

## **RADIATION EXPOSURE IN NEPHRON SPARING MANAGEMENT OF SMALL RENAL MASSES: SINGLE CENTER EXPERIENCE**

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**Introduction:** The incidence of small renal masses is increasing. Nephron-sparing approaches represent the current standard of care for the majority of these lesions. Imaging-related radiation exposure represents an important concern in the management of these patients, especially with the advent of new technologies and shifting of practice patterns in the absence of solid guidelines. Herein we assessed radiation exposure related to the management of small renal masses with partial nephrectomy (PN), percutaneous and laparoscopic cryoablation (PCA and LCA) at our center.

**Methods:** Records of 246 patients treated for a T1a renal mass were reviewed. Imaging procedures were recorded in the following categories: diagnostic evaluation, treatment exposure, complications within 30 days of treatment, and follow up through 1, 2, and 3 years. Only imaging studies performed for the renal mass management were considered. Exposures due to comorbidities were excluded. Radiation exposure doses for the individual imaging procedures were retrieved from the literature. Cumulative exposures were then estimated for 1, 2 and 3 year periods.

**Results:** Patients were treated with PN (n=143), LCA (n=31) or PCA (n=72). PN patients were younger ( $p<0.001$ ), more often female ( $p<0.01$ ), and had larger masses (2.6 vs 2.2 vs 2.1,  $p<0.001$ ). The median exposure doses for renal mass work-up and characterization were similar between the groups, 14.1mSv (IQR 14.1-16.8) overall. Complications were associated with exposures ranging between 0 and 114.2mSv and were higher in the PN group ( $p<0.01$ ). Radiation doses associated with follow up were overall 14.2mSv for 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> years. Over 3 years of follow up, cumulative radiation doses ranged between 8.5 and 219.3mSv (median 73.5) whereby PN, LCA and PCA groups were associated with 67.3 (range 8.5-154.4), 71.3 (14.6-92) and 204.3mSv (162.3-219.3),  $p<0.001$ . Overall, 8.1% of patients had Clavien I complications, 15.9% Clavien II, 7.3% Clavien III and 0.4% grade IV. Grade II-III complications were more common in the PN group ( $p=0.01$ ). Interestingly, radiation exposure doses were proportional to the severity of complication: 1.5(IQR 0.2-14.1mSv) for Clavien grade I, 9.1(1.5-14.2) for grade II and 33.1 (10.5-58.8mSv) for Clavien III events.

**Conclusions:** Patients with small renal masses managed with nephron-sparing procedures incur potentially substantial doses of radiation exposure specifically related to renal mass management. These data mandate increased awareness and strategies to reduce radiation exposure in patients with small renal masses.