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Poster #52

Age-related differences in primary testicular lymphoma: A large, population-based cohort study

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Introduction: Primary testicular non-Hodgkin's lymphoma (PTL) is a very rare disease, comprising 1% of all non-Hodgkin's lymphoma and <5% of all cases of testicular tumors. With a median age at diagnosis of 67 years, PTL is the most common testicular malignancy in men aged >60 years; however, scarce data has been published on PTL in younger patients and their overall outcomes. Our goal was to compare clinical parameters and survival outcomes between patients older and younger than 60.

Methods: The SEER database was queried for all patients diagnosed with PTL from 1980–2013. Data collected consisted of demographic and clinical parameters, including staging, pathological, and survival data. Patients were stratified according to their age and compared.

Results: The cohort included 1679 patients comprising 3.45% of all testicular tumors detected during a period of 33 years. The fraction of PTL out of all testicular tumors had remained stable at 3.24% in the 1980–1984 and 3.73% in the 2010–2013 period, although the absolute number of cases increased from 85 per year in 1980 to 378 in 2013. Overall, 433 patients (25.8%) were older than 60 years of age, with 208 (12.4%) being <50 and 91 (5.4%) <40. Older and younger patients exhibited similar racial diversity, geographical origin, and T stage. Almost all patients in both groups had mature B cell lymphoma. A larger percentage of younger patients received radiation to the contralateral testicle (43.4% vs. 31.9% of older patients, p<0.001), and chemotherapy (82.2% vs. 66%, p<0.001). Having insurance was more common with older patients (97.8% vs. 88.2%, p<0.001). On average, younger patients were less likely to die of their disease (28.2% vs. 38.8%, p<0.001) with a median survival time of 283 months vs. 98 months, p<0.001. Fine and Grey competing risk multivariable analysis demonstrated that increasing age, worse T stage, and mature T cell histopathology conferred a worse cancer-specific outcome, while receiving radiotherapy, chemotherapy, and being insured had a protective role.

Conclusions: PTL is the most common testicular malignancy in men older than 60 years of age, but more than a quarter of the patients are younger than 60 and more than 12% are <50. Younger patients are more likely to receive chemotherapy and radiation, and overall do better in terms of disease-specific survival. Being younger, insured, having a lower T stage, and being treated with chemotherapy and radiotherapy increase the chances of survival.

Poster #53

Long-term evaluation of recurrence in patients undergoing radiofrequency ablation for renal tumors

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Introduction: Current guidelines recommend that patients who have undergone radiofrequency ablation (RFA) for renal cell carcinoma (RCC) should be monitored for up to 5 years; however, long-term recurrence data beyond 5 years is lacking. The objective of this study was to evaluate RCC recurrence rates, time to recurrence (TTR), and predictors of recurrence in patients up to 10 years post-RFA.

Methods: This was a single-center, retrospective chart review of patients undergoing RFA for any size renal tumor between 2004 and 2015. Patients with familial syndromes, oncocytomas, and previous treatment of RCC on the ipsilateral kidney were excluded. All tumor recurrences were confirmed with conventional diagnostic imaging. Descriptive statistics, logistic regression, and correlations were conducted to determine predictors of recurrence and effects of variables on time to recurrence.

Results: A total of 142 RFAs were identified, with 80 patients included. Most (72.5%) were male, with a mean age at treatment of 68.1 (±10.7) years. The percutaneous approach was used in 59 (73.8%) patients, and 62.5% had clear-cell histology. Fourteen (17.5%) patients experienced recurrence, with a mean time to recurrence of 25.1(±29.9) months (median=11.5, range 1.1–90.0). Mean tumor size was 2.6 cm (±0.74) and 9 (11.3%) patients had minor complications (Clavien-Dindo <3). The mean RENAL Nephrometry Score was 6.6 (±1.8), indicating low-moderate complexity. Most (79%, 11) recurrences were between 3 and 12 months post-RFA. A higher RENAL Nephrometry Score was a predictor of recurrence (p=0.044) and was associated with a shorter TTR (p=0.033). There were no other significant predictors of recurrence in this sample.

Conclusions: A recurrence rate of 17.5% was found in this sample of 80 patients, with TTR observed up to 7.5 years. The RENAL Nephrometry Score was a predictor for recurrence and was significantly associated with a shorter TTR. Evaluating long-term data on post-RFA patients can aid in establishing parameters for routine followup, such as imaging and decision-making for continuing care.

Poster #54

Assessing the value of routine perioperative creatinine monitoring in clinical decision-making for patients undergoing radical nephrectomy

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Introduction: With a trend in recent years towards standardization of perioperative care via ERAS protocols, the goal after major surgery is accelerated recovery while identifying those at risk for complications. This study aimed to capture the frequency of clinical interventions as a result of routine creatinine monitoring in a population of patients undergoing radical nephrectomy (RN).

Methods: This study retrospectively examined 175 patients who underwent radical nephrectomies for a concerning renal mass from 2015–2021. All preoperative and postoperative creatinine values were recorded, as well as any clinical decision made based on these values, such as a fluid bolus, IV fluid rate change, medication dose reductions based on eGFR, or need for inpatient nephrology consultation. Logistic regression was used to identify variables that would predict a clinical decision based on creatinine.

Results: Descriptive statistics are included in Table 1. The average length of stay was 4.2 (±3.4) days with an average of 4.4 (±3.9) total creatinines drawn per patient. Overall, 26.3% of patients received a clinical intervention made based on their creatinine level. In patients with an uncomplicated operation and clinically localized disease, only 7.4% had a clinical decision made based on their creatinine level. Using logistic regression, additional procedures, such as adrenalectomy or lymph node dissection during nephrectomy was predictive of a future clinical decision based on creatinine values.

Conclusions: In patients undergoing routine nephrectomy with an uncomplicated postoperative course, repeat creatinine evaluations rarely results in a change in management for that patient. Discontinuing daily monitoring bloodwork in such patients as part of an integrated ERAS protocol can help reduce healthcare costs and prevent unnecessary investigation.

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Poster #54. Table 1. Descriptive statistics for patients undergoing radical nephrectomy

n = 175	
Age, mean	64.5±11.2
BMI, mean	31.0±6.6
Comorbidities, percentage	
Smoker	77/175 (44%)
Diabetic	37/175 (21.1%)
Hypertension	107/175 (61.1%
On ACE or ARB	82/175 (46.9%)
ASA score, percentage	
1	4/175 (2.3%)
2	104/175 (59.4%)
3	63/175 (36.0%)
4	4/175 (2.3%)
Preoperative creatinine, median umol/L	79.5 (IQR 70.8–97)
Localized disease, percentage	146/175 (83.4%)
Mass diameter, median cm	7.1 (IQR 5.5–9.5)
Biopsy performed, percentage	27/175 (15.4%)
OR time, median mins	132 (IQR 105–192)
EBL, median ml	200 (IQR 100–300)
Δ SCr from preop to POD1, median umol/L	+36 (IQR 24.0–47.3)
Clinical decision based on creatinine, percentage	46/175 (26.3%)
Total # of creatinines per patient, mean	4.4±3.9
Clavien complication ≥2, percentage	32/174 (18.4%)
Length of stay, mean days	4.2±3.4
Δ SCr preop to 1st outpatient SCr, median umol/L	+37 (IQR 23–49)

Poster #55

Mitomycin C efficacy when mixed with contrast agents in treating high-grade non-invasive urothelial carcinoma

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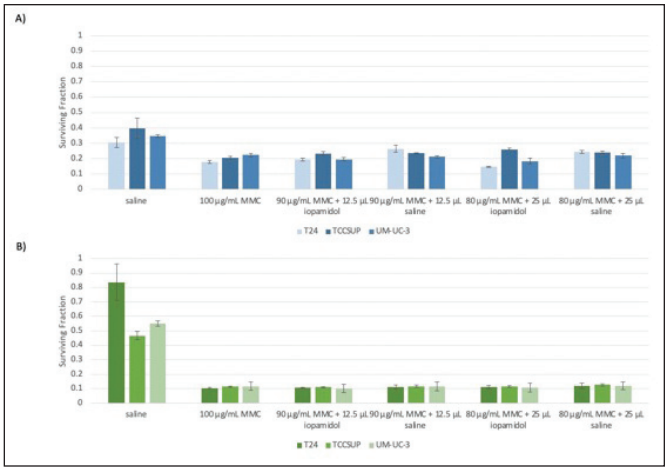
Introduction: Recently, Jelmyto® was FDA-approved for the intra-renal-pelviceal treatment of low-grade upper tract urothelial carcinoma (UTUC); however, there remains a cohort of patients with recurrent high-grade UTUC in functionally solitary kidneys where a nephroureterectomy would render them anephric. In such a patient, we used repetitive intrapelviceal treatments with mitomycin C (MMC) mixed with a contrast agent iopamidol to aid in visualizing the MMC within the pelvicalyceal system and decrease the likelihood of pyelovenous backflow. This study confirmed efficacy of MMC when mixed with iopamidol contrast agent.

Methods: Three human high-grade urothelial carcinoma (UC) cell lines were cultured until logarithmic growth and attached to 96-well microtiter plates. Cells were treated for 60 minutes at 37°C with 100 mg/mL MMC diluted with saline or iopamidol at varying concentrations. Saline alone was used as a control. After 24 and 72 hours, a dimethyl thiazolyl tetrazolium (MTT) test was performed to qualitatively measure cell viability. The experiment was performed in triplicate for each group. For each cell line, one-way ANOVA was used to compare mean values between treatment groups. Tukey's multiple comparison test was used to control the overall type I error in post-hoc pairwise comparisons.

Results: Both MMC and MMC mixed with iopamidol were effective in inducing cell death in all three cell lines, compared to the saline control. This cell death was evident after 24 hours and even more robust after 72 hours ($p<0.0001$ for all comparisons) (Figure 1). Treatment with intrapelviceal MMC has had a durable response 1.5 years after treatment when using our novel technique in one patient.

Conclusions: Instillation of MMC mixed with iopamidol is an effective method to treat high-grade UTUC in vitro even at 1/10th the concentration used in vivo. These findings are translatable to intrapelvyceal treatments in highly selected patients.

Funding: *Department of Urology, University of Rochester Medical Center*



Poster #55. Figure 1. MTT test results for each treatment group demonstrating cell viability at **(A)** 24 hours; and **(B)** 72 hours after treatment.

Poster #56

SunRISe-2: A phase 3, multicenter, randomized study evaluating the efficacy of TAR-200 in combination with cetrelimab vs. concurrent chemoradiotherapy in participants with muscle-invasive urothelial carcinoma

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Introduction: The standard of care for patients with muscle-invasive bladder cancer (MIBC) consists of neoadjuvant chemotherapy and radical cystectomy (RC) or chemoradiotherapy (CRT); however, RC is associated with considerable potential morbidity or mortality. TAR-200 is an intravesical drug delivery system designed for the local continuous release of gemcitabine within the bladder. Cetrelimab (CET) is an investigational immunoglobulin G4 anti–programmed death-1 antibody. This clinical study is aiming to evaluate the efficacy of combination treatment with intravesical TAR-200 and systemic CET in terms of enhanced local and systemic antitumor activity relative to concurrent CRT in participants with MIBC who are ineligible for or declined RC.

Methods: SunRISe-2 (NCT04658862) is a prospective, multicenter, open-label, randomized phase 3 study assessing the efficacy and safety of intravesical TAR-200 + systemic CET vs CRT. Eligible participants are aged ≥18 years with Eastern Cooperative Oncology Group performance status of 0, 1, or 2, histologically proven cT2-T4a, N0, M0 MIBC, and are ineligible for or declined RC. Participants (N≈550) are randomized 1:1 to

TAR-200 + CET or CRT. Stratification is on completeness of transurethral resection (visibly complete vs. incomplete and <3 cm) and screening tumor stage (T0 vs. Ta/T1/Tis vs. T2–T4a). In arm 1, participants receive intravesical TAR-200 every 3 weeks for the first 18 weeks, then starting on week 24, every 12 weeks until week 144 and systemic CET until month 18 (week 78). In arm 2, participants receive CRT with either cisplatin or gemcitabine for up to 6 weeks plus either conventional (6.5 weeks) or hypofractionated (4 weeks) radiotherapy (per investigator's choice). Primary disease assessments (transurethral resection of bladder tumor, axial imaging, and cystoscopy) are performed at week 18 to evaluate treatment efficacy in both arms. Subsequent assessments (axial imaging and cystoscopy) will occur at regular intervals through year 5. The primary endpoint is bladder-intact event-free survival. Key secondary endpoints include metastasis-free survival, overall survival, overall response rate at week 18, and safety. Exploratory endpoints include assessments of time to progression, cancer-specific survival, time to symptomatic progression, pharmacokinetics, immunogenicity, health-related quality of life, and biomarkers.

Results: This study opened in December 2020. As of April 7, 2022, 61 patients have been randomized in this study.

Conclusions: This phase 3 study will evaluate whether TAR 200 + CET is an effective treatment for participants with MIBC who are ineligible for or declined RC.

Funding: *Janssen Research and Development*

Poster #57

Do prophylactic antibiotics reduce urinary tract infections following robot-assisted radical cystectomy? A randomized control trial

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Introduction: Infectious complications are the most common following radical cystectomy, mostly occurring within 30 days of surgery. We sought to investigate the utility of prophylactic antibiotics to reduce urinary tract infections in the early postoperative period after robot-assisted radical cystectomy (RARC).

Methods: A prospective, randomized controlled trial (RCT) was performed to investigate the safety and efficacy of prophylactic antibiotics in reducing urinary tract infections (UTI) after RARC (NCT04502095). UTI was defined as the presence of a positive urine culture (≥10^5 cfu/mL with no more than 2 organisms) and ≤1 documented urinary symptom(s). Patients were randomized in a ratio 1:1 to receive prophylactic antibiotics (800/160 mg trimethoprim-sulfamethoxazole or 100 mg nitrofurantonin) for 30 days vs. current standard of care (no postoperative antibiotics). Compliance of treatment group was defined as administration of antibiotic for ≥15 days. Data were analyzed for adverse events and development of UTI within for 30 and 90 days following RARC.

Results: A total of 43 patients were enrolled (22 in the treatment arm and 21 controls). The final cohort comprised 36 patients (15 in treatment arm and 21 controls) with a median followup time of 3 months (IQR 1.5–7.3). No patient in the treatment group developed UTIs within 90 days of RARC compared to 7 patients (33%) in the control group (p=0.03). Patients in the treatment group had lower 30-day (67% vs. 76%, p=0.71) and 90-day complications (73% vs. 81%, p=0.70), lower 30-day (7% vs. 14%, p=0.63) and 90-day high-grade complications (7% vs. 29%, p=0.20) and lower 30-day (13% vs. 29%, p=0.42) and 90-day readmissions (13% vs. 33%, p=0.25), but did not reach statistical significance. Patients in the treatment group experienced lower overall infectious complications within 90 days of RARC (13% vs. 48%, p=0.04) (Table 1). Two (13%) patients in the treatment group experienced adverse events, one patient with Clavien-Dindo grade 2 event (Clostridium difficile colitis), and one patient with both grade 3 (AKI) and grade 4 events (hyperkalemia). Patients with adverse events received trimethoprim-sulfamethoxazole.

Conclusions: The administration of 30-day prophylactic antibiotics after RARC was significantly associated with decreased 90-day UTIs and infectious complications after RARC.

Funding: *Roswell Park Alliance Foundation*

Poster #58

Uretero-enteric strictures after robot-assisted radical cystectomy: Prevalence and management over two decades

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Introduction: Ureteroenteric stricture (UES) is a common cause of morbidity and reoperations after robot-assisted radical cystectomy (RARC). We sought to evaluate the prevalence, predictors, management, and trend over time for UES after RARC.

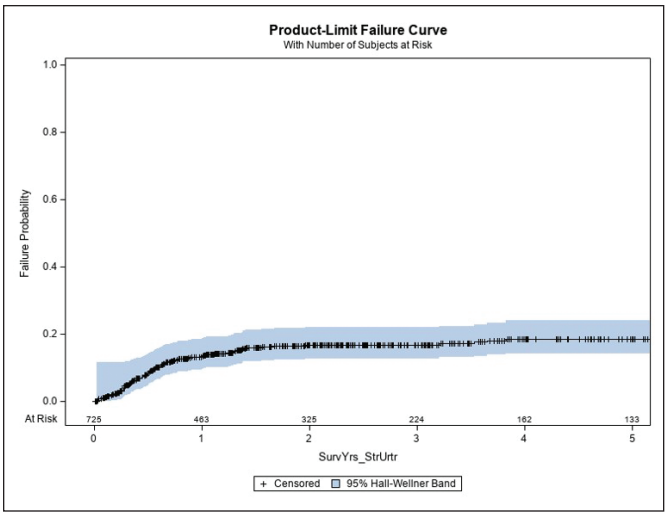
Methods: We retrospectively reviewed our departmental quality assurance database for RARC (2005–2022). UES was defined as the presence of obstruction and/or absence of reflux on imaging associated with flank pain, infection, worsening renal function, or worsening hydronephrosis. Patients with UES were identified. Data were analyzed for demographics and perioperative variables. UES was described in terms of timing, laterality, and management. A local regression model with smoothness parameters of 0.5 depicted trend of UESs from 2005–2021. Multivariable analysis (MVA) was used to identify variables associated with development of UES. Kaplan-Meier (KM) curves were used to depict time to UES and time to recurrence after surgical revision.

Results: UES occurred in 109 patients (15%) at a median time of 6 months post-RARC (IQR 3–10). Seven patients received no treatment, leaving 102 for analysis. Prevalence of UES was 13%, 17%, and 19% at 1, 3, and 5 years after RARC, respectively (Figure 1). Incidence of UES reduced starting 2018, coinciding with the technique change of not placing ureteral stents (Figure 2). UES occurred on the right in 33%, on the left in 46%, and bilaterally in 21%. All patients received an initial percutaneous nephrostomy or antegrade stent. Twenty (20%) patients were UES-free after 1 or 2 endoscopic/percutaneous procedures. Surgical revision was required for 46 (45%) patients, with 6 (14%) developing recurrent UES. Three patients immediately failed revision. The remaining 36 patients elected chronic stent or tube exchanges. On MVA, UES was significantly associated with ureteral stent placement (HR 2.30, 95% CI 1.00–5.27, p=0.05), intracorporeal urinary diversion (HR 1.84, 95% CI 1.04–3.24, p=0.04), neoadjuvant chemotherapy (HR 1.74, 95% CI 1.15–2.63, p=0.009), history of congestive heart failure (HR 2.84, 95% CI 1.31–6.19, p=0.008), and history of stroke, transient ischemic attack, or cerebrovascular accident (HR 2.41, 95% CI 1.25–4.66, p=0.009).

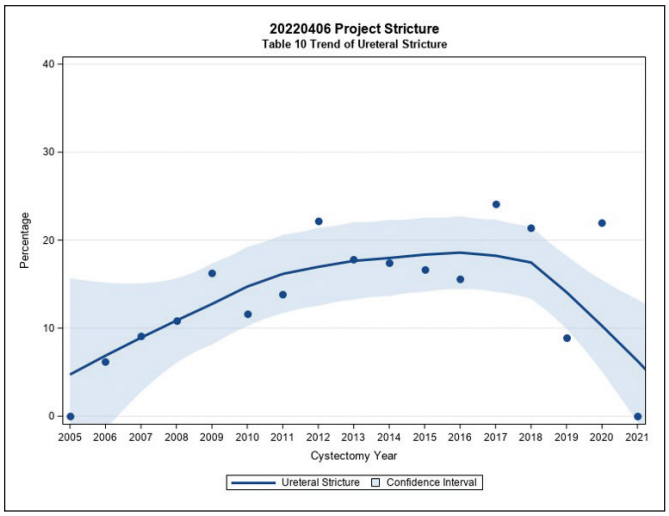
Conclusions: UES occurred in 15% of patients after RARC and 45% required reimplantation. Intracorporeal urinary diversion, ureteral stents, history of congestive heart failure, TIA/CVA/stroke, and neoadjuvant chemotherapy were associated with UES.

Poster #57. Table 1. Description of patients on treatment and control arms

	Control	Treatment	All	p
Patients, n (%)	21 (58)	15 (42)	36 (100)	0.32
Age, means (SD), years	71.25±9.55	71.33±8.75	71.29±9.08	0.97
sex, male, n (%)	12 (57)	13 (87)	25 (69)	0.08
BMI kg/m^2, median, (IQR)	30.3 (26.7, 33)	27.15 (24.5, 30.6)	30.1 (24.9, 32.6)	0.14
Race, Black, n (%)	–	2 (14)	2 (6)	0.06
Race, Other, n (%)	–	1 (7.14)	1 (3)	0.06
Race, White, n (%)	21 (100)	11 (79)	32 (91)	0.06
ASA score ≥3, n (%)	12 (57)	10 (67)	22 (61)	0.73
Neoadjuvant treatment, n (%)	6 (29)	4 (27)	10 (28)	1.00
CCI prior to cystectomy (IQR)	5 (4, 6.5)	5 (4, 7)	5 (4, 7)	0.70
Prior irradiation, n (%)	1 (5)	–	1 (3)	1
Prior abdominal surgery, n (%)	3 (14)	4 (27)	7 (19)	0.42
Preoperative T-stage ≥2 (%)	2 (13)	1 (8)	3 (11)	1.00
Preoperative N0 (%)	11 (100)	8 (100)	19 (100)	.
Preoperative hydronephrosis, n (%)	6 (29)	2 (13)	8 (22)	0.42
Inpatient stay, days (IQR)	7 (5, 8)	6 (5, 6)	6 (5, 7)	0.05
Lymph node yield (IQR)	15 (11, 20)	18.5 (10.5, 24.5)	16 (11, 22)	0.46
Diversion approach, intracorporeal, (%)	18 (100)	14 (93)	32 (97)	0.46
Diversion type, neobladder (%)	1 (5)	–	1 (3)	1.00
Estimated blood loss, 100 mL (IQR)	1.5 (1, 3)	1.88 (1.5, 3)	1.5 (1, 3)	0.38
Operative time, hours, median (IQR)	5.4 (4.8, 6.9)	5.6 (4.8, 7)	5.5 (4.8, 6.95)	0.94
Postoperative grade, high, n (%)	19 (100)	9 (100)	28 (100)	–
Postoperative T-stage ≥2, n (%)	3 (15)	4 (37)	7 (23)	0.21
Postoperative nodal disease, n (%)	5 (25)	5 (38)	10 (30)	0.46
Positive margins, n (%)	6 (29)	1 (7)	7 (19)	0.20
UTI within 30 days, n (%)	4 (23.53)	–	4 (13)	0.11
UTI within 90 days, n (%)	**7 (33)**	**–**	**7 (19)**	**0.03**
Recurrent UTI within 90 days, n (%)	2 (10)	–	2 (6)	0.50
Any complication within 30 days, n (%)	16 (76)	10 (67)	26 (72)	0.71
Any complication within 90 days, n (%)	17 (81)	11 (73)	28 (78)	0.69
High-grade complication within 30 days, n (%)	3 (14)	1 (7)	4 (11)	0.63
High-grade complication within 90 days, n (%)	6 (29)	1 (7)	7 (19)	0.20
Type of complication within 90-days				
Wound, n (%)	2 (9.52)	–	2 (5.56)	0.5
Infectious, n (%)	**10 (48)**	**2 (13)**	**12 (33)**	**0.04**
Pulmonary, n (%)	1 (5)	–	1 (3)	1.00
Cardiovascular, n (%)	1 (5)	3 (20)	4 (11)	0.29
Gastrointestinal, n (%)	7 (33)	4 (27)	11 (31)	0.73
Genitourinary, n (%)	6 (29)	3 (20)	9 (25)	0.71
Thromboembolic, n (%)	2 (10)	2 (13)	4 (11)	1
Neurological, n (%)	4 (19)	1 (7)	5 (14)	0.38
Bleeding, n (%)	–	–	–	–
Readmission within 30 days, n (%)	6 (29)	2 (13)	8 (22)	0.42
Readmission within 90 days, n (%)	7 (33)	2 (13)	9 (25)	0.25



Poster #58. Figure 1. Kaplan-Meier cumulative incidence curve for UES formation after RARC.



Poster #58. Figure 2. Local regression trend of UES formation between 2005 and 2021.

Poster #59

Discrepancies between preoperative and postoperative histology following robot-assisted radical cystectomy: Results from the International Robotic Cystectomy Consortium

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Introduction: We aimed to investigate the discrepancy between preoperative and postoperative histology in terms of presence of variant histology following robot-assisted radical cystectomy (RARC) and its impact on oncological outcomes.

Methods: A retrospective review of the multi-institutional, prospectively maintained database, the International Robotic Cystectomy Consortium (IRCC), was performed. Preoperative histology was compared with the histology at RARC to determine discrepancies in terms of the presence of variant histology. Descriptive statistics were used to summarize the data. Multivariate analysis (MVA) was performed to identify variables associated with a discrepancy in histology. The Kaplan-Meier method was used to depict recurrence-free (RFS), disease-specific (DSS), and overall survival (OS).

Results: A total of 28% exhibited a discrepancy between preoperative and postoperative histology. Mean age was 68 years (SD 10) and 18% received neoadjuvant chemotherapy (NAC). Eighteen percent had pure urothelial preoperatively and were found to have variant histology at RARC, and 10% had variant histology preoperatively that was no longer evident at RARC (Table 1). There was no significant difference between those who exhibited discrepancy vs. those who did not in terms of pT, pN, surgical margins, or recurrences (p>0.05 for all). There was no significant difference in RFS or DSS (log-rank 0.31 and 0.20, respectively) (Figures 1A, 1B). Patients with pure urothelial histology pre- and post-RARC and those with postoperative urothelial (preoperative variant) exhibited better OS compared to those with variant histology pre- and post-RARC and postoperative variant histology (preoperative pure urothelial) (log-rank p=0.01) (Figure 1C). Higher cT stage was associated with discrepancy (HR 1.51, 95% CI 1.15–1.98, p<0.01).

Conclusions: Discrepancies between preoperative and postoperative histology occurred in 28% of patients after RARC. Patients with preoperative variant histology that disappeared on postop histology exhibited similar survival to those with purely urothelial histology.

Poster #59. Table 1. Discrepancy between preoperative and final pathology after RARC

Histology	Patients (%)
No discrepancy, n (%)	887 (72)
Preop and postop pure urothelial, n (%)	729 (59)
Preop and postop variant, n (%)	158 (13)
Discrepancy, n (%)	347 (28)
Preop urothelial; postop variant, n (%)	227 (18)
Preop variant; postop pure urothelial, n (%)	120 (10)

Poster #60

Effect of gender on outcomes after radiation-based therapy for muscle-invasive bladder cancer

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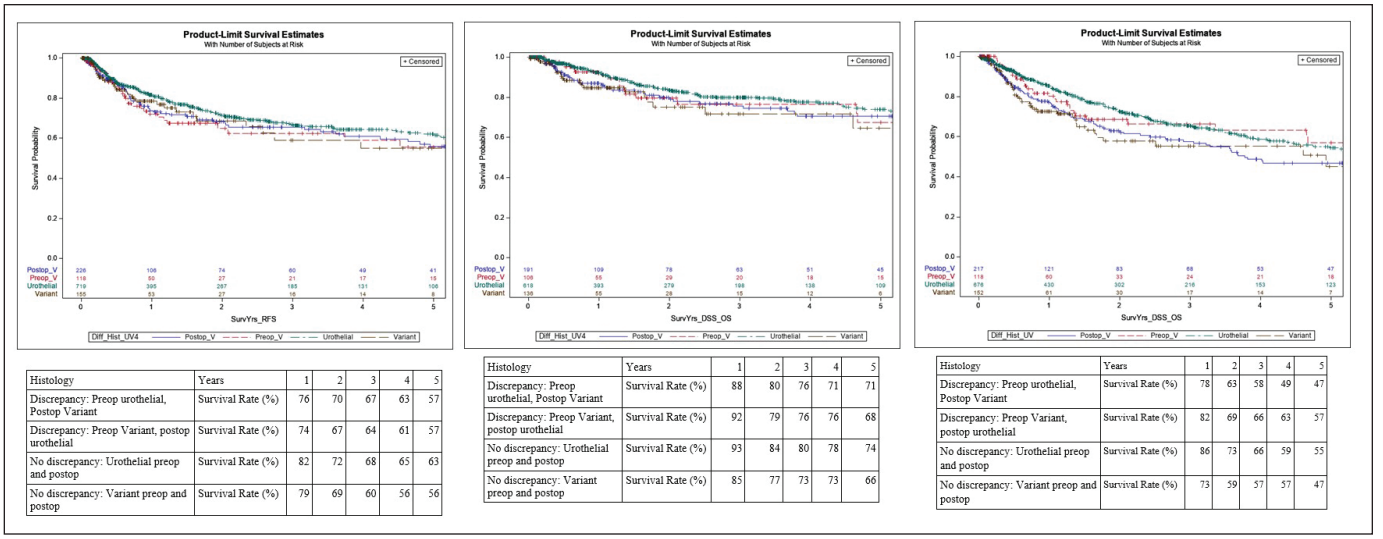
Introduction: There are well-demonstrated gender- and sex-based influences on bladder cancer incidence, stage at presentation and, potentially, therapeutic outcomes. Less clear is whether, stage for stage, there are differential outcomes between women and men with muscle-invasive bladder cancer (MIBC) treated for cure. The purpose of this study was to examine whether there are gender-related differences in survival outcomes for those patients treated with radical radiotherapy for MIBC.



Histology	Years	1	2	3	4	5
Discrepancy: Preop urothelial, Postop Variant	Survival Rate (%)	76	70	67	63	57
Discrepancy: Preop Variant, postop urothelial	Survival Rate (%)	74	67	64	61	57
No discrepancy: Urothelial preop and postop	Survival Rate (%)	82	72	68	65	63
No discrepancy: Variant preop and postop	Survival Rate (%)	79	69	60	56	56

Histology	Years	1	2	3	4	5
Discrepancy: Preop urothelial, Postop Variant	Survival Rate (%)	88	80	76	71	71
Discrepancy: Preop Variant, postop urothelial	Survival Rate (%)	92	79	76	76	68
No discrepancy: Urothelial preop and postop	Survival Rate (%)	93	84	80	78	74
No discrepancy: Variant preop and postop	Survival Rate (%)	85	77	73	73	66

Histology	Years	1	2	3	4	5
Discrepancy: Preop urothelial, Postop Variant	Survival Rate (%)	78	63	58	49	47
Discrepancy: Preop Variant, postop urothelial	Survival Rate (%)	82	69	66	63	57
No discrepancy: Urothelial preop and postop	Survival Rate (%)	86	73	66	59	55
No discrepancy: Variant preop and postop	Survival Rate (%)	73	59	57	57	47

Poster #59. Figure 1. (A) Recurrence-free survival (log-rank p=0.31); **(B)** disease-specific survival (log-rank p=0.20); **(C)** overall survival (log-rank p=0.01).

Methods: This retrospective, multicenter study reports on 864 patients that underwent curative intent radiotherapy, with or without concurrent chemotherapy, for MIBC across academic centers in Canada. Primary outcomes, including overall survival (OS) and cancer-specific survival (CSS), were estimated using the Kaplan-Meier method. Multivariable regression models were performed to explore independent predictors of survival outcomes.
Results: There were 637 males and 227 females who underwent curative intent radical radiotherapy for MIBC across the participating centers with a total median followup 26 months (95% CI 23–29). Few clinically significant gender-related differences in baseline cancer characteristics or treatment specifics were identified, although women had more documented pretreatment hydronephrosis (30% vs. 22%). Median OS for men was 55 months (95% CI 46–66) vs. 54 months for women (95% CI 47–66). Median CSS for men was 148 months (95% CI (103–not reached) vs. 129 months for women (95% CI 72–not reached). In multivariable analysis, cT3-4 stage (HR 1.91, 95% CI 1.32–2.77) and hydronephrosis (HR 1.90, 95% CI 1.36–2.66) were independently associated with CSS. Gender was not associated with differences in any survival outcomes in multivariable analysis. For those treated with concurrent chemotherapy, there was a trend towards a gender difference favoring men in CSS on univariable models (HR 1.46, 95% CI 1.00–2.15), but this was not significant on adjusted analysis.
Conclusions: Contrary to previous findings suggesting gender-related differences in the management and outcomes of patients with MIBC treated with cystectomy, this multicenter study did not demonstrate any significant differences between males and females receiving radiotherapy. The observations on univariable analysis for women treated with concurrent chemoradiation warrant further investigation.

Poster #61

Analysis of sex-based differences to bacillus Calmette-Guérin for non-muscle-invasive bladder cancer

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Introduction: The incidence of urothelial carcinoma of the bladder is lower in women but they tend to present with more aggressive and advanced disease. Prior studies also suggest there are sex-based differences in response to treatment for non-muscle-invasive bladder tumors. In this study, we evaluated whether differences exist between men and women in response to intravesical BCG treatments.
Methods: A retrospective chart review of consecutive patients who received BCG at the CHU de Québec – Laval University from 2009–2019 was performed. Men and women were treated with intravesical BCG therapy following pathologic confirmation of urothelial carcinoma. Outcomes evaluated included recurrence, progression, and treatment tolerability. Recurrence was defined as a pathology-confirmed cancer, whereas progression was the new development of high-grade (recurrence) pathology or an increase of stage. Tolerability was defined according to the proportion of prescribed BCG received. All clinical details were obtained through review of the medical records, collaborated by pharmacy records for BCG administration. Competing-risk analysis was used to compare outcomes.
Results: Among 613 patients who received BCG at our institution from 2009–2019, 472 (77.0%) were men and 141 (23.0%) were women. The recurrence rate was not different between sexes, with a 5-year recurrence risk of 52% (95% CI 36.93–65.4) among women compared to 57.5% (95% CI 51.9–62.6) among men. The overall non-progression rate at 1, 3, and 5 years was 97.3% (95% CI 95.6–98.3), 93.6% (95% CI 91.2–95.4), and 91.7% (95% CI 88.4–94.1), respectively. The completion of ≥5 induction BCG instillations and maintenance BCG use was similar in both genders.
Conclusions: In a contemporary NMIBC cohort treated with BCG we found no clear evidence for sex-based differences in response to BCG treatment regarding progression, recurrence, and tolerability.
Funding: *Northeastern Section Young Investigator Award*

Poster #62

Large state-level variation in intravesical treatment for non-muscle-invasive bladder cancer during the BCG drug shortage

Brian Chun[1], *Meiqi He*[2], *Cameron Jones*[1], *Robin Vasan*[1], *Bruce L. Jacobs*[1], *Inmaculada Hernandez*[2], *Benjamin J. Davies*[1]
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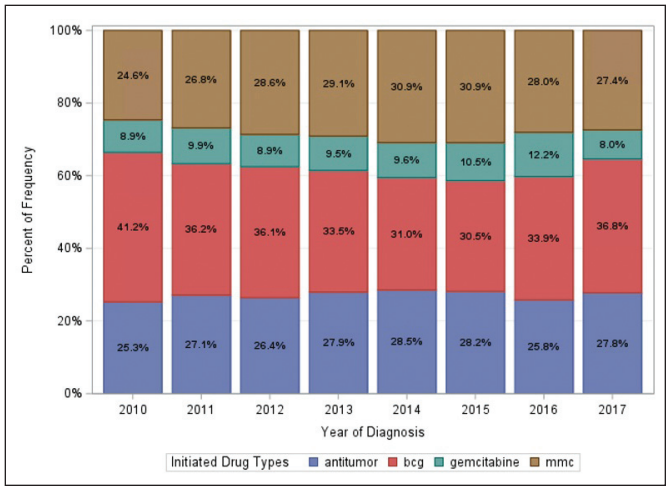
Introduction: Bacillus Calmette-Guérin (BCG) is the gold standard for treatment of non-muscle-invasive bladder cancer. In the last two decades, the two major manufacturers of BCG have suffered production failures or have left the market completely due to economic infeasibility. This has resulted in a worldwide shortage of this important biologic drug. We used a nationally representative dataset to describe the effect of this shortage on intravesical treatment patterns for non-muscle-invasive bladder cancer.

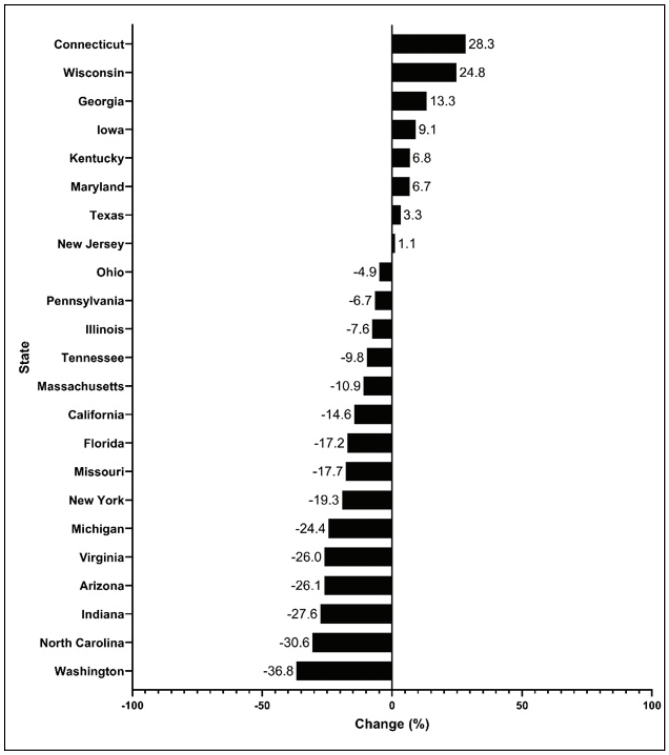
Methods: Using claims data from a 5% random sample of Medicare beneficiaries, we identified patients ≥66 years of age who received intravesical therapy within 1 year of bladder cancer diagnosis from 2010–2017. The BCG shortage period was defined from 2013 to the study endpoint. We estimated changes in the proportion of patients treated with BCG, mitomycin C, gemcitabine, or other intravesical agents before and during the shortage. We also evaluated state-level changes in BCG induction rates before and during the shortage period.

Results: A total of 8122 patients were included in our study. The proportion of eligible patients receiving BCG induction therapy decreased 12.6% during the shortage period (37.9% in 2010–2012 to 33.1% in 2013–2017, p<0.001). Over the same period, mitomycin C use increased 9.8% (26.7% to 29.3%, p=0.01). The use of gemcitabine (p=0.27) and other intravesical agents (p=0.16) remained stable (Figure 1). Among 23 states reporting data on ≥50 patients, 15 (65.2%) had a decrease in BCG initiation rate during the shortage period, ranging from 4.9% (Ohio) to 36.8% (Washington) (Figure 2). There was no regional pattern among states with decreased BCG use.

Conclusions: During the BCG drug shortage, BCG use for non-muscle-invasive bladder cancer decreased, with a compensatory rise in mitomycin C use. A large variation in state-level BCG use may reflect differences in regional practice patterns or BCG availability.



Poster #62. Figure 1. Proportion of intravesical agents used for induction therapy for newly diagnosed non-muscle-invasive bladder cancer by year. mmc: mitomycin C.



Poster #62. Figure 2. Change in BCG rate for induction therapy for newly diagnosed non-muscle-invasive bladder cancer in the shortage (2013–2017) vs. preshortage period (2010–2012) stratified by state. Only states reporting ≥50% patients are included.

Poster #63

Does the urinary microbiome profile change after treatment of bladder cancer?

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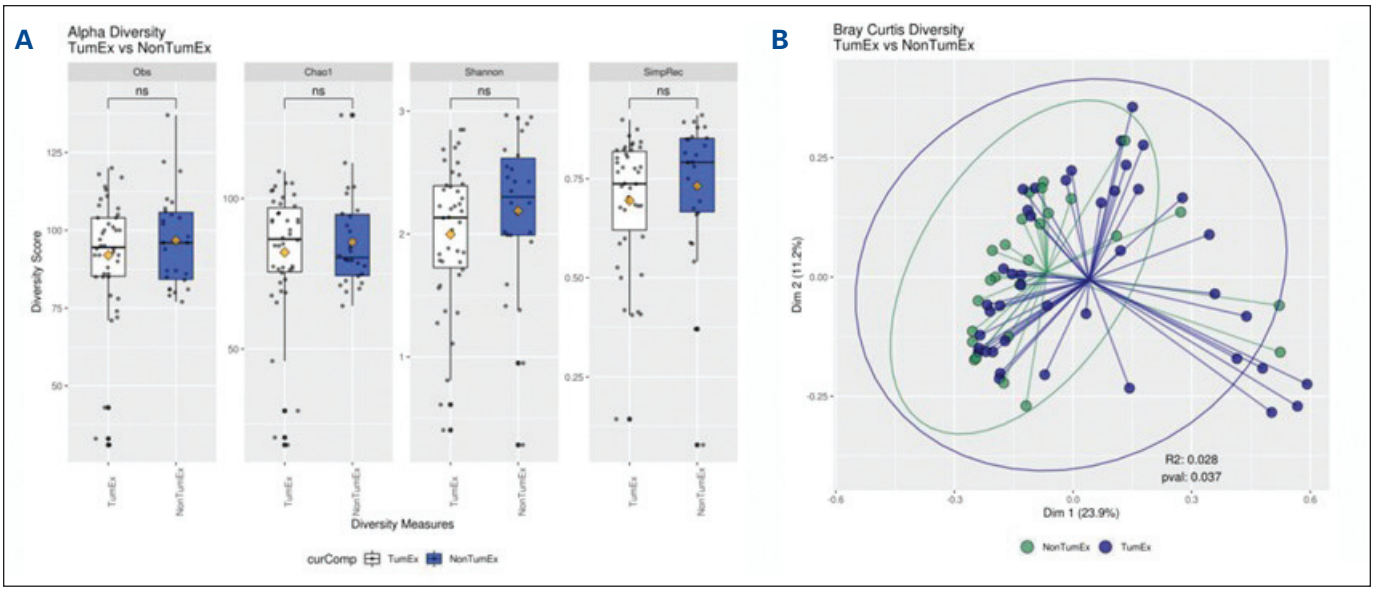
Introduction: We sought to investigate the change in the urinary microbiome profile after transurethral resection of bladder tumor (TURBT).

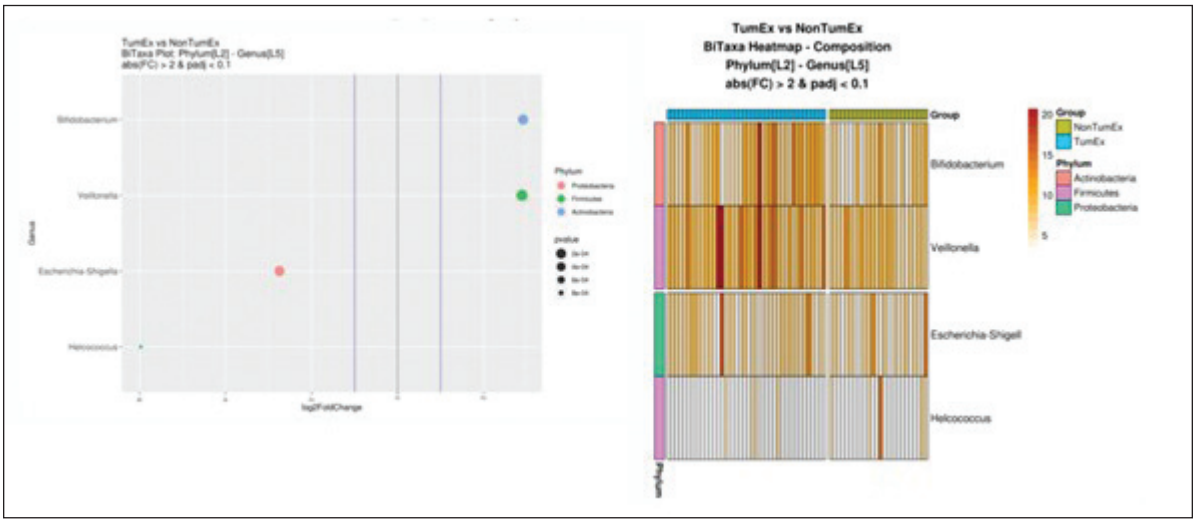
Methods: Urine specimens were collected from consecutive patients with bladder cancer. Patients were divided into those with bladder tumors (de novo tumors, or recurrent after TURBT ± intravesical therapy) vs. those without evidence of recurrent tumor after treatment. Samples were analyzed using 16S rRNA sequencing. Alteration in urinary microbiome was described in terms of alpha (diversity within a sample), beta diversities (diversity among different samples), and differential abundance of bacteria at the genus level. Analyses were adjusted for gender, method of preservation (frozen vs. preservative), and method of collection (mid-stream vs. catheter).

Results: Sixty-eight samples were analyzed (42 in "tumor" vs. 26 in "no recurrent tumor" groups). Median age was 70 years (IQR 64–74) and 85% were males. All patients in the "no recurrent tumor" group had NMIBC, and 85% received BCG compared to 70% and 43% for the "tumor" group, respectively. There was no difference in alpha diversity between the 2 groups (measured by Observed, Chao, Shannon and Simpson indices) (p>0.05) (Figure 1A). Beta diversity was significantly different (p=0.04) (Figure 1B). Veillonella and Bifidobacterium were more abundant in the "tumor" group (>2 FC, p=0.0002), while Escherichia-Shigella (>2 FC, p=0.0002) and Helococcus (>2 FC, p=0.0008) were more abundant in the "no recurrent tumor" group (Figure 2).

Conclusions: Bladder cancer patients with no recurrence exhibited a different urinary microbiome profile compared to those with tumors.



Poster #63 Figure 1. (A) Alpha diversity (diversity/evenness-level comparison). **(B)** Beta diversity (community-level comparison).



Poster #63. Figure 2.

Poster #64

SunRISe-1: TAR-200 plus cetrelimab, TAR-200 alone, or cetrelimab alone in high-risk non-muscle-invasive bladder cancer in BCG-unresponsive participants who are ineligible or decline radical cystectomy

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Introduction: Treatment options are limited for patients with high-risk non-muscle-invasive bladder cancer (HR-NMIBC) unresponsive to intravesical bacillus Calmette–Guérin (BCG). TAR-200 is an intravesical drug delivery system for local continuous gemcitabine release within the bladder. We will assess the rate of complete response (CR) upon treatment with TAR-200+systemic cetrelimab (CET [anti-programmed death-1 antibody]), TAR-200, and CET in BCG-unresponsive participants with HR-NMIBC who are ineligible for or decline radical cystectomy (RC).

Methods: SunRISe-1 (NCT04640623) is an open-label, parallel-group, multicenter, phase 2b study designed to assess the efficacy and safety of TAR-200+CET, TAR-200 alone, and CET alone in participants with BCG-unresponsive HR-NMIBC. Eligible participants are aged ≥18 years with Eastern Cooperative Oncology Group performance status of 0, 1, or 2 and recurrent or persistent histologically confirmed HR-NMIBC (carcinoma in situ) with or without papillary disease (T1, high-grade Ta), diagnosed within 12 months of last BCG treatment and are ineligible for or declined

RC. Participants (N≈200) are randomized 2:1:1 to receive TAR-200+CET (cohort 1, n≈100), TAR-200 (cohort 2, n≈50), or CET (cohort 3, n≈50). In cohorts 1 and 2, participants receive intravesical TAR-200 every 3 weeks through week 24, and every 12 weeks thereafter until week 96. In cohorts 1 and 3, participants receive CET until week 78. Primary disease assessments (cystoscopy, urine cytology, transurethral resection of bladder tumor [TURBT], and magnetic resonance imaging/computed tomography) are performed at baseline; subsequent cystoscopy and centrally read urine cytology are performed every 12 weeks through year 2, every 24 weeks until end of year 3, and in year 4 and year 5 per institutional standards of care. TURBT is conducted at 24 and 48 weeks. The primary endpoint for the 3 cohorts is overall CR rate at any time point. Secondary endpoints include duration of response (i.e., from time of first CR achieved to first evidence of recurrence, progression, or death [whichever is earlier] for participants who achieve CR), overall survival, pharmacokinetic immunogenicity of CET, safety and tolerability, and patient-reported outcomes. Exploratory endpoints include incidence and time to cystectomy (measured from randomization to date of cystectomy), biomarkers, and healthcare resource utilization.

Results: This study opened in January 2021. As of April 7, 2022, 43 patients have been enrolled.

Conclusions: This phase 2b study will evaluate the efficacy and safety of TAR 200+CET, TAR-200, and CET in BCG-unresponsive participants with HR-NMIBC who are ineligible for or decline RC.

Funding: *Janssen Research and Development*

Poster #65

The anti-tumor activity of prebiotics in bladder cancer

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Introduction: Recently, evidence emerged showing that the gut microbiota is a critical factor for the response to immune checkpoint blockade (ICB) immunotherapy in multiple cancers; however, we currently lack a clear understanding of the interaction between gut microbiota and cancer cells. More importantly, we still do not know if targeting the gut microbes is sufficient to impact tumor growth. Our first objective was to assess the modulatory effect of promising prebiotics on gut microbiota and on promoting antitumor response in bladder cancer. Second, we aimed to test the effects of these prebiotics on the systemic antitumor efficacy of ICB immunotherapy in bladder cancer.

Methods: C3H syngeneic mice were subcutaneously injected with MBT-2 mouse bladder tumor cells. Prebiotics were daily administrated by oral gavage until the end of experiment, while water was gavaged as a control. Following tumor implantation, mice were treated with anti-PD1 monoclonal antibody or isotype control intraperitoneally. Tumor growth was monitored twice a week. Mice fecal samples were collected at multiple timepoints before and during tumor growth in order to perform 16S rRNA gene sequencing and profile the gut microbiota composition. Endpoint tumors were dissociated to obtain single cell suspension for flow cytometry analysis.

Results: In vivo tumor growth data showed that independently of immunotherapy, two different prebiotics induced a significant reduction of MBT-2 tumor growth in comparison to control group. These two prebiotics also significantly improved the overall survival of mice. Interestingly, one of these prebiotics combined with anti-PD-1 monoclonal antibody immunotherapy also enhanced the systemic anti-tumor effect of ICB. The qPCR quantification of bacterial enrichment after gavage showed an upregulation of Bifidobacterium spp. that was previously associated with ICB efficacy in other cancers. Putative interactions between the prebiotics and the gut microbiota will be identified by the 16S rRNA sequencing analysis, while the underlying mechanisms linking prebiotics treatment with the observed bladder tumor reduction in C3H mice will be deciphered by the flow cytometry analysis of tumor-infiltrating lymphocyte composition.

Conclusions: Overall, our findings support that promising prebiotics can induce an anti-tumor effect alone, and in combination with anti-PD-1 treatment, in bladder cancer mouse model. These data will have a significant impact to understand and improve the clinical response to ICB treatment for bladder cancer patients.

Poster #66

Outcomes of neoadjuvant chemotherapy in patients with variant histology who underwent robot-assisted radical cystectomy: Results from the International Robotic Cystectomy Consortium

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Introduction: We sought to describe the use and outcomes of neoadjuvant chemotherapy (NAC) among patients with variant histology who underwent robot-assisted radical cystectomy (RARC).

Methods: A retrospective review of the multi-institutional prospectively maintained International Robotic Cystectomy Consortium (IRCC) database was performed (4139 patients from 33 institutions in 12 countries). Patients with preoperative variant histology who underwent RARC were identified. Patients who received NAC were identified and compared. Descriptive statistics were used to summarize the data. Kaplan-Meier method was used to depict recurrence-free (RFS), disease-specific (DSS), and overall survival (OS). Multivariate Cox regression models were used to depict variables associated with RFS, DSS and OS.

Results: A total of 278 patients had preoperative variant histology and 23% of these received NAC. There was no significant difference in terms of pT, pN, positive margins or recurrence rates between those who received NAC and those who did not ($p>0.05$ for all) (Table 1A). Patients who received NAC had RFS of 84% and 76% at 1 and 3 years, respectively, compared to 74% and 59% for those who did not receive NAC, respectively (log-rank $p=0.12$) (Figure 1A). Patients who received NAC had DSS of 85% and 81% at 1 and 3 years, respectively, compared to 89% and 72% for those who did not receive NAC, respectively (log-rank $p=0.96$) (Figure 1B). Patients who received NAC had OS of 77% and 65% at 1 and 3 years, compared to 76% and 60% for those who did not receive NAC, respectively (log-rank $p=0.70$) (Figure 1C). Patients with pN+ and pT3/T4 had worse RFS, DSS and OS. Patients with positive margins and higher Charlson comorbidity index had worse OS (Table 2).

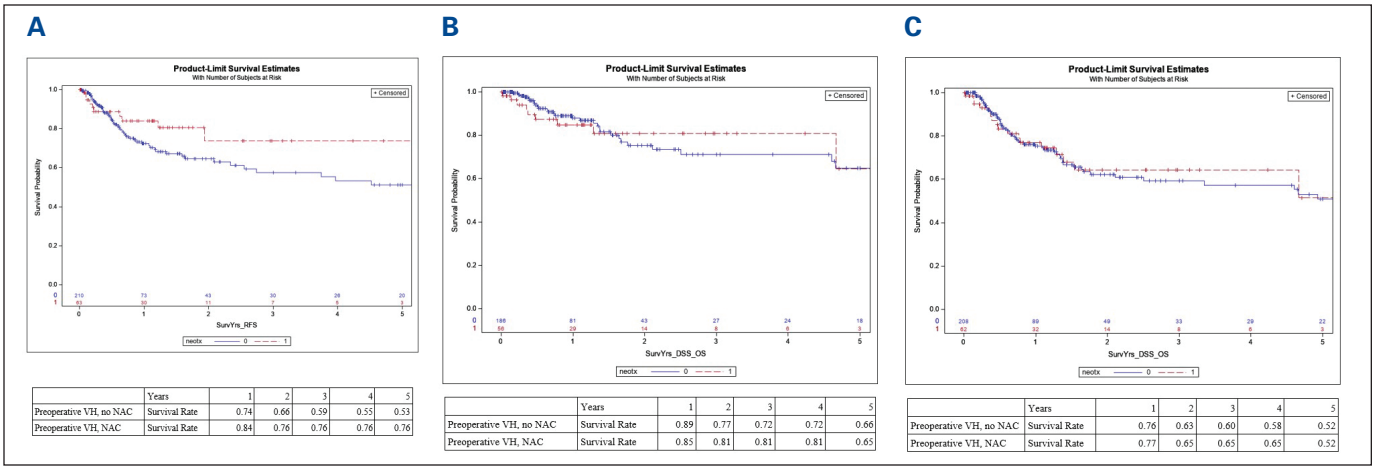
Conclusions: Twenty-three percent of patients with preoperative variant histology received NAC. They exhibited similar oncological outcomes compared to those who did receive NAC.

Poster #66. Table 1. Pathologic outcomes of patients who underwent RARC for variant histology (NAC vs. no NAC)

Patient descriptors	No NAC	NAC	All	p
Number of patients, n (%)	213 (77)	65 (23)	278	<0.01
Age in years, mean (SD)	69±10	64.±11.15	68.16±10.73	<0.01
Postoperative urothelial/variant histology, n (%)	90 (42)	25 (38)	115 (41)	0.86
Postoperative pure urothelial histology, n (%)	90 (42)	30 (46)	120 (43)	0.86
Postoperative pure variant histology, n (%)	33 (15)	10 (15)	43 (15)	0.86
Postoperative high grade, n (%)	182 (94)	59 (97)	241 (95)	0.74
Postoperative N+, n (%)	61 (29)	23 (35)	84 (30)	0.36
Postoperative T3/T4 stage, n (%)	103 (48)	34 (52)	137 (49)	0.67
Positive margins, n (%)	27 (13)	10 (15)	37 (13)	0.54
Any recurrence, n (%)	60 (28)	12 (18)	72 (26)	0.15
Any distal recurrence, n (%)	48 (23)	12 (18)	60 (22)	0.61
Any local recurrence, n (%)	24 (11)	3 (5)	27 (10)	0.15
Number of deaths, n (%)	66 (32)	17 (27)	83 (30)	0.64

Poster #66. Table 2. Multivariate Cox model depicting variables associated with RFS, DSS, and OS

RFS	Hazard ratio	95% confidence interval	p
pN+	2.29	1.38–3.78	0.01
pT3/T4 stage	4.68	2.50–8.76	<0.01
DSS			
pN+	2.76	1.39–5.44	0.01
pT3/T4 stage	4.10	1.83–9.17	0.01
OS			
Positive tumor margin	2.17	1.25–3.77	<0.01
Charlson Comorbidity Index	1.25	1.09–1.43	<0.01
pN+	2.58	1.6–4.14	<0.01
pT3/T4	3.03	1.74–5.28	<0.01



Poster #66. Figure 1. (A) Recurrence-free survival (log-rank p=0.12); **(B)** disease-specific survival (log-rank p=0.96); **(C)** overall survival (log-rank p=0.79).

Poster #67

A novel perioperative protocol to reduce readmissions and complications following radical cystectomy

Robin Vasan[1], Shan Wu[1], Danielle Sharbaugh[1], Jonathan Yabes[1], Brian Chun[1], Zeynep Gul[1], Michael Stencel[1], Cameron Jones[1], John Myrga[1], David Miller[1], Maria Pere[1], Michael Raver[2], Jennifer Mihalo[2], Mia Alcorn[1], Bruce L. Jacobs[1], Benjamin L. Davies[1]

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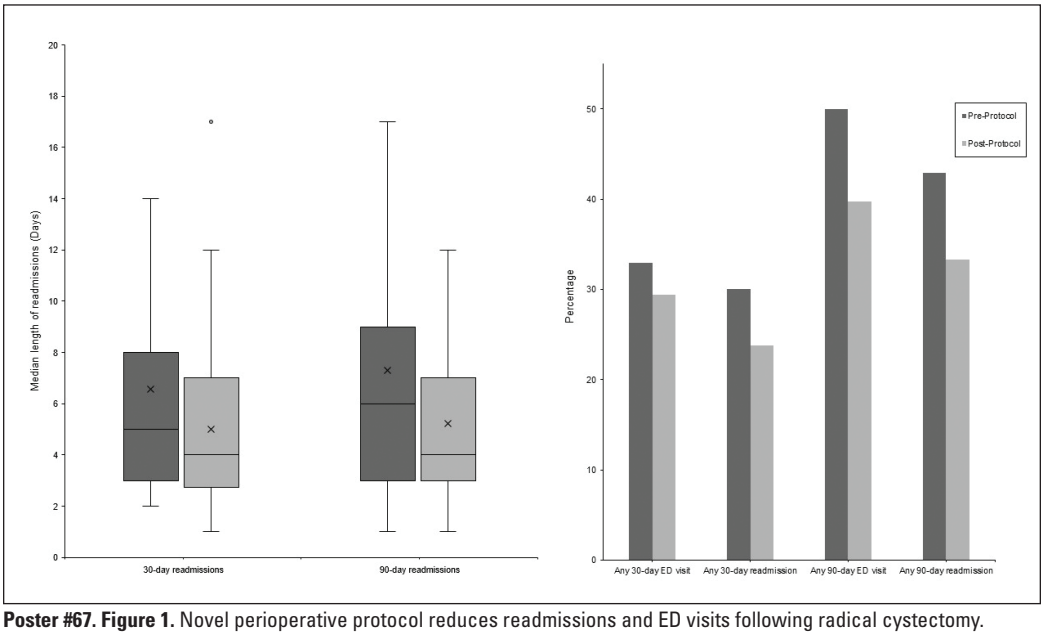
Introduction: Radical cystectomy performed for muscle-invasive bladder cancer is a morbid procedure associated with high rates of postoperative emergency department visits, readmissions, and complications. The aim of this study was to design and implement a perioperative protocol to reduce readmissions and complications following radical cystectomy.

Methods: A single-institution, multisite, prospective cohort study was performed for patients undergoing radical cystectomy over a 21-month period. A novel perioperative protocol involved patients receiving one week of preoperative enteral nutrition shakes, strict adherence to enhanced recovery after surgery (ERAS) principles (preoperative nerve blocks, alvimopan, acetaminophen, and subcutaneous heparin), removal of ureteral stents prior to discharge, and a 5-day postoperative checkup phone call by nursing or office staff. The preprotocol period extended from February 2020 to August 2020 and was followed by a three month 'washout period' for teaching and acclimation purposes. The protocol was initiated in December 2020 and data collection continued for an 11-month period through November 2021. Primary outcomes of interest included 30- and 90-day emergency department (ED) visits, readmission rates, and complications.

Results: Seventy radical cystectomies were performed during the preprotocol period and 128 in the postprotocol period performed by 8 surgeons at 3 sites. Following implementation of the protocol, 30-day ED visits decreased from 33% to 29%, 90-day ED visits from 50% to 40%, 30-day readmissions from 30% to 24%, and 90-day readmissions from 43% to 33% (Figure 1). Median length of stay for 30-day readmissions decreased from 5 to 4 days and for 90-day readmissions from 6 to 4 days. Thirty-day rates of postoperative pyelonephritis, small bowel obstruction and pneumonia decreased (14% to 7%, 6% to 4%, and 4% to 1%, respectively). Ninety-day rates of pyelonephritis, urosepsis, ureteroenteric anastamotic leak, small bowel obstruction and pneumonia all decreased (19% to 10%, 10% to 4%, 7% to 4%, 7% to 4%, and 7% to 2%, respectively). Mortality and postoperative length of stay were unchanged.

Conclusions: Implementation of a novel perioperative protocol for patients undergoing radical cystectomy, including one week of preoperative nutritional supplementation, adherence to ERAS principles, earlier ureteral stent removal, and a postoperative checkup phone call, resulted in decreased ED visits, readmissions, and complications. Further study involving larger patient cohorts, widened geographic areas, and a longer duration of followup will aid in assessing generalizability of the protocol and the benefit of application to a wider population.



Poster #67. Figure 1. Novel perioperative protocol reduces readmissions and ED visits following radical cystectomy.

Poster #68

Evaluation of toxicities for intravesical drugs in phase 1 bladder cancer trials

Karen Doersch, William Tabayoyong, Jathin Bandari

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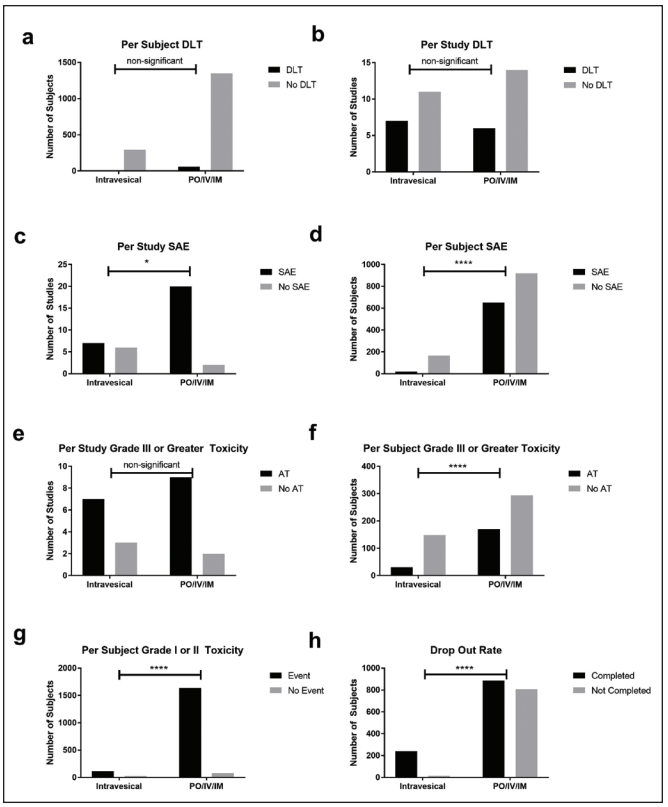
Introduction: Phase 1 clinical trials seek to determine phase 2 doses by investigating predefined dose-limiting toxicities. Traditional definitions of dose-limiting toxicity may not be applicable to intravesical therapies for bladder cancer. This study sought to compare the frequency of dose-limiting toxicities and serious adverse events in bladder cancer trials for intravesical therapies to other routes of administration.

Methods: Phase 1 studies were abstracted from ClinicalTrials.gov and reconciled with a PubMed search. Primary and secondary endpoints were predefined prior to data abstraction and the primary endpoint was subject-level dose-limiting toxicity rate. Fisher's exact tests were performed, with $p<0.05$ designated as significant.

Results: Eighteen intravesical studies and 24 studies with other routes of administration (the PO/IV/IM group) were identified. Results are shown in Figure 1. Dose-limiting toxicities were reported in 38.9% of intravesical studies, affecting 3.29% of subjects, compared with 30.0% of PO/IV/IM studies representing 4.19% of subjects ($p>0.05$). Serious adverse events were less frequent in the intravesical group, with 53.9% of intravesical studies reporting serious adverse events in 10.3% of subjects vs. 91.0% of studies reporting serious adverse events affecting 41.4% of subjects in the PO/IV/IM group ($p<0.05$ for both subject and study-level comparisons). Rates of grade 3 or greater toxicities were recorded in 10 of 18 (55.5%) intravesical studies with a total of 178 subjects, and 11 of 24 (45.8%) studies with a total of 462 subjects in the PO/IV/IM group. For the intravesical group, 7 of 10 (70.0%) studies and 9 of 11 (81.8%) PO/IV/IM studies reported grade 3 or greater toxicities ($p=0.64$). Thirty of 178 subjects (16.9%) experienced grade 3 or greater toxicities in the intravesical group vs. 169 of 462 subjects (36.6%) in the PO/IV/IM group ($p<0.0001$). In the studies with reported completion rates, 240 of 253 subjects (94.9%) in the intravesical group completed planned interventions, compared to 887 of 1649 (53.8%) subjects in the PO/IV/IM group ($p<0.0001$).

Conclusions: There was no difference in subject-level dose-limiting toxicity rate between intravesical and PO/IV/IM bladder cancer trials. The serious adverse event rate was lower in the intravesical group. Heterogeneity in the definition of dose-limiting toxicity in different routes of administration may affect interpretation of toxicity in phase 1 bladder cancer clinical trials.



Poster #68. Figure 1. Study results.

Poster #69

Discrimination of cystitis cystica from bladder cancer by intravesical contrast-enhanced magnetic resonance imaging (ICE-MRI)

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Introduction: Intravesical contrast-enhanced magnetic resonance imaging (ICE-MRI) is a novel imaging technique. It shows promise for the discrimination of high-grade superficial bladder cancer from the incidental finding of cystitis cystica, which is a nonneoplastic bladder mass characterized by inflammation and diffuse mural thickening.

Methods: A 60-year-old male with cystoscopic evidence of recurrent high-grade urothelial cancer on the right lateral wall, the posterior trigone, and the bladder neck (BN) underwent ICE-MRI in a Siemens Biograph 3T (NCT04369560) prior to transurethral resection (TUR) of the suspected lesions. Following localization, the bladder was scanned in the axial plane with T_1-weighted fast-low-angle-shot (FLASH) sequences using volume-interpolated-breath-hold-examinations at variable flip angles (VFA) from 3° to 22°. T_2-weighted turbo spin echo images were also acquired. Images from both sequences were taken both before and after instillation via 14 Fr urethral straight tip catheter of 50 mL gadobutrol and ferumoxytol at concentrations of 20 mM and 0.1 mM, respectively. Morphological and functional descriptors of lesions were correlated with TUR histopathologic findings.

Results: The T_2-weighted ICE-MRI images achieved negative contrast in the lumen for a clear demarcation of contrast enhancement in the lesioned areas of the bladder wall. T_2-weighted ICE-MRI displayed differences in the signal intensity of lesions on the right lateral wall and on the posterior BN. The brighter BN lesion was histologically confirmed to be benign exuberant cystitis cystica, while the faintly bright lesion on the lateral wall was confirmed as superficial, high-grade urothelial cancer.

Conclusions: ICE-MRI uses a novel contrast mixture to leverage well-established histological differences in the urothelium's permeability, cellularity, and extent of extracellular space available for gadobutrol diffusion. This case demonstrates the successful radiological differentiation of a neoplastic lesion from a nonneoplastic lesion (cystitis cystica) via differential MR signal enhancement.

Funding: *National Cancer Institute (R21CA252590, PI Maranchie, Tyagi)*

Poster #70

Effects of lifestyle and environmental factors on stage of bladder cancer at initial presentation

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Introduction: We sought to analyze the association between various lifestyle and environmental factors and the occurrence of muscle-invasive (MIBC) vs. non-muscle-invasive bladder cancer (NMIBC).

Methods: A total of 582 consecutive patients with bladder cancer completed a comprehensive questionnaire that encompassed different lifestyle and environmental risk factors for bladder cancer, which included smoking status, primary source of drinking water, a personal history of any previous genitourinary cancers, and environmental exposure to lead or asbestos, paint, rubber, and hair dyes. Patients were divided into MIBC and NMIBC. Descriptive statistics were used to summarize the data. Multivariable analysis (MVA) was performed to investigate the association between lifestyle and environmental factors, and the occurrence of MIBC vs. that of NMIBC.

Results: Median age was 71 years (IQR 64–78); 76% were males and 95% were Caucasians. Forty-one percent of patients had MIBC at presentation. Of all patients, 76% had history of smoking, wells were the source of drinking water in 13%, and 40% had history of environmental exposure. There was no difference in lifestyle and environmental exposures between MIBC and NMIBC (Table 1). Having a history of previous genitourinary cancers (OR 0.32, 95% CI 0.10–0.98, p=0.05) and older age (OR 1.02, 95% CI 1.01–1.04, p<0.01) were associated with higher risk of MIBC (Table 2).

Conclusions: Lifestyle factors and environmental exposures did not significantly differ between patients with MIBC and NMIBC. History of genitourinary cancer and older age were associated with MIBC.

Poster #70. Table 1. Baseline patient characteristics and exposure histories

Variable	NMIBC	MIBC	All	p
Number of patients, n (%)	342 (59)	240 (41)	582	<0.01
Age, median (IQR), years	70 (63–77)	73 (65–80)	71 (64–78)	0.01
Ethnicity				
White race, n (%)	322 (94)	230 (96)	552 (95)	0.57
Black race, n (%)	16 (5)	7 (3)	23 (4)	0.57
Others, n (%)	4 (1)	3 (1)	7 (1)	0.57
Gender				
Males, n (%)	254 (77)	173 (74)	427 (76)	0.37
Females, n (%)	76 (23)	62 (26)	138 (24)	0.37
Maximum Charlson Comorbidity Index, median (IQR)	5 (4–6)	5 (4–6)	5 (4–6)	0.35
Tobacco use				
Current smoker, n (%)	45 (13)	32 (13)	77 (13)	0.59
Former smoker, n (%)	211 (62)	156 (65)	367 (63)	0.59
Never smoked, n (%)	85 (25)	51 (21)	136 (23)	0.59
Drinking water source				
Tap, n (%)	220 (68)	141 (62)	361 (65)	0.51
Bottled, n (%)	35 (11)	27 (12)	62 (12)	0.79
Filtered tap, n (%)	28 (9)	29 (13)	57 (10)	0.12
Deep well, n (%)	28 (9)	21 (9)	49 (9)	0.88
Shallow well, n (%)	13 (4)	11 (5)	24 (4)	0.68
Cleaning water source				
Deep well, n (%)	23 (7)	20 (8)	43 (7)	0.52
Public source, n (%)	261 (76)	172 (72)	433 (74)	0.21
Shallow well, n (%)	8 (2)	4 (2)	12 (2)	0.77
Water tank, n (%)	23 (7)	22 (10)	45 (8)	0.52
Environmental exposure				
Lead or asbestos exposure, n (%)	44 (16)	32 (17)	76 (16)	1.00
Paint exposure, n (%)	68 (20)	50 (22)	118 (21)	0.67
Paint exposure, median (IQR), years	11 (3–30)	20 (3–35)	13 (3–30)	0.45
Leather exposure, median (IQR), years	14 (2–18)	15 (3–46)	15 (3–22)	0.55
Hair dye exposure, median (IQR), years	18 (10–30)	20 (10–30)	20 (10–30)	0.39
Cyclophosphamide exposure, n (%)	0 (0)	1 (0.42)	1 (0.17)	0.41

Poster #70. Table 1 (cont'd). Baseline patient characteristics and exposure histories

Variable	NMIBC	MIBC	All	p
Environmental exposure (cont'd)				
History of ifosfamide exposure, n (%)	342 (100)	240 (100)	582 (100)	–
History of phenacetin exposure, n (%)	3 (1)	3 (1)	6 (1)	0.70
History of glimepiride exposure, n (%)	6 (2)	1 (0.4)	7 (1)	0.25
History of metformin exposure, n (%)	35 (10)	22 (9)	57 (10)	0.78
History of pioglitazone exposure, n (%)	43 (13)	25 (10)	68 (12)	0.51
Hair dye exposure, n (%)	206 (61)	137 (60)	343 (60)	0.76
Leather exposure, n (%)	6 (2)	6 (2)	6 (2)	1.00
Agent Orange exposure, n (%)	24 (7)	9 (4)	33 (6)	0.14
Agent Orange exposure, median (IQR), years	1 (1–2)	1 (1–2)	1 (1–2)	0.86
Rubber exposure, n (%)	30 (9)	27 (12)	57 (10)	0.32
Rubber exposure, median (IQR), years	6 (2–21)	5(2–38)	6 (2–23)	0.48
Radiation exposure, n (%)	18 (5)	10 (4)	28 (5)	0.69
Family exposure to hair dye, n (%)	47 (19)	26 (15)	73 (17)	0.43
Family exposure to leather, n (%)	0 (0)	3 (2)	3 (1)	0.06
Family exposure to Agent Orange, n (%)	8 (3)	2 (1)	10 (2)	0.33
Family exposure to paint, n (%)	10 (4)	12 (7)	22 (5)	0.18
Family exposure to radiation, n (%)	2 (1)	6 (4)	8 (2)	0.06
Family exposure to rubber, n (%)	8 (3)	4 (2)	12 (3)	0.77
Perineural invasion, n (%)	1 (6)	3 (38)	4 (16)	0.08
Lymphovascular invasion, n (%)	3 (15)	29 (76)	32 (55)	<0.01

Poster #70. Table 2. Multivariate analysis modeling variables associated with higher T stage

Variables	Odds ratio	Confidence interval	p
Previous genitourinary cancers	0.32	0.10–0.98	0.05
Median age	1.02	1.006–1.04	<0.01

Poster #71

The association of baseline frailty with survival among older adults undergoing radical cystectomy for bladder cancer

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Introduction: Frailty is increasingly recognized as an important component of geriatric assessment in older adults and an important predictor of clinical outcomes. We hypothesized that baseline frailty is an independent predictor of survival for older adults undergoing radical cystectomy (RC) for bladder cancer. Herein, we examined the associations of a validated, claims-based frailty index (CFI) with survival in a large, population-based cohort.

Methods: Using the SEER-Medicare linked database, we identified older adults aged 66–89 years diagnosed with T_{any} N_{any} cM0 urothelial carcinoma of the bladder from 2000–2017 who underwent RC. Baseline CFI was calculated using a 12-month prediagnosis period. The associations of CFI with survival outcomes were assessed using the Kaplan-Meier method and Cox multivariable regression.

Results: A total of 5916 patients were included in the study cohort, including 3389 who were robust (CFI <0.15), 2247 who were prefrail (CFI 0.15 to <0.25), 232 who were mildly frail (CFI 0.25 to <0.35), and 48 who were moderately-to-severely frail (CFI ≥0.35). Median followup was 37.0 (IQR 16.0–84.0) months. During followup, a total of 3998 deaths occurred. Before adjustment, increasing level of frailty, as reflected by the CFI, was associated with worse cancer-specific survival, other-cause survival, and overall survival (Figure 1). In multivariable modelling, increasing CFI was independently associated with worse all-cause mortality, cancer-specific mortality, and other-cause mortality (Table 1).

Conclusions: Among older adults undergoing RC for bladder cancer, increasing baseline frailty, as measured by the CFI, was associated with worse survival outcomes, even after adjustment for patient and tumor characteristics.

Poster #72

Baseline frailty and perioperative outcomes in older adults undergoing radical cystectomy for bladder cancer

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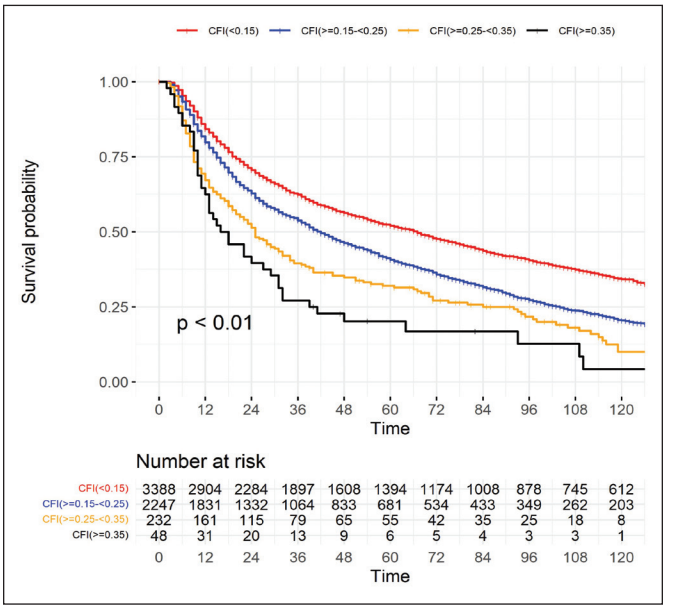

Poster #71. Figure 1. Increasing level of frailty, as reflected by the CFI, was associated with worse cancer-specific survival, other-cause survival, and overall survival.

Introduction: The perioperative morbidity of radical cystectomy (RC) is an important consideration for optimal decision-making in older adults with bladder cancer. Frailty, a component of geriatric assessment, has been associated with the morbidity of both surgical and nonsurgical interventions in this patient population. Herein, we examined the associations between a validated, claims-based frailty index (CFI) and perioperative morbidity among a contemporary cohort of patients undergoing RC for bladder cancer.

Methods: Using the SEER-Medicare linked database, we identified patients aged 66–89 diagnosed with T_{any} N_{any} cM0 primary urothelial carcinoma of the bladder who underwent RC from 2000–2017. Baseline frailty was assessed using the CFI, a validated deficit accumulation frailty measure, with a 12-month prediagnosis window. The associations of CFI with perioperative blood transfusion, prolonged hospitalization (pLOS, defined as length of stay ≥90%-ile), and 90-day hospital readmissions were evaluated using logistic regression.

Results: A total of 5916 patients formed the study cohort, including 3389 who were robust (CFI <0.15) and 2527 who were prefrail/frail (CFI ≥0.15). Overall, perioperative blood transfusion occurred in 1499 (25%) patients, prolonged hospitalization in 601 (10%) patients, and 90-day readmission in 2351 (40%) patients. Before adjustment, increasing baseline CFI was associated with higher rates of perioperative blood transfusion, pLOS, and hospital readmission (Table 1). After multivariable adjustment, increasing level of frailty was independently associated with higher risk of prolonged hospitalization and 90-day hospital readmission, but not perioperative blood transfusion (Table 2).

Conclusions: The present study provides real-world, contemporary estimates of the perioperative morbidity of RC among older adults. Baseline frailty, as reflected by the CFI, was associated with increased risk of prolonged hospitalization and 90-day hospital readmission, even after adjusting for other patient and tumor characteristics.

Poster #71. Table 1. Associations of CFI with all-cause mortality, cancer-specific mortality, and other-cause mortality

CFI modelling strategy	Unadjusted HR (95% CI)	Fully adjusted HR (95% CI)[1]	Fully adjusted HR (95% CI)[1]
All-cause mortality			
CFI (continuous)	1.51 (1.43, 1.60)*	1.26 (1.17, 1.35)*	–
CFI (discrete)			
CFI <0.15	–	–	–
CFI ≥0.15 to <0.25	1.40 (1.31, 1.49)*	–	1.19 (1.11, 1.29)*
CFI ≥0.25 to <0.35	1.96 (1.68, 2.28)*	–	1.41 (1.20, 1.67)*
CFI ≥0.35	2.70 (2.00, 3.66)*	–	1.54 (1.12, 2.12)*
Cancer-specific mortality			
CFI (continuous)	1.31 (1.22, 1.41)*	1.16 (1.05, 1.27)*	–
CFI (discrete)			
CFI <0.15	–	–	–
CFI ≥0.15 to <0.25	1.23 (1.14, 1.34)*	–	1.10 (1.00, 1.22)*
CFI ≥0.25 to <0.35	1.55 (1.26, 1.89)*	–	1.27 (1.02, 1.59)*
CFI ≥0.35	2.26 (1.52, 3.36)*	–	1.45 (0.95, 2.20)
Other-cause mortality			
CFI (continuous)	1.88 (1.73, 2.05)*	1.45 (1.30, 1.61)*	–
CFI (discrete)			
CFI <0.15	–	–	–
CFI ≥0.15 to <0.25	1.68 (1.52, 1.87)*	–	1.34 (1.19, 1.52)*
CFI ≥0.25 to <0.35	2.81 (2.24, 3.52)*	–	1.84 (1.43, 2.37)*
CFI ≥0.35	4.13 (2.55, 6.68)*	–	2.04 (1.22, 3.39)*

[1]Model adjusted for age, gender, marital status, Charlson index, smoking status, year of diagnosis, race, Hispanic origin, SEER registry, facility type, hospital bed size, NCI Center designation status, rurality, census tract poverty level, census tract income, census tract education level tumor grade, annual hospital cystectomy volume, receipt of neoadjuvant chemotherapy, T stage, pN stage, interaction term between T stage and receipt of neoadjuvant chemotherapy. *p<0.05 (significant).

Poster #72. Table 2. Associations of CFI with perioperative outcomes

CFI modelling strategy	Unadjusted OR (95% CI)	Fully Adjusted Continuous OR (95% CI)[1]	Fully Adjusted Discrete OR (95% CI)[1]
Perioperative blood transfusion			
CFI (continuous)	1.21 (1.08, 1.35)*	0.96 (0.83, 1.10)	–
CFI (discrete)			
CFI<0.15	–	–	–
CFI≥0.15 to <0.25	1.11 (0.99, 1.26)	–	0.88 (0.76, 1.02)
CFI≥0.25 to <0.35	1.26 (0.93, 1.69)	–	0.87 (0.62, 1.21)
CFI≥0.35	1.28 (0.66, 2.35)	–	0.76 (0.38, 1.44)
Prolonged hospitalization			
CFI (continuous)	1.73 (1.50, 1.99)*	1.58 (1.32, 1.89)*	–
CFI (discrete)			
CFI<0.15	–	–	–
CFI≥0.15 to <0.25	1.59 (1.33, 1.90)*	–	1.47 (1.19, 1.81)*
CFI≥0.25 to <0.35	2.60 (1.80, 3.66)*	–	2.19 (1.44, 3.27)*
CFI≥0.35	3.00 (1.40, 5.86)*	–	1.94 (0.87, 3.98)
90-day hospital readmission			
CFI (continuous)	1.74 (1.57, 1.93)*	1.36 (1.20, 1.55)*	–
CFI (discrete)			
CFI<0.15	–	–	–
CFI≥0.15 to <0.25	1.62 (1.45, 1.81)*	–	1.28 (1.13, 1.46)*
CFI≥0.25 to <0.35	2.23 (1.71, 2.92)*	–	1.53 (1.13, 2.06)*
CFI≥0.35	3.18 (1.78, 5.84)*	–	2.06 (1.13, 3.86)*

[1]Model adjusted for age, gender, marital status, Charlson index, smoking status, year of diagnosis, race, Hispanic origin, SEER registry, facility type, hospital bed size, NCI Center designation status, rurality, census tract poverty level, census tract income, census tract education level, tumor grade, annual hospital cystectomy volume, receipt of neoadjuvant chemotherapy, T stage, pN stage, interaction term between T stage and receipt of neoadjuvant chemotherapy. *p<0.05 (significant).

Poster #73

Benchmarking bladder cancer care: A real-life population-based study

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Introduction: Radical cystectomy (RC) is a complex oncological surgical procedure and population studies of routine surgical care have suggested suboptimal results compared to high-volume centers of excellence. A previous Canadian bladder cancer quality-of-care consensus led to adoption of multiple key quality-of-care indicators, with associated benchmarks created using available evidence and expert opinion to inform and measure future performance. Herein, we report real-life benchmark performance for the management of muscle-invasive bladder cancer (MIBC) relative to expert opinion guidance.

Methods: This is a population-based, retrospective, cohort study that used the Ontario Cancer Registry (OCR) to identify all incident patients who underwent RC from 2009–2013. Electronic records of treatment from 1573 patients were linked to OCR; pathology records were obtained for all cases and reviewed by a team of trained data abstractors. The primary objective was to describe benchmarks for identified indicators, first as median values obtained across hospitals or providers, as well as a "pared-mean" approach to identify a benchmark population of "top performance," as defined as the best outcome accomplished for at least 10% of the population.

Results: Overall, performance in Ontario across all indicators fell short of expert opinion-determined benchmarks. Annual surgical volume by each surgeon performing a RC (benchmark >6, percent of institutions meeting benchmark=20%), percent of patients with MIBC referred preoperatively to Medical Oncology (MO; benchmark >90%, percent of institutions meeting benchmark=2%) and Radiation Oncology (RO; benchmark >50%, percent of institutions meeting benchmark=0%), time to cystectomy within 6 weeks of TURBT in patients without neoadjuvant chemotherapy (benchmark <6 weeks, percent of institutions meeting benchmark=0%), percent of patients with adequate lymph node dissection (defined as >14 nodes, benchmark >85%, percent of institutions meeting benchmark=0%), percent of patients with positive margins post-RC (benchmark <10%, percent of institutions meeting benchmark=46%), and 90-day mortality (benchmark <5%, percent of institutions meeting benchmark=37%) fell considerably short. Simply evaluating benchmarks across the province as median performance significantly underestimated benchmarks that were possible by top-performing hospitals.

Conclusions: Performance through the majority of BC quality-of-care indicators fall short of benchmarks proposed by expert opinion. Different methodologies, such as a pared-mean approach of top performers, may provide more realistic benchmarking.

Poster #75

Pheochromocytoma: A hidden player behind the 25th amendment to the United States Constitution

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Introduction: Adrenal pheochromocytoma is a rare catecholamine-releasing tumor. The symptoms of pheochromocytoma can be quite profound due to the direct impact of catecholamine excess on the cardiovascular system. We aimed to review a case of pheochromocytoma, diagnosed at autopsy, involving Dwight D. Eisenhower, 34th President of the United States.

Methods: A comprehensive review of the literature was performed.

Results: A recent analysis of histology slides from President Eisenhower's autopsy confirmed a postmortem diagnosis of adrenal pheochromocytoma. While unproven, a careful review of his health history suggests a number of his comorbidities can be partially or completely accounted for as manifestations pheochromocytoma. It is speculated that symptoms from this tumor may have begun in his early years. An elevated blood pressure (BP) of 164/90 was first recorded at the age of 40. At least one episode of diaphoresis and presyncope with ECG abnormalities preceded Eisenhower's most publicized health crisis, the "Billion Dollar Heart Attack," in 1955. He continued to have erratic blood pressure measurements throughout his life and developed secondary headaches from hypertension. His cardiovascular comorbidities persisted into his second term, when a middle cerebral artery stroke left him temporarily aphasic. By the time of his death in 1969, he had survived at least 8 myocardial infarctions and 14 cardiac arrests.

Eisenhower's medical condition resulted in hospitalization for several months during his presidency. Unlike previous presidential disabilities, Vice-President Nixon was informed on Eisenhower's medical condition and was authorized to participate in policy administration and executive duties. This fostered the development of the Eisenhower-Nixon arrangement, formalizing the VP's role in the event of presidential incapacitation, and later served as the precedent for the creation of the 25th Amendment.

Conclusions: It is likely that at least some of President Eisenhower's comorbidities were secondary to undiagnosed pheochromocytoma. Hypertension and cardiovascular disease, known sequelae of catecholamine secreting tumors, had a significant impact on his presidency. Considerations regarding the president's health would impact the role of the vice-president, and ultimately lead to the adoption of the 25th Amendment to the Constitution.