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POD-2.01

Identification of factors predicting a loss of renal differential function on the operated kidney after laparoscopic partial nephrectomy

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Introduction and Objective: Partial nephrectomy (PN) is now the gold standard for small renal mass of less than 4 cm since it prevents renal insufficiency that may occur with radical nephrectomy. The impact of WIT on the operated kidney's renal differential function (RDF) has been poorly studied in the literature, especially when WIT is less than 30 minutes. We evaluated the effect of WIT and other perioperative factors on RDF function assessed by pre- and postoperative renal scintigraphy.

Materials and Methods: Between 2003 and 2008, 182 laparoscopic PN were performed by a single surgeon on patients with 2 kidneys. Among those, 56 had a MAG3-lasix renal scintigraphy pre- and postoperatively between 7 and 14 days. Data were collected prospectively. Loss in RDF is calculated as follows: loss in RDF = (RDF preoperatively – RDF postoperatively/RDF preoperatively) × 100.

Results: Medians for age, preoperative creatinine, preoperative GFR (Cockroft formula) and tumour CT size were 61 years, 83 μM, 83.2 mL/min and 26 mm, respectively. Median WIT and preoperative RDF were 30 minutes and 50%. Median loss of RDF after surgery was 24%. In multivariate analysis, low preoperative RDF, WIT and intrarenal location of the tumour were associated with a statistically significant loss of RDF ($p < 0.05$). Age, preoperative GFR, tumour CT-size, diabetes and HTN did not predict loss in RDF. Fitting the relative RDF loss versus WIT to a polynomial curve suggests that the rate of loss in RDF increases with WIT. The point of inflection of the polynomial curve (reflecting the maximal change in rates of loss in RDF) was estimated to be at 32 minutes. Linear regression curves show that loss in RDF rate is 0.8% per minute when WIT is less than 32 minutes and 1.3% per minute when WIT is more or equal to 32 minutes.

Conclusion: We show a WIT of less than 32 minutes optimizes the chances of preserving RDF of the operated kidney and that the rate of loss in RDF is higher above 32 minutes. Finally, higher loss in RDF must be expected if patient has a low preoperative RDF and intrarenal location of the tumour.

POD-2.02

Factors influencing shock wave lithotripsy (SWL) success: toward a clinical nomogram

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Introduction and Objective: Success rates for shock wave lithotripsy (SWL) vary from 60% to 90% and are dependent on both patient and stone-related factors. Unfortunately, no algorithm currently exists which accurately predicts SWL success. We retrospectively analyzed patient and stone factors to develop a comprehensive nomogram to predict SWL outcome before treatment.

Materials and Methods: Data from all patients treated at the St. Michael's Hospital Lithotripsy Unit from May 1, 2004, to June 30, 2008, was reviewed. We restricted analysis to patients with a noncontrast CT scan conducted at our centre within 72 days of treatment demonstrating a solitary renal calculus 20 mm or smaller, and who returned to our centre for follow-up. Follow-up was conducted 2 weeks and 3 months after SWL. Success was defined as patients who were stone-free or had asymptomatic, clinically insignificant residual fragments 4 mm or smaller after a single SWL treatment. Demographic, stone, patient, treatment and follow-up data were collected from a prospective database and review of CT and KUB imaging by 2 independent urologists.

Results: Data from 268 patients were analyzed. Mean stone size was 80.8 (standard deviation [SD] 80.5) mm^2, mean body mass index (BMI) was 27.3 (SD 6.1) and 45.5% of stones were in the lower calyx. The single treatment stone-free and success rates at 3 months were 50.2% and 67.8%, respectively. On univariate analysis, predictors of SWL success were: stone attenuation less than 1000 Hounsfield Units (HU) ($p = 0.027$), skin-to-stone distance (SSD) less than 105 mm ($p < 0.001$), stone area 100 mm^2 or less ($p = 0.003$), maximal stone length ($p < 0.001$), BMI less than 35 ($p < 0.001$) and presence of stent ($p = 0.018$). On multivariate analysis, any measurement of stone size and skin-to-stone distance remained as significant predictors of SWL outcome ($p < 0.005$ for all). Age, gender, side and presence of hydronephrosis did not predict outcome. Patients with favourable parameters (area ≤ 100 mm^2, SSD < 105 mm, and HU < 1000) had a success rate of 82.7% versus. 43.2% for those with unfavourable parameters in all 3 (OR 6.25, $p < 0.001$).

Conclusion: We have identified several patient and stone parameters that can predict SWL outcomes. These data can be used to provide accurate single-treatment success rates for SWL tailored to a clinical situation, and will aid both urologists and patients in the choice of optimal stone treatment.

POD-2.03

Are all ureteric colics stone-induced?

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Introduction and Objective: Ureteric colic is a common emergency presentation of renal stone disease. However, other causes of ureteric obstruction resulting in colic have to be considered in the differential diagnosis. Eosinophilic and idiopathic segmental ureteritis causes ureteric obstruction due to mural involvement. Both conditions can present acutely with pain mimicking ureteric colic and demonstrate hydronephrosis and hydrureter on imaging. Increased awareness of these intramural conditions will increase diagnostic accuracy.

Materials and Method: Data were prospectively collected on 276 consecutive cases of first presentation emergencies with "ureteric colic" admitted between July 2006 and Decenber 2007. Patients with known stone disease were excluded from this study. All patients had renal tract imaging with IVU (98) and noncontrast CT (178). Serum renal function, inflammatory parameters, serum calcium and urate levels were evaluated. All patients requiring surgical intervention underwent retrograde studies and ureteric stenting in the first instance followed by ureteroscopic assessment in the following sitting.

Results: There were 172/276 (62.5%) patients who were managed conservatively with analgesia and α blockers. ESWL was offered to 20/276 (7.0%) patients. Surgical intervention was required in the case of 84/276 (30.4%). During retrograde studies there was convincing evidence of ureteric calculi in 72/84 (85.7%) with radiological suspicion of luminal obstruction from intramural pathology in 12/84 (14.2%). Of the 12 biopsies performed, 3 were reported as transitional cell carcinoma, 4 as eosinophilic ureteritis and 5 as idiopathic ureteritis. The group of 9 patients reported as ureteritis, all were given courses of oral antihistamines ± corticosteroids and had repeat ureteroscopies ± holium lazaertripsy. Inflammation settled in 6/9 patients and they are now stent-free whereas 3/9 patients are still requiring further URS evaluation ± ureteric stenting.

Conclusion: In conclusion, we can say that soft tissue lesions of the ureter can present atypically as acute colic with radiological signs of obstruction. Careful ureteroscopic assessment is required to rule of

malignancy. Ureteric inflammation can persist protractedly and needs endoscopic as well as radiological monitoring.

POD-2.04

A randomized trial of intercostal nerve block following PCNL (percutaneous nephrolithotomy)

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Introduction and Objective: The aim of this study was to find an efficient and inexpensive method to reduce postoperative pain and length of hospital stay after PCNL. We sought to examine the effects of intercostal blockade after PCNL versus no intercostal blockade.

Materials and Methods: Forty-three (of a preplanned sample size of 70) patients scheduled to undergo PCNL were enrolled and randomized to either have intercostal blockade with 20 mL of 0.5% bupivicaine with epinephrine (group 1) or 20 mL placebo saline solution (group 2). All patients received intravenous narcotic patient-controlled analgesia (PCA) postoperatively. Data was collected on analgesic usage, length of stay and health-related quality of life (HRQL) as assessed by the Postoperative Recovery Scale (PRS, a modification of the SF-36 that includes visual analog assessments of pain). Data were analyzed with χ^2, ANOVA and repeated-measures ANOVA where appropriate according to our preplanned blinded interim analysis.

Results: Forty-three patients: 24 males (55.8%), with a mean age of 47.79 (SD 1.75) and mean BMI of 27.29 (SD 0.8) were enrolled between January 2004 and October 2008. There were no differences between the groups at baseline. There was no difference in PCA narcotic usage between the 2 groups (69.4 v. 66.8 mg morphine equivalent, $p = 0.810$). The HRQL scores were significantly higher in group 2 ($p = 0.05$). There was a trend to less postoperative pain in group 2 ($p = 0.058$).

Conclusion: Intercostal blockade significantly reduces severity of pain and appears to improve QOL in the immediate postoperative period. It is an easy, safe and inexpensive method that could be used following PCNL.

POD-2.05

Renal functional outcomes following percutaneous and laparoscopic cryoablation of small renal masses

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Introduction and Objective: Extirpative surgery for renal masses, including radical nephrectomy and partial nephrectomy, significantly affects global renal function. Cryoablation of renal masses has demonstrated safety and oncologic efficacy. However, renal functional outcomes after cryoablation of small renal masses have not been widely scrutinized. We report intermediate-term renal functional outcomes from a single centre, in patients treated with laparoscopic or percutaneous cryoablation for small renal masses.

Materials and Methods: We performed a retrospective review of our laparoscopic renal cryoablation (LRC) and percutaneous renal cryoablation (PRC) experience. Fifty-eight patients were treated between 1/2003 and 4/2007. Patients with at least 6 months follow-up were included in the analysis. LRC was performed using 3- or 4-port transperitoneal approach. PRC was performed with CT guidance under conscious sedation. Follow-up consisted of imaging and laboratory studies. Global renal function was assessed at least 3 months posttreatment using serum creatinine and estimated GFR (MDRD equation). Chronic kidney disease (CKD) was defined as eGFR less than 60 mL/min/1.73m^2.

Results: Fifty-eight patients (41% female:59% male, 43% black:57% non-black, mean BMI 29) underwent either LRC ($n = 38$) or PRC ($n = 20$) with a mean follow-up of 27 (range: 7–60) months. Average patient age was 68.8. Mean tumour size was 2.32 (range 1–4.6) cm. Comorbid conditions were prevalent: 77% HTN, 41% HLD, 26% DM, 40% tobacco use and 34% heart disease (CAD/CHF). There were no statistically significant differences between the LRC and PRC groups with respect to age, race, sex, HTN, HLD, DM, pretreatment CKD, tobacco use, heart disease, or tumour size (Student *t* and Fisher exact tests). Preoperative CKD was noted in 15 of 58 (26%) patients. Postoperative CKD was noted in 26 of 58 (45%) patients. *De novo* CKD was noted in 11 of 43 patients (25%) at least 3 months after treatment. Incidence of *de novo* CKD after LRC was 29%, compared with 17% after PRC ($p = 0.70$).

Conclusion: In spite of minimally invasive, nonextirpative treatment of small renal masses, *de novo* CKD was noted in 25% of patients, with mean follow-up greater than 2 years. Comorbid conditions were prevalent and likely contributed to the high incidence of *de novo* CKD.

POD-2.06

Outcomes of laparoscopic partial nephrectomy: the McMaster University experience

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Introduction and Objective: Laparoscopic partial nephrectomy remains one of the more challenging procedures in urology. Minimizing warm ischemia time and bleeding requires efficient intracorporeal suturing. In addition, achieving negative surgical margins requires complete excision of the tumour. We report a large Canadian series of laparoscopic partial nephrectomy with intermediate follow-up.

Materials and Methods: Between September 2000 and August 2008, 152 consecutive laparoscopic partial nephrectomies were performed at our centre. Demographic, pathological and clinical data were collected through a retrospective review of the charts.

Results: The average tumour size was 2.68 (range 0.5–8.8) cm. The vast majority of tumours were malignant (80%). All margins were negative except for 2 patients who underwent an immediate re-resection. There were no local recurrences or distant metastasis during the follow-up period of 44.3 months. The majority of procedures required hilar clamping (93.4%) with a mean clamp time of 34 (range 7–58) minutes. 19.7% of the procedures required an intraoperative pelvicalyceal repair. Five procedures were converted to laparoscopic radical nephrectomy, 10 converted to a hand-assist procedure and 1 was converted to an open partial nephrectomy. The average blood loss was 162 mL. Complications related to the procedure included 1 urine leak, which required stenting, and 2 pseudoaneurysms requiring embolization. The average drop in GFR as calculated by the MDRD equation between preoperation and 2.5 months postoperation was 8.6 mL/min/1.73m^2.

Conclusion: Laparoscopic partial nephrectomy is a challenging procedure that requires advanced laparoscopic skills. Laparoscopic partial nephrectomy is feasible with excellent oncological outcomes, and an acceptable complication profile. Short-term impact on overall renal function is minimal. The most common postoperative complication was pseudoaneurysm requiring embolization, reinforcing the intraoperative need for meticulous and quick suture-ligation of blood vessels during LPN.

POD-2.07

Systematic laparoscopic partial nephrectomy: experience from 309 cases

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Introduction and Objective: Laparoscopic partial nephrectomy (LPN) has been developed as a minimally invasive technique with excellent results when compared with open partial nephrectomy (OPN). However, most patients are chosen based on the tumour characteristic as to get an OPN, LPN or radical nephrectomy. This has led to a selection bias in the favour of LPN for outcomes. We report our experience where all patients candidate for partial nephrectomy in the region of Québec were referred systematically to 2 urologists that almost systematically performed laparoscopic approach.

Materials and Methods: From 2003 to 2008, all patients at Laval University that were candidates for a partial nephrectomy were referred to 2 urologists with expertise in laparoscopic partial nephrectomy. Three-hundred nine patients were scheduled for a LPN. Ten patients had an OPN, 1 for a single kidney and others for bilateral tumours or patient preference. One hundred forty-two LPN were performed by retroperitoneal approach

while 167 were performed by transperitoneal approach. Twenty LPN were performed on single functional renal units. Data were collected retrospectively.
Results: Average age, BMI, and CT-tumour size were 59.3 (standard deviation [SD] 11.3) years, 28.4 (SD 11.5) kg/m^2 and 3.0 (SD 1.3) cm. Forty-one percent of patients were female and 38% had a previous surgery or pathology increasing intra-abdominal adherences. Seventy-nine LPN were performed for renal tumours larger than 4 cm. Operating time, warm ischemia time, OR bleeding, positive margin rate and conversion rate were 122.0 (SD 34.2) minutes, 26.5 (SD 9.6) minutes, 164.6 (SD 251.8) mL, 2.3% and 1.3%, respectively. Median and average hospital stay to discharge home were 3 and 3.9 days. Histological tumour type was clear cell, papillary, chromophobe carcinoma in 52%, 18% and 8% of cases, while oncocytoma and angiomyolipoma were ressected in 8% and 5%. Seventy-eight, 12%, 3% and 7% of tumours were pathological stage pT1a, pT1b, pT2 and pT3a, respectively. The urological complication rate was 20.9%. The most frequent complications were urinary leak in 9% (clinical or subclinical). Average follow-up was 21.0 months and 99% of patients were free of recurrence.
Conclusion: When done systematically, LPN has a high success rate and low morbidity. This reinforces the importance of being able to approach the tumours by both transperitoneal and retroperitoneal laparoscopic approaches.

POD-2.08

Laparoscopic partial nephrectomy for cT1b (4–7 cm) renal masses: a new surgical paradigm

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Introduction and Objective: Laparoscopic partial nephrectomy (LPN) is frequently used for the management of cT1a (< 4 cm in diameter) renal masses. While data on safety and long-term oncological outcomes of LPN for T1a (< 4 cm) tumours is widely available, it is lacking for T1b lesions. We report the experience with laparoscopic partial nephrectomy for T1b (4–7 cm) renal masses from 2 Canadian tertiary centres.
Materials and Methods: This is an institutional ethics board–approved retrospective review of 56 consecutive patients who underwent an elective LPN for cT1b renal masses from March 2003 to November 2008 performed by 3 different surgeons. Demographic, clinical, pathological, and radiographic data were evaluated.
Results: Mean patient age was 60.3 years (53.6% male) and mean BMI was 29.6. Mean tumour size was 4.9 (4–7) cm. The mean surgical time was 149.6 minutes, and the mean estimated blood loss was 313.2 mL. The mean warm ischemia time was 29 minutes. Four (7.1%) cases required conversion to open surgery. No cases were converted to total nephrectomy. Six (10.7%) patients experienced low-grade intraoperative surgical complications. Seven (12.5%) patients developed a urine leak postoperatively that was managed with a ureteric stent. One (1.8%) patient developed a retroperitoneal hematoma that was managed conservatively. Surgical margins were positive in 1 (1.8%) patient. The median hospital stay was 4 (1–17) days. At a mean follow-up time of 17 (0.5–62.5) months, there was no statistically significant difference between preoperative and postoperative estimated glomerular filtration rate ($p = 0.113$), systolic ($p = 0.386$) and diastolic arterial blood pressure ($p = 0.653$)
Conclusion: Laparoscopic partial nephrectomy is a feasible option for the management of 4- to 7-cm renal masses. To the best of our knowledge, this is the largest series reported to date. This series demonstrates that this procedure, although technically challenging, has acceptable midterm surgical and oncological outcomes with no impact in renal function. Long-term assessment of oncological outcomes is required.