, vs. RNU, with a mean of 5.69 nodes and median of three nodes. SU was associated with improved overall survival (p=0.025), with a median survival of 66.1 months for SU and 64.9 months for RNU (Table 3). This was not consistent across high-risk subgroups; there was no significant difference in survival for high-grade tumors (p=0.14), tumors over 2 cm (p=0.37), pT2 disease (p=0.072), and pT4 disease (p=0.27), with RNU having better survival for pT3 disease (p<0.001).

Conclusions: Patients undergoing SU were more likely to be older, have surgery at an academic/research hospital, have lower-stage disease, have low-grade tumor, have open surgery, and had a higher rate of positive margins. LND was more likely to be performed with SU vs. RNU, and this was consistent across high-risk subgroups. When patients underwent LND, SU yielded more nodes on average. SU was associated with improved overall survival compared to RNU for the entire cohort, but there was no statistical difference in survival across high-risk subgroups outside of pT3 disease. While further prospective studies need to be done, SU appears to be non-inferior to RNU in selected high-risk patients.

UP-43. Table 2. Number of patients who had lymph node dissection by high risk feature

High-risk feature (n)	Number of patients who had LND performed (%)
High-grade tumor (22 322)	6091 (27.3%)
Tumor over 2 cm (20 537)	4922 (24.0%)
pT2 disease (2531)	744 (29.4%)
pT3 disease (7379)	2403 (32.6%)
pT4 disease (1427)	638 (44.7%)

UP-45

Disease recurrence patterns in high-risk non-metastatic renal cell carcinoma patients post-nephrectomy with long-term followup

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Introduction: Guidelines recommend intermediate- and high-risk renal cell carcinoma (RCC) patient monitoring for up to five years; however, some long-term studies have found disease recurrence among the high-risk population after the five-year mark. Our objective was to determine patterns of recurrence among high-risk non-metastatic RCC (HRnmRCC) patients up to15 years post-radical nephrectomy.

Methods: This was a single-center, retrospective chart review of HRnmRCC patients who underwent radical nephrectomy between January 2000 and December 2015. Patients on registered clinical trials for adjuvant therapy or with fewer than three years' followup were excluded. The primary outcome measure was progression-free survival (PFS), with evaluation of prognostic factors, including surgical approach, tumor histology and grade, and margin status.

Results: Fifty patients met the inclusion criteria and had complete data. Mean age at baseline was 70.3 (±12.6), with a median of 71 years (range 41–97), and 32 were male. Seventy percent had laparoscopic radical nephrectomy, while the rest had open radical nephrectomy. Eight-six percent had clear-cell RCC (ccRCC), four had papillary, two chromophobe, and one sarcomatoid. The most common stages were T3aNXMX and T3aNOMX (28% each), with 90% having negative margins. A total of 22 patients (16 male) had recurrence, with a median time to recurrence of 28 months (range 7–94). The median age of patients who progressed was 69.5 years (range 41–87 years) and 91% had ccRCC. Sixty-eight

UP-43. Table 3. Univariable and multivariable analyses of predictors of lymph node yield

	Univariable analysis		Logistic multivariable analysis	
	OR (95% CI)	p	OR (95% CI)	p
Age	0.959 (0.945–0.974)	<0.001	0.974 (0.957–0.992)	0.005
Year of diagnosis	0.949 (0.909–0.991)	0.0181	1.075 (0.978–1.183)	0.132
Time from diagnosis to definitive surgery	1.011 (1.008–1.014)	<0.001	1.011 (1.007–1.015)	<0.001
Sex				
Male		Reference		Reference
Female	0.748 (0.541–1.036)	0.081		
Charlson comorbidity index				
CCI 0		Reference		Reference
CCI 1	0.323 (0.221–0.473)	<0.001	0.396 (0.256–0.613)	<0.001
CCI 2	0.373 (0.202–0.687)	<0.001	0.372 (0.188–0.733)	0.004
CCI ≥3	0.289 (0.118–0.710)	0.007	0.432 (0.165–1.131)	0.087
Facility type				
Community cancer program		Reference		Reference
Comprehensive community cancer program	0.128 (0.068–0.243)	<0.001	0.645 (0.300–1.386)	0.261
Academic/ research program	0.706 (0.372–1.341)	0.288	3.463 (1.605–7.473)	0.002
Integrated cancer network program	0.0948 (0.046–0.195)	<0.001	0.557 (0.236–1.317)	0.183
Surgery type				
SU		Reference		Reference
RNU	1.226 (0.787–1.907)	0.366	0.918 (0.543–1.550)	0.749
Surgical approach				
Robotic		Reference		Reference
Laparoscopic	0.285 (0.181–0.449)	<0.001	0.415 (0.263–0.656)	<0.001
Open	1.638 (1.025–2.617)	0.039	1.766 (1.089–2.864)	0.021
Grade				
Low-grade		Reference		Reference
High-grade	2.937 (2.059–4.190)	<0.001	1.954 (1.248–3.059)	0.003

percent of patients had recurrence in the lung, with 50% having multiple locations. On Kaplan-Meier log rank tests, no factors played a significant role in recurrence.

Conclusions: Our results highlight the importance of followup for HRnmRCC patients beyond five years post-nephrectomy. Our preliminary data suggest that 44% (22/50) can have recurrence up to eight years post-nephrectomy. While this is a small sample size going back to 2000, these preliminary data would suggest that HRnmRCC (T3/T4) should have routine followup beyond five years.

UP-46

Treatment outcomes with percutaneous thermal ablation for small renal masses

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Introduction: Thermal ablation (TA) is a well-accepted, minimally invasive treatment option for patients with small renal masses (SRM). As a high-volume TA center, we report our contemporary outcomes data and factors leading to treatment failure.

Methods: A retrospective chart review of patients undergoing TA in Saskatoon, Saskatchewan from 2012–2019 was conducted. Patient and tumor characteristics were analyzed using measures of central tendency. Treatment outcomes and comparison of modalities were analyzed using Wilcoxon test and Chi-squared tests.

Results: The study cohort had a median patient age of 69 years (range36–73) and median tumor diameter of 2.5 cm (range 1–6). Ninety-nine microwave ablations (MWAs) and 95 radiofrequency ablations (RFAs) were successfully performed during the study period, with only one attempted procedure not being technically possible. The procedural and post-procedural complication rate (above Clavien-Dindo class 2) was 1%. Over a mean followup of 19.9 months (range 0–74), 8.8% had residual tumor (detected on first imaging study after TA) and 2.6% developed more remote tumor recurrence. Residual tumor post-TA was associated with larger tumors (p<0.0001) and treatment with MWA (p=0.039), however, MWA-treated tumors were larger (2.79 cm vs. 2.41 cm, p=0.02) and had a higher biopsy-positive rate for cancer (56.5% vs. 47.4%, p=0.034). In those who required a repeat procedure, 88.2% were successfully salvaged with additional TA.

Conclusions: TA is a safe and effective treatment option for patients with SRM. Those with residual disease had larger tumors and were more likely to be treated with MWA; however, these patients could be salvaged with more TA in the vast majority of cases.

UP-44. Table 1. Demographics of overall cohort by surgery type

	Radical nephro-ureterectomy	Segmental ureterectomy	p
Age	72.0 (64.0–79.0)	73.0 (65.0–80.0)	<0.0001
Female sex	10 768 (41.2%)	1562 (33.2%)	<0.0001
Charlson comorbidity score			0.19
0	17 104 (65.4%)	3005 (63.8%)	
1	6226 (23.8%)	1172 (24.9%)	
2	1958 (7.5%)	375 (8.0%)	
≥3	865 (3.3%)	156 (3.3%)	
Facility type			0.0002
Community cancer program	1893 (7.3%)	363 (7.7%)	
Comprehensive community cancer program	10 691 (41.1%)	1792 (38.2%)	
Academic/research program	9703 (37.3%)	1896 (40.4%)	
Integrated network cancer program	3703 (14.2%)	644 (13.7%)	
cT stage			<0.0001
cT0	69 (0.3%)	15 (0.3%)	
cTa	4442 (17.0%)	1048 (22.3%)	
cTis	478 (1.8%)	160 (3.4%)	
cT1	3697 (14.1%)	739 (15.7%)	
cT2	1020 (3.9%)	380 (8.1%)	
cT3	2738 (10.5%)	228 (4.8%)	
cT4	473 (1.8%)	25 (0.5%)	
cTX	11 667 (44.6%)	1782 (37.9%)	
cN stage			<0.0001
cN0	17 634 (67.4%)	3397 (72.2%)	
cN1	476 (1.8%)	37 (0.8%)	
cN2	470 (1.8%)	14 (0.3%)	
cN3	25 (0.1%)	3 (0.1%)	
cNX	6747 (25.8%)	1111 (23.6%)	
pT stage			<0.0001
pT0	95 (0.4%)	17 (0.4%)	
pTa	5249 (20.1%)	1106 (23.5%)	
pTis	581 (2.2%)	158 (3.4%)	
pT1	4137 (15.8%)	652 (13.8%)	
pT2	1774 (6.8%)	757 (16.1%)	
pT3	6657 (25.5%)	722 (15.3%)	
pT4	1389 (5.3%)	38 (0.8%)	
pX	5821 (22.3%)	1110 (23.6%)	
pN stage			<0.0001
pN0	9991 (38.2%)	2082 (44.2%)	
pN1	674 (2.6%)	104 (2.2%)	
pN2	859 (3.3%)	54 (1.1%)	
pN3	56 (0.2%)	3 (0.1%)	
pNX	12 716 (48.6%)	2100 (44.6%)	

UP-44. Table 1 (cont'd). Demographics of overall cohort by surgery type

	Radical nephro-ureterectomy	Segmental ureterectomy	p
pM+	320 (1.2%)	13 (0.3%)	<0.0001
Lymph node yield			<0.0001
0	19 706 (77.0%)	3149 (67.8%)	
1–5	3945 (15.4%)	907 (19.5%)	
6–10	992 (3.9%)	333 (7.2%)	
11–15	479 (1.9%)	142 (3.1%)	
16–20	207 (0.8%)	72 (1.5%)	
21–25	109 (0.4%)	23 (0.5%)	
26–30	63 (0.2%)	12 (0.3%)	
31–35	27 (0.1%)	4 (0.1%)	
36–40	20 (0.1%)	3 (0.1%)	
41–45	10 (0.0%)	1 (0.0%)	
46–50	16 (0.1%)	0 (0.0%)	
Over 51	11 (0.0%)	1 (0.0%)	
High-grade tumor	19 185 (73.4%)	3137 (66.6%)	<0.0001
Positive margins	1705 (6.7%)	609 (13.6%)	<0.0001
Surgical approach			<0.0001
Robotic	4245 (29.1%)	650 (25.0%)	
Laparoscopic	6089 (41.8%)	546 (21.0%)	
Open	4234 (29.1%)	1402 (54.0%)	
LVI present	3016 (24.5%)	356 (17.1%)	<0.0001
XRT given	459 (1.8%)	111 (2.4%)	0.006
Chemotherapy			<0.0001
No chemo	21 636 (84.5%)	3990 (86.9%)	
Underwent chemo	3703 (14.5%)	541 (11.8%)	
Unknown if recommended or administered	277 (1.1%)	61 (1.3%)	

UP-47

A systematic review and meta-analysis of the significance of body mass index on kidney cancer outcomes

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Introduction: Obesity is a well-known risk factor for kidney cancer incidence. However, several studies have demonstrated more favorable cancer prognosis in patients with elevated body mass index (BMI) conferring a survival advantage, termed the "obesity paradox." We aimed to evaluate the association between BMI and kidney cancer outcomes (progression-free survival, cancer-specific survival, and overall survival).

Methods: A computerized systematic search of Medline, Embase, ProQuest, PubMed, and Google Scholar for literature published in English was performed between its inception and December 2018, and Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines were used for reporting.

Results: Overall, 34 publications comprising a total of 50 717 patients were included in the analysis. The majority assessed the association between BMI and cancer-specific survival. Overweight and obese patients were associated with improved cancer-specific survival compared to patients with normal BMI (hazard ratio [HR] 0.85, 95% confidence inter-

UP-44. Table 2. Number of patients who had lymph node dissection performed stratified by high-risk feature

High-risk feature (n)	Number of patients who had LND performed (%)
High-grade tumor	
Radical nephroureterectomy (19 185)	4952 (25.8%)
Segmental ureterectomy (3137)	1139 (36.3%)
Tumor over 2 cm	
Radical nephroureterectomy (18 703)	4294 (23.0%)
Segmental ureterectomy (1834)	628 (34.2%)
pT2 disease	
Radical nephroureterectomy (1774)	432 (24.3%)
Segmental ureterectomy (757)	312 (41.2%)
pT3 disease	
Radical nephroureterectomy (6657)	2077 (31.2%)
Segmental ureterectomy (722)	326 (45.2%)
pT4 disease	
Radical nephroureterectomy (1389)	621 (44.7%)
Segmental ureterectomy (38)	17 (44.7%)

val [CI] 0.79–0.93). A similar trend was demonstrated for progression-free survival (HR 0.68, 95% CI 0.59–0.78) and overall survival (HR 0.66, 95% CI 0.55–0.79). On the contrary, the underweight group was associated with inferior cancer-specific survival (HR 2.16, 95% CI 1.15–4.04). Main drawbacks limiting the interpretation were the retrospective design in most studies, heterogeneity in study population, BMI classification, and covariates in multivariate analysis.

Conclusions: This is the largest systematic review evaluating the phenomenon of the obesity paradox in kidney cancer outcomes. It demonstrated a favorable effect of BMI on kidney cancer outcomes. However, due to significant heterogeneity of studies, multicenter, prospective studies and further research on the fundamental biological mechanisms are warranted to confirm the significance of BMI on kidney cancer prognosis.

UP-48

Real world evidence of patient compliance to cabozantinib for metastatic renal cell carcinoma: A single Canadian center experience

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Introduction: The diagnosis of kidney cancer is often incidental, with 17% of renal cell carcinomas (RCCs) presenting with distant metastases. Multicenter clinical trials, such as CABOSUN and METEOR, demonstrated efficacy of cabozantinib in metastatic RCC patients.[1,2] The associated toxicities of cabozantinib often limit patient adherence, which results in suboptimal antitumor activity. This study aimed to evaluate patient adherence to cabozantinib and outline the associated toxicities in daily clinical practice at a single cancer center.

Method: We conducted a retrospective chart review of metastatic RCC patients at McMaster University between 2018 and 2020 that received cabozantinib at any-line therapy with at least three-month followup. Outcomes included time to discontinuation, time to dose reduction, progression-free survival, and overall toxicity profile of cabozantinib.

Results: A total of 28 patients were evaluated, with a mean age of 59.4±8.3 years and a median time of exposure to cabozantinib of 8.1 months (interquartile range [IQR] 3.3–12.9) (Table 1). Cabozantinib was usually started at the full standard dose of 60 mg (82%) and half of the (54%) patients required dose reductions, with the median time to first dose reduction at 6.1 months IQR:3.5 – not yet reached) (Fig. 1A). Seven (25%) patients required treatment discontinuations, with toxicity-induced causes including hypertension (n=2), PPES, and thromboembolic event. Median progression-free survival was 12.8 months (IQR 9.1 – not yet reached) (Fig. 1B). The incidences of previously seen toxicities were lower than clinical trials, except for higher incidences of asymptomatic transaminitis and hypothyroidism.

Conclusions: This study aimed to evaluate the role of cabozantinib-induced toxicities that predispose unwanted dose reductions. These findings provide a benchmark for clinicians to anticipate toxicities and manage them by responding to reversible adverse events in the real-world setting.

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UP-44. Table 3. Median survival stratified by high-risk feature

High-risk feature	Median survival (months)	p
High-grade tumor		
Radical nephroureterectomy	52.3	0.14
Segmental ureterectomy	53.1	
Tumor over 2 cm		
Radical nephroureterectomy	61.2	0.37
Segmental ureterectomy	58.5	
pT2 disease		
Radical nephroureterectomy	60.3	0.07
Segmental ureterectomy	54.0	
pT3 disease		
Radical nephroureterectomy	36.0	<0.0001
Segmental ureterectomy	26.6	
pT4 disease		
Radical nephroureterectomy	12.1	0.21
Segmental ureterectomy	19.9	

UP-49

Adrenal pheochromocytoma: Tumor histology correlates with perioperative intensive care stay

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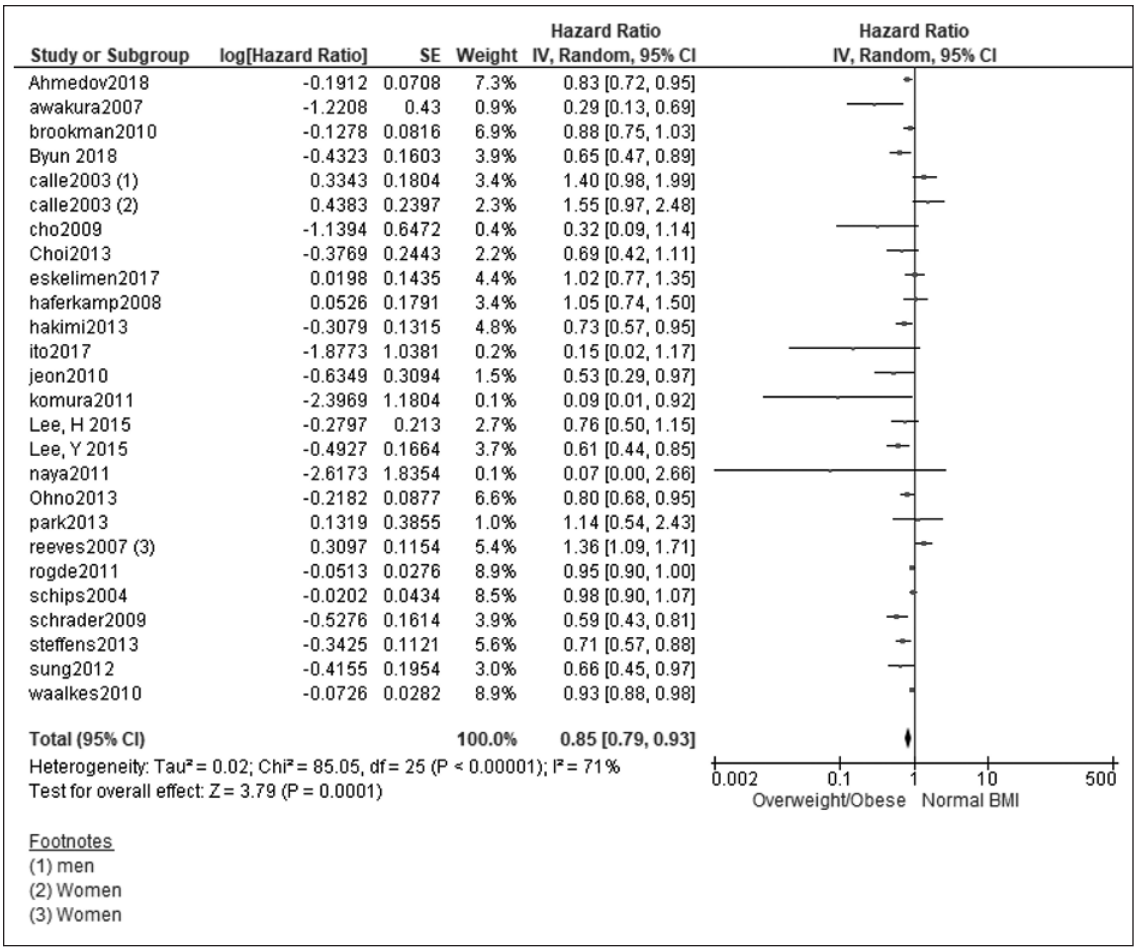
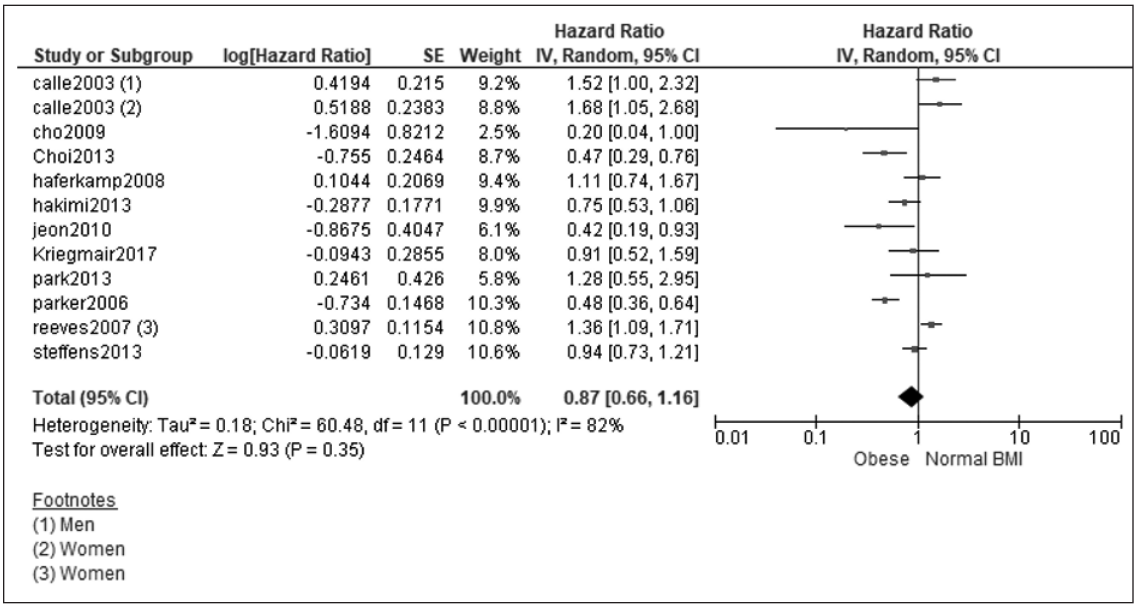
Introduction: Pheochromocytomas (PCC) are catecholamine-secreting tumors with the majority arising from the adrenal medulla. The behavior of these tumors is a challenge to predict on the basis of tumor histology. Malignant PCC is only confirmed in the presence of metastatic disease at non-chromaffin sites. Pheochromocytoma of the Adrenal Gland Scale Score (PASS)[1] is a pathological assessment that helps identify tumors at greater risk of metastatic spread. However, the value of PASS in assessing clinical outcomes apart from metastatic disease is unknown. In our study, we aimed to assess the relationship between PASS and clinical severity of resected adrenal PCC.

Methods: We performed a retrospective chart review on all resected PCC in a tertiary institution from 2008–2018. Pathology slides were reviewed,

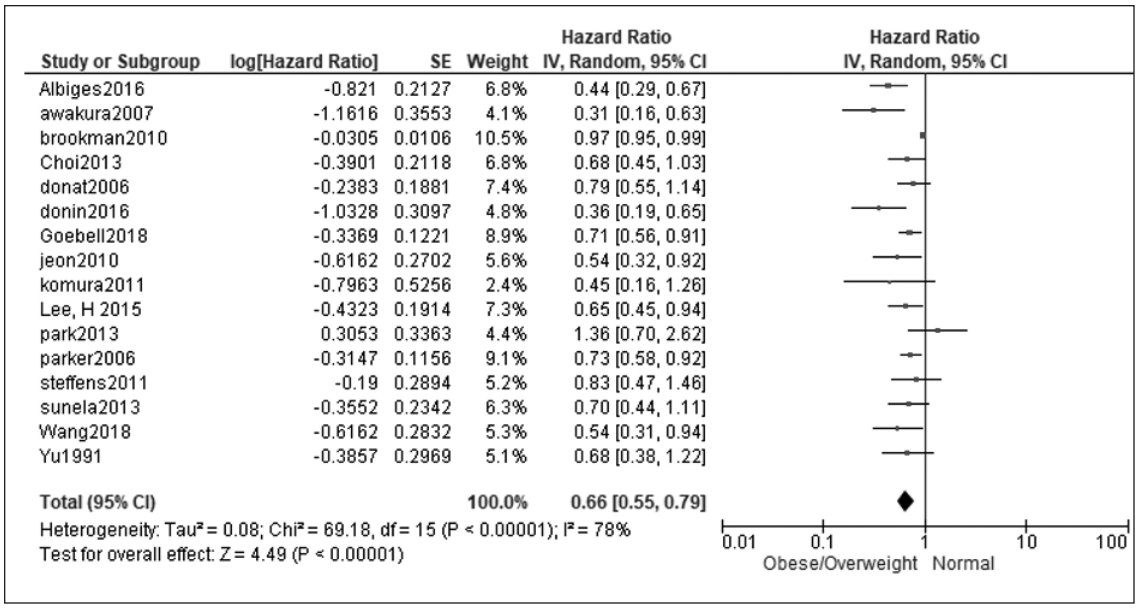


UP-47. Fig. 1. Cancer-specific survival based on BMI comparing obese/overweight group with normal BMI control group.

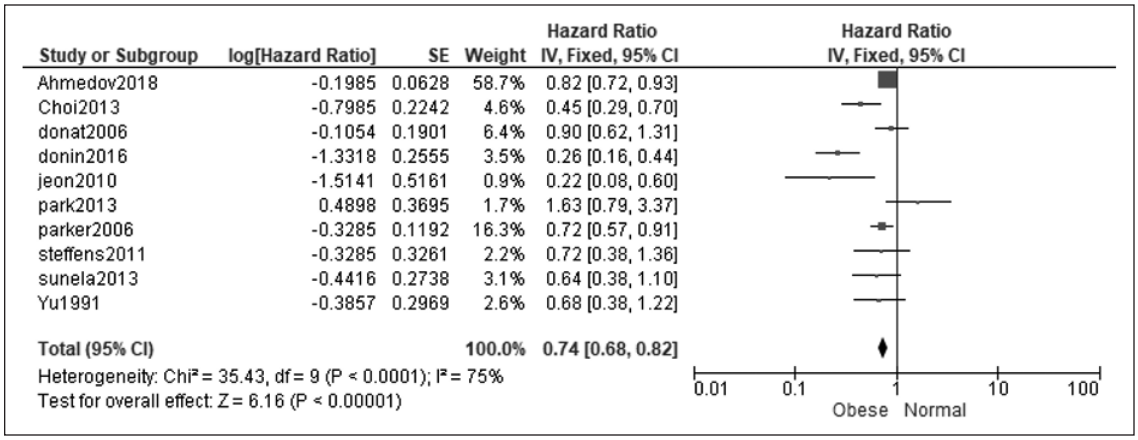


UP-47. Fig. 2. Cancer-specific survival based on BMI comparing obese vs. normal group.

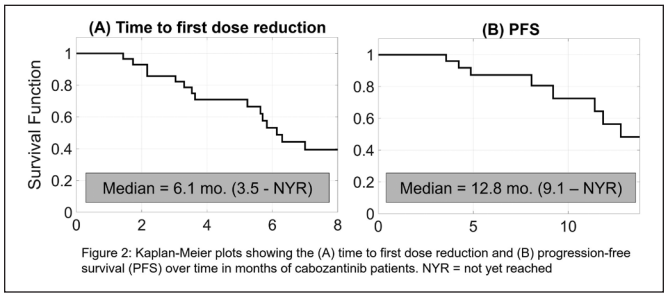
and all abbreviations were



UP-47. Fig. 3. Overall survival based on BMI comparing obese/overweight group with normal BMI control group.



UP-47. Fig. 4. Overall survival based on BMI comparing obese vs. normal group.



UP-48. Fig. 1. Kaplan-Meier plots showing the ***(A)*** time to first dose reduction and ***(B)*** progression-free survival (PFS) over time in months of cabozantinib patients. NYR: not yet reached.

UP-48. Table 1. Demographic and clinical information for the retrospective review of cabozantinib patients at McMaster University

Total	N=28	n	%
Age (y)		59.4±8.3	
Sex	Male	22	79%
	Female	6	21%
# of metastatic sites	1	14	50%
	≥2	14	50%
Starting dosage	60 mg	23	82%

assigned a PASS. Demographic information and clinical outcomes were collected for all PCC during the study period. Spearman correlation coefficients were used for comparison of continuous variables.
Results: Sixty-three tumors were identified. Two cases were deemed to be malignant PCC. There was no clear relationship between PASS and patient age, hypertension, cardiac presentation, metanephrine level, peak intraoperative blood pressure, or length of stay. Symptomatic presentations trended toward higher PASS but did not reach statistical significance (6 vs. 4, p=0.47). Median PASS was higher in females than males (6 vs. 2, p=0.017). Patients requiring perioperative ICU admission had higher PASS than patients who did not (8 vs. 5, p=0.04).
Conclusions: This is the first study to use PASS to assess patient outcomes beyond metastatic disease. While metastatic disease is devastating, the more common danger is related to the sequelae of catecholamine excess. We report a novel application of the PASS to confirm a relationship between tumor histology and perioperative outcome in PCC patients While this preliminary work is hypothesis-generating, further studies with larger sample sizes are needed.
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UP-50
Time trends for drug-specific adverse events in patients on sunitinib: Implications for remote monitoring
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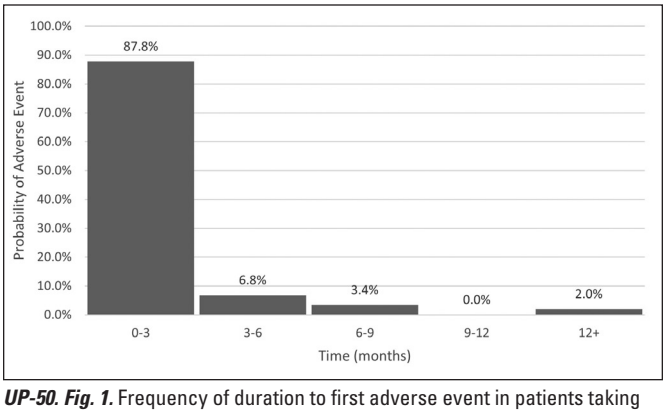
Support: Princess Margaret Cancer Centre's McCain GU BioBank, Queen's University Arts & Science Undergraduate Research Fund.
Introduction: Sunitinib is a multitargeted receptor tyrosine kinase inhibitor used in the treatment of metastatic renal cell carcinoma (mRCC). Sunitinib can cause many dangerous side effects and patients treated with it require regular, in-person appointments to monitor for adverse events (AEs). Given the current COVID-19 pandemic, it has become increasingly difficult for patients to attend in-person outpatient appointments. This study investigated whether reducing in-person appointments for patients prescribed sunitinib was feasible by a remote monitoring strategy.
Methods: In this retrospective chart review of patients with a diagnosis of mRCC, 167 patients were identified to have received sunitinib during the course of their treatment. The time between initiation of treatment and the first AE was recorded. The AEs included were hypertension, hyperkalemia, liver dysfunction, cardiac event, palmar-plantar erythrodysesthesia (hand-foot syndrome), diarrhea, and hypothyroidism. The AEs were categorized according to the Common Terminology Criteria for Adverse Events (CTCAE), version 5. Survival analysis was used to calculate the time to AE.
Results: Of 167 patients identified, 147 experienced an AE (88%). Of these patients, cumulative incidence of AEs at three, six, and nine months were 87.8%, 94.6%, and 98.0%, respectively (probability of adverse events shown in Fig. 1). The severity of AEs observed were 37.4% CTCAE grade 1, followed by 39.4% grade 2, 21.8% grade 3, and 1.40% grade 4 events. There were no grade 5 AEs observed.
Conclusions: Given the current COVID-19 pandemic, decreasing exposure and risk of infection for mRCC patients is essential. We found that patients prescribed sunitinib were most likely to experience the first AE within three months of treatment and remote monitoring after this time appears appropriate. Furthermore, the AE is likely to be a grade 1 or 2 in severity. We suggest that remote monitoring in the community after three months is feasible, as the likelihood of an AE decreases with time.



UP-50. Fig. 1. Frequency of duration to first adverse event in patients taking sunitinib for mRCC.

UP-51
Achieving trifecta outcomes early in the robotic-assisted partial nephrectomy learning curve
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Introduction: Achieving trifecta outcomes in robotic-assisted partial nephrectomy (RAPN) is desirable for improved patient safety and clinical outcomes. This study aimed to evaluate achievement of trifecta outcomes for RAPN during the initial learning curve period for an experienced laparoscopic surgeon.
Method: Forty-nine consecutive RAPN cases performed at a tertiary center in Queensland, Australia were reviewed retrospectively. The demographic, histolopathology, and perioperative data was collected, including length of surgery, intraoperative blood loss, and warm ischaemic time (WIT). The trifecta was defined as negative surgical margin, zero perioperative complications, and warm ischemia time (WIT) of less than 20 minutes.
Results: The mean operative time was 139 minutes (57– 235) and the mean estimated blood loss was 190 ml (20–600). Intraoperative hilar clamping was not performed in five cases. The mean WIT was 16 minutes (8–28). The mean lesion diameter was 28 mm (6–52) mm. The overall complication rate was 12.2%, of which >80% were Clavien-Dindo grade II or less. Positive surgical margins were found in 4.1% of cases. The mean length of hospital was 4.2 days (2–9) days. Trifecta outcome was achieved in 71.4% cases. There was no significant difference in incidence of trifecta outcomes between the first 25 cases (72%) and the last 24 cases (71%).
Conclusions: The trifecta outcome of negative surgical margins, no perioperative complications, and a WIT of less than 20 minutes may be achieved early in a surgeon's learning curve with robotic-assisted surgery. To achieve excellent surgical and histological outcomes, a good surgical team and reproducible surgical technique is essential.

UP-52
Outcomes and prognosticators following radical nephroureterectomy for upper tract urothelial carcinoma
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Introduction: Upper tract urothelial cancer (UTUC) accounts for 5–10% of all urothelial cancers and approximately 60% are invasive at diagnosis. Clinical staging remains a challenge, as most ureteroscopic biopsies are often inadequate. The current accepted paradigm for prediction of tumor stage includes a combination of cytology, tumor grade, visual inspection, and radiographic findings. Improvement in prediction of tumor stage would allow for optimal selection of therapeutic options. We analyzed the

ability of tumor characteristics to predict the presence of muscle-invasive and non-organ-confined (NOC) disease.
Methods: Pathology reports of patients who underwent radical nephroureterectomy (RNU) for UTUC from January 1, 2008 to December 31, 2018 were identified from the Manitoba provincial pathology database. Tumor factors, including grade, size, and location (pelvis/ureter), were identified and correlated with tumor stage using univariable and multivariable analyses.
Results: Of 81 patients who underwent RNU, 74% had high-grade tumors. Forty-six percent had muscle-invasive disease or higher (≥pT2) and 35% had NOC disease (≥pT3). Presence of high-grade tumor (odds ratio [OR] 12.8, p=0.002), size >45 mm (OR 3.35, p=0.048), and location in both renal pelvis and ureter (OR 3.72, p=0.031) were independently associated with ≥pT2 disease. Presence of one, two, and three risk factors were associated with rates of ≥pT2 UTUC of 32%, 67%, and 71%, respectively. However, only high-grade disease (OR 7.82, p=0.010) and size >45 mm (OR 2.52, p=0.093) were associated with ≥pT3 disease.
Conclusions: Pathologic-based tumor factors independently predict presence of muscle-invasive and NOC UTUC. Presence of multiple risk factors shows a cumulative effect in the ability to predict ≥pT2 disease. Further correlation with clinical data and radiographic findings will allow for improved risk-stratification and optimal selection of candidates for neoadjuvant chemotherapy.

UP-53
Cost-effectiveness analysis of post-orchiectomy management for clinical stage I non-seminoma germ cell testicular cancer

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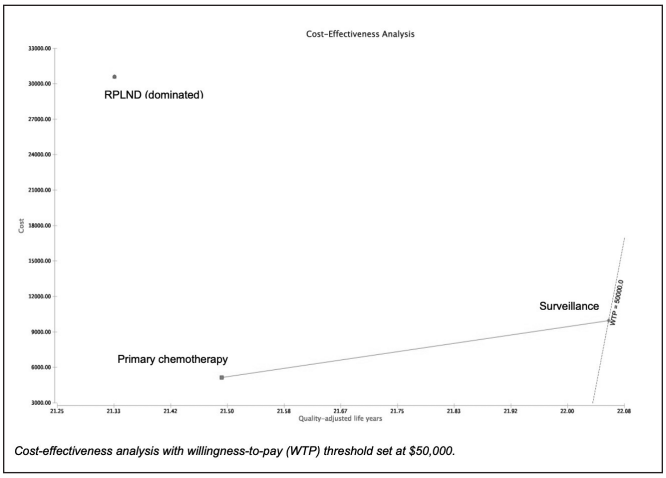
Introduction: The optimal management following initial orchiectomy of testicular cancer patients with a clinical stage (CS) I non-seminomatous germ cell tumor (NSGCT) is controversial. There is a survival equipoise between retroperitoneal lymph node dissection (RPLND), primary chemotherapy, and surveillance following initial orchiectomy. Considering that differences in survival outcomes are marginal, we performed a cost-effectiveness analysis to elucidate the tradeoffs and expected values for each management option.



UP-53. Fig. 1. Cost-effectiveness analysis.

Methods: We developed a Markov cohort simulation model that projected overall survival (OS), cancer-specific survival (CSS), quality-adjusted life-years (QALYs), and healthcare cost from the payer's perspective with a lifetime time horizon for a cohort of a 33-year-old CS1 NSGCT patients. Disease history, characteristics of relapses, relapse treatment algorithms, and utility values were derived from a comprehensive review of the literature and expert opinion. Costs were determined based on the Premier Hospital Database, a national hospital discharge database representing 20% of hospitals in the U.S. The model was calibrated and validated against existing literature. A willingness-to-pay (WTP) threshold of $50 000 per QALY was employed.
Results: In the base case, surveillance was associated with the highest OS, CSS, and QALYs. It was associated with a 94.7% 15-year OS, a 98.6% 15-year CSS, and 22.06 QALYs. RPLND was more costly and less effective than both surveillance and primary chemotherapy. The incremental cost-effectiveness ratio associated with surveillance, as compared to primary chemotherapy, was $1410 per QALY gained, which is well below the WTP threshold. Results of the cost-effectiveness analysis are summarized in Fig. 1.
Conclusions: We found that surveillance for CS1 NSGCT patients is the optimal strategy compared to RPLND and primary chemotherapy. These findings can inform clinical decision-making, as well as resource allocation.

UP-54
Surgical outcomes in robotic-assisted partial nephrectomy for imperative vs. elective indications: A propensity score-matched analysis

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Support: Vattikuti Foundation & Vattikuti Urology Institute, Henry Ford Hospital, Detroit, MI, United States.
Introduction: Partial nephrectomy (PN) is the standard treatment for kidney tumors in imperative settings, defined as situations where there is a single kidney, bilateral renal tumors, and renal impairment. Limited data is available on robotic-assisted PN (RAPN) outcomes for imperative indications. Although recent data has demonstrated RAPN to have reduced complications and length of hospital stay compared to open PN, fewer RAPN are offered for imperative indications, as they are considered high-stake scenarios. We sought to compare the perioperative and surgical outcomes in RAPN performed for imperative vs. elective indications.
Methods: We retrospectively interrogated the multinational Vattikuti database of 3801 RAPN cases for elective and imperative indications. Baseline data for age, gender, body mass index (BMI), ASA and PADUA score were examined. Primary outcomes included organ ischemic time, operative time, estimated blood loss, rate of blood transfusions, Clavien-Dindo complications, conversion to radical nephrectomy (RN), and positive surgical margins. Propensity score-matching was performed to match baseline variables and bivariate analysis used to compare outcomes of interest between groups.
Results: A total of 348 patients (87 imperative vs. 261 elective indications) were included in the final analysis. No significant differences

were found between groups for ischaemic time (18.9 min vs. 18.6 min, p=0.76), operative time (186 min vs. 180 min, p=0.67), estimated blood loss (226 ml vs. 211 ml, p=0.55), rate of blood transfusions (2.5% vs. 3.4%, p=0.99), or Clavien-Dindo complications (p=0.88). There were no conversions to RN in the imperative group and 6.3% (n=8) conversions in the non-imperative group (p=0.37). Positive surgical margins were seen in 1.2% (1/87) of the imperative group and 4.1% of the non-imperative group (1/261), (p=0.37).

Conclusions: RAPN is feasible and safe for imperative indications, demonstrating comparable, if not superior, outcomes to RAPN performed for elective indications.

UP-55

Stimulated Raman spectroscopy as a method to improve access and decrease time required to determine renal biopsy adequacy — a pilot study

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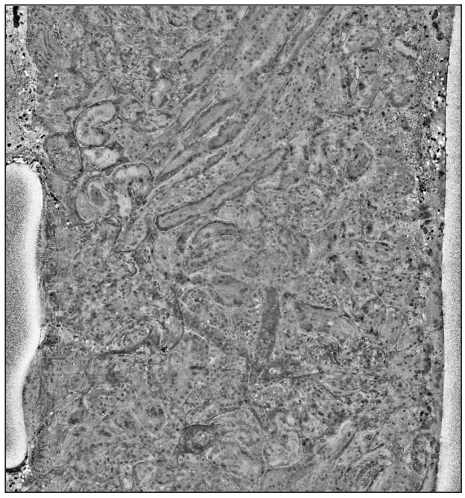
Introduction: Renal biopsy requires adequate tissue sampling to aid in the investigation of medical renal disease. The adequacy of renal biopsy may be improved by onsite pathologist light microscopy; this evaluation has been shown to increase adequacy rates, decrease the number of biopsies, and increase the number of glomeruli sampled.[1] Stimulated Raman histology (SRH) is a novel microscopic technique that has created the possibility for rapid, label-free, and high-resolution images of unprocessed tissue, which may be viewed on PACS.[2] The application of SRH to renal biopsy may provide the benefits of pathological light microscopic evaluation, while also removing the requirement for a renal pathologist to be onsite and decreasing the time required to determine tissue adequacy.

Methods: An 18-gauge core needle biopsy was taken of a radical nephrectomy specimen, remote to a renal mass. Histological images of the fresh, unstained biopsy samples were obtained using a Stimulated Raman spectroscopy microscope using two Raman shifts: 2845 cm^{-1} and 2930 cm^{-1}. These Stimulated Raman spectroscopic images were then processed to create SRH, which is reminiscent of hematoxylin and eosin, and viewed by a dedicated renal pathologist.

Results: The SRH microscope took seven minutes to produce a high-quality image of the renal biopsy (Figs. 1, 2). The seven minutes required to obtain SRH was less then the 23 minutes usually required for pathologist light microscopic evaluation. The biopsy was read by a dedicated renal pathologist without prior SRH training and determined to be diagnostic, which was confirmed by interpretation of the biopsy's H&E. The pathologist perceived difficulty of SRH interpretation was substantially decreased compared to light microscopic evaluation, and the image quality was considered near hematoxylin and eosin staining.

Conclusions: SRH produces high-quality images that can be rapidly produced and easily interpreted to determine renal biopsy adequacy.

UP-55. Fig. 1. Virtual H&E image created by clinical stimulated Raman spectroscopy microscope of benign ex-vivo renal biopsy.



UP-55. Fig. 2. Example of glomeruli from virtual H&E image created by clinical stimulated Raman spectroscopy microscope of benign ex-vivo renal biopsy from ***Fig. 1***.

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