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MP-09.01

The Impact of Histopathological Subtypes on Clinical Outcomes for Surgically Treated Renal Cell Carcinoma: A Canadian Multi-Institutional Analysis

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Introduction and Objectives: Histological subtypes of renal cell carcinoma (RCC) have significantly different clinicopathological features; however, there is a paucity of literature regarding the prognostic value of histological cell type. We sought to examine the impact of histopathology on disease outcomes for RCC in a large, multi-institutional analysis.

Methods: The Canadian Kidney Cancer Information System (CKCis) database, including 14 Canadian institutional databases, identified 1625 patients with non-metastatic RCC who underwent surgical intervention with curative intent. Patients were stratified according to primary histology (clear cell, chromophobe, and papillary type I and II). The prognostic value of histological subtype on disease progression was evaluated with a multivariate Cox model adjusting for age, gender, tumour size, tumour grade and pathological stage.

Results: Of the 1625 patients, who met study criteria, there were 1316 (81%) patients with clear cell, 125 (8%) with chromophobe, 100 (6%) with papillary type I, and 77 (5%) with papillary type II histology. After a median follow-up of 1.9 years, 71.8%, 86.4%, 82.0%, and 77.9% of patients with clear cell, chromophobe, papillary type I, and type II RCC were free of disease, respectively. On multivariate analysis, histology was significantly associated with disease-free survival (DSS). When compared with clear cell histology, chromophobe RCC had a lower rate of disease progression (HR=0.38, 95% CI 0.15-0.95, p<0.05), and papillary type I RCC had a trend toward improved disease-free survival (HR=0.31, 95% CI 0.08-1.28, p=0.14). There was no significant difference in DSS between clear cell and papillary type II histology.

Conclusions: RCC histological subtype is independently associated with disease-free survival. Specifically, chromophobe RCC had the highest DSS. These differences highlight the unique biology of various tumour subtypes and may be used to help guide patient discussions and follow-up.

MP-09.02

Renal Artery Pseudoaneurysms after Nephron Sparing Surgery for Renal Cell Carcinoma: Incidence, Management and Functional Outcomes from Canadian Kidney Cancer Information System Database

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Introduction and Objectives: Renal artery pseudoaneurysms (RAP) after nephron sparing surgery (NSS) is associated with significant patient morbidity and requires aggressive management. We conducted this study to evaluate the incidence, management and functional outcomes of RAP after NSS. **Methods:** We retrospectively accessed the prospectively maintained Canadian Kidney Cancer information system (CKCis) database for 1066 patients who underwent NSS in 14 centres across Canada.

Results: Sixteen (1.5%) patients presented with RAP. Out of 628 open NSS and 421 laparoscopic or robot-assisted NSS, 8 patients each (1.27% and 1.9% respectively) presented with RAP. Mean patient age was 64.3 years (48.0-83.0), BMI 28.2 kg/m2 (18.0-35.0), tumour size 3.6 cm (1.5-8.0), operative time 167.8 minutes (125-221), estimated blood loss 318 ml (50 -1000) and warm ischemia time was 26.6 minutes (14-55). Eight (50%) patients had clear cell RCC, 4 (25%) had papillary, 2 (12.5%) had chromophobe and one (6.3%) each had mucinous spindle cell tumour and angiomyolipoma. Median duration of presentation from NSS was 15 days (IQR 11-34). Symptoms included hematuria in 7 (43.7%), hematuria with flank pain in 5 (31.3%), hematuria with flank swelling in 1 (6.2%), flank pain in 2 (12.5%) and hypotension in one (6.3%). Diagnosis of RAP was made through computerized tomographic angiography and all patients underwent successful selective embolization (Fig. 1). There was no recurrence up to a mean follow-up of 22 months (1-83). Blood transfusion was required in 4 (25%) patients. Mean serum creatinine levels prior to surgery and at latest follow-up were 89.6 µmol/L (50-144) and 96.2 µmol/L (57-162) respectively.

Conclusions: Délayed presentation in the form of RAP is a rare complication after NSS with overall incidence of 1.5%. Majority of patients present with hematuria. Angiography and selective embolization achieves a high success rate with low impact on overall renal function.



Figure 1. (A) Angiographic findings showing 2.3 cm pseudoaneurysm on one of the patient who underwent nephron sparing surgery for a 3.0 cm right upper pole renal mass. (B) Post coil embolization angiogram showing complete exclusion of pseudoaneurysm.

Fig. 1. MP-09.02.

MP-09.03

Positive Surgical Margins after Partial Nephrectomy for Renal Cell Carcinoma: Results from Canadian Kidney Cancer Information System Database

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Introduction and Objectives: To examine the predictors of positive surgical margin (PSM) after partial nephrectomy (PN) and its impact on oncological outcomes for renal cell carcinoma (RCC).

Methods: Prospectively maintained Canadian Kidney Cancer information system (CKCis) database was accessed for 1066 patients who underwent PN for RCC in 14 centres across Canada.

Results: Out of 1066 patients, 59 (5.5%) had PSM, 928 (87%) had negative surgical margin (NSM) and records of 79 (7.4%) patients were not available. Mean patient age and tumour size was 61 years (26-91) and 3.6 cm (1.1-9.5) in PSM group and 59 years (20-86) and 3.3 cm (0.5-16.2) in NSM group. Histopathology from PSM group revealed 37 (63%) patients as having clear cell RCC, 9 (15%) papillary, 5 (8%) chromophobe, 6 (10%) others and 2 (3%) as unclassified as compared to 552 (59%), 162 (17%), 54 (6%), 142 (15%) and 18 (2%) respectively from NSM group. PSM group had 5 (8%) grade 1, 28 (47%) grade 2, 16 (27%) grade 3 and 5 (8%) grade 4 tumours as compared to 127 (14%), 458 (50%), 207 (23%) and 27 (3%) respectively in NSM group. Four (6.7%) patients from the PSM group and 49 (5.3%) patients from the NSM group had local and/ or systemic progression of disease. There were two cancer related deaths in NSM group and none in PSM group. Fifty two (88%) and 861 (93%) patients were alive at mean follow-up of 18.5 (range 0-91.7) and 28.9 months (range 0-315.5) in PSM and NSM group respectively. On multivari-



Fig. 1. MP-09.03.

ate analysis; pathological stage T3 or higher (p=0.01) and Fuhrman grade 4 (p = 0.04) predicted presence of PSM whereas operative technique or tumour size did not. 5 year progression-free survival was not different in both groups (Fig. 1).

Conclusions: Results from the CKCis database suggest that PSM after PN are common but do not result in adverse oncological outcomes. Pathological stage T3 or higher and Fuhrman grade 4 may be associated with PSM on final pathological specimen.

MP-09.04

Contemporary Outcomes of pT3 Renal Cell Carcinoma: The Canadian Kidney Cancer Information System (CKCis) Data

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Introduction and Objectives: A large, multi-institutional analysis was undertaken to examine the pathological and oncological outcomes for patients with surgically treated pT3 renal cell carcinoma (RCC).

Methods: Institutional databases on patients, surgically treated for RCC, were obtained from 14 centres across 6 Canadian provinces forming the Canadian Kidney Cancer Information System (CKCis) database. Data was collected on 2204 patients and included patient characteristics, perioperative information, pathological and oncological outcomes.

Results: Of the 2204 patients, 498 (22.6%) patients had pT3 disease according to the 2009 TNM staging system. Mean pathological tumour size was 8.6cm. 89% of patients underwent a preoperative renal biopsy. 443 (89%) patients underwent a radical nephrectomy (RN) and 55 (11%) underwent a partial nephrectomy (PN). Of those treated with RN, 247 (55.8%) were open, 159 (35.9%) were laparoscopic and 1 (0.2%) was robotic. Of those treated with PN, 37 (67.3%) were open, 14 (25.5%) were laparoscopic and 4 (7.3%) were robotic. The average operative time was 184 minutes, with an average blood loss of 650cc. Of the pT3 lesions, 365 (73.3%) were pT3a, 97 (19.5%) were pT3b and 12 (2.4%) were pT3c. 109 (22%) patients had a metastatic diagnosis before or at the time of nephrectomy. Of the remaining 389 patients, 68.9% remained free of disease after a median follow-up of 1.3 years. Common sites of metastatic disease included lung, lymph nodes and bone (77%, 35% and 25%, respectively). Clear cell RCC was the predominant histopathology (74%). There were no perioperative (<30 days) mortalities. Complications were found in 14.1% of patients. Systemic therapy was initiated in 132 (26.5%) of patients, most commonly with Sunitinib in 106 (80%) patients. Conclusions: Locally advanced, pT3 renal cell carcinoma is an aggressive disease that is associated with high rates of metastatic disease. A significant proportion of surgically treated patients remained disease free at the time of follow-up.

MP-09.05

Long Term Survival in Metastatic Renal Cell Carcinoma Patients Undergoing Preoperative Sorafenib Therapy

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Introduction and Objectives: With phase III trials still ongoing the risks and benefits of preoperative targeted therapy (TT) for patients (pts) with metastatic renal cell carcinoma (mRCC) are unknown. There have been

case series published, but to date long term data is lacking. We report long term follow-up on a completed phase II trial of preoperative sorafenib (sora) for patients with mRCC.

Methods: Biopsy confirmed mRCC patients received 12 weeks (wks) of sora followed by cytoreductive nephrectomy (CN). Sora was restarted 6 wks post-CN and continued until progression. Primary endpoint was time to progression as per RECIST. Secondary outcomes included safety, feasibility, pathologic and radiologic response.

Results: In total, 19 patients were enrolled. Preoperative sora decreased overall and primary tumour burden in 74% of patients (mean 17%, range 1-62%). 17/19 pts had stable disease (SD); 1 had a partial response. 16/19 patients have progressed with a mean time to progression of 44 wks (F/U 112 wks). 8/19 patients are alive with a mean overall survival of 195 wks from trial start date. On uni-variate analysis, RECIST response was associated with survival (p=0.047). Five of 8 alive patients have progressive disease and are on secondary TT agents; the remaining 3 have SD despite being off TT for 230, 229 and 62 wks respectively (F/U 315, 292, 119 wks). These patients all demonstrated significant reductions in tumour blood volume (mean 84%) with near complete loss of primary tumour enhancement on CT. 1 near complete pathologic response was observed. Conclusions: Preoperative sora for patients undergoing CN is well tolerated and has the potential for significant long-term survival responses in select patients. This emphasizes the need for continued support of ongoing phase III trials. Genome-wide sequencing studies are underway to identify novel biomarkers predictive of survival given the varied response and lack of predictive clinical parameters. Moving forward, a personalized medical approach may be the adopted paradigm.

MP-09.06

Prediction of High versus Low Grade Disease in Patients with Small Renal Masses Using a Classification Tree

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Background and Objectives: High rates of benign and low grade disease have been reported postoperatively in patients with small renal masses (SRM), and these potentially unnecessary surgical treatments carry a substantial risk of morbidity. The preoperative prediction of benign disease remains a significant challenge for the urologist. Nomograms have been developed that predict both risk of malignancy and high grade disease. In our centre a classification tree was developed to preoperatively predict benign vs. malignant disease of SRM's with an accuracy of 89%. The objective of this study was to determine if a similar approach could be used to predict low vs. high grade disease.

Methods: 395 from our Institution underewent surgical resection of their renal mass. Age, sex, volume on preoperative imaging, tumour location



Fig. 1. MP-09.06

(central/peripheral), degree of endophytic component (1-100%), and tumour axis position were used to create and internally validate a classification tree. Fuhrman grade 1 and 2 were considered low grade while 3 and 4 were considered high grade.

Results: Using a classification tree approach with 395 surgical patients with SRM's a tree was developed that could predict low vs. high grade disease in small renal masses. Both tumour volume and endophytic component were predictive tree disease grade with a 72% accuracy (CI: 0.66-0.76) (Fig. 1).

Conclusions: A classification tree using tumour volume and percent of endophytic component was able to predict low vs. high grade disease. We believe that this classification tree is easier to use than nomograms as it mimics the clinician's thought process, thereby increase clinical utilization.

MP-09.07

A Contemporary Analysis of Patients Undergoing Laparoscopic Management of pT3 Renal Masses: A Canadian Multi-institutional Series

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Introduction and Objectives: Technological innovations and improved experience have resulted in advanced renal masses being treated by minimally invasive techniques. We report the oncological outcomes of patients with non-metastatic renal masses with vascular invasion (pT3) who were treated with laparoscopic nephrectomy (LN) and/or caval thrombectomy in a large, multi-institutional analysis.

Methods: Institutional databases on patients treated surgically for renal cell carcinoma (RCC) were obtained from 14 centres across 6 Canadian provinces forming the Canadian Kidney Cancer Information System (CKCis) database. Data were collected on 2204 patients and included patient characteristics, perioperative information, as well as pathological and oncological outcomes.

Results: Of the 2204 patients, 498 (22.6%) patients had pT3 disease according to the 2009 TNM staging system. 173 (35%) of these patients underwent laparoscopic management, and 135 (27%) did not have evidence of metastatic disease at the time of surgery. Mean patient age was 65 (range 35-88) with a higher propensity of male patients (n=87, 64%). Median tumour size was 6.5 cm (range 1-15 cm). The preoperative clinical stage ranged from cT1-cT4. Average blood loss was 266 ml (range 0-4000 ml) with a mean operative time of 146 minutes (range 73-360 minutes). The majority of lesions were clear cell RCC (68%). Of the pT3 lesions, there were no perioperative deaths (<30 days). After a median follow-up of 1.4 years, 31 (23%) patients developed metastatic disease, the vast majority being of pulmonary origin (97%). At the end of our follow-up period 130 (96%) patients were alive.

Conclusions: For properly selected patients, laparoscopic management of locally advanced renal masses yields acceptable oncological outcomes. Although encouraging, longer follow-up is required to further delineate its role.

MP-09.08

Inhibition of Pyruvate Dehydrogenase Kinase Increases Apoptosis and Reduces Proliferation and Angiogenesis in Renal Cell Carcinoma

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Introduction and Objectives: Renal Cell Carcinoma (RCC) exhibits a metabolic phenotype known as the Warburg Effect. This principle describes the preferential usage of cytoplasmic glycolysis (Gly) over mitochondrial glucose oxidation (GO), which provides several growth advantages to cancer including increased angiogenesis and decreased apoptosis. The small molecule Dichloroacetate (DCA) increases mitochondrial reactive oxygen species (mROS) and metabolites that can be used to regulate important targets like redox sensitive P53 and α -ketoglutarate (α -KG) sensitive hypoxia-inducible factor. The objective of this project is to assess the therapeutic benefit of DCA on RCC, a highly glycolytic cancer, by evaluating changes in proliferation, apoptosis and angiogenesis.

Methods: Human proximal tubule (PT) cells and a clear cell RCC line (786-O) were treated with 0.5 and 5mM DCA. Mitochondrial membrane potential ($\Delta\psi$ m) and mROS were assessed with TMRM and mitosox, respectively. Tumour proliferation and apoptosis were measured using the ki67 and TUNEL, respectively. Nuclear localization of P53 was detected by imaging. PDH activity and α -KG were measured using commercially available kits. Angiogenesis was assessed in-vitro by matrigel assay.

Results: RCC cells have more hyperpolarized $\Delta \psi m$ (TMRM, p<0.01) and less mROS (Mitosox, p<0.01) than PT cells. Treatment with DCA reversed these changes in the RCC line without significantly altering PT $\Delta \psi m$ or mROS. DCA increased PDH activity (p<0.05) and the Krebs' cycle metabolite α -KG (p<0.01). The nuclear localization of P53 increased with DCA (p<0.01), which was associated with decreased markers of proliferation (p<0.05), increased rates of apoptosis (p<0.05), and a decreased rate of growth in vitro. Supernatant, containing the angiogenic signals from RCC cells increased vascularity when placed on microvascular endothelial cells, which was blocked by DCA treatment (p<0.05).

Conclusions: DCA is a novel, inexpensive, oral agent that reverses the mitochondrial remodeling of RCC, thereby inhibiting the Warburg effect. Treatment with DCA decreases proliferation and angiogenesis while increasing apoptosis in a human RCC line.

MP-09.09

Management of Clinically Localized Stage T1 Renal Tumours in a Multicentre Canadian Cohort

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Methods: The Canadian Kidney Cancer Information System (CKCis) was queried retrospectively to determine the use of; active surveillance, focal ablation, nephron sparing surgery and minimally invasive surgical techniques for managing cT1 renal tumours. Descriptive statistics were performed to characterize practice patterns. Associations between patient, tumour, and hospital factors with management approaches were determined.

Results: From 1988 to 2013, 1464 patients were treated for cT1 renal tumours at 13 participating centres and had data entered in the CKCis database. Median follow-up time was 1.95 years. Median patient age was 62.4 years and 918 (63%) patients were male. Most patients (1055; 72%) were surgically treated, and the majority of those (718; 68%) received partial nephrectomy. Among the 934 (64%) patients with T1a tumours, 514 (80%) received partial nephrectomies performed, a minimally invasive

approach was used in 264 (51%) T1a tumours, compared to 34 (23%) T1b tumours. A minority of patients received radiofrequency ablation (45; 3.1%), cryoablation (6; 0.4%), and active surveillance (95; 6.5%). Unadjusted analysis indicate a lower relative risk of partial nephrectomy performed for clinical T1 tumours; using minimally invasive versus open surgical approach (RR 0.66 95% CI 0.60-0.71), in the presence of renal disease (RR 0.46 95% CI 0.30-0.70), and for stage T1b versus T1a tumours (RR 0.56 95% CI 0.49-0.63).

Conclusions: A high proportion of patients with cT1 renal tumours receive nephron sparing surgery via minimally invasive techniques at Canadian academic centres.

MP-09.10

Developing a Patient-derived Xenograft Model Using Chicken Embryos to Predict Targeted Therapy Tumour Resistance in Renal Cell Carcinomas

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Introduction and Objectives: Approximately 30% of patients with metastatic renal cell carcinoma (RCC) will have primary resistance to targeted agents. The remainder will develop resistance over a longer time course. Our aim was to develop a patient-derived xenograft model to determine the sensitivity of each RCC patient's tumour cells to a defined targeted therapy prior to the start of systemic therapy.

Methods: We developed a patient–derived xenograft model using chicken embryos. Seven patient-derived primary RCC cell lines were implanted into the chorioallantoic membrane (CAM, N>15/cell line) to assess the effect of sunitinib on tumour take ratios. Three of these cell lines are sensitive to sunitinib (XP206, XP158, XP185) and four are resistant to sunitinib (XP127, XP121, XP258, PF22), as determined previously in murine models. A secondary cell line that is sensitive to sunitinib (786-0) was also implanted as a control. Each cell line was implanted into the CAM of day-9 chicken embryos. To evaluate sunitinib sensitivities in vivo, chicken embryos were divided into two groups: one treated with sunitinib and one with vehicle. Intravital imaging was performed to assess tumour size. Tumour take rates were determined 6–8 days post implantation.

Results: Using the 786-0 cell line, tumour take rates were 82% in vehicles compared to 46% in sunitinib treated tumours. Using the 7 patient derived RCC cell lines, decreased tumour take rates were observed in sunitinib-sensitive cell lines treated with sunitinib, when compared to their controls (Table 1). Tumour xenografts underwent extensive angiogenesis as observed by IV injection of Dextran-Alexa555 (10 kDa; Fig. 1).



Fig. 1. MP-09.10.

Conclusions: We believe our patient-derived xenograft model could be a useful tool for drug sensitivity evaluation, allowing to potentially individualize targeted treatments to each patient with metastatic RCC prior to systemic therapy. Further studies will be performed with other drugs used in the treatment of RCCs.

MP-09.11

Renal Nephrometry Score and Predictors of Outcomes in Partial Nephrectomies

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Introduction and Objectives: Feasibility of partial nephrectomy extends beyond clinical tumour size. We analyze patient characteristics and anatomic tumour factors to determine variables associated with surgical outcomes following partial nephrectomy.

Methods: Retrospective review of patients who underwent partial nephrectomy between January 1, 2012 and August 31, 2013. The R.E.N.AL. Nephrometry score (maximum radius for tumour size, exophytic/endophytic tumour, nearness of tumour to collecting system/sinus, anterior/ posterior descriptor, tumour location relative to polar line) was applied to each preoperative scan. Standardized grading systems and statistical analysis were applied.

Results: Eighty-eight patients (74 laparoscopic) underwent partial nephrectomy. Twenty-one patients (24%) had 28 complications; 8 were Clavien-Dindo grade 3-4. Four laparoscopic patients had intraoperative conversions to either open partial or laparoscopic radical nephrectomies. Forty-seven (53%) of operated patients were obese, morbidly obese, or super obese. Fifteen (17%) patients had pathologic oncocytomas or angiomyelipomas. In univariate analysis Charlson comorbidity score ($\geq 6 p=0.003$), diabetes (p=0.020), age ($\geq 70 p=0.020$), obesity (BMI $\geq 30 p=0.021$) and total Nephrometry score (high p=0.025) were associated with complications. Nephrometry score correlated with warm ischemic time (WIT) in laparoscopic cases (low 26 min [SD +/-12], intermediate 31 min [SD +/-7], high 34 min [SD +/-14]) and absolute change in estimated glomerular filtration rate (low -5 [+/-16], intermediate -12 [+/-20], high -12 [+/-25]).

Conclusions: Categorizing renal masses according to the Nephrometry score may help us council patients towards expected WITs, complication rates, and predicted renal function outcomes. This is increasingly important most of our patients are either obese, elderly, or have significant comorbidities; all of which have been shown to be associated with increased complication rates.

MP-09.12

Short-term Outcome of Metastasectomy in Renal Cell Carcinoma: The Canadian Kidney Cancer Information System Initial Experience

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Introduction: Metastasectomy (M) is an acceptable treatment option for selected patients with Metastatic renal cell carcinoma (mRCC). Our aim was to evaluate the effect of surgical resection (SR) of metastasis on disease recurrence and survival.

Methods: Using the Canadian Kidney Cancer Information System (CKCis), we identified patients who underwent surgical resection of mRCC. We evaluated the histological features of the primary renal cell cancer (RCC), the sites of metastasis and whether M was complete or incomplete. The use of systemic therapy (ST) before or after M and its impact on the outcome of SR was evaluated. Kaplan Meier analysis was performed to assess the metastasis-free survival (MFS) for patients who underwent complete SR.

Results: Out of 624 patients with mRCC, 127 patients underwent SR of their mRCC. The mean age at the time of M was 62 (range 26-87) years. The median time (IQR) in years between diagnosis of RCC and mRCC was 1.46 (0-4.5) and between the diagnosis of mRCC and M was 0.15 (0-0.4). The median follow-up (FU) duration was 1.5 (IQR 0.6-3.4) years. The majority of our patients (64%) had clear cell carcinoma histology. The most common site of M was lung, bone, brain and adrenal gland. Nineteen (15%) patients had ST before, 59 (46%) after surgery, and 49 (39%) did not receive any ST. Sixty- eight (54%) patient had complete resection and 20 (16%) patients had unknown resection status. Complete SR was achieved in 13 (68%) patients who had initial ST and in 55 (51%) patients with no prior ST. Twenty-five (20%) patients developed a new site of metastasis during follow-up, (23%) with incomplete resection and 19% with complete resection.

Conclusions: SR of metastasis should be contemplated when feasible in order to increase cure rate in mRCC. ST prior to M could increase the rate of sNED. A larger patient population and longer follow-up is needed to draw firm conclusion.

MP-09.13

Surgeon-specific Factors Affecting Treatment Decisions in the Management of Small Renal Cancers

Millman, Alexandra; Pace, Kenneth; Ordon, Michael; Lee, Jason Y. St. Michael's Hospital, University of Toronto, Toronto, ON, Canada Introduction and Objectives: Majority of small renal masses (SRM) are now detected incidentally. Both patient- and disease-related factors affect treatment decisions greatly however, with multiple treatment options available, surgeon-specific factors may also play a role. We aim to determine the impact of surgeon-specific factors on treatment decisions in the

management of SRM in Canada. **Methods:** An online survey was distributed, via email blast, to registered CUA members (n=632) and involved the collection of demographic data, clinical practice details, and respondent recommendations for six index patients with a SRM, all of various ages (51-80 years), medical comorbidities, and renal function.

Results: A total of 110 urologists responded (17% response rate); 51% were <45 years of age, 18% were >64 years old. Approximately half (45%) were academic urologists, 21% had completed an oncology fellowship, 6% reported a personal history (PMHx) of cancer and 16% had a 1st degree relative die of cancer. With increasing age and co-morbidity of the index patient, AS and thermal ablative therapies were more often selected as the recommended treatment option. Older respondent age correlated with a non-academic practice (p<0.001), a PMHx of cancer (p<0.001), and more "aggressive" management of the 2 index cases (C5 & C6) involving octagenarians (p<0.01). A PMHx of cancer also correlated with an increased likelihood of performing surgery on patients C5 & C6 (p<0.04). Academic urologists were less likely to offer aggressive treatment (surgery) for patients C5 & C6, and whenever surgery was offered to any patient, it was more likely to be an MIS technique (p<0.005).

Conclusions: There are various factors that influence the management options offered to patients with SRMs. The surgeon's age, PMHx of cancer, practice-type and other surgeon-specific variables may impact treatments offered across Canada.

MP-09.14

Patients with T2B Renal Cell Carcinoma Have no Difference in Survival when Treated with Radical or Partial Nephrectomy: Analysis of the SEER Database

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Introduction and Objectives: The implementation of partial nephrectomy for renal masses has been increasing over recent years. Although these surgeries were originally performed on patients with multiple tumours and then for small renal masses, there have been reports of PN for T2B lesions. **Methods:** SEER-18 registries database was queried for all patients ≥20 years of age, with primary renal tumours treated surgically with either RN or PN between the years 2004-2010. Only patients with N0M0 dis-

ease were included in analysis. Those with unknown tumour size, or histology were excluded from analysis. Patient demographics and tumour characteristics were compared using Chi-square analyses. Overall and Cancer-specific survival was compared between groups using Kaplan-Meier LogRank analyses.

Results: There were 75 and 2077 patients treated with PN and RN, respectively. Between the cohorts there was no difference seen in patient demographics or tumour characteristics. Mean survival was 36 and 34.8 months for RN and PN, respectively. In addition, 5-year OS was 78.6% and 78.3% for RN and PN, respectively. There was no difference seen in OS or CSS between PN and RN (p=0.65 and p=0.9, respectively).

Conclusions: PN appears to be a valid treatment option for patients with large (T2B) renal masses. There is no difference seen in CSS or OS after close to 7 years. Although PN is a more complicated operation, especially in larger masses, it may be a more optimal treatment for select patients that may benefit from a nephron-sparing approach.

MP-09.15

Robot-assisted versus Laparoscopic Nephroureterectomy for Upper Tract Urethelial Cancer: A Population-based Assessment of Costs and Perioperative Outcomes

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Introduction and Objectives: The safety and feasibility of robot-assisted radical nephrouretectomy (RANU) for treatment of upper tract urothelial carcinoma (UTUC) remains debated. We sought to compare short-term outcomes and expenditures between RANU and laparoscopic radical nephroureterectomy (LNU) in a large population-based cohort of patients with UTUC.

Methods: Overall, 1,914 patients with UTUC treated with RANU or LNU between 2008-2010 within the Nationwide Inpatient Sample were abstracted. Propensity score matching was performed to account for inherent differences between patients undergoing RANU and LNU. Multivariable logistic regression models adjusted for clustering were fitted to compare postoperative complications, blood transfusions, prolonged length of stay, and expenditures between the two procedures.

Results: Overall, a weighted estimate of 1,199 (62.6%) and 715 (37.4%) patients received LNU and RANU, respectively. In multivariable analyses no significant differences were observed in postoperative transfusion and length of stay between the two surgical approaches (all p>0.1). However, patients undergoing RANU were less likely to experience any postoperative complications compared to their counterparts undergoing LNU (p=0.04). The utilization of RANU was associated with substantially higher expenditures compared to the laparoscopic approach.

Conclusions: Our results support the safety and feasibility of RANU for the treatment of UTUC. Indeed, the use of the robotic approach was associated with lower probability of experiencing postoperative complications compared to LNU. On the other hand, the utilization of RANU is associated with higher expenditures compared to LNU.

MP-09.16

Measuring the Impact Medical Prognostic Factors for Renal Functional Decline Following Radical Nephrectomy and Nephron-sparing Surgery for Renal Cell Carcinoma

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Introduction: The risk factors for medical chronic kidney disease (CKD-M) are well established, however, the impact of such factors in a conjunction with surgical chronic kidney disease (CKD-S) have been the source of recent debate. The goal of our study was to identify risk factors for renal functional decline following extirpative renal surgery, and to establish the impact of these factors on glomerular filtration rate (GFR) reduction. **Methods:** We present a retrospective cohort study of 344 consecutive

patients who underwent surgery for a renal mass at a tertiary care centre between 2002 and 2010. Patients were grouped by radical nephrectomy (RN) or partial nephrectomy (PN) and baseline characteristics were compared. Renal function was estimated by the Modification in Diet and Renal Disease (MDRD) formula. Multivariate linear regression was used to identify independent predictors of renal function.

Results: 120 patients were treated with PN and 224 with RN. Mean age was 60.9 yr for PN and 62.6 yr for RN. Mean tumour size was 2.9 cm for the PN group and 6.2cm for the RN group. Multivariate analysis identified radical nephrectomy, preoperative GFR and Diabetes Mellitus (DM) as independent predictors of 1 year postoperative renal function. Patients undergoing RN had a mean decrease in GFR of 20.7 mL/min/ 1.73 m² (95%CI 18.1- 23.3) compared to those undergoing PN. For each unit elevation in preoperative GFR, postoperative GFR was elevated by 0.66 mL/min/1.73 m2 (95%CI 0.60-0.71). DM impacted a postoperative GFR decline by 3.6 mL/min/1.73 m2 (95% CI 0.7 -- 6.6).

Conclusions: Pre-op GFR, type of surgery and DM were independent predictors of postoperative renal function. While our findings support nephron-sparing surgery for patients with chronic kidney disease, the value of nephron-sparing approaches in diabetic patients may be even greater.

MP-09.17

Zero Ischemia Robotic Partial Nephrectomy in Alberta: Initial Results of a Novel Approach

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Introduction and Objectives: Partial nephrectomy developed as a standard of care treatment for organ-confined small renal masses with the goal of preserving all possible renal function through sparing unaffected kidney. The most recent advancement to further preserve renal function in these patients is to perform the surgery with 'zero ischemia' (with or without segmental vessel clamping); the rationale being that minimizing warm ischemia time prevents nephron loss. This study reviews outcomes of the initial series of zero ischemia robotic partial nephrectomy cases performed at our institution.

Methods: A retrospective review of all patients undergoing zero ischemia partial nephrectomy by a single surgeon at our site. Preoperative data was collected including age, gender, co-morbidities (Charlson index), tumour side, location & size. Pathology including Fuhrman grade & margin status was reviewed. Outcomes examined include changes in pre- and post-op hemoglobin & creatinine, blood loss, OR time, length of stay, transfusion rate and 90 day complications.

Results: Twenty-one patients underwent zero ischemia robotic partial nephrectomy at our tertiary care centre between January 2012 and June 2013; all cases were successfully completed without hilar clamping. Average tumour size was 3.1cm (16 T1a, 5 T1b). Average OR time was 153 min while length of stay averaged two days. Mean estimated blood loss was 158 mL and average hemoglobin drop was 18 g/L. No patients required transfusion. Average increase in creatinine post-op was 7.4 µmol/L. There were 3 90-day complications (ER visits, no re-admission); one Clavien grade II and two Clavien grade I. No recurrences with a mean follow-up of 320 days.

Conclusions: Żero ischemia partial nephrectomy is a novel approach for the purpose of maximizing preserved renal function. While longer follow-up & larger studies are needed; our study shows this technique to be feasible at our institution with generally favourable results.