Is EMG flowmetry with a urethral catheter during the pressure flow phase a reliable test in children? A comparative study between EMG flowmetry with and without a catheter

Abstract

Background: EMG flowmetry is an essential step in pressure flow assessment. The guidelines of the International Children's Continence Society state that catheters with a diameter of Fr 6 or Fr 7 do not cause obstruction of the urethra. In view of a different impression obtained from tests performed at our institution, the accuracy level of the EMG flowmetry test using a urethral catheter in children was evaluated, compared to the same test performed without use of a catheter.

Methods: A retrospective study in children who underwent urodynamic evaluation at our institution in the years 8/2018-7/2022. Urination curves and pelvic floor muscle activity were compared in EMG uroflowmetry using a catheter with a non-invasive test. Non-invasive EMG uroflowmetry was chosen as the gold standard.

Results: Of 104 children tested, 34 children (33%) were able to urinate only with non-invasive EMG uroflowmetry. The percentage of boys who failed to empty with a catheter was significantly higher compared to the percentage of girls (54% vs 13%, p-value<0.001). Of 70 children tested, a normal bell-shaped urinary curve was found in 13 (18%) compared to 33 (47%) in invasive and non-invasive EMG uroflowmetry, respectively (p-value = 0.02). The EMG uroflowmetry test using a catheter demonstrated a specificity of 39% (95% CI 23-57), and a positive predictive value (PPV) of 61% (95% CI 53-67) in finding urine curves that are not bell-shaped. Relaxation of the pelvic floor muscles was demonstrated in 21 (30%), compared to 39 (55%), in invasive and non-invasive EMG uroflowmetry respectively (p-value=0.5).

Conclusions: The level of accuracy of EMG uroflowmetry in children using a catheter, primarily in boys, compared to the non-invasive test is poor, and may pose a problem in the diagnosis and the the consequential treatment. We recommend considering the completion of non-invasive EMG uroflowmetry in cases where the child refused to urinate or in cases where a pathology was detected, requiring a change in treatment.