

19-4315

Shockwave lithotripsy and ureteroscopy for the treatment of lower pole stones: Results from a statewide clinical registry

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INTRODUCTION AND OBJECTIVES: Large scale multi-institutional data comparing outcomes for the treatment of lower pole (LP) renal stones are limited. We assessed the efficacy and morbidity of shockwave lithotripsy (SWL) and ureteroscopy (URS) for treating LP stones using a prospective registry from the state of Michigan.

METHODS: We used data from the Michigan Urological Surgery Improvement Collaborative Reducing Operative Complications from Kidney Stones (MUSIC ROCKS) quality initiative. MUSIC ROCKS maintains an all-payer clinical registry in which detailed patient and perioperative information is prospectively entered by trained abstractors on patients undergoing URS and SWL at 24 participating practices. We identified all patients with stones located only in the lower pole that underwent SWL or URS from June 2016 to July 2018. We compared patient demographics, emergency department (ED) visit and hospitalization rates, and stone-free rates (SFR). SFR was defined as absence of any fragment on X-ray, CT or ultrasound reports obtained within 60 days. Sub-group analysis was performed stratified by stone size <1 cm and 1-2 cm.

RESULTS: 832 (63.3%) SWL and 483 (36.7%) URS procedures were analyzed. Mean (mm) stone sizes were not statistically different between the two groups [SWL 8.0 vs URS 8.3, $p=0.27$]. In total, there were 979 (74.4%), 232 (24.5%) and 104(1.1%) procedures for stones <1, 1-2, and >2 cm in size, respectively, with no significant differences in procedural distribution based on size. Compared to SWL, patients undergoing URS had significantly greater rates of medical comorbidity, female gender, positive urine culture, pre-operative hydronephrosis and antiplatelet therapy ($p<0.05$). The overall 30-day ED visit rate was higher for URS (12.6 vs. 2.5%, $p<0.001$). Stone clearance was higher after URS (56.5% vs. 39.4%, $p<0.0001$). For stones 1-2 cm, there were no significant differences in complications between URS and SWL (Figure).

CONCLUSIONS: URS provides better efficacy than SWL for treating LP stones but comes at the expense of increased morbidity. For stones 1-2 cm in size, URS demonstrates superior stone clearance with no significant difference in complications. Our findings serve to inform the development of treatment appropriateness criteria for SWL in the state of Michigan.

Source of Funding: funding from Blue Cross Blue Shield of Michigan

Figure: Outcomes for Lower Pole stones treated by URS and SWL in MUSIC

