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MP 5.1

Outcomes of percutaneous renal cryoablation in a large cohort over 15 years

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Introduction: Historically, the standard of care for renal cell carcinoma (RCC) has been partial nephrectomy (PN) or radical nephrectomy (RN). Image-guided percutaneous cryoablation (PCA) of renal masses has emerged as a nephron-sparing, minimally invasive alternative. In this study, we aimed to assess outcomes of percutaneous renal cryoablation at a single center over 15 years.

Methods: Patients who underwent PCA of renal masses from 2006–2022 were included with no exclusions. All patients had cross-sectional imaging prior to the procedure and most underwent biopsy at the time of procedure. Cryoprobe placement and ice-ball formation were monitored via computed tomography (CT) imaging during the procedure. Data were collected via electronic medical record review, as well as pre-, intra-, and post-procedure imaging review. Data included demographics, tumor characteristics, pathology, local recurrence and metastatic disease rates, complications, pre- and post-procedure renal function and blood counts, comorbidities, and mortality rate of patients in followup.

Results: This study included 598 patients in the analysis with a median age of 65.1 years and median followup of 39 months (Table 1). The average size of tumor was 2.7 cm. Overall local recurrence rate was 4.8%, including surgically resected and hereditary RCC. The average nephrometry score was 6.1. Median time to local recurrence was 2.0 years. Five percent of patients made up 52% of the recurrences. Overall survival rate was 82.3% at time of analysis. Cancer-specific survival overall was 97.3%. Average length of time to discharge was 28.2 hours. The Clavien-Dindo 3+ complication rate was 2.3%. Overall metastatic rate was 1.8% and 0.7% in patients with no recurrence.

Conclusions: PCA outcomes in this large cohort with no exclusions and long-term followup revealed an overall low recurrence rate, low complication rate, and an acceptable metastatic rate.

Acknowledgements: This work was accepted as a poster presentation at AUA 2023.

MP 5.1. Table 1. Comparison of perioperative details by recurrence status for T1 patients

	Total Cohort	No Recurrence	Local Recurrence	De Novo Tumor Recurrence	Recurrence After Prior Surgical RCC
Total Number of Patients	598	543 (90.8%)	29 (4.8%)	7 (1.2%)	52 (8.7%)
Age at treatment	65.1	65.4	68.2	64	62.9
Gender Male	394 (65.9%)	357 (65.7%)	18 (62.1%)	5 (71.4%)	39 (75%)
Female	204 (34.1%)	186 (34.3%)	11 (37.9%)	2 (28.6%)	13 (25%)
Average tumor dimension in cm	2.7	2.7	2.8	2.5	2.2
Average number of probes	2.8	2.9	2.8	2.7	2.5
Number of T1a tumors	560 (88.1%)	474 (87.8%)	25 (86.1%)	7 (100%)	50 (96.2%)
Number of T1b tumors	76 (11.9%)	66 (12.2%)	4(12.9%)	0	2 (3.8%)
Nephrometry Score Average	6.1	6.1	6.5	5.8	5.8
Low	385 (62.9%)	376 (69.2%)	15 (51.7%)	5 (71.4%)	32 (59.3%)
Medium	199 (32.5%)	125 (23.0%)	9 (31.0%)	0	16 (29.6%)
High	28 (4.6%)	22 (4.1%)	3 (10.3%)	1 (14.3%)	0
Average Skin to Tumor Length					
Posterior	8.4	8.3	7.9	9.3	9.4
Lateral	8.6	8.5	8.7	9.2	8.5
Pathology from Biopsy at Cryoablation					
Clear Cell	335 (52.3%)	275 (50.1%)	26 (89.7%)	3 (42.9%)	30 (55%)
Papillary	66 (10.2%)	70 (12.9%)	2 (6.9%)	1 (14.3%)	1 (1.9%)
Chromophobe	22 (3.4%)	22 (4.1%)	0	0	1 (1.9%)
Mucinous Tubular/Spindle Cell	6 (<1%)	6 (1.1%)	0	0	0
Sarcomatoid	1 (<1%)	1 (<1%)	0	0	0
Benign	80 (12.4%)	75 (13.8%)	0	1 (14.3%)	4 (7.7%)
Non-diagnostic/Normal	57 (8.9%)	46 (8.5%)	0	2 (28.6%)	3 (5.8%)
Other/No Biopsy	74 (11.5%)	38 (7.0%)	1 (3.4%)	0	15 (28.8%)
Fuhrman Grade					
I-II	265 (44.3%)	222 (40.9%)	22 (75.9%)	2 (28.6%)	13 (25.0%)
III-IV	52 (8.7%)	45 (8.3%)	3 (11.1%)	1 (14.3%)	6 (11.5%)
Metastatic RCC after Cryoablation	11 (1.8%)	4 (0.7%)	4 (7.8%)	0	3 (5.8%)
Median Follow Up (months)	39	39	35.5	49	33.5
Complications (Clavien-Dindo)					
Total	24 (4.0%)				
I-II	10 (41.6%)				
III-IV	14 (58.3%)				

MP 5.2

Examining the utility of routine perioperative hemoglobin monitoring in patients undergoing radical nephrectomy

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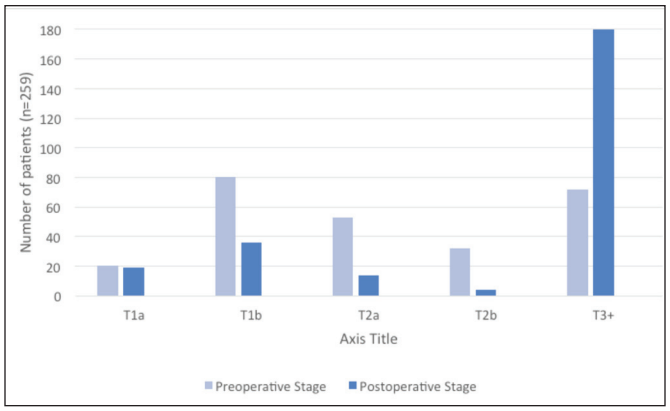
Introduction: ERAS protocols are increasingly used throughout urology to streamline the postoperative period.[1-3] Identification of those patients who may be safely discharged without risk of morbidity is crucial to facilitate early discharge after surgery. This study examines perioperative hemoglobin values in the interest of determining those patients at low risk of intervention.

Methods: This study retrospectively examined 259 patients at a single institution from 2015–2021. Patients were included if undergoing open or laparoscopic nephrectomy for a concerning renal mass. Patients were excluded if the indication was for non-functioning kidney or infection. Demographic information was collected, as well as tumor and patient factors. Perioperative hemoglobin values and transfusion rates were recorded. Logistic regression was used to create a model to identify patient and tumor factors that were predictive of requiring a blood transfusion.

Results: Descriptive statistics are included in Table 1. Median length of stay was 3 days (IQR 2–5) and total number of CBCs per patient was 4 (IQR 2–5). Overall, 12% of patients required a blood transfusion based on postoperative bloodwork (Figure 1). In those patients with an initial hgb drop of <15 g/dL, 3.1% required a blood transfusion in their subsequent hospital stay. Using logistic regression, age and estimated blood loss were found to be significantly associated with postoperative transfusion rates, while preoperative hemoglobin value was found to be protective.

MP 5.2. Table 1. Descriptive statistics and transfusion rates of a cohort of radical nephrectomy patients

n = 259	
Age, mean years	64.7 ± 11.0
BMI, mean	31.1 ± 6.8
Preoperative Hgb, median g/L (IQR)	132 (117-145)
Renal mass diameter, median cm (IQR)	7.0 (5.5 – 9.1)
OR time, median mins	126 (101 – 174)
EBL, median ml	150 (100-300)
Change in Hgb preop-postop, median g/L (IQR)	-15 (-22 to –9)
Total # of CBCs, median	4 (2 – 5)
Length of stay, median days	3 (2-5)
Overall transfusion rate	31 (12%)
Transfusion > POD0	13 (5%)
Transfused in uncomplicated disease	3/104 (2.9%)
Transfused after POD0 if initial hgb drop < 15	4/131 (3.1%)



MP 5.2. Figure 1. Preoperative and postoperative staging for patients undergoing radical nephrectomy.

Conclusions: This cohort of radical nephrectomy patients found low transfusion rates in patients with localized disease and uncomplicated surgery, while predictive factors include blood loss, age, and low preoperative hemoglobin. Reducing daily monitoring bloodwork, which rarely results in intervention, as part of an integrated ERAS approach, may help prevent unnecessary investigation and healthcare costs.

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MP 5.3

Impacts of the COVID-19 pandemic on diagnosis of renal cell carcinoma and disease stage at presentation

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Introduction: Renal cell carcinomas (RCC) are insidious neoplasms with the highest mortality of all urogenital malignancies. Most cases are incidentally discovered, and overall survival is contingent on multiple factors, most importantly, the stage of disease at diagnosis. Disruptions in healthcare delivery during the COVID-19 pandemic have resulted in various reported diagnostic and treatment delays, which have undoubtedly had detrimental impacts on malignancies such as RCC.

Methods: Surgically managed cases of RCC at our center were identified using a retrospective chart review of all nephrectomies conducted from March 1, 2018, to October 31, 2022. This study examined the stage of disease in three time period cohorts (before, during, and following the COVID-19 pandemic). Timeframes were determined relative to the implementation and abolition of public health restrictions in the province of Newfoundland and Labrador.

Results: Four hundred and forty-nine surgically managed RCC cases were identified during the study period. Clear-cell RCC accounted for 74.8% of cases. Laparoscopic techniques were used in 57.7% of patients. The median age was 64 years (IQR 58–72), and 63.0% of patients were male. These demographics did not vary across the defined timeframes. Before and during the pandemic, pathologic stage 3 (pT3) disease was reported in 38.9% and 35.4% of cases, respectively, whereas the post-pandemic period saw this presentation in 51.5% of patients.

Conclusions: The early post-pandemic period has seen a 12.6% increase in patients presenting with pT3 RCC relative to the pre-pandemic era. These findings are suggestive of a stage migration following this disruptive global event and provide critical consideration in the urgency of diagnostic and treatment decisions for RCC in the immediate future.

Acknowledgements: The authors would like to express their gratitude to Ms. Orla Ring for compiling the initial list of undertaken procedures during the study timeframe.

MP 5.4

Evaluating the prognostic variables for overall survival in metastatic renal cell carcinoma: A meta-analysis of 33 644 patients

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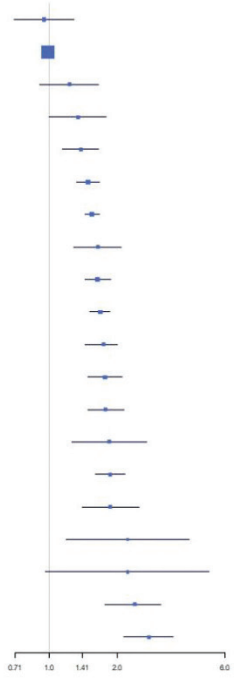
Introduction: Scoring systems are a method of risk assessment used to stratify patients with metastatic renal cell carcinoma (mRCC) and guide systemic therapy. The variables are weighed equally when calculating total score; however, the difference of even one positive predictor can change one's risk category and therapy. Thus, the objective of this meta-analysis was to compare the relative strength of association between predictive variables and OS in mRCC.

Methods: A search of MEDLINE and Embase was conducted. Clinical studies, retrospective and prospective, were included if the association of at least one predictor and OS in patients with mRCC receiving first-line systemic therapy was evaluated. Non-clear-cell histology only, cytoreductive nephrectomy, or non-first-line therapy samples were excluded. Meta-analysis was performed to generate pooled HRs and 95% CIs for OS for predictors with ≥5 included studies. Sensitivity analysis identified sources of heterogeneity. Publication bias was assessed via Egger's test, trim-and-fill method.

MP 5.4. Table 1. Characteristics of included studies

Type of study design	Number of studies	Percentage (%)
Retrospective cohort study	69	92%
Prospective cohort study	3	4%
Randomized controlled trial	3	4%
Total	75	100%
Disease histology	**Number of patients**	**Percentage (%)**
Clear-cell	29 151	87%
Non-clear-cell	2093	6%
Unknown	2400	7%
Total	33 644	100%
Types of systemic therapy	**Number of patients**	**Percentage (%)**
TKI	16 685	57%
mTOR inhibitor	665	2%
Anti-VEGF monoclonal antibody	10 463	33%
Cytokine immunotherapy	1503	5%
Anti-PD-1/anti-PD-L1 inhibitors	643	2%
Placebo/no active treatment	116	0%
Combination of 2 or more of the above	589	2%
Other	958	3%
Median F/U (months)	27.3	
IQR (months)	19.3–41.0	

Prognostic Variable	Number of Included Studies	Pooled HR	95% LL	95% UL
Sex (male vs. female)	6	0.95	0.7	1.29
Age (continuous)	5	0.99	0.98	1.02
Histology (non-clear cell vs. clear cell)	11	1.23	0.91	1.66
Lung metastases	8	1.34	1	1.79
Bone metastases	7	1.38	1.15	1.66
Thrombocytosis	12	1.49	1.32	1.67
Time from diagnosis to systemic treatment < 1 year	19	1.55	1.44	1.67
Liver metastases	10	1.64	1.29	2.09
Hypercalcemia (corrected)	25	1.64	1.44	1.88
Anemia	25	1.68	1.51	1.86
Elevated NLR	21	1.74	1.45	2.01
Multiple sites of metastases (> 1)	17	1.77	1.49	2.1
Neutrophilia	16	1.78	1.48	2.15
Poor ECOG status	10	1.84	1.26	2.71
No previous nephrectomy	14	1.87	1.61	2.17
Elevated LDH	12	1.87	1.4	2.5
Fuhrman Grade (3 + 4 vs. 1 + 2)	5	2.23	1.19	4.19
CNS metastases	5	2.23	0.96	5.13
Elevated CRP	10	2.39	1.77	3.12
Karnofsky performance status < 80%	15	2.76	2.15	3.54



MP 5.4. Figure 1. Forest plot of pooled HRs and associated 95% CIs of predictors with five or more comparable studies.

Results: Seventy-five studies containing 33 644 patients qualified for inclusion (Table 1). The most common systemic agents included TKIs (57%). Meta-analysis indicated lung metastases, bone metastases, thrombocytosis, time to systemic therapy <1 year, liver metastases, hypercalcemia, anemia, elevated NLR, multiple metastatic sites, neutrophilia, poor ECOG status, no previous nephrectomy, elevated LDH, Fuhrman grade 3 or 4, CNS metastases, elevated CRP, and KPS <80% were associated with significantly worse OS (Figure 1). The HRs varied from 1.34–2.76, representing heterogeneity in predictive strength. The effects of study heterogeneity and publication bias were minimal to moderate across all predictors.
Conclusions: Based on differences in pooled HRs, prognostic strength between the variables is likely not equivalent. Restructuring scoring models, through inclusion of other prognostic factors and usage of relative weighting, should be considered to improve accuracy of risk stratification.
Acknowledgements: The authors would like to thank Dr. Yu Luo, PhD, for his assistance with constructing the search strategy and statistical analysis.

MP 5.5

Comparison between transperitoneal and retroperitoneal robot-assisted partial nephrectomy

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Introduction: Robot-assisted partial nephrectomy (RAPN) is increasingly being used and has been shown to be safe and effective. Retroperitoneal RAPN can be used for surgical treatment of posterior renal masses. The aim of the study was to compare the intraoperative and postoperative outcomes between the transperitoneal (TP) and retroperitoneal (RP) approaches in RAPN.
Methods: A retrospective study in a single institution was done. We included all patients who underwent RAPN between January 2019 and April 2022. The outcomes assessed were: operative time, warm ischemia time, estimated blood loss, hospital stay, complications, ΔeGFR. The results were compared between the transperitoneal and retroperitoneal approaches.
Results: We had a total of 90 cases: 70 cases performed by transperitoneal approach (78%) and 20 by retroperitoneal approach (22%). In the two groups, there were no significant differences in patient characteristics. Most patients were over the age of 50 (74% vs. 85%), were male (67% vs. 75%), had normal preoperative renal function (87% vs. 75%), and had an ASA score of II (69% vs. 85%). In the two groups, the sizes of the masses were relatively balanced, and most of the masses were clear-cell carcinomas (54% vs. 55%). In terms of surgical results, a shorter hospital stay was observed for the retroperitoneal approach (1.65 vs. 2.46 days). All surgical margins were negative. We did not observe any significant change in renal function up to one year after surgery. We listed 12 postoperative complications for the TP group and three complications for the RP group. In both groups, the most serious complication was Clavien-Dindo grade 2.
Conclusions: Postoperative and perioperative outcomes seem similar between the two approach with possibly a shorter length of stay for the RP approach.
Acknowledgements: This subject was presented at the Quebec Urological Association 2022 annual meeting; however, the database has since been updated with additional variables.

MP 5.6

Evaluating the prevalence of the International Metastatic Renal Cell Carcinoma Database Consortium criteria in non-metastatic renal cancer patients and their normalization after undergoing nephrectomy

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Introduction: The International Metastatic Renal Cell Carcinoma (RCC) Database Consortium (IMDC) is the most widely used prognostic tool for disease risk stratification; however, how the primary tumor contributes to IMDC criteria abnormalities and how cytoreductive nephrectomy can induce change in risk group remains unknown. The objective of this study was to determine the prevalence of IMDC criteria abnormality in non-metastatic RCC and to determine how nephrectomy influences normalization of each criterion.

Methods: The Canadian Kidney Cancer information system database was used to identify RCC patients diagnosed from January 2011 to March 2022. Only non-metastatic patients at diagnosis that underwent nephrectomy were included. IMDC criteria were identified preoperatively (previous six months) and postoperatively (between 2–15 months).

Results: A total of 7092 patients (pts) were included. Median age was 61 years, 66.2% were male, and the majority were clear-cell RCC (71.2%). The preoperative prevalence of at least one abnormal (aN) value was: hemoglobin (HB) (3853 pts, 32.3% aN), neutrophils (NT) (3476 pts, 35.0% aN), platelets (PL) (3841 pts, 3.4% aN), and calcemia (CA) (401 pts, 1.0% aN). The postoperative prevalence of at least one aN value was: HB (176 pts, 37% aN), NT (162 pts, 25.9% aN), PL (176 pts, 2.8% aN), and CA (48 pts, 4.2% aN). Only a small group of patients had values both pre- and postoperative: HB 129 pts (32.6% vs. 40.3% aN, p<0.0001), NT 114 pts (37.7% vs. 30.7% aN, p=0.0044), PL 129 pts (9.3% vs. 3.1% aN, p=0.0024), and 34 CA. In that group, the proportion of criteria normalization postoperatively was HB 35.7%, NT 53.5%, and PL 75%. The proportion of criteria change to aN was HB 28.7%, NT 21.1%, and PL 0.9%.

Conclusions: In non-metastatic RCC, the prevalence of aN IMDC risk criteria is high and a large proportion of patients will normalize their laboratories after nephrectomy. Therefore, IMDC criteria should not be the sole determinant of patient candidacy for cytoreductive nephrectomy.

MP 5.7

An updated systematic review and meta-analysis on the technical, oncological, and safety outcomes of microwave ablation in patients with renal cell carcinoma

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Introduction: Percutaneous microwave ablation (MWA) has emerged as a new energy modality for renal tumor ablation with potential advantages over radiofrequency and cryoablation. The goal of this study was to determine treatment outcomes of MWA for renal cell carcinoma (RCC), as well as for T1b RCC.

Methods: Studies that reported outcomes of MWA for RCC were identified in Medline, EMBASE, and Scopus. Random effects models with inverse-variance weighting were used to pool outcomes, including technical success rate (TSR), technical efficacy rate (TER), local recurrence rate (LRR), cancer-specific survival rate (CSSR), overall survival rate (OSR), and complications.

Results: Among 914 studies captured, 27 studies with 1584 patients (1683 malignant renal tumors) were included. The pooled TSR and TER were 99.6% (95% CI 98.0–100%, I2=51%) and 96.2% (93.8–98.2%, I2=66%). The pooled LRR was 3.2% (1.9–4.7%, I2=11%). At one, three, and five years, the pooled CSSRs were 100% (99.4–100%, I2=11%), 100% (98.4–100%, I2=64%), and 97.7% (94.5–99.7%, I2=48%), respectively, while pooled OSRs were 99.0% (97.5–99.9%, I2=19%), 96.0% (93.1–98.3%; I2=12%), and 88.1% (80.3–94.2%, I2=64%), respectively. The pooled minor and major complication rates were 10.3% (7.1–13.9%, I2=78%) and 1.0% (0.3–2.1%, I2=21%), respectively. In 204 patients with 208 T1b tumors, the pooled TSR and TER were 100% (96.6–100%, I2=0%) and 85.2% (71.0–95.8%, I2=71%), respectively. The pooled LRR was 4.2% (0.9–8.9%, I2=21%). At one, three, and five years, the pooled CSSRs were 98.2% (88.7–100%, I2=63%), 97.2% (78.5–100%, I2=77%), and 98.1% (72.3–100%, I2=70%), respectively. At one and three years, the pooled OSRs were 94.3% (85.7–99.6%, I2=0%) and 89.3% (68.7–100%, I2=0%), respectively. The pooled minor and major complication rates were 8.5% (4.2–13.8%, I2=0%) and 5.7% (0–18.6%, I2=77%), respectively.

Conclusions: MWA demonstrated favorable technical and oncological outcomes with a low incidence of complications, including in the T1b subset. This supports MWA as a safe and effective treatment for RCC and a viable option for larger tumors.

MP 5.8

Impact of frailty on postoperative outcomes of open and laparoscopic radical nephrectomy for renal cancer

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Introduction: Frailty has been associated with poor patient outcomes and increased hospital utilization; however, there is a lack evidence on the impact of frailty after radical nephrectomy (RN).

Methods: Adult patients who underwent radical nephrectomy (RN) for renal cancer from 2015–2019 were identified from the NSQIP database using CPT and ICD-10 codes. Patient frailty was assessed using the modified five-item frailty (mFI-5) index (not frail [NF] 0, slightly frail [SF] 1, and frail [F]>2). The primary outcome was 30-day postoperative complications. Secondary outcomes were hospital utilization: total hospital length of stay, unplanned readmission, and non-home discharge. Odds ratios (OR) with 95% confidence intervals (CI) and p-values (α=0.05) were estimated using multivariate regression. Subgroup analysis, chosen a priori in open RN and laparoscopic RN, was performed.

Results: From a total of 16 454 RN patients included for analysis, 30.3% (n=4991) were not frail, 46.0% (n=7573) were slightly frail, and 23.6% (n=3890) were frail. Most patients underwent laparoscopic RN (68.2%), and this rate did not differ between frailty groups. After controlling for covariates, among all RN patients, frail patients but not slightly frail patients were associated with a higher likelihood for 30-day complications (F: OR 1.19, 95% CI 1.05–1.35, p=0.005), to be discharged to somewhere other than their home (F: OR 1.62, 95% CI 1.28–2.07, p<0.001), but did not in hospital length of stay. Both frail and slightly frail patients were more likely to have unplanned readmission (F: OR 1.37, 95% CI 1.12–1.67, p=0.002; SF: OR 1.23, 95% CI 1.03–1.47, p=0.023). In subgroup analyses, laparoscopic RN patients, frailty predicted greater complications, non-home discharge, unplanned readmission, and hospital length of stay; however, in the open RN subgroup, increased frailty predicted only non-home discharge.

Conclusions: Patient frailty is a useful prognostic indicator for postoperative complications and greater healthcare utilization for RN patients. Further studies are needed to investigate the relationship between open RN and in-hospital course.

MP 5.9

Is high-dose interleukin 2 for metastatic renal cell carcinoma still a preferable option for the fit patient?

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Introduction: In 1992, high-dose interleukin 2 (HD-IL2) treatment became the first FDA-approved treatment of metastatic renal cell carcinoma. Complete response (CR) was reported in 7% and overall response rate (ORR) in 15%, many of which were reported to last for decades, indicating a possible cure. The objective of this study was to examine long-term survival outcomes in men with metastatic renal cell carcinoma who receive HD-IL2 treatment.

Methods: A systematic review and narrative analysis of human trials for men receiving HD-IL2 for metastatic renal cell carcinoma using the Grading of Recommendations, Assessment, Development and Evaluations (GRADE) system was performed. Two authors independently abstracted all abstracts. The primary outcome was overall cancer-specific survival and frequency of complete response. Secondary outcomes were partial response, stable disease, and progressive disease. Information on deaths and side effects from therapy was compiled when available.

Results: We identified 274 titles from our systematic review, of which 22 articles were included in this review. The overall complete response rate was

MP 5.9. Table1 Prior studies of mRCC patients receiving HDIL-2 and associated response rates

Study	Patient inclusion period	No of patients	Cr (%)	PR (%)	SD (%)	PD (%)
Abrams (1990)	NR	16	0 (0%)	0 (0%)	2 (12.5%)	14 (87.5%)
Negrier (1998)	1992–1995	138	1 (0.7%)	3 (2.1%)	9 (6.5%)	94 (68.1%)
Rosenberg (1998)	1985–1996	227	21 (9.3%)	22 (9.7%)	NR	NR
Oleksowicz (1999)	1994–1997	20	3 (15%)	5 (25%)	NR	NR
Fisher (2000)	NR–1996	255	17 (6.6%)	20 (7.8%)	NR	NR
Gitlitz (2001)	NR	124	7 (5.6%)	11 (8.8%)	NR	NR
Yang (2003)	1991–1993	155	11 (7.0%)	22 (14.1%)	NR	NR
McDermott (2005)	1997–2000	95	8 (8.4%)	14 (14.7%)	9 (9.4%)	NR
Belldegrun (2008)	1989–2005	212	16 (7.5%)	25 (11.7%)	51 (24.0%)	110 (51.8%)
Klapper (2008)	1986–2006	259	23 (8.8%)	30 (11.5%)	NR	NR
Shablak (2011)	2006–2008	72	14 (19.4%)	29 (40.2%)	NR	NR
Dandamudi (2013)	2005–2007	50	4 (8%)	11 (22%)	22 (44%)	12 (24%)
Hanzly (2014)	2004–2011	18	4 (22.2%)	2 (11.1%)	6 (33.3%)	6 (33.3%)
Payne (2014)	1997–2012	186	12 (6.4%)	32 (17.2%)	54 (29.0%)	NR
McDermott (2015)	2006–2009	120	3 (2.5%)	25 (20.9%)	9 (7.5%)	83 (69.1%)
Stenehjem (2016)	1997–2013	391	35 (9%)	39 (10%)	125 (32%)	192 (49%)
Gills (2017)	2007–2014	87	7 (8.0%)	30 (24.5%)	3 (3.4%)	47 (54%)
Pili (2017)	2009–2015	41	3 (7.3%)	12 (29.2%)	18 (43.9%)	8 (19.5%)
Lee (2017)	2010–2014	37	2 (5.4%)	11 (30%)	21 (57%)	1 (3%)
Kuzman (2017)	2003–2013	71	9 (12.6%)	5 (7.0 %)	23 (32.3%)	34 (47.8%)
Chow (2016)	2003–2013	145	30 (20.7%)	32 (20.6%)	46 (31.7%)	37 (25.5%)
Fishman (2018)	2006–2017	810	44 (5.4%)	156 (19.2%)	337 (41.6%)	229(28.2%)
Total	–	3529	274 (7.8%)	536 (15.2%)	735 (20.8%)	867 (24.6%)

7.8%. The partial and stable disease rates were 15% and 20%, respectively; 25% of pooled patients had progressive disease after treatment. There was significant heterogeneity in the timing and duration of treatment protocols. Side effects and death reporting were variable across studies, but all patients received therapy in the inpatient setting. This treatment is associated with significant morbidity that necessitates hospitalization for administration, but we did not observe any reported deaths from the studies reviewed (Table 1).

Conclusions: HD-IL2 is associated with a 7.8% complete response rate for individuals with metastatic renal cell carcinoma. Treatment is associated with significant morbidity and may not be tolerable for many patients or their providers. Nevertheless, HD-IL2 should continue to be considered a treatment option for highly motivated individuals who understand the risks and benefits.

MP 5.10

Primary robotic retroperitoneal lymph node dissection for testicular germ cell tumors: The Princess Margaret Cancer Centre experience

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Introduction: Open retroperitoneal lymph node dissection (O-RPLND) has been the gold-standard approach; however, increasingly robotic RPLND (R-RPLND) is being performed due to the potential for superior cosmesis, less blood loss and pain, shorter length of stay, and lower risk of incisional hernia. We aimed to report our experience with primary R-RPLND at an academic tertiary center.

Methods: We retrospectively reviewed patients who underwent primary RPLND (pRPLND) at Princess Margaret Cancer Centre from 1995–2022. Herein, we report patient demographics, perioperative outcomes, and complications of primary R-RPLND. This analysis will be followed by a propensity score model comparing primary O-RPLND and R-RPLND based on clinical, surgical, and pathological characteristics.

Results: During the study period, 151 patients underwent pRPLND (41 underwent R-RPLND vs. 110 O-RPLND). No differences were found in patient demographics or tumor characteristics. Among R-RPLND, 25 (61%) were CS

I and 16 (39%) CS IIA/B. The majority, 36 (88%), had non-seminoma and five (12%) had seminoma in the initial pathology. Median total OR time was 8.7 hours (IQR 8– 9), estimated blood loss was 200 ml (IQR 100–300), and length of stay was two days (IQR 1–2). Median lymph node yield was 31 (20.7–41.7); 87.8% had viable GCT and 12.2% teratoma. Median followup was 15 months (IQR 4– 37). Three (7%) relapses have been detected, one in-field and two out of field (mediastinal), two successfully treated with chemotherapy and one with surgery. We documented eight complications; six were Clavien-Dindo 1 and two Clavien-Dindo 3a.
Conclusions: Our experience confirms that R-RPLND is feasible and safe in academic tertiary centers. Primary R-RPLND appears associated with less blood loss, shorter length of stay, and decreased morbidity when compared to previously reported data of O-RPLND. The oncological efficacy appears non-inferior, but a well-designed, propensity-matched analysis will help us address this conundrum.

MP 5.11
Restricted access and advanced disease in post-pandemic testicular cancer
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Introduction: The clinical stage of testicular cancer at presentation is predictive of cancer-specific survival. A delay in the presentation will have consequences for patient outcomes. During the COVID-19 pandemic, access to all manner of health resources was severely limited, potentially leading to fewer cases diagnosed during this period and a higher proportion of late-stage cancer diagnoses after restrictions were lifted. We have investigated the clinical and pathologic stage of presentation of testicular cases at our institution before, during, and after the pandemic to evaluate its impact on this malignancy.
Methods: A retrospective chart review was performed of all surgically managed cases of testicular cancer at our centre from March 1, 2018, to October 31, 2022. Patients were distributed into temporal cohorts, chosen to represent before, during, and following the provincial health restrictions. Disease severity at the presentation was staged using the Canadian Urological Association guidelines.
Results: Forty-three surgically managed patients with testicular cancer were identified during the study period. The mean patient age was 41, and the right testis was affected in 53.5% of cases. Of the 43 tumours identified, 90.7% were germ cell, and 9.3% were non-germ cell. Before and during the pandemic, clinical stage 3 disease was reported in 13.6% and 8.3% of cases, respectively. The post-pandemic cohort saw a rise of stage 3 disease to 33.3% of patients.
Conclusions: Our investigation revealed a 19.7% increase in the proportion of patients presenting with clinical stage 3 testicular cancer. Although this study is small in sample size, these findings suggest that restricting access to health care during the COVID-19 pandemic has led to delays in testicular cancer diagnosis. These delays will likely lead to morbidity and mortality, warrant further follow-up investigations, and prompt resource allocation now to negate adverse patient outcomes.
Acknowledgements: Ethics approval was obtained from the Memorial University of Newfoundland Health Research Ethics Board (HREB #2022.174). The authors wish to thank Orla Ring, perioperative clinical educator, for acquiring operating room codes for all orchidectomy cases in our study.

MP 5.12
A population-based analysis of the epidemiology of penile cancer in Newfoundland and Labrador
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Introduction: Penile cancer is a rare malignancy accounting for less than 1% of oncological diagnoses; however, current reports suggest increasing incidence globally. Limited research regarding these malignancies has been conducted in Canada. The province of Newfoundland and Labrador (NL), with the highest national incidence of cancer and a plethora of relevant risk factors, is of particular interest when considering these malignancies.
Methods: A retrospective chart analysis of all patients with a diagnosis of penile cancer in NL between the years of 2006 and 2018 was conducted using a provincially maintained database. Main outcomes included overall incidence, proportion with metastatic disease, tumor demographics, and prevalence of identified risk factors. Incidence among the male population was calculated using NL Statistics Agency reports.
Results: An identified 81 cases satisfied the inclusion criteria, with incidence of penile cancer ranging from 1.20–4.27/100,000 males in 2007 and 2010, respectively. The median age at diagnosis was 65 years. A thorough analysis of 54 cases has been conducted to date, with invasive squamous cell carcinoma (SCC) being the predominant histology in 68.5% of patients and SCC in situ reported in a further 27.8%. Metastatic spread was documented in 24.1% of patients, while a further 20.4% succumbed to their disease. Phimosis and balanitis xerotica obliterans were present in 31.5% and 44.2% of patients, respectively, while 46.3% had a history of smoking and a further 42.6% were classified as obese.
Conclusions: Incidence of penile cancer across the study period was significantly higher than other reported Western jurisdictions and showed frequent rates of metastatic spread. These observations are likely multifactorial, resultant of chronic inflammation paired with high rates of modifiable risk factors and diagnostic delays. There is an evident need for greater examination and discussion of these malignancies in the province.

MP 5.13
A retrospective review of primary prophylaxis with granulocyte-colony stimulating factor (GCSF) for patients with genitourinary malignancies receiving chemotherapy during the COVID-19 pandemic and implications for the future
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Introduction: To mitigate the risks of chemotherapy-associated neutropenia during the COVID-19 pandemic, all genitourinary (GU) cancer patients treated with chemotherapy at the Princess Margaret Cancer Centre (PMCC) were offered primary prophylaxis with GCSF. We hypothesized that this reduced the rates of febrile neutropenia, hospitalizations, and healthcare costs, and improved overall outcomes compared to GU cancer patients treated with chemotherapy without GCSF in the two years prior to the pandemic.
Methods: We performed a retrospective review of GU cancer patients receiving curative- or palliative-intent chemotherapy, with or without primary GCSF prophylaxis, between January 2018 and June 2022. GCSF was given either as a single dose or as consecutive doses post-chemotherapy. Main outcomes were incidence of febrile neutropenia, hospitalization, and healthcare expenditures, as well as disease-specific outcomes.
Results: Overall, 248 patients with prostate cancer (44%), urothelial cancers (33%), germ cell (21%), and rare GU cancers (4%) were identified. Median age was 70 (range 19–91), 92% were male, 65% were ECOG 0/1. Treatment intent was neoadjuvant (13%), adjuvant (20%), or palliative (67%). The main regimens used were docetaxel, cabazitaxel, carboplatin, cisplatin/etoposide, gemcitabine/cisplatin, and BEP. The median followup was 10.5 months (0.23–52.3). A total of 206/248 received primary GCSF prophylaxis. GCSF users were younger and had a better ECOG compared to non-users ($p<0.001$ for both). During chemotherapy, the median white blood cell levels were higher in the GCSF group compared to the non-GCSF group (14.1*10*9/L vs. 2.90*10*9/L, $p<0.0001$); and neutropenia rates were markedly lower (2% vs. 93%, $p<0.0001$). Hospital admission rates were significantly lower in GCSF users compared to non-users (19% vs. 69%, $p<0.0001$). Symptomatic disease progression (13%) was the leading cause of admission in the GCSF group. Infectious causes, such as UTI, pneumonia, COVID-19, and sepsis were seen in only 12% of the GCSF group compared to 31% in the non-users. GCSF was generally well-tolerated, with just 0.97% discontinuing GCSF.
Conclusions: During the COVID-19 pandemic, primary prophylactic GCSF use in GU cancer patients undergoing chemotherapy significantly lowered rates of both febrile neutropenia and hospitalizations and could be a cost-effective strategy in this patient population that warrants further study.
Acknowledgements: This study was presented as a poster at ASCO GU 2023.

UP 5.2

Utility of post-orchiectomy lactate dehydrogenase in predicting risk of death from testicular cancer

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Introduction: American Joint Committee on Cancer (AJCC) staging in testis cancer relies on a combination of tumor, imaging, and serum markers. Standard tumor markers include lactate dehydrogenase (LDH), human chorionic gonadotropin (HCG), and alpha-fetoprotein (AFP). Recent work has demonstrated that lactate dehydrogenase alone is not independently associated with early relapse in stage 1 seminoma or non-seminomatous germ cell tumor surveillance and was elevated in a high proportion of non-relapsing tumors. The objective of this study was to evaluate the utility of lactate dehydrogenase (LDH) levels after orchiectomy to predict mortality from testis cancer.

Methods: This is a retrospective cohort study of men who underwent orchiectomy for testicular cancer. Data were extracted from a 17-registry sample of the Surveillance, Epidemiology and End Results (SEER) program. Men who had missing LDH levels or whose tumors were identified from autopsy samples were excluded. The primary outcome was the utility of LDH alone or in combination with other tumor markers in predicting testicular cancer death. Secondary outcomes were the test characteristics of these tumor markers to predict tumor size or death.

Results: We identified 10 362 individuals who underwent orchiectomy for testicular cancer from 2010–2019. The majority were white (89%) with a balanced distribution for laterality and histological type (seminoma: 48% vs. non-seminoma: 48%). A total of 265 men died of testis cancer over the study period. All had post-orchiectomy LDH measurements, of which 8127 (78%) were <1.5 times normal, 1502 (14%) were 1.5–10 times normal, and 733 (7%) were >10 times the normal level. Binary logistic regression analysis showed a significant association between death from testis cancer and all markers. Multivariable logistic regression showed that elevated markers post-orchiectomy were significantly associated with death from testis cancer (LDH relative risk ratio [RRR] 1.9, 95% CI 1.5–2.3; AFP RRR 2.4, 95% CI 1.8–2.2; HCG RRR 2.4, 95% CI 2.1–2.8) (Table 1).

Conclusions: LDH is useful alone and in combination with other traditional tumor markers in predicting the risk of death from testis cancer. LDH should continue to be collected post-orchiectomy both for IGCCCG risk category assignment to guide treatment and for its ability to predict death from testicular cancer.

UP 5.2 Table 1. Characteristics of the cohort

Variable	Number (%)
Ethnicity	
White	9214 (89%)
Asian or Pacific Islander	547 (5%)
Black	283 (3%)
Laterality	
Left	4930 (48%)
Right	5362 (52%)
Tumor size (median)	3.5 cm (IQR: 1.6-5.5 cm)
Post orchiectomy tumor markers	
LDH	
<1.5X normal	8127 (78%)
1.5-10X normal	1502 (14%)
>10X normal	733 (7%)
AFP	
<1000	7708 (96%)
1000-10,000	217 (3%)
>10,000	76 (1%)
HCG	
Normal	7,831 (81%)
<5000	1426 (15%)
5,000-10,000	182 (2%)
>50,0000	182 (2%)
Vital status	
Alive	8887 (95%)
Deceased	475 (5%)
Deceased of testis cancer	265 (2.6%)

UP 5.3

Does tumor size affect risk of death from low-grade upper tract urothelial carcinoma?

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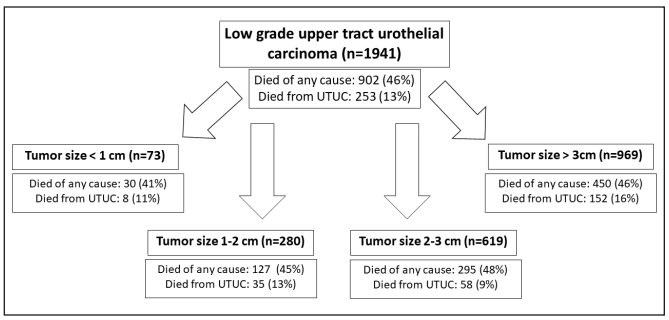
Introduction: The gold-standard treatment for upper tract urothelial carcinoma is nephroureterectomy. This surgery carries significant morbidity and management is increasingly shifting towards minimally invasive techniques, including endoscopic management, chemotherapy, or a combination of the two. Existing guidelines risk-stratify patients based on tumor histology, size, and staging. The objective of this study was to determine if primary tumor size of low-grade upper tract urothelial carcinoma affects the risk of death from this disease.

Methods: We performed a retrospective cohort study using the Surveillance, Epidemiology End Results (SEER) database. We included individuals who were diagnosed with urothelial carcinoma of the renal pelvis or ureter from 2000–20217, with a median followup of 26 months (IQR 9–64). We excluded patients with unknown-grade disease.

Results: We identified 11 104 individuals with low- (n=1941) and high-grade (n=9163) tumors. Median survival was 19 months (IQR 8–41) for those who died of all causes and 14 months (IQR 6–28) for those who died of upper tract urothelial carcinoma. At the end of the followup period (median 27 months), 57% of participants had died of any cause and 27% had died of upper tract urothelial carcinoma. Among those initially diagnosed with low-grade disease (n=1941), 46% died of any cause and 13% died of upper tract urothelial carcinoma. We stratified the risk of death by tumor size (Figure 1). Logistic regression showed a slight increase in risk of cancer-specific mortality by tumor size in low-grade tumors for size category (OR 1.22, 95% CI 1.03–1.45, p=0.01).

Conclusions: There does not appear to be a significant difference in cancer-specific mortality risk for low-grade upper tract urothelial carcinoma tumors under 3 cm in size, but larger tumors (>3 cm) do likely confer additional risk of cancer-specific mortality. We will explore the relationship between tumor size and cancer mortality further.



UP 5.3. Figure 1.

UP 5.4. Table 1. Mortality risk by age at diagnosis

Variable	Percentage who died of other causes	Percentage who died of upp tract urothelial carcinoma
Total cohort (n=11,104)	3296 (52%)	2994 (48%)
Age category at diagnosis		
60-64	234 (51%)	228 (49%)
65-69	384 (49%)	402 (51%)
70-74	525 (53%)	458 (47%)
75-79	656 (51%)	622 (49%)
80-84	701 (57%)	534 (43%)
85+	556 (57%)	427 (43%)

UP 5.4

Age and risk of cancer-specific mortality from upper tract urothelial carcinoma

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Introduction: Upper tract urothelial carcinoma is a rare malignancy, but patient outcomes tend to be poor. The gold-standard treatment is nephroureterectomy but increasingly we are trying to define populations that can be treated with less invasive methods including chemotherapy and endoscopic management. The objective of this study was to determine if age category can be used to identify individuals at high risk to die of competing risks rather than their upper tract urothelial carcinoma.

Methods: We performed a retrospective cohort study using the Surveillance, Epidemiology End Results (SEER) Program. We included individuals who were diagnosed with urothelial carcinoma of the renal pelvis or ureter from 2000–20217 with a median followup of 26 months (IQR 9-64). We excluded those with unknown grade or size of disease.

Results: We identified 11 104 individuals with low- (n=1941) and high-grade (n= 9163) tumors. Median survival was 19 months (IQR 8-41) for those who died of all causes and 14 months (IQR 6-28) for those who died of upper tract urothelial carcinoma. At the end of the followup period (median 27 months), 57% of participants had died of any cause and 27% had died of upper tract urothelial carcinoma. We stratified the percentage who died of their disease or other causes by age of diagnosis. (Table 1) The proportion who died of their cancer decreased across age of diagnosis from the lowest category (49% of those diagnosed at age 60–64) to the highest (43% of those diagnosed over the age of 85). Age category at diagnosis was significantly associated with risk of death from upper tract urothelial carcinoma (OR 1.09, 95% CI 1.07–1.11, p<0.01). We performed further analyses using multivariable models and known risk factors for cancer-specific mortality.

Conclusions: Age of diagnosis is significantly associated with risk of cancer-specific mortality in upper tract urothelial carcinoma. Current risk stratification of individuals with upper tract urothelial carcinoma should include age or some determination of life expectancy/competing risk.

UP 5.5

Demographics and clinical characteristics of solitary fibrous tumors: A contemporary, population-based analysis

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Introduction: Solitary fibrous tumors represent a rare mesenchymal malignancy that can manifest anywhere in the body, including the pelvis and retroperitoneum. Due to the low prevalence of the disease, there is a lack of contemporary data regarding patient demographics and clinical outcomes. The aim of our study was to identify the current state of solitary fibrous tumors in a North American population-based descriptive analysis.

Methods: Within Surveillance, Epidemiology. and End Results database (2000–2019), we identified 581 patients diagnosed with a solitary fibrous tumor. Distribution of patient age and race, tumor size, tumor location, and extent of disease were documented. Kaplan-Meier plots estimated cancer-specific survival at five years according to patient age, tumor size, and tumor location.

Results: Overall, median patient age at diagnosis was 64 years and disease was predominantly documented in the Caucasian race/ethnicity (73%). Overall distribution of solitary fibrous tumor between male and female was equal. Solitary fibrous tumors were classified as localized in 47%, locally advanced in 36%, and metastatic in 17% of patients. The median size at diagnosis was 9.7 (6–14.5) cm. Specifically, solitary fibrous tumors located in sites of urological interest (pelvis and retroperitoneum) were 22% (n=125), with pelvis identified as the second most common location (13%) after chest (48%). Median size was 10.2 (7.8–13.6) vs. 14 (9–18) cm for pelvic and retroperitoneal solitary fibrous tumors, respectively, with retroperitoneal being the biggest tumors across all sites. Compared to other sites, pelvic solitary fibrous tumors were more frequently diagnosed as locally advanced (46%). Overall, five-year cancer-specific survival was 70%, while decreasing from 74% to 66% in patients older than 64 years. Cancer-specific survival rates at five years for localized, locally advanced, and metastatic disease were 78%, 72%, and 53%, respectively. Specifically, pelvic solitary fibrous tumor cancer-specific survival was 68% and retroperitoneal solitary fibrous tumor cancer-specific survival was 73% at five years from diagnosis.

Conclusions: The pelvis is the second most common location of solitary fibrous tumors after the chest. Five-year cancer-specific survival of solitary fibrous tumor sited in a urological location was 68% for pelvis and 73% for retroperitoneum.

UP 5.6

Hospital stay and operation time after nephrectomy and thermal ablation: A systematic review and meta-analysis

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Introduction: Most patients treated for a small renal mass (SRM) are being managed by one of two interventions: thermal ablation or partial nephrectomy (PN). In this systematic review, we evaluated the length of hospital stay (LOS) and operating room (OR) time in patients undergoing invasive procedures for a SRM, including open, laparoscopic, robotic PN (OPN, RPN, RPN), or thermal ablation, examining the possible influence of geographic region.

Methods: We searched MEDLINE, EMBASE, and CINAHL from inception to the end of 2020. To obtain pooled estimates of mean LOS and OR time, we conducted a random-effects meta-analysis. To assess risk of bias (ROB), we used the QUIPS tool, and for the quality of evidence, applied the GRADE framework.

Results: We screened 2130 titles and abstracts and identified 54 eligible studies, including 24 at low and 30 at high ROB. Pooled estimates demonstrated mean LOS for OPN of 5.7days (95% CI 4.6–6.5) in North America, 7.1 days (5.7–8.3) in Europe, and 13.4 days (5.7–8.3) in Asia; for LPN, 3.0 days (2.5–3.5) in North America, 5.4 days (3.4–7.3) in Europe, and 5.8 days (4.8–6.7) in Asia; for RPN, 2.7 days (1.9–3.5) in North America, 3.7 days (2.6–4.9) in Europe, and 7.1 days (5.3–8.9) in Asia; and for thermal ablation, 1.2 days (0.7–1.6) (all data from North America). With regards to OR time, mean pooled estimates for OPN were 187 min (159–216) in North America, 133 min (124–141) in Europe, and 184 min (161–208) in Asia; for LPN, 199 min (164–222) in North America, 128 min (84–171) in Europe, and 200 min (169–232) in Asia; and for RPN, 187 min (168–206) in North America; 160 min (138–183) in Europe; and 188 min (162–213) in Asia. For thermal ablation, the pooled estimate in North America was 144.4 min (115–174).

Conclusions: Our results provide the best available estimates of LOS and OR time for patients undergoing invasive procedures for management of SRMs and highlight the marked geographic differences in LOS.

UP 5.7

Major complications and blood loss after invasive treatments of small renal masses: A systematic review and meta-analysis

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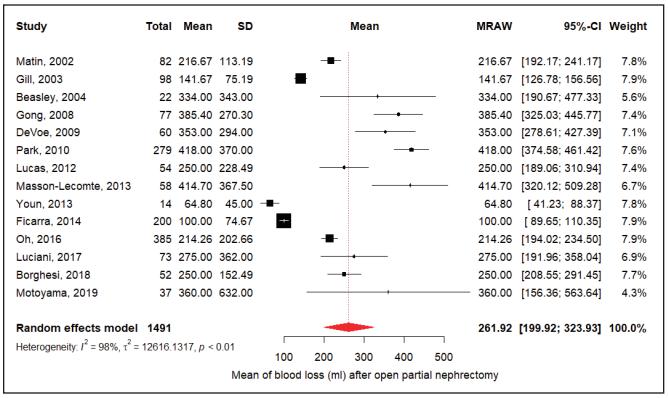
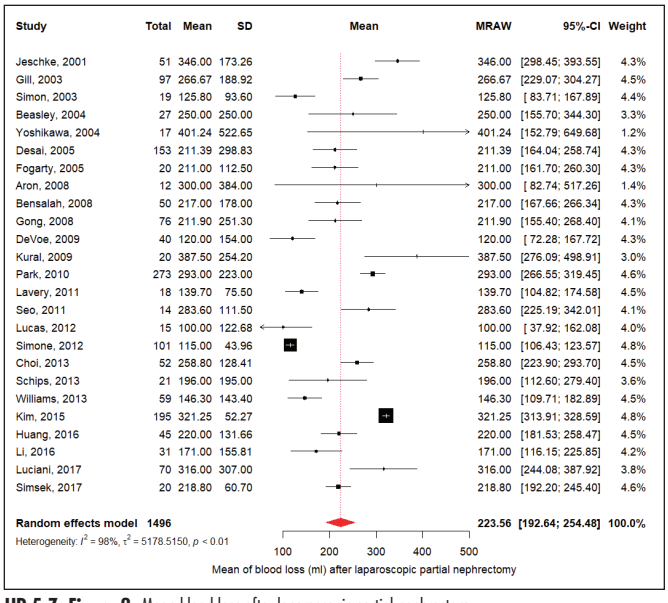
Introduction: During the past decade, partial nephrectomy (PN) has been the standard care for T1a renal tumors; however, ablative therapies, which treat tumors by heating or freezing techniques, are becoming much more common. This systematic review and meta-analysis provides estimates of blood loss and major complications for open PN, laparoscopic PN, robotic PN, and thermal ablation in patients with small renal masses (SRMs).

Methods: We searched MEDLINE, EMBASE, and CINAHL from inception to the end of 2020. We added more articles through a hand search of the reference lists of included studies and suggestions from two expert urologists who were members of our team. We conducted a random-effects meta-analysis to obtain a pooled estimate of blood loss and major complications. We used the QUIPS tool for risk of bias assessment and applied a prognosis approach to assess the quality of evidence using the Grades of Recommendation, Assessment, Development, and Evaluation (GRADE) framework.

Results: We included 61 eligible studies. Mean estimated blood loss was 262 ml (95% CI 200–324) for open PN; 224 ml (95% CI 193–254) for laparoscopic PN; and 179 ml (95% CI 150–208) for robotic PN. The pooled estimates of major complications after open PN was 5.4% (95%CI 2.9–9.6); after laparoscopic PN was 4.7% (95% CI 2.6–8.3); after robotic PN was 2.74% (95% CI 2.1–3.6); and with thermal ablation was 3.5% (95% CI 3.4–5.1) (Figures 1–5).

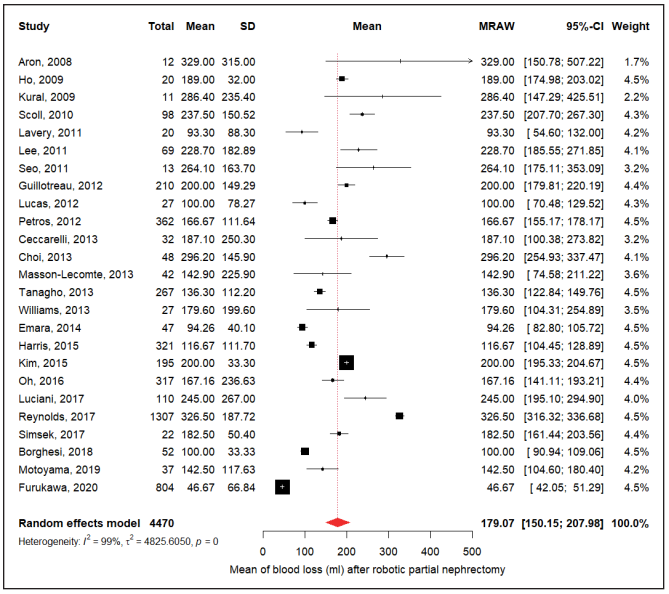


UP 5.7. Figure 1. Mean blood loss after open partial nephrectomy.

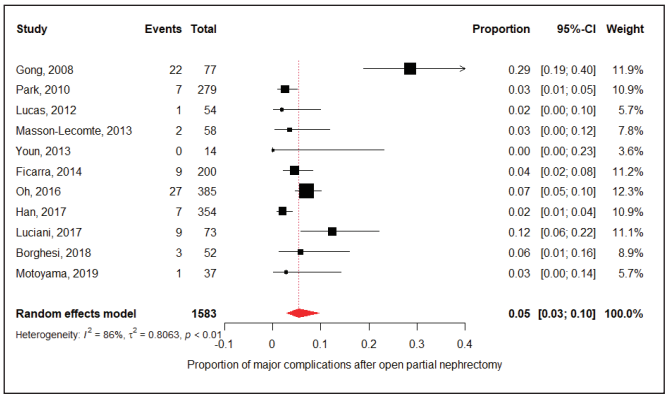


UP 5.7. Figure 2. Mean blood loss after laparoscopic partial nephrectomy.

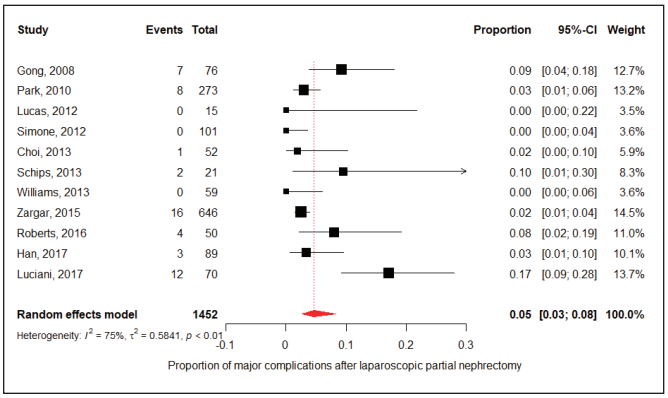
Conclusions: We present the best available estimates of mean blood loss and proportion of major complications after PN and thermal ablation in patients with SRMs.



UP 5.7. Figure 3. Mean blood loss after robotic partial nephrectomy.



UP 5.7. Figure 4. Proportion of major complications after open partial nephrectomy.



UP 5.7. Figure 5. Proportion of major complications after laparoscopic partial nephrectomy.