

CHRONIC CONSTIPATION: A CAUSE OF RECURRENT URINARY TRACT INFECTIONS*

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SUMMARY: Romańczuk W, Korczewski R. (Pediatric Clinic, Institute of Clinical Medicine, Rzeszów, Poland). Chronic constipation: a cause of recurrent urinary tract infections in children. Turk J Pediatr 35: 181-188 1993.

In this study children hospitalized for chronic constipation were investigated for urinary tract problems. The study group consisted of 180 children, 62 girls and 118 boys, suffering from recurrent urinary tract infections. In a number of the patients, radiological and ultrasonographic examinations revealed various urinary tract anomalies. When patient presents with a problem of the urinary tract, it is necessary to consider constipation as a possible cause. In many cases the treatment of chronic constipation may be the most important remedy for pyuria, bacteriuria and enuresis.

Key words: chronic constipation, children, recurrent urinary, tract infection.

Colon disturbances comprise a variety of pathological processes occurring more and more often in everyday pediatric practice. It seems that constipation, either chronic or acute, is the most important problem in terms of colon pathology in children and adolescents. Nowadays this is a social problem resulting from the influences of civilization and family predispositions¹⁻⁴.

Despite the vast literature on the subject, constipation still remains a problem that has not been thoroughly investigated and is not fully understood. Most researchers tend to use the term "constipation" to describe the occurrence and difficult passage of hardened, dry stool. Constipation usually denotes fewer bowel movements than normal, although the term seems more suitable for denoting the kind of stool rather than the frequency of its passage^{1,3,4}. In Poland, chronic constipation in children includes habitual, functional constipation and that caused by different forms of hypoganglionosis and aganglionosis of the colon.

The classical complications associated with chronic constipation include: progressive loss of the urge to defecate; painful bowel movement; mechanical trauma of the anal mucosa caused by the passage of large amounts of hard feces through the anus; fecal soiling resulting from overflow; encopresis; and secondary changes in the anatomy of the colon (dolichocolon or considerable dilatation). However, more and more often, urinary tract problems accompany the condition. Not until the 60s and 70s did reports appear in the literature referring to recurrent

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urinary tract infections, incontinence or enuresis in children suffering from chronic constipation^{2,4-6}. The frequent occurrence of morphological anomalies such as hydronephrosis, vesicoureteral reflux, bladder and urethra deformities, and functional disturbances such as uninhibited bladder contractions, have also attracted the attention of investigators⁵⁻⁸.

In this paper we present observations concerning urinary tract anomalies in children hospitalized for chronic constipation resistant to ambulatory treatment.

Material and Methods

The current investigators studied children between the ages of 3 and 17 who were admitted to the Rzeszow Pediatric Clinic, between 1983 and 1989 for chronic constipation. The group comprised 180 children 62 girls and 118 boys (female to male ratio 1:1.9). The ratio of town children to those from the country was 1.2:1. The average observation period was 13.5 months, however in every case it was more than six months from the date the child was discharged from the hospital.

The diagnosis of chronic constipation was established on the basis of interview, clinical symptoms, physical examination including rectal palpation, and endoscopy of the large bowel, rectoscopy and/or sigmoidoscopy. In some cases, radiological examinations of the colon along with barium enema studies using double contrast, abdominal ultrasonography or pathomorphological examinations were done, histochemical specimens of mucosae and submucosae were obtained, or Quinton's probe or deep rectal biopsies were done during endoscopy of the colon.

After Hirschsprung's disease was ruled out and the functional character of the constipation was diagnosed, medical treatment included daily cleansing enemas often preceded by manual disimpaction of feces from the rectum, laxatives and purgatives. A high-fibre diet and a special bowel training program were also prescribed. The treatment also included consultation with a psychologist as well as the child's parents, who were educated as to the nature of the problem as well as treatment and prevention methods.

Detailed information was obtained pertaining to urological problems of each child. If recurrent urinary infections, enuresis and other miction problems were present, repeated general urinalysis and two bacteriological urine cultures were done to determine urea and creatine levels in the blood serum. Radiological examinations of the urinary tract, intravenous urography and miction cysto-ureterography were sometimes necessary. Since 1988, ultrasonographic study of the urinary tract in such patients has been routine.

Results

Within the investigated group of children with functional chronic constipation, an additional diagnosis of recurrent urinary tract infections was established in 41 girls (66%) and 30 boys (25%).

In 27 girls (44%) and 40 boys (34%) the interview revealed a history of enuresis. Tables I, II and III list the urinary tract abnormalities accompanying the intestinal disorders.

The patients were divided into three groups. The first group comprised children with the diagnosis of functional megacolon syndrome by endoscopic and radiological examination. The second group consisted of children with elongated colons or extra loops of the large intestine. The third group comprised children in whom no colorectal anomalies were found.

Table I: Urinary Problems in Children with Chronic Constipation
(Total: 180, girls: 62, boys:118)

	Children with chronic constipation					
	Grils		Boys		Total	
	n	%	n	%	n	%
Recurrent urinary tract infections	41	66.13	30	25.42	71	39.44
Enuresis	27	43.55	40	33.89	67	37.22

Table II: Girls with Chronic Constipation and Urinary Problems

Chronic constipation	N	EN	ER	UTI	UTI + ER	USG/RTG	PSYCHE
Functional megacolon	22	10	14 (63.6%)	12 (54.6%)	8 (36.4%)	4 (18.2%)	13
Dolichocolon	14	5	5 (35.7%)	12 (85.7%)	5 (35.7%)	4 (28.6%)	5
Normal colon	26	6	8 (30.8%)	17 (65.4%)	7 (26.9%)	5 (19.2%)	6
Total	62	21	27 (43.6%)	41 (66.1%)	20 (32.3%)	13 (20.9%)	24

Abbreviations:

N : Number of patients
EN : Encopresis
ER : Enuresis

UTI : Urinary Tract Infections
USG/RTG : Abnormal results of USG/RTC
PSYCHE : Psychological deviations

Table III: Boys with Chronic Constipation and Urinary Problems

Chronic constipation	N	EN	ER	UTI	UTI + ER	USG/RTG	PSYCHE
Functional megacolon	47	16	16 (34%)	11 (23.4%)	7 (14.9%)	5 (10.6%)	13
Dolichocolon	31	9	9 (29%)	8 (25.8%)	3 (9.7%)	5 (16.1%)	7
Normal colon	40	14	15 (37.5%)	11 (27.5%)	8 (20%)	8 (20%)	11
Total	118	39	40 (33.9%)	30 (25.4%)	18 (15.3%)	18 (15.3%)	31

Abbreviations:

N : Number of patients

EN : Encopresis

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UTI : Urinary Tract Infections

USG/RTG : Abnormal results of USG/RTC

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The following urinary tract anomalies were found in three girls and four boys with functional megacolon syndrome: ambilateral vesicoureteral reflux, dilatation of the pyelocaliceal systems (unilateral or bilateral), hydronephrosis with megaureter, decidedly increased echogeneity and indistinct parenchyma structure in both kidneys (Figs. 1, 2). Eight patients (4 girls, 4 boys) with elongation of the colon or with extra loops in the large intestine also had urinary tract anomalies involving



Fig. 1: Intravenous urography demonstrating hydronephrosis with megaureter.

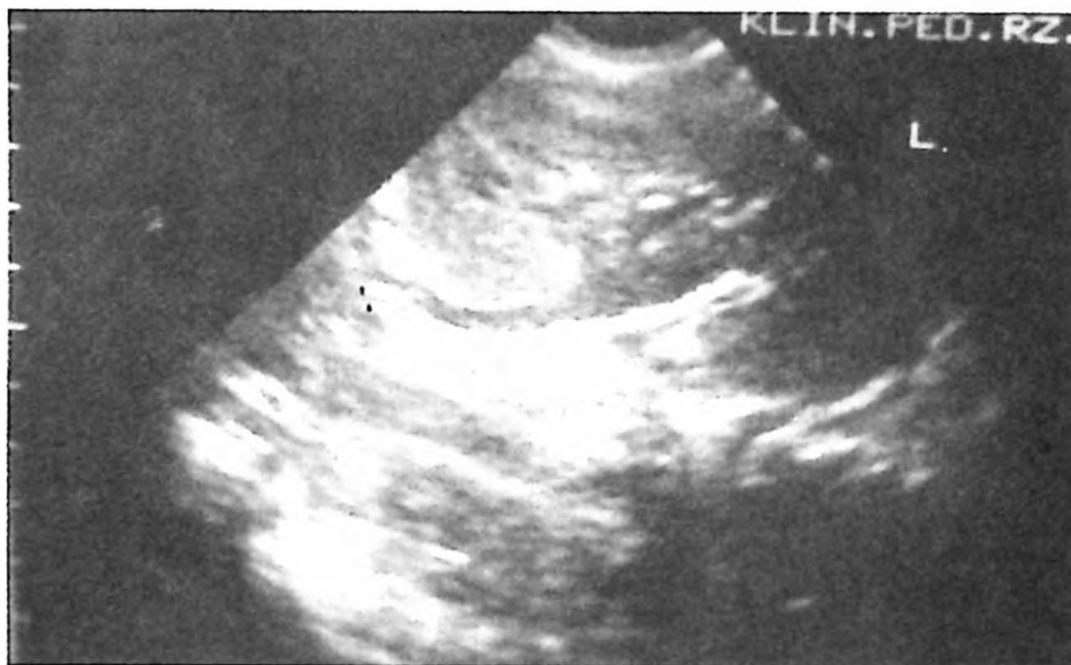


Fig. 2: USG demonstrating dilatation of the pyelocaliceal system in the left kidney.

ambilateral vesicoureteral reflux with simultaneous hypertrophy of the anterior lip of the bladder neck, and bilateral or unilateral dilatations of the kidneys' collecting systems. In one girl with dolichocolon, a lowered left kidney was also found. The greatest number of urinary tract anomalies was found in the group with no anatomic anomalies of the colon. All of the children suffered from chronic constipation which was believed to have a psychogenic origin since no other explanation could be found. Urinary anomalies were observed in as many as 20% of patients in this study. The most common anomalies were: explicit signs of urinary retention in one or both kidneys, and echogenic accumulation, shadows or deposits in the renal parenchyma.

Despite the long duration of colon and urinary problems, symptoms of functional disturbances of the kidneys were found in none of the cases under investigation. The kidneys of children functioned efficiently, and the blood urea and creatine concentrations were normal.

Discussion

Chronic constipation as an etiologic factor in recurrent urinary tract infections and enuresis in children has recently been discussed in the literature^{1,2,4-9}. In our study group of 180 children, persistent pyuria was found in more than 66% of girls and 25% of boys. In all cases, *E. coli* was the infecting organism responsible for the significant bacteriuria.

Researchers have reported a frequent association between recurrent pyuria and/or bacteriuria, and chronic constipation^{1,3,4,5,7,10}. The studies showed that

this association occurred in 13%¹ to 45%⁵ of patients, and, as in our group, girls were predominant (ratio of 2:1).

Enuresis was the most common complaint reported by parents on the children's admission to our clinic (27 girls and 40 boys). Enuresis most often occurred at night while the child was sleeping (64 children). Only one girl and two boys experienced diurnal enuresis. The prevailing type was secondary enuresis which recurred several months or even years after full control over miction was achieved. Various investigators have reported a similar ratio, although in none of the available sources did we find a clear distinction between the particular types of enuresis.

The considerable variety of developmental anomalies found in our study confirms earlier observations^{1,5,6,8}. Elongation of the urethra, irregularities in bladder wall contours, hydronephrosis, vesicoureteral reflux and anomalies in the base plate were the most frequent abnormalities found in Shopfner's study of 39 children aged 5-13 years in 1968⁶. On the basis of radiological and ultrasonographic examinations, we found such anomalies in 11 girls and 12 boys. The most frequent anomalies were hydronephrosis, dilatation of the pyelocaliceal system and vesicoureteral reflux.

The factors favorable to the development of recurrent urinary tract infections include, among others, an increase in the absolute number of bacteria in the region of the external opening of the urethra (e.g. with intensive fecal soiling), disturbances in miction causing easier bacterial penetration into the bladder lumen, and disturbances in the bladder's defense mechanisms caused by urine retention or increased endovesical pressure". All of these conditions occur in children suffering from chronic constipation and secondary fecal incontinence, and therefore are fully relevant to our investigation.

In advanced chronic constipation in children and infants, chronic urine retention and urinary tract infection may occur. Bentley² went so far as to say that chronic constipation may in some cases lead to terminal renal failure. We observed no such case, normal levels of urea and creatine suggested undisturbed functional efficiency of the kidneys.

A number of authors have tried to account for the frequent presence of urinary tract anomalies in patients with chronic constipation. The predominant view is that such anomalies are caused by chronic urine retention. The rectum, considerably overloaded with hard fecal masses, is said to exert direct pressure on the bladder, resulting in obstructive uropathy. The blockage leads to recurrent urinary tract infections and hydronephrosis. The phenomenon of irregular contours of the bladder and its displacement on x-ray was described by Neuman⁵ and Lloyd-Still⁴. However, another group of researchers see the disturbances in the process of maturation of the bladder base plate as the main cause of

hydronephrosis, vesicoureteral reflux and urethral elongation⁶. The plate is the most important part of the bladder because of its role in the mechanism of miction, producing the "triangle canal" which elongates the urethra towards the cephalad. When miction finishes, the walls of the triangle canal return to their primary position¹¹. In children with habitual constipation, the dilated rectum rests on the sacral bone and exerts pressure on the bladder. It undergoes compression and moves down below the pubic symphysis, and the base plate becomes cone-shaped and undergoes front and upper displacement. This makes the formation of the normal triangle canal and the intracystic segments of the ureters impossible. The final effect is the formation of bladder-ureter refluxes, vesicoureteral refluxes and hydronephrosis⁶. Chronic distention of the bladder secondary to urine retention caused by problems with miction only contributes to the formation of hydronephrosis in these cases.

The treatment of recurrent urinary tract infections and enuresis is often unsuccessful. In nearly half of patients, the infections linger and very often recur, despite intensive medical treatment. In these cases total regression of the renal problems may be achieved only after normalizing the activity of the colon. The results of a number of authors^{4,5,8}, as well as our own experience, confirm the significance of regulating bowel movements in the treatment of recurrent pyuria, bacteriuria and enuresis. This therapy consists of the use of certain chemotherapeutic agents, preferably in accordance with an antibiogram together with dietary regulations, a fiber-rich diet, bowel movement training and medicine to restore a proper bowel movement pattern (e.g. lactulose). It is sometimes necessary to use a more invasive approach, such as cleaning the bowel with enemas or manually disimpacting the colon clogged with feces.

Defective bladder activity and recurrent urinary tract infections cause gradually increasing damage to the upper urinary tract with progressive renal insufficiency. To make a detailed estimation of the urinary tract, it is necessary to do clinical, radiological and neurological examination. The neurological examination should determine the functional state of the muscles of the perineum, buttocks and lower extremities; the sensation within the perineum and the tone of the anal sphincters per rectum; the anal reflex; and the bulbo-cavernous reflex. A more detailed evaluation of the anal and urethral sphincters and the detrusor muscle may be obtained by electromyographic and urodynamic cystometry and uroflowmetry examinations^{5,8,11,12}. The considerable cost of the electromyographic and urodynamic methods encourages pediatricians to make more efficient use of their own assessment skills.

It is important to consider chronic constipation in every patient with a urinary tract infection. Unfortunately, this factor is often overlooked by doctors and parents, while radiological examinations of children with recurrent urinary tract infections are frequently not preceded by an examination per rectum. Doctors often opt for

cleaning of the bowels and artificial disimpaction of the colon instead of attending first to fecal impaction, the most significant symptom of chronic constipation. Urinary tract infections are observed not only in children with advanced and obvious constipation but also in children with latent problems of defecation. Therefore, in each case of functional disturbance of the colon, one must evaluate the urinary tract, and vice versa. Treating chronic constipation may often be the most important activity in the therapy of recurrent urinary tract infections and enuresis.

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