

RADIATION EXPOSURE IN PATIENTS UNDERGOING NEPHRON-SPARING TREATMENT FOR SMALL RENAL MASSES: SCENARIO-BASED ESTIMATION

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Introduction: Nephron-sparing treatment is considered the treatment of choice for most small renal masses. While partial nephrectomy (PN) represents the gold standard, ablative approaches are accepted alternatives. To date, there is only few data to describe the radiation exposure due to imaging procedures that these patients incur.

Methods: A hypothetical scenario for the management of a patient with an incidental small renal mass was constructed including 1 non-contrast CT scan for unrelated problems unveiling the renal mass, 1 dedicated contrast enhanced CT, as well as treatment and 1st follow-up imaging procedures. Radiation exposure doses were retrieved from the literature. Other scenarios were elaborated, specifically related to possible complications: retreatment after percutaneous ablation, urine leak requiring stent placement and bleeding requiring embolization after PN. Radiation exposure was then estimated for the different scenarios.

Results: All of the considered scenarios involved significant radiation exposure exceeding the 20mSv limit for yearly occupational exposure. Moreover, in all the scenarios involving complications, the limit of 50mSv, linked with excess cancer risk, was surpassed. Based on these estimations, the percutaneous ablation scenarios as well as PN scenarios requiring angiographic procedures were associated with doses of radiation that could be over 100mSv. These estimations do not include additional potential exposure sources such as CT-guided biopsy, radionuclide studies and other radiographic studies that may be used as part of the management algorithm. Moreover, these estimations do not include radiation exposure during follow-up, imaging for other medical reasons or background radiation exposure.

Conclusions: In this scenario-based estimation of radiation exposure, nephron-sparing modalities for the treatment of small renal masses were associated with significant doses of radiation exposure related to diagnosis, treatment and immediate follow-up. In all scenarios, radiation exposure exceeded the recommended limit for occupational exposure, whereas in scenarios with complications, exposure may reach the range associated with excess cancer risk. In view of these data awareness to radiation exposure and strategies to minimize the doses are warranted.



