The Accuracy of Observer-Interpreted Retrograde Urethrography in the Diagnosis and Staging of Anterior Urethral Stricture Disease

Introduction and Objective: The retrograde urethrogram (RUG) is an essential tool in the pre-operative evaluation of anterior urethral strictures because it provides valuable information on stricture presence, location, and length. The RUG is a dynamic test that depends on numerous factors to obtain adequate images for disease evaluation. While practices differ at various institutions, at our institution, the surgeon typically performs the RUG but produces films that are then interpreted independently by a radiologist. This study aims to assess the accuracy of RUG interpretation between the operating physician performing the procedure and the observing physician interpreting the films in order to evaluate the suitability of relying on observer interpretations for the purposes of pre-operative urethral stricture surgery planning.
Materials and Methods: A retrospective review was performed on a cohort of 397 patients undergoing anterior urethroplasty over a seven-year period at a single centre. Pre-operative RUG findings (stricture presence, location, and length) as reported by both the RUG operator and the observer were abstracted from the medical records. This data was compared to the gold standard of stricture location and length as measured intra-operatively. RUG adequacy was defined as comment on the presence, location, and length of urethral stricture. Statistical analysis was performed using Chi-squared, paired t-test, and linear regression.
Results: Only 49% (196/397) of observer-reported RUG studies were deemed adequate and 87% of observer-reported studies correctly diagnosed the presence of a stricture. When assessing stricture location, 49% of observer-reported studies correctly identified the location of the stricture compared to 96% of operator-reported cases ($p<0.001$). Of RUGs with an observer-reported stricture length ($n=144$), the mean stricture length reported by the observer was 3.23cm compared to 4.18cm by the operator and 4.56cm intra-operatively (all differences statistically significant with $p<0.001$). Upon linear regression analysis, the observer-reported length showed a 0.47 R^2-coefficient of correlation to the intra-operative length ($p<0.001$) compared to a 0.93 R^2-coefficient of correlation between the operator-reported length and the intra-operative length ($p<0.001$).
Conclusions: Our study suggests that observer-reported RUGs are neither adequate nor accurate for use in pre-operative staging of anterior urethral stricture. The observer-reported RUGs correlate poorly with intra-operative measurements when compared to operator-reported RUGs.