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## Relevance of Constipation to Enuresis, Urinary Tract Infection and Reflux

### A Review

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**Key Words.** Constipation · Urinary tract infection · Enuresis

**Abstract.** Little attention has been afforded the relevance of constipation to urinary symptoms. Problems of definition and measurement have contributed to this problem. A review of the literature suggests that rectal dilatation may influence the function of the urinary tract leading to urinary tract infection and enuresis. Our studies indicate that constipation may, by causing uninhibited bladder contractions, cause urinary tract infection, enuresis and vesicoureteral reflux.

The world of medicine has undergone revolutionary changes, with quantum leaps in information on various organ systems being realized in the last 3 decades. As a result, not only has specialization evolved concentrating on single organ systems, but the explosion of knowledge has been such that subspecialization based on elements within organ systems is commonplace. Attention by specialists is usually focused on adjacent organ systems only when infiltrative lesions are involved, distant derangements occur due to hormonal effects or toxin accumulation or when multi system organ dysfunctions occur due to systemic disease. Consequently in the field of nephrology relatively scant attention has been afforded to observations relating derangements in bowel function which might influence the function of the urinary tract system.

During the past 5 years we have focused our attention in our nephro-urology clinics to determining the relevance of constipation to pediatric problems associated with enuresis, urinary tract infection and vesicoureteral reflux. We review evidence substantiating a role for constipation in causing urinary symptoms.

Prior to puberty the pediatric abdominal and pelvic cavities are one. As a result the close proximity of the rectum to the posterior wall of the bladder is such that any gross distention of the rectum could therefore result

in compression of the bladder, bladder neck obstruction or distension of the urethra leading to abnormalities of urinary tract function [1]. Shofpner [2] in 1968 demonstrated that the presence of constipation has the potential for inducing gross distortion of the bladder and urethra in children. Though this report concentrated on radiologic evidence of distortion resulting from constipation, of note was the fact that of the 39 children studied, 8 had reflux, 21 also had enuresis and 2 had recurrent urinary tract infection. The relevance of these abnormalities to the constipation was not discussed. Neumann et al. [3] in 1973 noted the association of constipation and recurrent urinary tract infection in children. On occasion they also noted the presence of reflux in these constipated children and they indicated that the aggressive treatment of constipation resulted with its resolution of associated urinary tract infection. In addition these workers made the point that constipation was not sought commonly as a complaint because: (a) the doctors did not inquire; (b) bowel preparation prior to radiologic studies resulted in evacuation, eliminating radiologic signs of constipation, and (c) mothers did not volunteer the information because of either lack of

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knowledge of the presence of constipation or because it was not a dominant presenting complaint.

Progress in this field has been hampered by the lack of a standard definition of constipation. Also a method of measurement of rectal abnormality which would correlate with the presence of constipation and which was recordable and therefore free of observer bias was not generally available.

Progress in the past decade has enabled the development of methods and definitions which go some way to achieving these ends. We [4] therefore define functional constipation as being present if any of the following are present: (1) more than a 72-hour interval between bowel movements; (2) the presence of an overflow fecal incontinence (soiling or encopresis); (3) the passage of small hard scibalous stools with intermittent passage of large stools; (4) poor emptying and dilatation of rectal ampulla after defecation as determined by rectal examination, and (5) grossly decreased level of perception and increased tolerance of balloon insufflation in the presence of normal anorectal relaxation during rectal manometry, combined with any element of the above.

We performed rectal manometric studies using an air-filled balloon system. We noted the smallest inflation volume perceived by the patients, the volume at which relaxation of the internal sphincter occurred and the maximum inflation volume that was tolerated by the patients without pain or discomfort [5]. The diagnosis of constipation is a diagnosis to be made by a physician with appropriate questioning (quantity and quality of stools, frequency of defecation, etc.) and physical examination. A convenient way of avoiding being misled is to obtain a written record of stool frequency and quality at follow-up visits.

Similarly apart from radiologic studies, acceptable measurements and recording of bladder and urethral function under normal and abnormal conditions were generally not available. However, the advent of techniques to assess urodynamics has led to the identification of uninhibited bladder contractions as a common finding in children with urinary tract infection. The presence of uninhibited bladder contractions were determined by urodynamic studies using a DISA 1200 system [4]. Bladder instability was considered present if at least one of these elements were identified: (1) the presence of uninhibited contractions of the detrusor during the filling phase of the bladder with an amplitude equal or greater than 15 cm of water and (2) the occurrence of detrusor contraction at the end of or after urinary flow.

## Constipation and Urinary Tract Infection

Using these criteria for constipation and uninhibited bladder contractions we studied 47 children with recurrent urinary tract infections [6]. In all these patients follow-up urodynamic studies indicated uninhibited bladder contractions. They were also constipated. Enuresis was present in 32 and encopresis in 21. Aggressive treatment of the constipation resulted in cessation of infection in 44 of the 47 children, enuresis in 22 of 32 patients and encopresis in 20 of 21 patients and an improvement of bladder function as indicated by cessation of uninhibited contractions in 12 who underwent repeat studies. These results were achieved by appropriate dietary advice (increase fiber content) and by aggressive treatment of constipation utilizing a phosphate soda enema daily for 1 month, every other day for a further month and twice weekly or more often if required for a third subsequent month. This was in order to allow for return of normal rectal tone by a dilated hypotonic rectum. Of interest was that many of the patients studied had no prior history, or a history of constipation was denied. Normal bowel habits were perceived by patients and parents even in the presence of proven rectal reservoirs of feces by rectal examination and rectal manometry and on occasion even with encopresis. White and Taylor [7] have also noted the frequent presence of constipation with urinary tract infection as have Smellie et al. [8]. A retrospective analysis of the incidence of urinary tract infection in patients with Hirschprung's disease, a constipating entity, disclosed a much increased frequency of infection prior to and after surgery [9]. An increased incidence of bacteruria occurs in rats with fecal retention [10].

## Constipation and Enuresis

Therapy for enuresis presents a major problem for pediatric nephrologists and urologists. Psychologic stress inflicted on the patients by discomfort of bed wetting and by parental reaction is considerable. As a result numerous therapeutic modalities have been used including alarm devices and systemically acting drugs, none of which is completely satisfactory [11]. The exact etiology of enuresis is unknown. However, we did note a very high incidence of enuresis in girls with urinary tract infection and constipation [6]. The enuresis resolved upon treatment of constipation. We therefore studied 22 patients with enuresis [4]. We noted that in over 40% of these cases encopresis or soiling was also present but was considered a

minor symptom. By history, physical examination including rectal examination and rectal manometric studies, constipation was an extremely common though often unrecognized accompaniment of enuresis. These patients had uninhibited bladder contractions similar to that previously observed by Berger et al. [12] who also noted a decreased bladder capacity in relation to age in many of these patients, a phenomenon similarly noted by us. Aggressive treatment of constipation resulted in rapid resolution of enuresis without any form of pharmacologic drug therapy. Our studies strongly implicate unrecognized rectal distension as an etiologic factor in enuresis.

As previously stated, Shopfner [2] in discussing urinary tract pathology associated with constipation also noted that 54% of these patients were enuretic. Similarly Baumann and Hinman [13] described the treatment of incontinent boys with nonobstructive disease of the urinary tract. These children had encopresis and enuresis. Hypnotherapy was emphasized for the therapy of the enuresis. However, they did note that aggressive treatment of constipation including, if necessary, digital evacuation of the rectum was required prior to cessation of enuresis. This fact suggests to us that the constipation was the primary element in causing enuresis. We have also noted uninhibited bladder contractions in children who were constipated but did not have urinary symptoms [4]. Uninhibited bladder contractions in the absence of urinary incontinence can occur in situations in which urethral constriction can overcome the increased intravesical pressures induced by uninhibited contractions [14]. The presence of uninhibited contractions in otherwise asymptomatic but constipated children [4] suggests a cause and effect relationship. Drug therapy directed towards the suppression of uninhibited bladder contractions in enuretic [15] or refluxing patients [16] may be successful. However, aggressive treatment of constipation, a therapy directed against a common etiologic factor causing bladder abnormalities, may be more beneficial.

### Constipation with Vesicoureteral Reflux

Though little attention has been paid to the observation, constipation was noted to cause dilatation of the urinary system [16]. Dilatation of the urinary tract, especially the bladder, but also the ureters was noted by numerous authors to occur in association with Hirschsprung's disease [17-19]. In addition successful treatment of Hirschsprung's disease may result in resolution of the vesicoureteral reflux [20]. Kottmeier and Clatt-

worthy [21] noted a similar incidence of vesicoureteral reflux in children with severe functional constipation and those with Hirschsprung's disease. We noted constipation to be present in patients with primary vesicoureteral reflux [22]. Though numbers did not allow for a controlled study, we did note rapid resolution of reflux with aggressive treatment of constipation in the absence of antibiotic therapy, or anticholinergic therapy for treatment of associated inhibited bladder contractions. Similarly White [23] noted that resolution of infection with reflux is more easily attained when accompanying constipation is aggressively treated. These reports suggest that constipation is a nonfortuitous phenomenon occurring in patients with vesicoureteral reflux and may be of major etiologic importance. Consequently this phenomenon may be a major factor of contention in the interpretation of the medical-surgical prospective study of the International Study on Vesicoureteral Reflux since, in the medical protocol, avoidance of constipation is emphasized whereas this factor is not considered in the surgical approach to therapy [24].

Hinman [25] made note of the fact that the constipated child may have an evolution of encopresis leading to enuresis, to urinary tract infection and eventually to vesicoureteral reflux. Though the symptom complex was attributed by him to behavioral characteristics, perhaps constipation may be the initiating factor as resolution of reflux and enuresis followed therapy including treatment of encopresis [26]. The precipitating cause of constipation may be due to short episodes of psychologic stress (e.g., to early aggressive toilet training, to anal fissure, etc.), causes that may be long resolved but which, however, may result in persisting constipation.

Studies by Bailey et al. [27] noted a 55% incidence of abnormal anal sphincter electromyograms in children with enuresis and urinary tract infection. These observations substantiate the possibility that abnormalities of the rectum may cause enuresis, urinary tract infection and reflux in children. The observation that children with functional constipation may have uninhibited contractions of the bladder in the absence of urinary symptoms strongly supports this possibility. Because the rectal sphincter and the urethral sphincter, together with the perineal musculature is considered as a single physiologic unit, with voluntary rectal sphincter contraction, consequent concomitant urethral sphincter contraction occurs. This urethral sphincter contraction, in turn, may be responsible for a dyssynergistic voiding pattern with secondary bladder instability, enuresis, urinary tract infection, and/or vesicoureteral reflux possibly ensuing. Thus a

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- 6 O'Regan, S. bility, urina 154 (1985).
- 7 White, R.H. primary ves coureteric r 1984).
- 8 Smellie, J.N prophylacti Lancet ii: 1

spectrum of disease may exist of constipation with uninhibited bladder contractions in the absence of urinary symptoms or with enuresis, urinary tract infection and vesicoureteral reflux. Because of the high spontaneous resolution rate of vesicoureteral reflux, a long-term controlled trial of constipation treatment would be required to substantiate the thesis of a cause and effect relationship.

Since the intestinal transit time in children with functional constipation is normal, oral therapy alone directed to maintenance of an empty rectum is inappropriate [28]. Though we have achieved satisfactory success using phosphate soda enema therapy, factors of cost as well as patient discomfort and inadequate volume to achieve consistent and complete rectal evacuation have arisen. A more appropriate and satisfactory approach is the use of saline enemas (5 ml of salt in 1 liter of warm water). Using a bag held 2 feet above the patient an adequate volume will be infused under gravity. The incidence of cramps is less with this method [Murray, R., personal commun.].

The morbidity associated with enuresis, urinary tract infection and reflux is so high and constipation a condition easily amenable to resolution with aggressive therapy that extreme care should be exercised in determining whether constipation is present in children presenting with these complaints, so that therapy for constipation may be instituted and thus aid in the resolution of the urinary symptoms.

## References

- O'Regan, S.; Yazbeck, S.: Constipation: a cause of enuresis, urinary tract infection and vesico-ureteral reflux in children. *Med. Hypotheses* 17: 409-413 (1985).
- Shopfner, C.E.: Urinary tract pathology associated with constipation. *Radiology* 90: 865-877 (1968).
- Neumann, P.Z.; de Domenico, I.J.; Nogrady, M.B.: Constipation and urinary tract infection. *Pediatrics*, Springfield 52: 241-145 (1973).
- O'Regan, S.; Yazbeck, S.; Hamberger, B.; Schick, E.: Constipation a commonly unrecognized cause of enuresis. *Am. J. Dis. Child.* 140: 260-261 (1986).
- Meunier, P.; Mollard, P.; Marechal, J.M.: Physiopathology of mega rectum: the association of megarectum with encopresis. *Gut* 17: 224-227 (1976).
- O'Regan, S.; Yazbec, S.; Schick, E.: Constipation, bladder instability, urinary tract infection syndrome. *Clin. Nephrol.* 23: 152-154 (1985).
- White, R.H.R.; Taylor, C.M.: The non-operative management of primary vesicoureteric reflux; in Johnson, Management of vesicoureteric reflux, pp. 117-136 (Williams & Wilkins, Baltimore 1984).
- Smellie, J.M.; Katz, G.; Grüneberg, R.N.: Controlled trial of prophylactic treatment in childhood urinary tract infection. *Lancet* ii: 175-178 (1978).
- Yazbeck, S.; O'Regan, S.: Hirschsprung's disease and urinary tract infection: unrecognized association. *Nephron* 43: 211-213 (1986).
- Breda, G.; Bianchi, G.P.; Bonimi, U.; Piacentini, I.; Farello, G.: Faecal stasis and bacteriuria: experimental research in rats. *Urol. Res.* 2: 155-157 (1975).
- Kass, E.J.; Diokno, A.C.; Montealergre, A.: Enuresis: principles of management and result of treatment. *J. Urol.* 121: 794-796 (1979).
- Berger, R.M.; Maizels, M.; Moran, G.C.; Conway, J.J.; Firlit, C.F.: Bladder capacity (ounces) equals age (years) plus 2 predicts normal bladder capacity and aids in diagnosis of abnormal voiding patterns. *J. Urol.* 129: 347-349 (1983).
- Baumann, F.W.; Hinman, F.: Treatment of incontinent boys with nonobstructive disease. *J. Urol.* 111: 114-116 (1974).
- Koff, S.A.: Disordered vesico-urethral function in the pathogenesis of urinary infection and vesico-ureteric reflux; in Johnson, Management of vesicoureteric reflux, pp. 67-81 (Williams & Wilkins, Baltimore 1984).
- Smey, P.; Firlit, C.F.; King, L.R.: Voiding pattern abnormalities in normal children. Results of pharmacologic manipulation. *J. Urol.* 120: 574-577 (1978).
- Koff, S.A.; Murtagh, D.S.: The uninhibited bladder in children: effect of treatment of recurrence of urinary tract infection and on vesico-ureteral reflux resolution. *J. Urol.* 130: 1138-1141 (1983).
- Savage, J.P.: The deleterious effect of constipation upon the reimplanted ureter. *J. Urol.* 109: 501-503 (1973).
- Swenson, O.; Fisher, J.M.: The relationship of megacolon and megaloureter. *New Engl. J. Med.* 253: 1147-1150 (1955).
- Ehrenpreis, T.: Hirschsprung's disease, pp. 60-61 (Year Book Medical, Chicago 1970).
- Sieber, W.K.; Soave, F.: Hirschsprung's disease. *Curr. Probl. Surg.* 15: 14-15 (1978).
- Kottmeier, P.K.; Clattworthy, D.W.: Aganglionic and functional megacolon in children - a diagnostic dilemma. *Pediatrics*, Springfield 36: 572-582 (1965).
- O'Regan, S.; Schick, E.; Hamberger, B.; Yazbeck, S.: Constipation associated with vesico-ureteral reflux. *Urology* 28: 394-396 (1986).
- White, R.: Reflux nephropathy. Update: 1983. Discussion. *Contr. Nephrol.*, p. 249 (Karger, Basel 1984).
- Medical versus surgical treatment of primary vesicoureteral reflux: A prospective international reflux study in children. *J. Urol.* 125: 277-283 (1981).
- Hinman, F.: Urinary tract damage in children who wet. *Pediatrics*, Springfield 54: 143-150 (1974).
- Hinman, F.; Bauman, F.W.: Vesical and ureteral damage from voiding dysfunction in boys with neurologic or obstructive disease. *J. Urol.* 109: 727-732 (1973).
- Bailey, J.A.; Powers, J.J.; Wayeonis, G.W.: A clinical evaluation of electromyography of the anal sphincter. *Archs phys. Med. Rehabil.* 51: 403-408 (1970).
- Corazziari, E.; Cucchiara, S.; Staiano, A.; Romaniello, G.; Tamburrin, O.; Torsoli, A.; Auricchio, S.: Gastrointestinal transit time, frequency of defecation, and anorectal manometry in healthy and constipated children. *J. Pediat.* 106: 379-882 (1985).

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