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VIDEOURODYNAMIC ASSESSMENT FOR DAYTIME URINARY INCONTINENCE ATTRIBUTABLE TO OVERACTIVE BLADDER IN CHILDREN

Aims of study

Overactive bladder symptoms (OAB) including urgency, increased daytime frequency anddaytime urinary incontinence (DUI) are considered among the most common and bothersome developmental disorders of childhood. DUI is perhaps the most troublesome of these, and its prevalence in schoolchildren is reported to be 6.3% (1). Some cases carry a risk of urinary tract infection (UTI), vesicoureteral reflux (VUR) and constipation, and sometimes persist into adolescence. It is generally thought that OAB symptoms decrease spontaneously with age. However, the prevalence and conditions of children with OAB symptoms have been obscure. The aims of this study were to examine the associated symptoms of children with DUI attributable to OAB and to clarify their conditions.

Materials and methods

Among children who had been hospitalized at our department with a chief complaint of OAB symptoms during 1998 to 2003, 106 children were retrospectively enrolled into the study. The inclusion criteria for the children were that they were over six years old, without neurological abnormalities, and had not responded to first-line treatment. First-line treatment consisted of ensuring that the children understood the normal vesicoureteral anatomy and mechanism of micturition, and behavioral modification employing a bladder diary, timed voiding therapy, correction of voiding posture and treatment of constipation with/without anticholinergic drugs (oxybutynin chloride) for more than three months. Children who had monosymptomatic nocturnal enuresis only and/or who had pure stress incontinence were excluded. To investigate the urological conditions in these children, all of them underwent voiding cystourethrography and a pressure flow study (videourodynamic study; VUDS). On the basis of their VUDS data, the children were classified into the following six groups according to the standardization and definitions of lower urinary tract dysfunction in children stipulated by the International Children's Continence Society (2): urge syndrome (US), dysfunctional voiding (DV), lazy bladder (LB), and normal (Norm), unknown, or congenital organic lower urinary tract obstruction (BOO). To examine the conditions and the associated symptoms of children with DUI attributable to OAB, we compared the VUDS findings among the six groups. The data were analysed statistically using non-parametric tests (Mann-Whitney U test and the chi-squared test).

Results

The patients comprised 61 boys and 45 girls aged between 6 and 15 years (mean age 8.3±2.2 years). There was no significant age difference between the sexes. As OAB symptoms, all children had DUI occurring more than weekly, which was the most frequent symptom, and 67 of them (67.9%) had nighttime bedwetting (occurring every night in 50 children (47%), twice to five times weekly in 15 (14%), and once a week in two (1.9%)). A history of pyelonephritis was found in 12 children (11%; 2 boys and 10 girls), and cystitis in 13 (12%; 4 boys and 9 girls). Constipation was detected in 31 children (29%; 7 boys and 24 girls) with a significant difference between the sexes, including 4 children with faecal incontinence (**Table 1**). VUR was newly detected in 32 children (30%; 34 ureters, 2 bilateral cases), and 74% of them were of slight severity. With regard to the VUDS findings, the mean functional bladder capacity of children with US, LB and BOO was significantly lower than that expected for age ($p<0.05$). Involuntary detrusor contraction was detected in 63 children (59%). In children with Norm and LB, the capacity was almost equal to that expected for age. However, children with LB had a significantly large post-void residual ($p<0.05$; mean 81 ml). Mean maximum flow rate (Qmax) in LB children was significantly lower than that in Norm children, and there was no difference in mean Qmax between BOO, US and DV. Mean detrusor pressure at maximum flow in US, DV and BOO children was significantly higher than that in Norm children ($p<0.05$; **Table 2**).

Concluding message

Our VUDS findings demonstrated that children with OAB who had not responded to first-line therapy had a wide range of pathological conditions, including a small-capacity bladder, IDC, low-grade VUR and a large post-void residual. Nighttime bedwetting, a history of UTI and constipation were significantly associated symptoms. VUDS is a relatively invasive and upsetting examination for children (3). However, more attention should be paid to the possible link between DUI, UTI, low-grade VUR and constipation when they accompany OAB, and VUDS should be applicable and available.

Table 1
Conditions of each group at the time of videourodynamic study

Groups	Norm	US	DV	LV	BOO	Unknown	Total
No. of pt	15	44	12	3	31	1	106
Bedwetting n (%)	8 (53.3)	30 (68.2)	8 (66.7)	3 (100)	18 (58.0)	0 (0)	67 (63.2)
History of UTIs n (%)	2 (13.3)	13 (29.5)	2 (16.7)	1 (33.3)	7 (22.6)	0 (0)	25 (23.6)
Constipation n (%)	5 (33.3)	14 (31.8)	5 (41.7)	2 (66.7)	5 (16.1)	0 (0)	31 (29.5)

Table 2
The videourodynamic findings of each group

	Norm	US	DV	LV	BOO	unknown
VV	245±84	164±90	130±69	223±173 (PVR =80)	162±77	636
IDC (n) (%)	0 (0)	30 (68.2)	9 (75.0)	2 (66.7)	22 (71.0)	0 (0)
P-Qmax	50±11	69±43	68±25	77±11	71±24	unknown
Qmax	23±13	16±8.9	13±7.6	5.8±3.7	13±5.6	18

VV= voided volume (ml); IDC =involuntary detrusor contraction; P-Qmax= detrusor pressure at maximum flow rate (cmH_2O); Qmax= maximum flow rate (ml/s); PVR= post void residual (ml).

Reference

1. Kajiwara M, Inoue K, Kurihara M, et al. The micturition habits and prevalence of daytime urinary incontinence in Japanese primary schoolchildren. J Urol 2004 **171**(1): 403-407
2. Norgaard JP, van Gool JD, Hjalmas K, et al. Standardization and definitions in lower urinary tract dysfunction in children. International Children's Continence Society. Br J Urol 1998; **81** Suppl 3:1-16
3. P. Abrams. Editional comment. Br J Urol 1995; **76**: 781-782