Prevalence of urinary incontinence and other lower tract urinary symptoms in patients with uterine myomas

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Abstract

To study the prevalence and risk factors of the overactive bladder, urinary incontinence and other lower tract urinary symptoms in patients with uterine myomas, female patients with established diagnosis of the uterine myomas presenting to gynecology clinic were invited to answer a self-administered questionnaire, which included questions on evidence of lower urinary tract symptoms [modified Overactive Bladder-Validated 8-question Screener (OAB-V8)]. Demographic data, relevant medical and surgical history, and pelvic ultrasound findings were reviewed from the patients charts. Statistical significance of relationship between OAB, stress incontinence and urge incontinence in relation to body mass index (BMI), uterine volume and size of dominant myoma were analyzed using 2-taild exact Fisher test and Wilcoxon test. Ninty-eight patients (28 to 81 years) completed the questionnaire over a period of 3 months. The majority were premenopausal and had detectable myomas on ultrasound. OAB was present in 47.9% women. No significant statistical relation between size and volume of the uterus and overactive bladder, urge incontinence, stress incontinence and mixed incontinence was noted. Observation of OAB subtypes with urge and stress incontinence in premenopausal patients with uterine myomas was statistically significant in comparison with premenopausal women studied (60.8% *vs* 15.3 and 63% *vs* 6.8, respectively; P<0.001). Overall prevalence of OAB was similar in both groups. Our study showed the higher prevalence of overactive bladder than in the general population, however overall OAB prevalence related to fibroids did not show statistical significance. OAB-stress incontinence and OAB-urge incontinence subtypes were associated with uterine myomas.

Introduction

Numerous population-based surveys have been used to assess the prevalence of urinary incontinence, overactive bladder and other urinary tract symptoms using the 2002 International Continence Society (ICS) definitions.[1] One of the largest studies was conducted by Milsom *et al.* in Europe and Canada on 19,165 individuals and reported that the prevalence of storage lower urinary tract symptoms (LUTS) in women was 54.5%, voiding symptoms 19.5% and overactive bladder (OAB) 11.8%.[2] The National Overactive Bladder Evaluation (NOBLE) program in the US interviewed 5204 participants and assessed the rate of OAB among women to be 16.9%.[3] The study conducted in our community in the family medicine clinic revealed greater numbers of OAB, 46.4% in premenopausal and 41.8% in post menopausal women.[4]

It seems that the prevalence of urinary incontinence, OAB and other LUTS is underestimated in the clinical setting. No data exist on the prevalence of urinary symptoms among patients with uterine myomas visiting the gynecology clinic.

Design and Methods

Female patients with established diagnosis of the uterine myomas presenting to gynecology clinic were invited to answer a self-administered questionnaire. The modified questionnaire included 8 questions on evidence of lower urinary tract symptoms (LUTS) [Overactive Bladder-Validated 8-question Screener (OAB-V8)],[5] two questions on stress urinary incontinence (SUI), and one question on incomplete emptying of the bladder during urination. Responses were answered on a 6-point Symptom Bother scale ranging from 0 (not at all) to 5 (a very great deal). An additional question asked about the effect of urinary symptoms on quality of life (QOL), with answers ranging from 0 (delighted) to 6 (terrible). Demographic characteristics, relevant medical and surgical history, size of the uterus on the pelvic exam, ultrasound findings of uterine size, number of detected myomas and size of the dominant uterine myoma were reviewed from patient's charts. Patient characteristics and demographics were recorded and their weight and height were measured for calculating body mass index (BMI) (kg/m^2). The uterine volume was calculated using the ellipsoid formula (4/3)×pi×R(1)/2×R(2)/2×R(3)/2. The criteria for LUTS and explanation of OAB subtypes are included in Table 1. Patients were considered to have OAB if their OAB-V8 score is ≥8.

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The prevalence of specific LUTS and OAB subtypes were also analyzed. The Fisher exact test and Wilcoxon test were used to analyze statistical significance of association between OAB, urinary incontinence and uterine volume, size of dominant uterine myomas and BMI.

Results

Table 2 reports the characteristics of patients studied including age, sex, ethnicity, BMI, smoking, parity, prior surgical history, size of the uterus by pelvic exam, size of the detected myomas and OAB status. Patients ranged from 28 to 81 years, the majority were African-American women of which 85.7% were premenopausal and 11.2% were post menopausal of all surveyed. Further, 73.4% of all patients had ≥4 cm uterine myomas detected on ultrasound. Of these, 41% patients had uterine myoma greater than 6cm. Almost all dominant uterine myomas were intramural and anterior. The most often reported LUTS were nocturia 75.5%, urgency 67.3% and frequency 66.3%. SUI was present in approximately half of the patients and UUI in 34.7% (Table 3). As shown in Table 2, OAB was present in 47.9% of patients the vast majority of whom were premenopausal. OAB with urinary incontinence was present in 38 out of 47 patients. Table 3 shows the prevalence of OAB subtypes. The most often reported were OAB with urge incontinence (59.5%) and stress incontinence (63%). Furthermore, analysis of the 51 women without OAB shows that 39.2% reported frequency and 56.8% reported nocturia; urgency was present in 27.4%, UUI in 11.7% of these women, and SUI was present in 21.4%. It should be noted that of the 51 women without OAB, some had urgency and urge

Table 1. Criteria for lower urinary tract symptoms and overactive bladder subtypes.

	Identification criteria
LUTS	
Urgency	Answer ≥1 to any one of the three OAB-V8 questions on urge to urinate
Frequency	Answer ≥1 to any one of the two OAB-V8 questions on frequent urination
Nocturia	Answer ≥1 to the OAB-V8 question on nocturia
Urge urinary incontinence (UUI)	Answer ≥1 to one of the two OAB-V8 questions on urine leakage associated with urge
Stress urinary incontinence (SUI)	Answer ≥1 to one of the two questions on urine leakage associated with physical activities, sneezing, coughing, or laughing
Mixed urinary incontinence (MUI)	Meet the criteria for both UUI and SUI described above
Incomplete emptying	Answer ≥1 to the question on incomplete emptying
OAB subtypes (based on presence of above symptoms)	
OAB with frequency alone (OAB-F)	OAB-V8 score ≥8 with symptoms of frequency and/or nocturia only
OAB with urgency without incontinence (OAB-U)	OAB-V8 score ≥8 with symptoms of urgency without incontinence
OAB with urge urinary incontinence (OAB-UUI)	OAB-V8 score ≥8 with symptoms of UUI and no SUI
OAB with stress urinary incontinence (OAB-SUI)	OAB-V8 score ≥8 with symptoms of SUI and no UUI
OAB with mixed urinary incontinence (OAB-MUI)	OAB-V8 score ≥8 with symptoms of MUI

LUTS, Lower urinary tract symptoms; OAB, overactivebladder.

Table 2. Patients characteristics.

Characteristic, *n* (%)	Premenopausal (n=87)		Postmenopausal (n=11)		Total (n=98)	
Age, years						
25-34	10	(11.5)	-		10	(10.2)
35-44	32	(36.7)	-		32	(32.6)
45-54	45	(51.7)	3	(27.2)	48	(48.9)
55-64	-		6	(54.5)	6	(6.1)
65-74	-		1	(9.0)	1	(1.0)
≥75	-		1	(9.0)	1	(1.0)
Race						
Black	84	(96.5)	11	(100)	95	(97.9)
Hispanic	1	(1.0)	-		1	(1.0)
Wite	-		-		-	
Other/Not stated	2	(2.2)	-		2	(2.0)
Body mass index (BMI), kg/m²						
<24.9	21	(24.1)	0		21	(21.4)
25.0-29.9	26	(29.8)	6	(54.5)	32	(32.6)
30-34.9	20	(22.9)	3	(27.2)	23	(23.4)
35-39.9	7	(8.0)	0		7	(7.1)
>40	13	(14.9)	2	(18.1)	15	(15.3)
*History of smoking**						
Yes	3	(3.0)			3	(3.0)
No	95	(96.9)	0		95	(96.9)
Parity						
<2	44	(50.5)	1	(9.0)	45	(45.9)
2-4	38	(43.6)	7	(63.6)	45	(45.9)
>5	5	(5.7)	3	(27.2)	8	(8.1)
Previous surgical history						
Bladder surgery	0	--	0		--	--
Urinary leakage surgery	0	--	0		--	--
C-section	14	(14.2)	0		14	(14.2)
Myomectomy	7	(7.1)	0		7	(7.1)
Size of the uterus wks						
8-11	19	(21.8)	3	(27.2)	22	(22.4)
12-14	23	(26.4)	3	(27.2)	26	(26.5)
15-19	28	(32.1)	4	(36.3)	32	(32.6)
>20	17	(19.5)	1	(9.0)	18	(18.3)
Size of dominant uterine fibroids						
<3 cm	23	(26.4)	3	(27.2)	26	(26.5)
4-5 cm	29	(33.3)	3	(27.2)	31	(31.6)
>6 cm	37	(42.5)	3	(27.2)	41	(41.8)
OAB status						
Normal	41	(47.1)	10	(90.9)	51	(52.0)
OAB	46	(52.8)	1	(10.0)	47	(47.9)
OAB with UI	38	(43.6)	0		38	(38.7)
OAB without UI	7	(8.0)	1	(10.0)	8	(8.1)

incontinence but did not achieve a score of more than 8 on OAB V* validated questionnaires so they did not qualify and thus were not included in the OAB group for this study.

The distribution of differences in the size of the largest uterine myoma was analyzed in addition to the volume of the uterus and BMI in association of presence of OAB and urinary incontinence. This approach revealed that there is no significant statistical relation between size and volume of the uterus and overactive bladder, stress incontinence and mixed incontinence (Table 4).

The relationship of OAB subtypes in the premenopausal patient population surveyed was also assessed. As shown in Table 5, the prevalence of OAB in premenopausal women was 53.2% with a comparable representation of premenopausal patients with uterine myomas (52.8%). Of these premenopausal women, 59 out of 111 patients had OAB with urinary incontinence *versus* 46 out of 87 premenopausal women with uterine myomas. Comparison of OAB subtypes in these 2 groups, showed that the prevalence of OAB-urge incontinence and OAB-stress incontinence was at least fourfold higher in patients with uterine myomas (61% *vs* 15% and 63% *vs* 7%, respectively, P<0.001) (Table 5).

Table 3. Prevalence of LUTS and OAB subtypes in all patients with uterine myomas.

LUTS, N(%)	N=98
Urgency	66 (67.3)
Frequency	65(66.3)
Nocturia	74(75.5)
UUI	34(34.7)
SUI	50(51.0)
Incomplete emptying	35(35.7)
MUI	22(22.4)
OAB positive N (%)	**47(47.9)**
OAB-F	9(19.1)
OAB-U	0
OAB -UUI	28(59.5)
OAB-SUI	29(63.0)
OAB-MUI	18(38.3)
OAB negative N (%)	**N=51(52.0)**
Urgency	14(27.4)
Frequency	20(39.2)
Nocturia	29(56.8)
UUI	6(11.7)
SUI	21(21.4
MUI	4(7.8)
Incomplete emptying	13(13.2)

OAB, overactive bladder; LUTS, lower urinary tract symptoms; OAB-F, OAB with frequency alone; OAB-U, OAB with urgency without incontinence; OAB-UUI, OAB with urge urinary incontinence; OAB-SUI, OAB with stress urinary incontinence; OAB-MUI, OAB with mixed urinary incontinence; UUI, urge urinary incontinence; SUI, stress urinary incontinence; MUI, mixed urinary incontinence.

Discussion

There are no published data demonstrating the prevalence and management of OAB and LUTS specifically in patients with uterine leiomyomas. Findings in the literature are consistent with the studies focused on the outcomes of medical and surgical management of symptomatic uterine myomas. Most of the symptoms are described as having pelvic pain and abnormal uterine bleeding. The urinary symptoms are mentioned as urinary frequency and difficulty voiding as a result of compression on the bladder.[6,7] No objective screening tools for OAB and LUTS were used to compare the outcomes in symptom control.

One study of fourteen patients with uterine myomas[8] reported improvement of the frequency and nocturia after reduction of uterine size with pharmacological treatment but there was no difference in improvement of the urge and stress incontinence which was confirmed by cystometric and urethral pressure profile measurements. Another conclusion was that stress and urge incontinence were unrelated to uterine size. This study and our findings of significant association of OAB -SUI and OAB -UUI subtypes and uterine myomas would support the need for further investigation and specific treatment of urinary incontinence in patients with uterine myomas. The general belief in our patient community (that urinary symptoms related to fibroids would resolve after hysterectomy or myomectomy) are not supported by any study. Meta-analysis show that hysterectomy increases the odds for urge incontinence.[9] There is no relationship between hysterectomy and reduced SUI after hysterectomy, except for the patients who underwent surgeries to treat concurrent pelvic floor defects.[10,11] Based on the case reports only patients with large uterine myomas causing severe urinary retention[12] would benefit from surgical removal of myomas for urinary symptoms. Overall the prevalence of OAB and LUTS in patients with uterine myomas was higher than in the general population.[2] Similar findings were noted in a study of women in a family medicine clinic, however in those studies the subtype of OAB-MUI was higher than in our study.[4] SUI was more common than UUI in patients with leiomyomas, which is consistent with findings of higher SUI prevalence overall in other studies in the general population.[13,14]

Our investigation did not show association between BMI and OAB as previously reported.[2,4,14]

With respect to our assessment, limitations pertaining to patients' language barriers, cultural differences and trust issues should be considered when implementing a questionnaire-based approach. To this concern it should also be noted that self-selection bias may be present, given that patients with LUTS may be more inclined to complete the questionnaire than those without any symptoms. Nonetheless, measures were taken to assure comprehension and completeness of questionnaires by providing interpretation and help when completing the forms. Further studies, including prospective assessments and corre-

Table 4. Statistical relation between size and volume of the uterus and overactive bladder, stress incontinence and mixed incontinence.

	OAB	SUI	UUI	MUI
Body mass index	P=0.321	P=0.120	P=0.124	P=0.153
Max fibroid size	P=0.101	P=0.516	P=0.941	P=0.727
Volume of the uterus	P=0.580	P=0.310	P=0.275	P=0.175

OAB, overactive bladder; SUI, stress urinary incontinence; UUI, urge urinary incontinence; MUI, mixed urinary incontinence.

Table 5 . Prevalence of the OAB subtypes in premenopausal patients in a family medicine clinic and in patients with leiomyoma.

n (%)	Premenopause (n=111)	Premenopause with uterine myomas (n=87)	P
OAB positive	59 (53.2)	46 (52.8)	1.0
OAB subtypes			
OAB-F	2(3.4)	9 (19.5)	0.011
OAB-U	6(10.2)	0	0.035
OAB-UUI	9(15.3)	28(60.8)	<0.001
OAB-SUI	4(6.8)	29(63.0)	<0.001
OAB-MUI	38(64.4)	18 (39.1)	0.887
OAB with incontinence	51(86.4)	38 (82.6)	0.597

OAB, overactive bladder; OAB-F, OAB with frequency alone; OAB-U, OAB with urgency without incontinence; OAB-UUI, OAB with urge urinary incontinence; OAB-SUI, OAB with stress urinary incontinence; OAB-MUI, OAB with mixed urinary incontinence.

lations with objective testing algorithms, are warranted to determine the prevalence of females with incontinence and myomas and the types of urgency in different populations in order to increase physician awareness towards maximizing patient treatment.

References

1. Abrams P, Cardozo L, Fal M, et al. The standardization of terminology of lower urinary tract function: report from the standardization sub-committee of the International Continence Society. Neurourol Urodyn 2002;21:167-78.
2. Irwin DE, Milsom I, Hunskaar S, et al. Population based survey of urinary incontinence, overactive bladder, and other lower urinary tract symptoms in five countries: results of EPIC study. Eur Urol 2006;50:1306-14.
3. Stewart WF, Van Rooyen JB, Cundiff GW, et al. Prevalence and burden of overactive bladder in the United States. World J Urol 2003;20:327-36.
4. Cheung WW, Khan NH, Choi KK, et al. Prevalence, evaluation and management of overactive bladder in primary care. BMC Family Practice 2009;10:8.
5. Coyne K, Margolis M, Zyczynski T, et al. Validation of an overactive bladder awareness tool for use in the primary care settings. Adv Ther 2005;22:381-94.
6. Spies JB, Ascher SA, Roth AR, et al. Uterine artery embolization for leiomyomata; Obstet Gynecol 2001;98:29-34.
7. Spies JB, Bruno J, Czeyda-Pommersheim F, et al. Long-Term outcome of uterine artery embolization of Leiomyomata. Obstet Gynecol 2005;106:933-9.
8. Langer R, Golan A, Neuman M, et al. The effect of large uterine fibroids on urinary ladder function and symptoms. Am J Obstet Gynecol 1990;163:1139-41.
9. Van der Vaart CH, van der Bom JG, de Leeuw JR, et al. The contribution of hysterectomy to the occurrence of urge and stress urinary incontinence symptoms. BJOG 2002;109:149-54.
10. De Tayrac R, Chevalier N, Chauveaud-Lambling A, et al. Risk of urge and stress urinary incontinence at long-term follow-up after vaginal hysterectomy. Am J Obstet Gynecol 2004;191:90-4.
11. Miller JJ, Botros SM, Beaumont JL, Aschkenazi SO. Impact of the hysterectomy on stress urinary incontinence: an identical twin study. Am J Obstet Gynecol 2008;198:565.el-4.
12. Novi JM, Shaunik A, Mulvihill BH, Morgan MA. Acute urinary retention caused by a uterine myoma: case report. J Reprod Med 2004;49:131-2.
13. Hannensted YS, Rortveit G, Sandvik H, Hunskaar S. A community-based epidemiological survey of female urinary incontinence: Norwegian EPINCOT study. Epidemiology of incontinence in the county of Nord-Trondelag. J Clin Epidemiol 2000;53:1150-7.
14. Teleman PM, Lidfeldt J, Nerbrand C, et al. Overactive bladder: prevalence, risk factors and relation to stress incontinence in middle-aged women. BJOG 2004;111:600-4.