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ORIGINAL ARTICLE

Lower urinary tract symptoms in chronically constipated women

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Abstract
Introduction and hypothesis The prevalence of lower urinary tract symptoms (LUTS) is as high as 66 % in the general population. Constipation rates of >30 % were reported among women with LUTS. We examined the association of chronic constipation to the occurrence of LUTS and, in particular, the relationship of LUTS to the type of constipation. We also examined the prevalence and association of pelvic organ prolapse (POP) to LUTS.
Methods In a retrospective survey of data collected on patients referred to our clinic during 2008–2009 for assessment of chronic constipation, 161 constipated women and 162 healthy female volunteers completed a structured questionnaire of urinary and bowel habits components (BBUS-Q22), the constipation scoring system for assessment of constipation severity and the Rome III component for IBS and chronic constipation. The constipated group underwent dynamic transperineal ultrasound.
Results Demographic data was similar in both groups. LUTS were more common in the constipated group (increased urinary frequency 34 % vs. 14 %, $p<0.001$, nocturia 31 % vs. 8 %, $p<0.001$, urinary urgency 53 % vs. 21 %, $p<0.001$, incomplete urinary emptying 24 % vs. 9 %, $p=0.003$ and urinary incontinence 21 % vs. 5 %, $p<0.0001$). Urinary symptoms did not vary between IBS and functional constipation. In addition, the occurrence of urinary symptoms was unrelated to the diagnosis of posterior pelvic organ prolapse (POP) in the constipated group.
Conclusions LUTS are common in constipated women, but are unrelated to the type of constipation. These findings may suggest that the constipation process may have a direct contribution to the occurrence of LUTS.

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Introduction

Chronic constipation is a common condition, reported by two thirds of middle aged women at least once a year, and in 12 % at least once a week [1–4]. Chronic constipation can be classified into functional and irritable bowel syndrome (IBS) related. [5]. Lower urinary tract symptoms (LUTS) are widespread conditions affecting 16 %-53 % of adult women [6–8]. LUTS can be divided into three categories: storage, voiding, and postmicturition [9]. Storage symptoms are believed to be correlated with underlying detrusor overactivity [10] and include increased micturition frequency, nocturia, urinary urgency, and urinary incontinence (UI) [11]. Voiding symptoms are correlated to impaired detrusor contractility and include slow or weak stream, hesitancy, and terminal dribble. Postmicturition symptoms include the sensation of incomplete emptying and postmicturition dribble [11]. Few uncontrolled retrospective cohort studies described high rates of anorectal dysfunction among middle aged women with LUTS, and constipation was reported in >30 % in this group. [12, 13].

The aim of our study was to examine the correlation between the occurrence of urinary symptoms and chronic constipation and to define possible causes for this correlation.

Methods

Patients and controls

The present study is a retrospective survey of data that has been collected on patients referred to our clinic between 2008–2009 for assessment and evaluation of chronic constipation. As part of their evaluation, all patients were questioned for constipation,

Table 1 Demographic and anthropometric data of constipation and control groups

	Constipation	Control	*P* value
Age	49±13	51±15	0.8
Number of deliveries	2.8±1.2	2.5±1.3	0.8
Prior pelvic surgery	37 %	35 %	0.8
BMI	25±3.7	25±4	0.9

irritable bowel syndrome and lower urinary symptoms. We used the Birmingham Bowel and Urinary Survey Questionnaire (BBUSQ-22) [14] for urinary and evacuation disorders, the constipation scoring system for assessment of constipation severity [15], and the Rome III module for irritable bowel syndrome (IBS) and chronic constipation [5]. We included in the constipation group only patients who had at least score of 15. As part of their evaluation, patients were assessed with dynamic transperineal ultrasonography (DTP-US) to evaluate defecation difficulty as previously reported by our unit [16, 17]. The control group consisted of healthy female volunteers. After granting informed consent, the control group was given the same questionnaires described earlier. The study was approved by the local ethics committee, and informed consent was obtained for completion of questionnaires without signature.

Clinical parameters and definitions

Functional constipation was defined as at least two positive symptoms of the following for a period of 3 months, with symptom onset at least 6 months prior to diagnosis: straining >25 % of the time, hard stool, unproductive call, infrequent stools (<3/week), or incomplete evacuation [5]. IBS is functional bowel disorder in which abdominal pain or discomfort is associated with defecation or change in bowel habits and with features of disordered defecation [5]. Increased urinary frequency is the complaint by the patient who considers that he/she voids too often by day. Urgency is the complaint of a sudden compelling desire to pass urine and is difficult to defer. UI is any involuntary leakage of urine. Stress urinary incontinence (SUI) is involuntary leakage on effort or exertion or on sneezing or coughing due to insufficient strength of pelvic floor muscles. Urge urinary incontinence (UUI) is involuntary leakage accompanied by or immediately preceded by urgency. Nocturia is when the individual has to wake at night one or more times to void. Feeling of incomplete emptying is a self-explanatory term for a feeling experienced by the individual after passing urine [18, 19].

Dynamic transperineal ultrasound (DTP-US)

DTP-US is readily performed after rectal cleansing with one enema. The examination is recorded to allow retrograde and orthograde scrolling and conducted using a curvilinear 5–8.5 MHz (B&K, Profocus Ultra View, Herlev, Denmark) probe after liberal application of acoustic gel to the perineum and instilling 10 ml intravaginally and 50 ml into the rectum. Anal examination is performed with the transducer initially applied transversely to the perineal body to identify the axial view of the anus using as the landmark the hypoechoic ring of the internal anal sphincter in an image similar to that obtained in the midanal canal using endoanal US. The transducer is then turned 180° to obtain a sagittal view of the contrast-filled rectum with extension of the hypoechoic internal anal sphincter appearing above and below the anal canal in profile. The anorectal junction is well seen with the bright hyperechoic

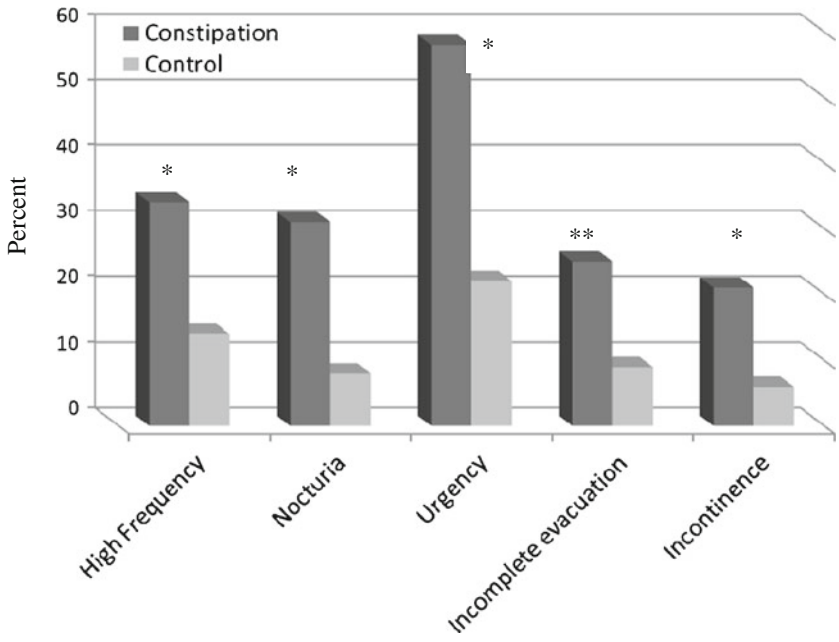

Fig. 1 Lower urinary tract symptom (LUTS) occurrence in the constipated and the control groups. *$p<0.0001$ **$p=0.0003$

Table 2 Comparison of lower urinary tract symptom (LUTS) occurrence between constipation-predominant irritable bowel syndrome (IBS-C), functional constipation, and control groups

	Number	High frequency	Nocturia	Urgency	Incomplete evacuation	Urinary incontinence
IBS-C	122	32(26 %)	37(27 %)	57(47 %)	24 (20 %)	26 (21 %)
Functional constipation	39	13(33 %)	17(44 %)	26(67 %)	15 (38 %)	8 (20 %)
Control	162	23(14 %)	13(8 %)	35(21 %)	15 (9 %)	9 (6 %)
IBS-C vs. control		0.017	<0.001	<0.001	0.001	0.001
FC vs. control		NS	<0.001	<0.001	<0.001	0.007
IBS-C vs. FC		0.8	1	0.6	0.2	0.8

IBS-C constipation-predominant irritable bowel syndrome, *FC* Functional constipation, *NS* no statistical significance

elliptical bundle of the puborectalis sling demonstrable in relief. The anal canal, already identified in the initial US sweep for landmarks is examined in more detail during forcible straining and simulated evacuation of the intrarectal acoustic gel. Here, definitive diagnoses may be made of a rectocele, intussusception, enterocele, or cystocele, with determination of rectocele depth and cystocele grade. All exams were performed and interpreted by a single physician (MBG). We regarded as significant and included in the study cystocele ≥ grade 2 [20], rectocele >2 cm [21], low-grade rectoanal intussusception [22], and deep enterocele.

Statistical analysis

Demographic data and occurrence of urinary symptoms were compared between the constipated and control groups. Another comparison of the occurrence of urinary symptoms was performed between IBS, functional constipation, and control groups. Further analysis was performed comparing urinary symptom occurrence and relation to pelvic anatomical abnormalities. Demographic data was checked for normality of distribution between the constipation and control groups by Student's *t* test. Analysis was conducted using the SPSS for windows program (16.0; SSS Inc., Chicago, IL, USA) with use of the chi-square or Fisher's exact probability test for dichotomous variables. *P* value<0.05 was reported as significant.

Results

We assessed 161 constipated women and 162 healthy women. DTP-US was performed on 100 % of the constipated study group. Age, body mass index (BMI), and parity did not significantly differ between the chronic constipation and control groups (Table 1). The diagnosis of storage symptoms and incomplete urinary evacuation was significantly more common in the constipated group (Fig. 1). Based on the Rome criteria, we subdivided the constipated cohort to constipation-predominant irritable bowel syndrome (IBS-C) (122, 67 %) and functional constipation (39, 33 %).The occurrence of LUTS was more frequent in the IBS-C and the functional constipation groups compared with the control group but not did not vary significantly between IBS-C and functional constipation (Table 2).

Significant POP observed on DTP-US consisted of rectocele >2 cm (46, 28 %), rectoanal intussusception (5, 3 %), enterocele (17, 10 %), and cystocele of at least grade 2 (77, 48 %). Of those, only the first three can presumably cause constipation by obstructive mechanisms. Twelve women had multiple organ prolapses: three had rectocele, enterocele, and intussusception, and nine had enterocele and rectocele. The occurrence of rectocele, deep enterocele, and rectoanal intussusception did not vary significantly between the IBS-C and the functional constipation groups (rectocele >2 cm in 25 % and 38 %; rectoanal intussusception in 2 % and 5 %; deep enterocele in 10 % and 10 %, respectively). Cystoceles were diagnosed more commonly in women with functional constipation (67 % vs. 43 %, $p=0.007$). LUTS were not associated with the diagnosis of POP on DTP-US (Table 3).

Discussion

Our main findings are that urinary symptoms are more common in constipated women than in normal volunteers

Table 3 Occurrence of lower urinary tract symptoms (LUTS) in constipated women with or without pelvic organ prolapse (POP)

	High frequency	Nocturia	Urgency	Incomplete evacuation	Urinary incontinence
POP ($n=51$)	21 (41 %)	37 (71 %)	29 (56 %)	13 (25 %)	13 (25 %)
NO POP ($n=111$)	62 (58 %)	80 (73 %)	56 (51 %)	27 (25 %)	21 (19 %)
P value	0.08	1	0.44	0.86	0.34

We included only women with POP that can cause constipation by obstructive mechanisms: rectocele >2 cm, deep enterocele, and low-grade rectoanal intussusception

but do not vary between women with IBS-C and functional constipation. In addition, we found that LUTS were not associated with the forms of POP diagnosed on DTP-US in constipated women. To the best of our knowledge, our study is the first to compare occurrence of LUTS in constipated and healthy women. Previous reports that looked into this association were observational and uncontrolled and usually investigated the occurrence of defecation disorders in women with LUTS [4, 12, 23, 24]. Although higher rates of chronic constipation were described in those studies, the range of urinary symptoms correlated with constipation was limited, with USI being the major symptom [4, 12, 23]. Our results demonstrate that not only are other storage symptoms common in constipated women, but postmicturation symptoms are also found frequently in this group. These findings suggest that both detrusor overreactivity and impaired detrusor contractility may be frequent in constipated women.

The relationship of constipation and LUTS may be explained by the close proximity of the rectum and urinary bladder, by the common sympathetic and parasympathetic innervations, and by the autonomic reflex interaction that prevails between the urinary bladder and the distal part of the gastrointestinal tract [25]. Distension of the rectum by stool impaction can press the bladder wall, causing bladder outflow obstruction. Additionally, overreactivity of the pelvic muscular floor resulting in dysfunctional elimination of stool and urine can be caused by bladder overactivity and bowel dysfunction [26].

The influence of POP on the occurrence of LUTS and constipation was examined previously, with conflicting results. Increased occurrence of LUTS, most commonly, SUI, was demonstrated in patients with significant posterior wall defects and prolapse [27, 28], and high-grade posterior compartment prolapse was found to cause bladder outlet obstruction by urethral compression [29]. POP, most commonly uterovaginal, was an independent risk factor for diagnosis of constipation in a few studies [4, 12, 13]. Yet in another study, constipation was found only in a subgroup of women with LUTS without pelvic anatomical abnormality [13]. In our study cohort of constipated women, there was no correlation between US diagnosis of posterior organ prolapse and LUTS. This finding can be explained by lack of any relationship between the occurrence of LUTS and the diagnosis of posterior POP in constipated women. Although constipation can be caused by pathologies causing mechanical obstruction (e.g., rectocele), it is more often a functional disorder. Constipated patients have frequent sensation of incomplete defecation and an urge to defecate, with recurrent defecations as a consequence. These symptoms may be the intestinal parallel of those of LUTS and might have the same pathways through mechanisms such as visceral hypersensitivity or hypervigilance. Obviously, we could not perform imaging studies on controls, and therefore we could not define the prevalence of POP in this group. Yet, the rate of diagnosis of POP in the study population was low, and it is unlikely that higher prevalence could be found in the control group. However, due to the lack of controls, this result should be interpreted with caution.

There is only scare data regarding the correlation of functional gastrointestinal diseases on the occurrence of LUTS. LUTS were previously described in a mixed cohort of IBS patients consisting of constipated and diarrheic women [30] but were not linked solely to constipation. Furthermore, urinary symptoms were found not to be correlated to the type of constipation (difficult stool passage vs decreased stool frequency and difficult stool passage) [13]. Our observation is similar, because LUTS were more common in the IBS-C and the functional constipation groups compared with to the control group but did not differ within subgroups.

Our study has limitations. First, selection bias is possible due to the retrospective design. Another is the lack of imagining studies in the control group, which made comparison of pelvic anatomical pathologies impossible. In conclusion, we found that urinary symptoms were common in chronic constipation patients and were not correlated to the type of constipation. Our results imply that constipation may have an impact on the occurrence of LUTS. Further, larger prospective studies are needed in order to define the specific relationship between urinary system abnormalities zand lower gastrointestinal tract dysfunction.

Conflicts of interest None.

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