

Evaluation of voiding dysfunctions in children with chronic functional constipation

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SUMMARY: Kasırğa E, Akil İ, Yılmaz Ö, Polat M, Gözmen S, Egemen A. Evaluation of voiding dysfunctions in children with chronic functional constipation. Turk J Pediatr. 2006; 48: 340-343.

There are controversial results about the role of dysfunctional bowel emptying in disorders of the urinary tract like urinary tract infection (UTI), vesicoureteral reflux (VUR) and enuresis. Constipation may cause UTI, enuresis and VUR due to the uninhibited bladder contraction.

The aim of this study was to investigate the frequency of nocturnal enuresis, UTI and instability symptoms in chronic functional constipation (CFC).

This study included 38 children with CFC and 31 children as the control group. Detailed past and present history of UTIs or symptoms pointing to this diagnosis, enuresis, encopresis, urgency and urge incontinence was obtained from both groups as well as the family history of UTI. Urinalysis, urine culture and stool parasite analysis as well as abdominal ultrasonography were performed on both groups.

Age range of the children with CFC was 6-192 months (mean±standard deviation (SD) 63.5±51 months); that of the control group was 4-180 months (mean±SD 82±46.2 months). Frequency of UTI and urgency was significantly higher in the CFC group. However, frequencies of urge incontinence, nocturnal enuresis, and genitourinary abnormalities were not different between the two groups.

In conclusion, risk of UTI and urgency is increased in CFC, but that of other voiding dysfunctions like urge incontinence do not change significantly. Therefore, we suggest that UTI and urgency should be questioned in children with CFC and vice versa.

Key words: chronic functional constipation, voiding dysfunction, children.

Constipation, which is defined on the basis of the frequency and discomfort of defecation, delayed intestinal transit and weight of the stool, makes up 3% of the chief complaints of all pediatric outpatient visits¹. Rectal distention in children with chronic functional constipation (CFC) is thought to cause obstruction on the bladder outlet causing detrusor instability^{1,2}. Some studies have suggested that constipation may cause urinary tract infection (UTI), enuresis and vesicoureteral reflux (VUR) due to the uninhibited bladder contractions²⁻⁵.

Moreover, distortion of the trigonal area may lead to failure of ureteral valve competence and therefore VUR⁵.

Bladder instability, infrequent voiding and the Hinman syndrome, termed as dysfunctional voiding, may adversely affect the urinary tract. However, as has been suggested previously, these form only a part of a spectrum of functional disturbances, which also include disordered bowel function. Therefore, all these are termed as dysfunctional elimination syndromes⁶. Furthermore, there are controversial results

about the role of dysfunctional bowel emptying in the disorders of the urinary tract like UTI, VUR and enuresis.

The aim of this study was to investigate the frequency of nocturnal enuresis, UTI and instability symptoms like urgency and urge incontinence in children with versus without CFC.

Material and Methods

The patient population of this study included 38 children with CFC (16 boys, 22 girls) and 31 children (16 boys, 15 girls) as the control group. CFC was defined as painful defecation with hard stools less than thrice a week for a duration of at least six months. Children with spinal or anal anomaly, Hirschsprung disease, and neurological, endocrinological or metabolic diseases were excluded from the study. The group of 31 healthy children who served as controls were selected from patients who presented with complaints other than those associated with urinary or gastrointestinal disorders like upper respiratory tract infection or asthma.

Detailed past and present history of UTIs or symptoms pointing to this diagnosis was obtained from both groups as well as the family history of UTI. Dysuria, pollakiuria, fever, loin pain, abdominal pain, hematuria and frequency were symptoms of UTI that were questioned. If history of constipation was present, enuresis, encopresis, urgency and urge incontinence were questioned. Urgency and urge incontinence were explained as a sudden desire to void, crossing of legs or squatting to avoid incontinence.

A detailed physical examination was performed on both groups searching carefully for spinal and genitourinary anomalies. Additionally, digital rectal examination was performed to evaluate anal tonus and anal sphincter reflex and to search for the presence of anal fissure or hard stool impacted in rectum. Urinalysis, urine culture and stool parasite analysis were performed on both groups in an attempt to identify UTIs as well as the parasitic infections. Moreover, abdominal ultrasonography was evaluated to detect genitourinary anomalies as well as the post voiding residual urine if present.

Statistical analyses were performed by SPSS 11.0 (Chicago, IL) computer program. Pearson's chi-square, Fisher's exact and Student's *t* tests were used. *P* values less than 0.05 were regarded as statistically significant.

Results

Age range of the children with CFC was 6-192 months [mean±standard deviation (SD) 63.5±51 months]; that of the control group was 4-180 months (mean±SD 82±46.2 months). Difference between the mean ages of the two groups was not statistically significant. Similarly, the numbers of boys and girls in the groups were not significantly different.

Frequency of UTI reported by the CFC and control groups was 42.1% and 19.4%, respectively, and the difference was statistically significant. Microorganisms identified in urinary cultures included *Escherichia coli* in 81.3% and 83.3% of the CFC and control groups, respectively, and *Klebsiella* spp. in 12.5% and 16.7%, respectively; *Enterococcus* spp. constituted 6.3% of the microorganisms identified in the urinary cultures of the CFC group.

Enuresis was detected in 8% of the control group, which was obviously less than in the CFC group (23.1%). However, the difference was statistically insignificant. Urgency was reported by 26.9% of the CFC group, which was statistically different from the 4% reported by the control group. However, difference in frequency of urgency incontinence was not statistically different between the two groups. Coexistence of urgency incontinence and enuresis was detected in 15.4% of the CFC group (Table I).

Abdominal ultrasonography failed to detect urinary tract pathology, and frequency of post voiding residual urine was not different between the two groups (12% and 15.4% in CFC and control groups, respectively) (Table I).

The frequency of parasitic infections in the CFC group was 5.4%, while none was detected in the control group. However, this difference was not statistically significant (*p*=0.49).

Discussion

Definition of constipation should address various issues like decreased frequency and increased discomfort during defecation causing distress⁷. CFC is further defined as constipation without an underlying abnormality for more than six months⁸. This is a common disease of childhood which is usually overlooked by parents and therefore is under-diagnosed and under-treated.

Table I. Clinical and Radiological Findings of the Study Groups

Symptoms	Groups				p
	CFC		Control		
	n	Positive (%)	n	Positive (%)	
UTI	38	16 (42.1)	31	6 (19.4)	<0.05
Enuresis	26*	6 (23.1)	25*	2 (8)	NS
Urgency	26*	7 (26.9)	25*	1 (4)	<0.05
Urge incontinence	26*	5 (19.2)	25*	0	NS
Coexistence of urge incontinence and nocturnal enuresis	26*	4 (15.4)	25*	0	NS
Residual urine detection in ultrasonography	33**	4 (12)	26**	4 (15.4)	NS

NS: Not significant. CFC: Chronic functional constipation. UTI: Urinary tract infection.

*Total number is less than the number of children included in the study groups because children who had not yet gained bladder control were excluded from the analysis.

**Ultrasonography could not be performed in all patients.

A relationship between functional bowel disorders and bladder function has been discussed in many previous researches. However, a precise causal relationship between constipation and voiding dysfunction as well as UTI has not been proven. The finding that an underlying functional bladder or bowel disturbance adversely affects the resolution of VUR and UTI has led to the use of a terminology such as dysfunctional elimination syndromes instead of dysfunctional voiding, underlying the interrelation of these two systems⁶. Common embryological origin, anatomical localization and innervation may lead to the interdependence of genitourinary and gastrointestinal tracts. Therefore, as underlined with the terminology of “dysfunctional elimination syndromes”, it is an expected phenomenon that children with defecation dysfunctions may also display symptoms of voiding dysfunction⁹. As has been demonstrated in previous studies, the pattern of dysfunctional elimination syndromes influences clinical outcomes, especially in the case of VUR. In the same study of children with VUR, breakthrough UTI was more common in the ones with constipation⁶. In this study, UTI was significantly more common in the CFC group. This is an expected phenomenon when the impact of colonic dilatation on the bladder leading to dysfunctional voiding patterns is considered¹⁰. Besides this mechanical aspect of the problem, the increased number of bacteria around the external urethral opening due to intensive fecal soiling should be considered¹¹.

It has been proposed that rectal distention due to fecal retention in CFC leads to a distortion in the bladder wall and base, and elongation

of the urethra causing mural irregularities. These factors may lead to the stimulation of the detrusor and dyssynergia. Additionally, distortion of the trigonal area of the bladder may cause ureteral valve incompetence and therefore VUR^{8,10}. Frequency of urgency was significantly different between the two groups. This may reflect the adverse effect of rectal distention on voiding function in CFC patients as well as the effect of a higher frequency of UTI since urgency is also a symptom of UTI. Urge incontinence, on the other hand, was not statistically significant between the two groups, but the p value (0.051) was near significance. Therefore, the lack of a statistically significant difference in urge incontinence was attributed in part to the number of the patients included in the study. Moreover, questioning mothers or the children themselves regarding the presence of urge incontinence might have led to more subjective results. In other words, mothers might not have paid attention or may not be willing to report this symptom. It should also be remembered that while bowel function affects bladder function, it does not have an absolute impact on voiding patterns. In other words, for voiding dysfunction to develop in constipated children, many other factors no doubt also contribute to the influence of constipation. In previous investigations, urodynamic studies have revealed uninhibited bladder contractions in children with recurrent UTI and nocturnal enuresis accompanied by constipation^{4,5,12}.

In this study, nocturnal enuresis was found to be more common in the CFC group, but the difference from the control group was not statistically significant. This finding contrasts

with the results of a previous study that reported a relationship between constipation and nocturnal enuresis; enuresis disappeared with treatment of constipation¹². However, nocturnal enuresis, which was found to have little or no association with fecal incontinence in another study, was claimed to be a true separate entity called monosymptomatic nocturnal enuresis⁹.

Another parameter investigated in both groups was detection of a urinary tract anomaly or postvoiding residual urine by ultrasonography. In contrast to the previous studies, no anomaly was detected in the study population. Major anomalies detected in previous studies included incomplete bladder emptying and pelvicaliceal dilatation^{8,13}. Romanczuk et al.¹¹ detected urinary anomalies in 20% of chronic constipated children. These children, some of whom had functional megacolon and elongated colons, had severe chronic constipation resistant to ambulatory treatment and required hospitalization. The urinary anomalies detected included VUR, functional disturbances, bladder and urethral deformities and hydronephrosis¹¹. This difference in results may be attributed to the difference in the severity of constipation as well as the age group of the study population.

In conclusion, risk of UTI and complaint of urgency are increased in CFC, but that of other voiding dysfunctions like urge incontinence do not change significantly. Therefore, we suggest that UTI and urgency should be questioned in children with CFC and vice versa.

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