## Title

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# Durability of flexible ureteroscopy and predictors of repair: A prospective multi-center study

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INTRODUCTION & OBJECTIVES: Flexible ureteroscopy is routinely used to treat upper tract stones and other pathologies. Reusable scopes continue to pose a significant cost and administrative burden to hospital systems, but few studies have examined long-term performance and operator satisfaction. Flexible ureteroscope durability and operator satisfaction were assessed in a prospective study at six high volume institutions comprising the Western Endourology Stone (WEST) research consortium: University of California San Francisco, San Francisco General Hospital, Oregon Health Sciences University, University of Washington, University of California San Diego, and Puget Sound VA Hospital.

MATERIAL & METHODS: Surveys were performed using Research Electronic Data Capture (REDCap) software at the start and end of consecutive flexible ureteroscopic procedures to document case characteristics including ureteroscope properties, accessories used, patient characteristics, and stone location. Operator satisfaction with visualization and performance was reported on a Likert scale. Scope photographs at maximal flexion (up and down) were obtained at the start and end of each case and measured with a computerized protractor. Descriptive statistics and multivariate regression were used to identify possible predictors of ureteroscope damage.

RESULTS: Between August 2014 and April 2015, 383 consecutive flexible ureteroscopy cases were recorded, of which 295 (79.7%) were stone cases. 23 total repairs were recorded. Mean stone size was 11.6 +/- 11.35 mm. 315 (69%) cases were conducted by residents, while 93 (20%) were conducted by attendings. The mean life span of a scope was 6.5 +/- 2.9 cases. Mean loss of upward deflection per case was 6.7° +/- 16°. Mean loss of downward deflection per case was 7.5° +/- 17.8°. Concern for scope function was expressed in 48 (12.8%) cases, while image quality was compromised or unusable in 107 (28%) of cases. Adjusted mulitivariate analysis showed that use of lithotrite was associated with need for ureteroscope repair (OR=3.66, 95%CI 1.95-6.87, p<0.0001). The association between time of scope in body and need for repair trended towards significance (OR=1.011, 95%CI 1.00-1.02, p = 0.052), as did BMI (OR=1.02, 95%CI 1.00-1.05, p=0.07). Gender, primary surgeon type, stone size, and laser time were not correlated with need for repair.

CONCLUSIONS: Ureteroscopy damage is common. Use of lithotrite during stone cases predicts ureteroscope damage. Further study on the factors accounting for progressive loss of deflection, cost, and surgeon satisfaction and stressors is warranted.

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