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Introduction & Objectives: Retrograde Intra Renal Surgery (RIRS) via flexible uretero-renaloscopy (FURS) has become well established as a method for treatment of renal calculi. With newer scopes, modern technology, and improved experience, the indications for this modality are being further refined. This study assesses the influences of stone size; location; type of flexible uretero-renaloscope (analogue vs. digital); and stone density on treatment outcomes from a large series in a single UK centre.

Materials & Methods: A prospective database of patients undergoing flexible URS and Holmium laser lithotripsy between March 2002 and December 2016 was retrospectively analysed. Single-treatment success was defined as satisfactory visual clearance of stone bulk, radio-opacities less than 2mm on non-contrast CT, and no further treatment.

Results: 1376 treatments were performed on 1035 patients (median age = 56 years; range 16–92 years). Overall single-treatment success rate was 86.4%; when stratified by stone size it was 95.8% (<5 mm), 90.2% (5-10 mm), 87.6% (11-15 mm), 81.7% (16-20 mm), 64.5% (21-30 mm) and 27.4% (>30 mm). For stones <20 mm, an overall stone-free rate of 89.2% was achieved after a single procedure. In 94 patients with stone size 21-30 mm, 86 (91.5%) were stone free after their second FURS. 69.4% of patients with stone size >30 mm were stone free after the second FURS. Stone locations were lower pole, renal pelvis, mid and upper pole, and in caliceal diverticula in 47%, 24%, 14%, 11% and 4% of the cases respectively, with single-treatment success rate of 86%, 79%, 92%, 81% and 78%, respectively. Following 517 FURS for renal stones of <10 mm, 325 (63%) of cases did not have ureteric stent. Of these, only 14 patients (4.3%) re-attended with symptoms, of which only two required stenting. The introduction of the digital flexible uretero-renaloscope in 2010 did not significantly change the stone free rate (91% for analogue vs. 91.5% for digital). In patients who had a pre-operative CT scan enabling Hounsfield Unit (HU) density measurement, 34.5% had a stone density >1000 HU. Stone-free rates were 95.4% in <1000 HU and 89.7% in >1000 HU, not statistically different ($p=0.258$, chi-square test).

Conclusions: Stone clearance of nearly 90% can be achieved for stones <20 mm, and similar stone free rates can be achieved for stones up to 30 mm following two procedures. Stone density, digital technology and stone location do not influence outcomes significantly. The majority of renal stones up to 10 mm, do not require insertion of a ureteric stent post-operatively.