

6

Authors: H. Kakizaki, K. Moriya, K. Ameda, H. Tanaka, T. Shibata and T. Koyanagi
Institution: Department of Urology, Hokkaido University Graduate School of Medicine
Title: DIAMETER OF THE EXTERNAL URETHRAL SPHINCTER AS A PREDICTOR OF DETRUSOR SPHINCTER DYSSYNERGIA: A STUDY OF VOIDING CYSTOURETHROGRAPHY IN CHILDREN WITH NORMAL VOIDING FUNCTION

Aims of Study:

Voiding cystourethrography (VCUG) is one of diagnostic procedures widely used to evaluate voiding dysfunction in children. By comparing VCUG and electromyography of the external urethral sphincter (EUS) in children with suspected neurogenic voiding dysfunction, we have previously demonstrated that diameter of EUS (EUSD) on VCUG was significantly decreased in children with detrusor-sphincter dyssynergia (DSD) compared to those without DSD (a mean of 2mm versus 4.6mm, $p < 0.00001$), and that the sensitivity of EUSD for diagnosing DSD was 93% if we defined 3mm of EUSD as a cut-off value [1]. In order to estimate the specificity of this cut-off value, we analyzed EUSD in a large number of children with normal voiding function.

Methods:

Ninety-six children (59 boys and 37 girls) with normal voiding function serially underwent VCUG. In each child 1 to 6 VCUGs (mean 2.1) were performed as a part of urological evaluation. Thus, a total of 200 VCUGs were collected. Ages at the time of VCUG were 1 week to 11 years (mean age 4.9 years). The absence of organic urethral abnormalities was confirmed by endoscopy in all children. Underlying urological disease was primary vesicoureteral reflux in 57, congenital hydronephrosis in 9, urinary tract infection in 6, ureteral anomalies in 11, and others in 13. For the determination of EUSD in a given VCUG, EUSD was measured in consecutive films and the widest EUSD was chosen [1].

Results:

Age-dependent increase in EUSD was seen in boys as well as in girls. EUSD (mm) was $0.166 \times \text{age (year)} + 4.31$ for boys ($p = 0.0001$, $r = 0.374$), and $0.222 \times \text{age} + 2.73$ for girls ($p < 0.0001$, $r = 0.595$). Incidence of EUSD less than 3 mm was only 0.8% (1/124) in boys, 9.2% (7/76) in girls, and 4.0% (8/200) in overall. If we define 3mm of EUSD as a cut-off value to diagnose DSD in children, the specificity of EUSD for diagnosing DSD is 99%, 91% and 96% in boys, girls and overall, respectively. If children younger than 2 years are excluded from the analysis, the specificity of EUSD is 100%, 97% and 99% in boys, girls and overall, respectively.

Conclusions:

EUSD in children with normal voiding function has an age-dependent distribution and is 3mm or greater in the majority of them. EUSD has a satisfactory specificity for diagnosing DSD in children. The specificity of EUSD is more enhanced in children older than 2 years. Thus, simple measurement of EUSD on VCUG should be recommended in children with suspected voiding dysfunction before employing rather invasive urodynamic studies.

References:

1. Neurourol Urodyn 16: 392-393, 1997

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