Free video uroflowmetry and its role in evaluating lower urinary tract dysfunction in children

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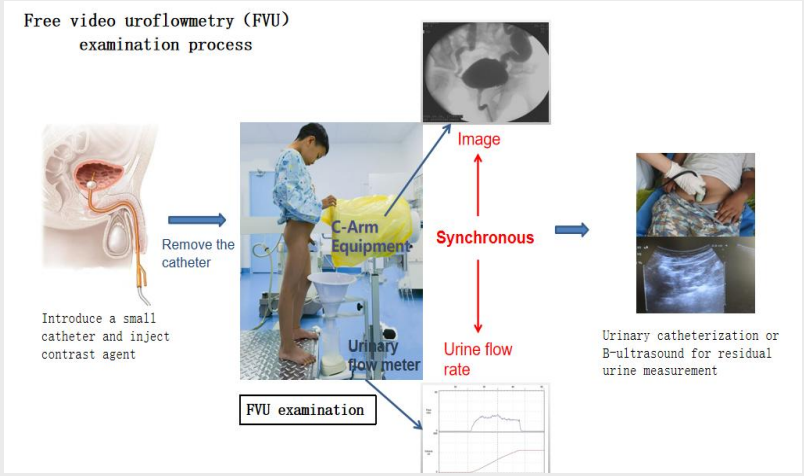
Background

In order to compensate for the shortcomings of free uroflowmetry and video urodynamic examination, we propose a novel "free video uroflowmetry" technique: instilling contrast agent via a catheter, ,performing free uroflowmetry under C-arm fluoroscopy after removing it. This study aims to evaluate the feasibility and clinical significance of free video uroflowmetry in children with LUTD.

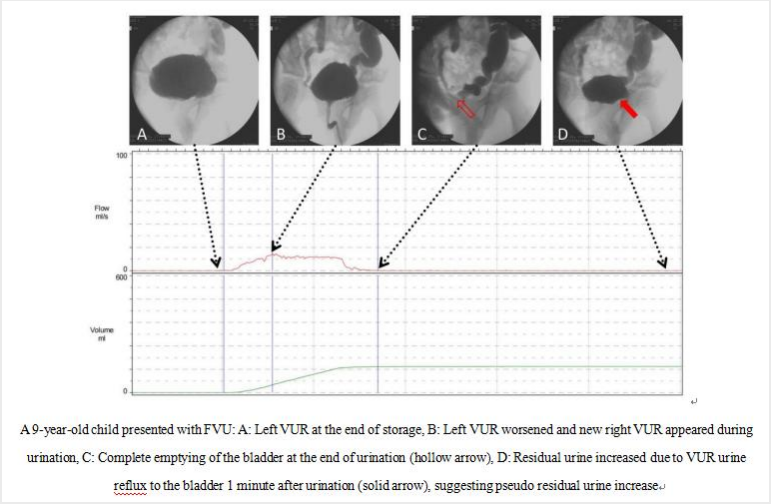


Methods

Retrospective analysis was conducted on data from children hospitalized with LUTD at Dongguan Children's Hospital between September 2024 and February 2025. Parameters included urinary flow metrics (maximum flow rate, average flow rate , voiding-time, voided-volume, post-void residual urine andimaging findings (VUR, detrusor-sphincter dyssynergia , pseudo-residual urine).

Results

Twenty-six children were included.Three children were unable to urinate due to urethral pain during video urodynamic examination. Both FU and FVU showed significant differences compared to VU in Qmax, Qave, voiding-time, and PVR ($P < 0.05$) . Imaging findings showed no significant difference between FVU (16/26) and VU (17/26) ($P > 0.05$) .



A 9-year-old child presented with FVU: A: Left VUR at the end of storage, B: Left VUR worsened and new right VUR appeared during urination, C: Complete emptying of the bladder at the end of urination (hollow arrow), D: Residual urine increased due to VUR urine reflux to the bladder 1 minute after urination (solid arrow), suggesting pseudo residual urine increase.

Implications

Free video uroflowmetry enables functional assessment of voiding in a near-physiological state while simultaneously visualizing anatomical abnormalities and VUR. It serves as a valuable complement to conventional free uroflowmetry and video urodynamic examination in pediatric LUTD evaluation.