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Introduction & Objectives: Radiation exposure during endourological procedures has gained growing attention in the last decade. There is a lack of standard radiation exposure dose limit among the International Societies for urological surgeries. Therefore we aimed to assess the amount of effective dose (ED) and potential predictors of radiation exposure during endourological procedures at one tertiary referral center.

Materials & Methods: We retrospectively reviewed data from 461 patients who underwent retrograde intrarenal surgery (RIRS) or percutaneous nephrolithotomy (PCNL) for stone disease between 2013-2018 at our Institution. Demographic, clinical, procedural and radiographic parameters were collected. Body mass index (BMI) was calculated for each patient. Patients' ED and the equivalent dose rates of each organ were calculated using a PC-based Monte Carlo program (PCXMC). For each patient we designed a custom-made phantom and a radiation box. Descriptive statistics and linear regression analyses tested the association between clinical characteristics and patient's radiation exposure.

Results: During the study period 259 (41.8%) and 202 (32.6%) patients were treated with RIRS and PCNL, respectively. Mean (SD) patient's ED was 1.8 (1.8) mSv and 6.8 (4.5) mSv for RIRS and PCNL, respectively. Left sided procedures showed a higher ED than right sided ones (5.0 vs. 3.8 mSv; $p=0.01$). This is probably related to the anatomical proximity of the stomach, which has a high radio-sensibility, to the fluoroscopy field. No differences were found between left and right-sided procedures in terms of age, BMI, stone burden and operative time. Patient's BMI, stone burden, operative time and left-sided laterality were all univariably associated with increased ED (all $p<0.03$). Similarly, at multivariate linear regression analysis patient's BMI ($p<0.001$), stone burden ($p<0.001$), operative time ($p<0.001$) and left laterality ($p=0.013$) were all associated with increased ED.

Conclusions: Several clinical factors are associated with patient's effective dose during endourological procedures. We found that laterality should be considered while planning such procedures. Patients with left-sided stones, high BMI, and large calculi shall be monitored for the cumulative dose in their clinical and surgical management.