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INTERPRETABILITY OF FLUORO-URODYNAMICS IS NOT ALTERED BY CONTRAST CONCENTRATION.

Hypothesis / aims of study

Urodynamics is used frequently in assessing patients with lower urinary tract symptoms and fluoro-urodynamics (FUDS) is commonly used for patients with more complex voiding symptoms[1]. Standardization of intravesical contrast concentration for fluoro-urodynamics has not been established. Understanding differences in outcomes with the use of diluted intravesical contrast is important for establishing guidelines. In this era of healthcare cost containment, resource utilization and decreased expenditure by reducing use of disposables, such as contrast media, is important. The study aims to determine interpretability of FUDS images with the use of diluted intravesical contrast.

Study design, materials and methods

A double blinded, randomized, prospective trial was designed to compare interpretability of fluoro-urodynamic images with the use of diluted intravesical contrast compared to full strength contrast. Patients were randomized to receive either full strength contrast for the entire study versus contrast for the first 250 mL followed by sterile saline until maximum cystometric capacity(MCC). Images were reviewed by fellowship trained urologists and then graded on an ordinal scale ranking the confidence level in interpreting the visibility of the bladder silhouette during filling and voiding and then the visibility of the bladder neck and urethra during voiding. Inter-reader reliability was compared. Responses were then analysed using Visual Grading Characteristics (VGC), a validated method of radiologic image analysis based on receiver operating characteristics curves[2,3]. Computerized image analysis was then utilized to calculate contrast-to-noise (CNR) ratios for the bladder at MCC and for the bladder neck during voiding using a constant region of interest (ROI). CNR was compared to biometric and urodynamic variables.

Results

Fifty subjects were randomized, 27 subjects to dilute and 23 to non-dilute contrast with mean age 52. Mean maximum cystometric capacity (MCC) was not significantly different between the dilute contrast and non-dilute contrast groups, and was 424 mL and 472 mL, respectively. 73% had MCC volumes greater than 250 mL. Agreement was found between raters. VCG analysis demonstrated no difference in image interpretability between dilute and non-dilute contrast groups for each criterion assessed. Interpreters were unable to consistently identify the study group, dilute contrast versus non-dilute contrast, and were correct in only 55% of cases. The mean CNR was 7.4 ± 6.0 and 4.6 ± 3.2 in the dilute contrast group during filling and voiding, respectively, compared to 7.9 ±4.7 and 5.4 ±4.0 in the non-dilute group; these differences were not significant ($p > 0.05$). CNR did not correlate to body mass index, waist circumference, or MCC.

Interpretation of results

Use of diluted intravesical contrast during FUDS did not alter the ability of fellowship trained urologists to interpret the images. Visual image analysis by VGC did not identify differences between images acquired with full strength contrast compared to diluted contrast. Image quality did not deteriorate as noted by lack of statistical difference in CNR between groups.

Concluding message

Contrast concentration had limited impact on study interpretation and intravesical contrast is only necessary for the first 250 mL of filling during FUDS, thus reducing the need for additional resources.

References

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