COMPARISON OF THE CONVENTIONAL UROFLOWMETRY AND A NOVEL MOBILE ACOUSTIC UROFLOWMETRY IN CHILDREN: A PILOT STUDY

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Background: Standard uroflowmetry is inconvenient for patients because the measurement environment is unfamiliar and unnatural, demanding a timed voiding for the test. A novel acoustic uroflowmetry is based on sound analysis using a smartphone application without any additional device, and can be used at home without cumbersome settings. The aim of this study is to assess the performance of a new mobile acoustic uroflowmetry application in comparison to conventional uroflowmetry in the pediatric population.

Materials/Methods: A novel mobile acoustic uroflowmetry is an easy-to-use, non-invasive method to estimate the urine flow simply by recording the sound during voiding with a smart phone. After the approval of institutional review board, pediatric patients who are prescribed uroflowmetry testing were recruited and the voiding sound was recorded during standard uroflowmetry measurements. Male subjects were recorded in standing position. The urine flow rate is calculated as the voiding sound was recorded and processed. Voided volume can be obtained by integrating the calculated flow rate. Cases with voided volume <20mL or having recording problems were excluded. Pearson's correlation coefficient (PCC, r) was used to compare the maximal flow rate (Qmax), average flow rate (Qavg), and voided volume estimated by the standard uroflowmetry with those calculated via acoustic uroflowmetry.

Results: A total of 4 male patients were analyzed. Median age was 7.5 (4-12) years. Flow patterns recorded by acoustic uroflowmetry and conventional uroflowmetry showed a good visual correlation. Median Qmax, Qavg, voiding time and voided volume were 20.1 (8.1-24.9) mL/s, 9.2 (5.5-14.1) mL/s, 29.3 (10.4-64.5) sec, 184.2 (62.6-247.1) mL, respectively. An excellent correlation was observed between the two methods for Qmax (r= 0.985, p=0.015) and voided volume (r=0.998, p=0.002) but not for Qavg (r=0.116, p=0.884) and voiding time (r=0.713, p=0.287).

Conclusions: This study shows that an acoustic uroflowmetry is possible with a good correlation with the standard uroflowmetry in pediatric patients. Further works on prediction accuracy and error with different toilet settings is needed for broader use.