

Does the Use of a Ureteral Access Sheath Reduce Infection-Related Hospitalization? Real-World Data from a Surgical Collaborative

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INTRODUCTION AND OBJECTIVE: Elevated intrarenal pressure during ureteroscopy (URS) may result in pyelovenous backflow, which is hypothesized to increase the risk of sepsis. When treating renal stones, the ureteral access sheath (UAS) is considered a pressure mitigation strategy, yet evidence on whether a UAS reduces infectious complications is unclear. Prior studies are limited by small cohorts, heterogeneous inclusion criteria, ambiguous endpoints, or lack adequate risk adjustment. We examined UAS use when treating renal stones and its association with infection-related hospitalization in a statewide registry.

METHODS: Using the Michigan Urological Surgery Improvement Collaborative (MUSIC) registry, we identified all patients undergoing single-stage unilateral URS for renal stones, with or without the use of a UAS. We assessed variation in UAS in practices with >10 cases. We evaluated demographic differences between cases with or without UAS. A multivariable logistic regression model was constructed to examine the impact of UAS use and other patient, stone, and surgical factors on 30-day infection-related hospitalization.

RESULTS: Among 6,142 patients undergoing URS by 233 urologists across 34 practices, 152 (2.5%) had an infection-related hospitalization within 30 days. Patients with UAS had significantly larger stones, more positive preoperative urine culture, and higher comorbidity. Overall 59% of cases utilized UAS, with significant variation between practices (4.1% to 99.5%, $p < 0.0001$; Figure). Infection-related hospitalization rates were no different for cases with (2.6%) vs. without (2.3%) UAS use ($p = 0.5$). On multivariable analysis, infection-related hospitalizations did not differ by UAS (OR 0.8; 95% CI 0.6 - 1.2; $p = 0.4$), but were associated with higher Charlson Comorbidity Index (CCI 1 vs. 0, OR 1.9; 95% CI 1.2 - 2.9; CCI 2+ vs. 0, OR 2.3; 95% CI 1.4 - 3.6; $p < 0.001$), history of recurrent UTI (OR 2.4; 95% CI 1.4 - 4.0; $p < 0.01$), larger stones (OR per 5mm 1.1; 95% CI 1.0 - 1.3; $p = 0.04$), and positive preoperative urine culture (OR 1.8; 95% CI 1.2 - 2.7; $p < 0.01$).

CONCLUSIONS: Utilization of UAS when treating renal stones varies widely across practices within Michigan. UAS did not reduce infection-related hospitalization following URS for renal stones.

Source of Funding: Blue Cross Blue Shield of Michigan

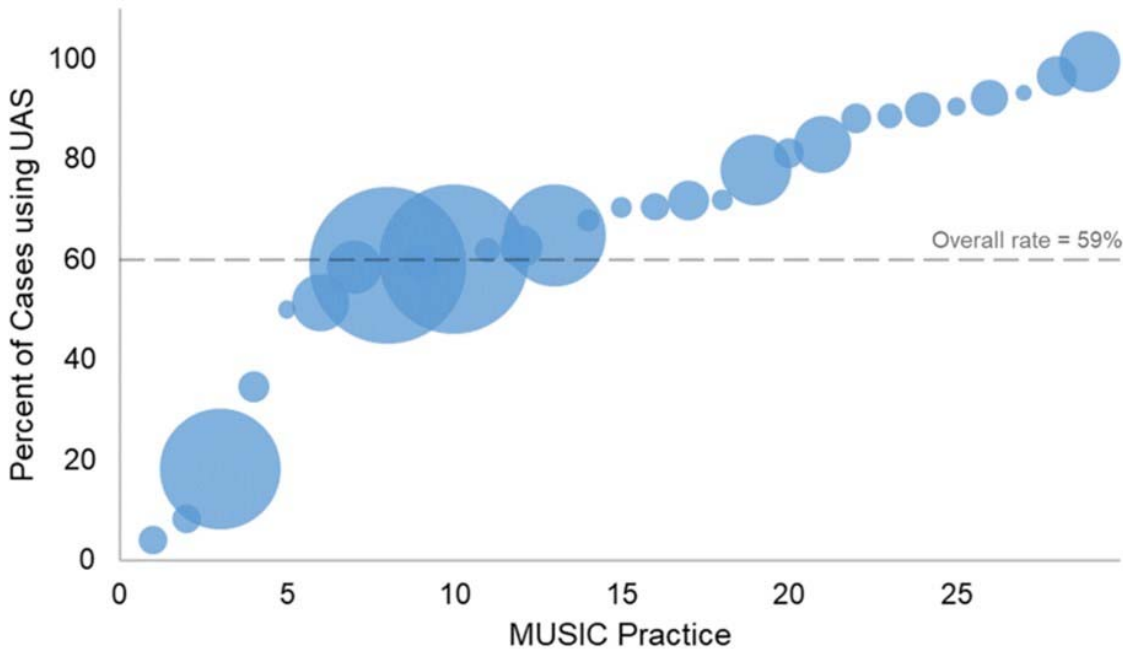


Figure. Variation in ureteral access sheath (UAS) use for ureteroscopic treatment of renal stones among 29 urology practices in MUSIC. Bubble size indicates relative case volume for each practice.