

## Association of Voiding Dysfunction with Functional Constipation

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To identify the frequency of voiding dysfunction in patients with functional constipation, dysfunctional voiding system (DVSS) was surveyed in 85 patients with functional constipation. Urinalysis, culture and renal ultrasound were performed in all cases. If the child had urinary tract infection, voiding cystourethrography and DMSA scan were performed. Fifty four patients (63.5%) out of 85 had voiding dysfunction (DVSS score above 6 in females and above 9 in males) compared to 28 out of 280 normal children (10%) in control group ( $P < 0.001$ ). Voiding dysfunction symptoms should be examined carefully in patients with functional constipation.

**Key words:** Child, Constipation, Iran, Voiding dysfunction.

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The urinary and lower gastrointestinal tract are anatomically and physiologically interdependent systems sharing common features including embryologic origin, passing through pelvic floor musculature and sacral innervations(1-3). Inappropriate contractions and imbalanced relaxation of pelvic floor muscle along with behavioral discrepancies in the absence of anatomic or neurological disease make a common pathway in which the final endpoint would be dysfunctional emptying in both systems, a condition known as dysfunctional elimination syndrome (DES)(2). Functional, non-organic constipation is frequently diagnosed in patients with DES and its role in dysfunctional voiding is highlighted(4).

Most studies have focused on urinary abnormalities in patients with DES(5-7), despite the fact that voiding dysfunction comprises a subset of the clinical picture of this syndrome(8). Resolution of bladder symptoms after successful treatment of constipation is also documented(9). Very few studies describe the presence of voiding dysfunction in

children with functional constipation(4). This prospective study was performed to identify the frequency of voiding dysfunction in patients with functional non-organic constipation.

### METHODS

The study group included 85 children with functional constipation referred to pediatric gastroenterology clinic of the Children Medical Center Hospital between April 2004 to March 2005. Functional constipation was defined as 2 or more weeks of a chain of symptoms including infrequent passage of stools, difficulty passing stools, feces that are large and hard or in small pieces, abdominal pain, palpable stool in the abdomen, and stool in the rectal vault, with exclusion of organic causes. The work-up included a thorough history and physical examination with attention to neurologic examination and anatomic anomalies to exclude organic causes of constipation. Relevant X-ray (plain films of sacral spine and MRI in selected cases) and a history of medications were obtained for each patient. Voiding

### WHAT THIS STUDY ADDS?

- Voiding dysfunction is common in children with constipation and all patients with functional constipation should be evaluated for urinary symptoms

cystourethrography (VCUG) was done in patients with UTI. In patients with history of pyelonephritis and/or vesicoureteral reflux, DMSA scan was done.

All patients were subjected to the dysfunctional voiding scoring survey (DVSS)(10). We used a modified version of DVSS, in which urinary records consisting of questions that enquired about incontinence, nocturnal enuresis, dysuria and other urinary symptoms were taken into account and symptoms related to constipation were excluded. Each question was scored on a 0 to 3 scale (0-never, 1-sometimes, 2-about half the time and 3-most of the time). A control group, consisting of 280 age and sex-matched normal children were surveyed using the same questionnaire.

The DVSS Scores were validated separately for boys and girls and those with a total score of 9 were diagnosed as having dysfunctional voiding with a sensitivity of 81% for boys and score of 6 or more with a sensitivity of 93% for girls(10). For all children, urinalysis and culture, and abdominal ultrasonography were performed.

The study was approved by the Ethics Committee of the University; informed written consent was obtained from the parents of the participants. Comparisons between control and patients groups were performed by appropriate tests; risk analysis was undertaken using odds ratio with 95% confidence intervals of differences.  $P < 0.05$  was considered significant.

### RESULTS

Of eighty-five patients with constipation, 60 (70.6%) were girls. The mean age of the patients was  $5.7 \pm 2.7$  yr. Fifty four (63.5%) patients had symptoms of voiding dysfunction (DVSS score above 6 in females and above 9 in males) compared to 28 out of 280 normal children (10%) in control group ( $P < 0.001$ ; odds ratio 15.74, 95% confidence interval 8.7-28.4)

Forty five (52.9%) patients had urinary tract infection and 36 (42.4%) had nocturnal enuresis. Ultrasonography revealed urinary residue  $\geq 10$  cc after voiding in 13 patients. On VCUG, 11 of 33 (33%) showed vesicoureteral reflux (2 bilateral and 9 unilateral). Of these 11 patients, 8 (72.7%) had voiding dysfunction. Nine patients had focal areas of reduced radiotracer uptake on DMSA renal scan.

### DISCUSSION

DES is a combination of urinary symptoms and gastrointestinal complaints. The anatomic proximity, the common neural pathways and the mutual passage through pelvic floor explains the dual involvement(2).

We found a high prevalence of voiding dysfunction in children who were primarily consulted for functional constipation. We found 54 patients (63.5%) to have symptoms of voiding dysfunction according to the DVSS scores. Compared to normal controls, this denotes a 15-fold increase of voiding dysfunction in patients with functional constipation. This high prevalence is consistent with other reports(11). Seventy five percent girls and 36% boys had symptoms of voiding dysfunction ( $P < 0.01$ ) and the male/female ratio for affected patients was 0.20. In contrast, in a study by Curran, *et al.*(12), this ratio was 0.6. The higher incidence of voiding dysfunction in our female patients could be attributed to cultural beliefs and improper training of voiding in girls that encourage them to avoid voiding in unfamiliar places.

Renal and bladder ultrasonography, showed urinary residue in 13 patients after double voiding, which was significantly higher in voiding dysfunction group ( $P < 0.05$ ). This finding is also reported elsewhere(13). Considering the high frequency of urinary tract infections and vesicoureteric reflux in our patients and other reports(14), combined treatment of constipation and

voiding dysfunction should be administered to this group of patients to eliminate bladder and bowel symptoms(4,14,15).

Our findings suggest that voiding dysfunction is common in children with constipation. All patients with a primary diagnosis of functional constipation should be systematically questioned for urinary symptoms.

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