24 Awareness reduces radiation exposure during flexible ureteroscopy – a prospective multicenter evaluation

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Introduction & Objectives: Retrograde intrarenal surgery (RIRS) can necessitate extensive X-ray usage. We evaluated the impact of a preoperative surgeon briefing regarding inclusion and evaluation of fluoroscopy time (FT) and radiation dose (RD) into a multicenter study on the applied X-ray usage. We postulate that an increased awareness of the RIRS performing endourologist leads to a significant decrease of applied radiation.

Materials & Methods: A multicenter study with 6 centers (Regensburg/GER, Hamburg/GER, Cologne/GER, Vienna/AUT, Münster/GER & Freiburg/GER) was performed. Each center was obliged to recruit 25 prospective patients which were scheduled for RIRS for renal stones of any size requiring laser lithotripsy. Prior study start all surgeons were briefed by the local investigator about hazards of radiaton and how to avoid high doses in endourologic surgery, as well as FT and RD will be assessed according to study protocol. This prospective study arm was compared to past RIRS procedures in each study center, prior surgeon's X-ray training. The study was approved by the leading ethic committee: University of Regensburg, GER, IRB No16-101-0064. FT was defined as primary outcome parameter. To examine the procedures outcome and safety, endoscopic stone-free rate (SFR) and complications were evaluated according to Clavien-Dindo, SATAVA and postureteroscopic lesion scale (PULS), respectively. Results were analyzed using T-test, chi-square test, univariate analysis and confirmed in a multivariate regression model.

Results: Overall, 303 patients were included (145 retro- & 158 prospective patients). Regarding potentially FT influencing parameters (e.g. stone burden, lower pole stones, prestenting, poststenting) the two study arms were balanced. Overall, mean FT and RD (no unit available due to different units of the study centers) were reduced from 130.8s/565.8 down to 77.4s/357.8 ($p<0.05$). SFR was improved from 85.5% to 93% in the prospective study arm ($p<0.05$). Complications were not different according to Clavien ($p=0.081$), PULS ($p=0.65$) and SATAVA ($p=0.33$). In univariate variance analysis neither stone position ($p=0.57$), prestenting ($p=0.42$), surgeons' experience (>100 RIRS), nor PULS ($p=0.055$) had significant impact on FT. Significant univariate parameters were confirmed in a multivariate model, revealing X-ray training to be radiation-protective (OR-44, $p=0.001$), while an increased FT was confirmed for postprocedural JJ (OR 68, $p=0.028$), lasersetting dusting vs. fragmenting (OR 92, $p<0.001$), UAS usage (OR 59, $p<0.001$) and to SATAVA classification (OR 26, $p=0.02$).

Conclusions: Increased surgeon awareness regarding X-ray has a significant impact on FT and RD. This “awareness effect” is a simple way to reduce RD for the patient and OR-staff while procedures outcome and safety are not affected. This study is the result of GeSRU Academics, a network of residents within the German Society of Residents in Urology.