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UP-088

Obesogenic Profile of Contemporary North American Renal Stone Patients

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Introduction and Objective: Obesity, defined by most studies according to body mass index (BMI), is linked to increased rates of renal stone (RS) formation and treatment failures. BMI has inherent limitations as a measure of obesity and fails to account for fat distribution, a more accurate predictor of morbidity. Patterns of fat distribution may affect the success of extracorporeal shockwave lithotripsy (ESWL), since peripheral adiposity tissue increases the skin-to-stone distance more than does visceral adipose tissue (VAT). The objective of this study was to characterize the fat distribution and metabolic hormonal milieu in a cohort of RS patients.

Methods: 113 patients (73 male; 40 female; mean age 54 years) undergoing treatment for RS between November 2009 and June 2010 at one center were prospectively enrolled; 81 met inclusion for BMI analysis and 63 for %VAT. CT scans were analyzed for visceral and subcutaneous adipose tissue volumes from axial slices at 3 fixed levels (L2 vertebral body, umbilicus and anterior superior iliac spine) using commercial software (Clear Image Demo). Adipose tissue was defined as -250 to -30 Hounsfield Units. The ratio of visceral to total adipose tissue (%VAT) was calculated and BMI data collected. Adiponectin and leptin levels of fasting serum samples were measured by ELISA.

Results: 28% of patients had BMI within the normal range (<25kg/m^2), while 32% were overweight (25<BMI <29.9kg/m^2), 21% obese (30.1 <BMI <35kg/m^2) and 19% morbidly obese (BMI >35 kg/m^2). Mean BMI was 30. 54% of females and 32% of males were obese or morbidly obese (BMI >30). Mean %VAT was 47.7 and 29.71 for males and females respectively (p<0.001), indicating relatively higher visceral adiposity in males, and peripheral adiposity in females. Mean levels of adiponectin and leptin were 7.67 and 17.50 respectively (normal values 10 µg/mL and 10 ng/mL respectively).

Conclusion: In this cohort of RS patients, males had a higher proportion of visceral adiposity than females (%VAT 47.7 vs 29.71), while more females were obese or morbidly obese according to BMI. The gender differences in fat distribution may affect ESWL success; obese females have more peripheral adiposity, increasing the skin-to-stone distance and, consequently, the probability of ESWL failure. Mean serum levels of adiponectin and leptin indicate that these RS patients are at risk of obesity-related metabolic disorders and higher perioperative complication rates. These associations should be further investigated in a larger multi-center cohort.

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Structured Electronic Operative Reporting: Comparison of Completion Rates with Dictation for Kidney Cancer Surgical Procedures

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Introduction and Objective: Management of chronic medical conditions, particularly cancer, requires complex information management to enable high quality assessment of large quantities of data from multiple sources, consistent management decisions, and report generation. We have developed and adopted an online, point-of-care (POC) clinical documentation tool, *eCancerCare*^{Kidney} (*eKidney*) for kidney cancer patient care. Clinicians directly enter patient data electronically into a database at POC with user-friendly structured templates and clinically relevant terminology with automatically generated reports (Figure 1). The purpose of this study was to evaluate the completeness and timeliness of kidney surgery operative reporting using *eKidney*, compared with standard dictation.

Methods: The optimal components of a complete operative record for partial and radical nephrectomy performed for kidney tumor were agreed on by experts. The records of 255 procedures were reviewed. For each operative report, the total number of completed components was tallied. The percentage of retrieved components was calculated for each group of variables by procedure and by method of documentation.
The procedure, note completion and transcription dates were recorded which generated median times for the intervals between these events.

Results: Overall, 66% of dictated notes were complete, compared with 93% of structured notes. Completion rates for dictated open radical, open partial, laparoscopic radical and laparoscopic partial nephrectomy were 65%, 63%, 74%, and 70%, respectively. Corresponding percentages for respective structured notes were 96%, 88%, 95%, and 97%. Both dictated and structured notes were generated on the day of surgery. However, *eKidney*-generated notes were instantaneously uploaded to the EPR, while dictated notes were transcribed after a median of 2 days.

Conclusions: Our study demonstrates that operative notes completed using *eKidney* structured templates are significantly more complete and timely than those dictated in the standard manner. Structured documentation is a powerful tool to ensure important procedural details are recorded.

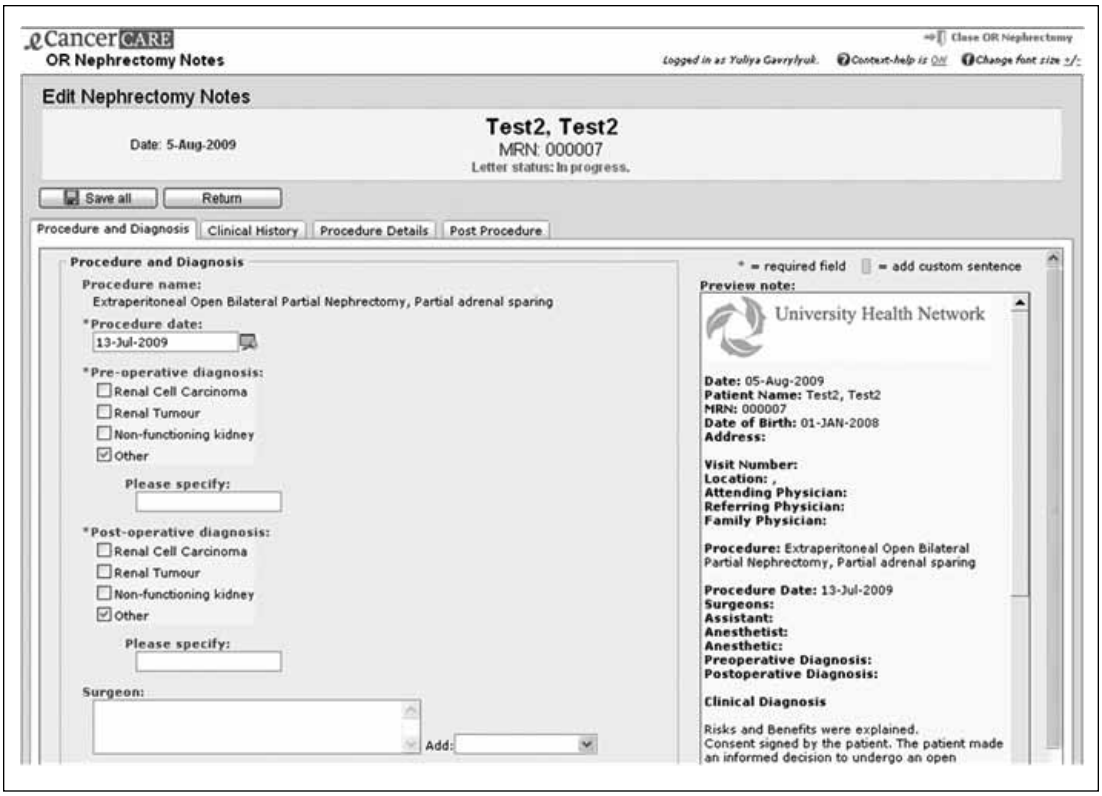

Fig. 1. UP-089

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Ex Vivo and In Vivo Validation of a Novel Radiofrequency Ablation (RFA) Device for Treating Large Tumours

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Introduction and Objectives: Radiofrequency ablation (RFA) has been shown to be a safe and effective treatment in a selected group of patients with renal tumors <3cm. The current limitations of the method are the procedure duration and small, non uniform coagulate tissue volumes which limits its application for larger tumours. The objective was to evaluate a novel monopolar RFA device that can treat large liver and kidney tumours >4 cm in diameter within an acceptably shorter time.

Materials and Methods: A novel loosely wound coil, composed of Nitinol, operated at 27.12 MHz with power settings between 100 and 200W was evaluated in both *ex vivo* and *in vivo*. In the *ex vivo* experiment (n = 16) the novel RFA device treated bovine liver encased in a polyacrylamide phantom. The *in vivo* tests (n = 8) were performed on live pig kidneys (n = 7) and liver (n = 11). Impedance was measured before treatment and temperatures within the ablation zone were recorded during the procedure. The ablated tissue underwent a gross and histological evaluation. Tissue specimens were stained with nicotinamide adenine nucleotide (NADH) to assess cell viability. The ablation volume measurements *in vivo* trials were confirmed with contrast enhanced CT imaging.

Results: In the *ex vivo* tests, the average ellipsoidal ablation volume was 64.2 (±11.6) cm^3 with an average treatment time of 9.5 (±3.2) minutes. For the *in vivo* tests the average kidney and liver ablation volumes were 33.2 (±17.4) and 51.5 (±17.2) cm^3 with an average treatment time of 10.4 (±4.8) and 10.8 (±5.1) minutes, respectively. The kidney ablation volume was limited by the organ's size and tissue boundaries. Both temperatures measured in the center and on the wire of the coil reached plateaus of >90 degrees Celsius. Histological sections revealed uniform cell necrosis with a distinctive edge demarcating the ablation volume, which correlated with CT imaging. A minimal reduction in ablation volume in the perfused *in vivo* environment was found.

Conclusion: Our novel RFA coil device is able to successfully ablate large tissue volumes >4 cm in diameter, creating a uniform necrotic zone within a short treatment time evident in both *ex vivo* and *in vivo* settings. Further tests are needed to evaluate safety and efficacy of this new RFA modality in human models. The device's ability to achieve high temperatures within a short time may help reduce vascular heat sink effect and minimize immune system response.