Is EMG flowmetry using a urethral catheter at 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 evaluation. The International Children’s Continence Society guidelines state that catheters with a diameter of 6Fr or 7Fr do not cause obstruction of the ureter. In view of a different impression from tests carried out at our institutions an evaluation was made of the degree of accuracy of the EMG flowmetry test in children using a urethral catheter, compared to an identical test without the use of a catheter.

Methods: A retrospective study in children who had undergone a urodynamic evaluation at our institution in the years 8/2018-7/2022. A comparison of urination curves and pelvic floor muscle activity were compared in EMG uroflowmetry using a catheter and a non-invasive test. The non-invasive EMG uroflowmetry was selected as the gold standard.

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

Conclusions: The level of accuracy of EMG uroflowmetry with a catheter in children, primarily in boys, compared to the non-invasive test is poor and may pose a problem in the diagnosis and consequent 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 found, requiring a change in treatment.