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Variation in Imaging after Stone Treatment

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INTRODUCTION AND OBJECTIVE: Imaging after stone treatment is an important recommended step to assess stone clearance and identify potential complications. We assessed prevailing practice patterns of post-SWL and post-URS imaging to identify areas for quality improvement.

METHODS: Reducing Operative Complications from Kidney Stones (ROCKS) is a quality improvement initiative from the Michigan Urological Surgery Improvement Collaborative (MUSIC). Trained abstractors prospectively record standardized data elements from the health record in a web-based registry. Using the ROCKS registry, we identified patients undergoing SWL and URS between June 2016 and December 2019. The frequency and modality of postoperative imaging within 60 days was assessed. Variation in imaging was evaluated at the practice level by those with ≥10 SWL and URS cases per year, as well as the urologist level with ≥5 SWL and URS cases per year. Demographic, clinical and operative data were compared using bivariate and multivariable analyses to understand factors associated with post-SWL and post-URS imaging.

RESULTS: 14,894 cases were identified (5273 SWL and 9621 URS) from 33 practices and 205 urologists. Overall, postoperative imaging was obtained in 49.1% of patients. Significant differences were seen with respect to imaging following SWL and URS (72.4% vs 36.3%, $p<0.01$). The most common imaging modality for patients following SWL was KUB (63.9%), KUB plus US (17.2%), and US (11.1%) while after URS it was US (35.5%), KUB (34.7%), CT (13.7%), and KUB plus US (9.6%). Substantial practice and provider-level variation was seen in postoperative imaging following SWL (range 36-95.2%) and URS (range 0 – 93.1%) (Figure). The odds of imaging post-URS compared to post-SWL were significantly different by practice ($p<0.001$) after factor adjustment (odds by practice: range 0.02 – 1.96). Additional factors associated with 60-day postoperative imaging included higher Charlson comorbidity index (CCI), larger stone size and renal stone location.

CONCLUSIONS: The postoperative imaging rate for SWL is almost double the rate for URS in the state of Michigan. Wide variation exists amongst practices and providers with respect to imaging, with no apparent correlation amongst those practices imaging at a high rate for either SWL or URS. Future efforts are needed to better align postoperative imaging practices with best practice guidelines.

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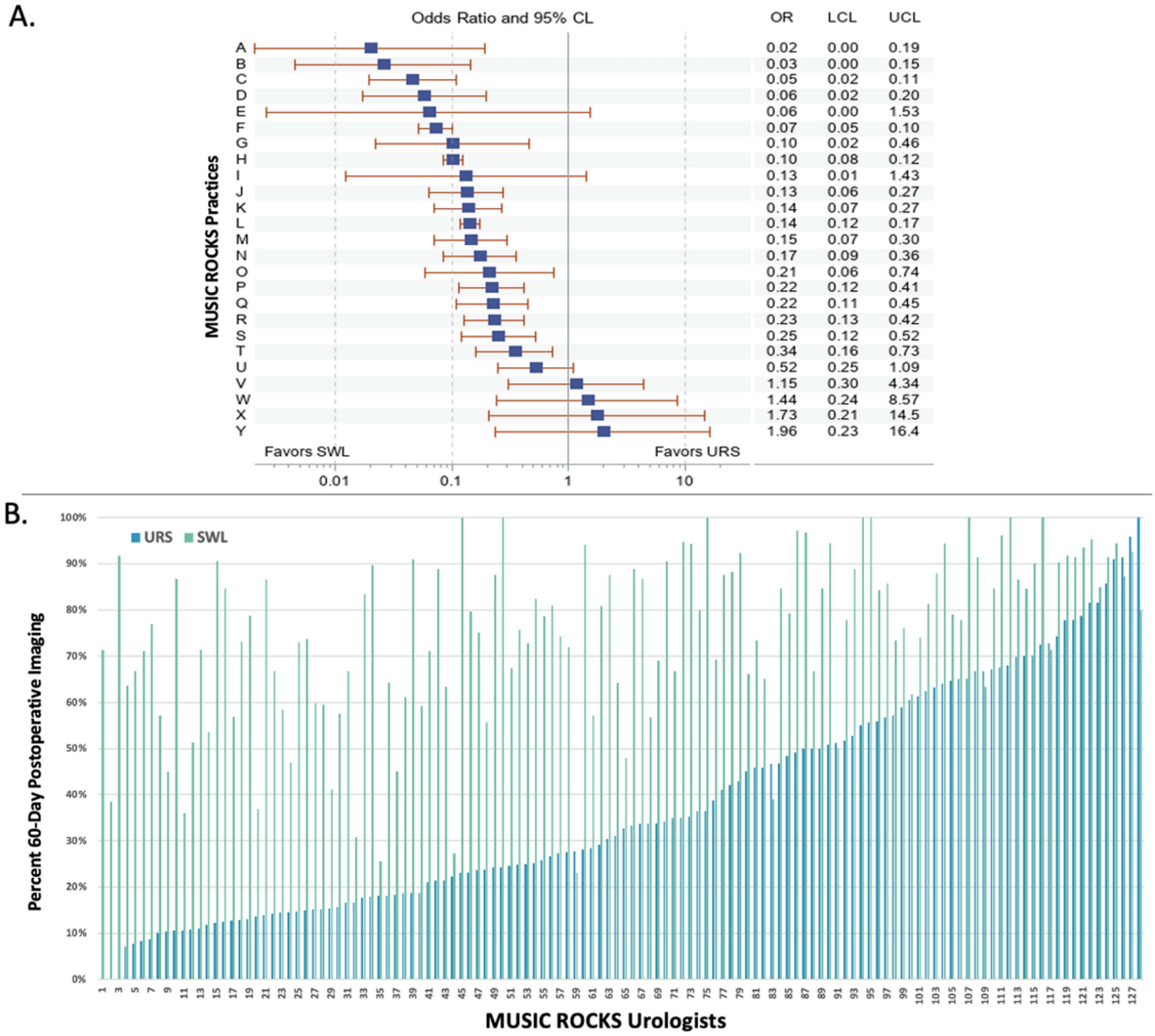
Figure 1. **A**. Variation in odds of 60-day post-operative imaging after SWL versus URS by practices with ≥5 SWL and ≥5 URS procedures, adjusting for gender, BMI, CCI, insurance status, stone size, stone location, presented status UA/urine culture result and intraoperative stent placement. **B**. Variation in 60-day post-operative imaging rates for SWL and URS cases by urologist in MUSIC with ≥5 SWL and ≥5 URS cases.



SWL – shockwave lithotripsy; URS – ureteroscopy; BMI – body mass index; CCI – Charlson comorbidity index; UA – urinalysis