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Lower Urinary Tract Symptoms and Urodynamic Changes in Natural Menopause versus Surgical Menopause: A Comparative Study

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Abstract: Declining level of estrogen among the postmenopausal female patients leads to various urogynaecological problems. In this study we intend to compair the difference in the spectrum of urogynaecological problems among the surgical menopause and naturally occurring menopause. A total of 100 patients were studied (Group I: 50 naturally attained menopause patients and Group II: 50 patients with surgical menopause). After a detailed evaluation of their urogenital symptoms, all were subjected to urodynamic study (UDS) for confirmation of their lower urinary tract symptoms. The parameters were then statistically analyzed. Fifty patients in each of these groups were analyzed. The demographic profile was comparable in both the groups. Pruritus was most common genital symptom in Group I and vaginal discharge in Group II. Frequency was the most common lower urinary tract symptom (LUTS) in both the groups. On analyzing the LUTS, voiding symptoms were more common among both the groups, followed by storage symptoms and incontinence. Surgical menopause patients had more severe urodynamic features among those who presented with voiding symptoms. Of all the patients with storage symptoms, detrusor over activity was more common among the natural menopause group. Urinary incontinence incidence was similar in both the groups with urge incontinence was predominant in Group II and mixed incontinence in Group I. Except for some subtle differences, essentially the spectrum of urogenital problems is similar among both surgical and natural menopausal patients. Larger longitudinal studies are essential to validate these findings.

Keywords: lower urinary tract symptoms; menopause; urodynamics; bladder outlet obstruction; urinary incontinence.

INTRODUCTION

Lower urinary tract symptoms among post-menopausal females are a common identity and needs proper knowledge and assessment to address this wide spectrum of problems. Embryologically, the female genital tract and the lower urinary tract develop from the common urogenital sinus and hence the symptomatology of both the system seems to be intermingled. This is even more apparent among the postmenopausal female population where the declining estrogen levels tend to cause atrophic changes in the urogenital tract which in turn is associated with various lower urinary tract symptoms [1]. A proper history along with urodynamic evaluation needs to be done for evaluation of this urinary tract dysfunction. The spectrum of this urinary tract dysfunction tends to be different among the women who undergo menopause from surgical cause from those who attain natural menopause.

This study was conducted with the aim and objectives of documenting the urogenital complaints and their associated urodynamic changes in women after attaining natural menopause and also to compare the findings between these two groups.

MATERIALS AND METHODS

Fifty post-menopausal women who attained natural menopause and fifty women with surgical menopause who attended the Urology outpatient department in a tertiary care hospital between July 2015 and May 2017 with urogenital symptoms were recruited into the study. Institutional Ethical Committee clearance taken for the study and written informed consent taken from all the patients included in the study. The patients were assigned into two groups:

Group I: postmenopausal women with at least 12 months of amenorrhea having urogenital symptoms.
Group II: post-menopausal women after at least 12 months of surgical menopause after trans-abdominal hysterectomy with salpingo-ophorectomy with urogenital symptoms.

Patients with neurological disorders, diabetes, pelvic malignancies, malignancies with autonomic nervous system involvement and those on drugs affecting the urogenital system (eg. alpha blockers, anticholinergic and diuretics) were excluded from the study. Previously catheterized patients or those who undergone some surgical procedure for the urogenital symptoms were excluded. All the patients who were recruited were first time care seekers. An informed consent was taken from each of these patients prior to including them into the study.

Initial evaluation included a detailed history of their urogenital symptoms followed by detailed physical examination including the neurological, abdominal examinations and gynaecological evaluation along with digital rectal examination. Subsequently an urodynamic study was performed in all these patients for evaluation of their lower urinary tract symptoms after confirming a sterile urine culture and recording a proper two day voiding diary. The voiding diary recorded the frequency volume chart of the voiding pattern along with the timing of the micturation and also record the time and type of incontinence if present. As a part of their urodynamic assessment initially a noninvasive uroflowmetry was performed and repeated twice and the best recording was taken for evaluation. This was followed by a multichannel urodynamic evaluation according to recommendation of the International Continence Society (ICS). In the uroflowmetry the following three major points were recorded: total voided volume (VV), peak flow rate (Qmax), and total voided time (VT). The voiding pattern curve was also noted. Post void residual urine was calculated using ultrasonography. The following urodynamic parameters were recorded : first bladder sensation, maximum bladder capacity, intubated peak urinary flowrate (P Qmax), detrusor pressure at peak flow rate (Pdet Qmax), maximum detrusor pressure (Pdet max), uninhibited detrusor contractions, bladder compliance and any urinary leak points,

Results were analyzed using Student's t-test and Chi-square test. The values of $P < 0.05$ were considered as statistically significant.

RESULTS

One hundred patients were recruited in the study with fifty patients in each of the groups I and II as mentioned above and all initially presented for their lower urogenital problems. Majority of the patients belonged to the age group 51-60 years followed by age group 40-50 years. The mean age of the patients with natural menopause (Group I) was 52.98 +/- 4.62 and that of surgical menopause (Group II) was 52.16 +/- 5.12 and there was no statistical difference in the age group of the patients in both the groups.

The genital and the lower urinary tract symptoms were analyzed separately. The most common genital symptom was pruritus among Group I and vaginal discharge in Group II [Table 1].

Among the LUTS, frequency of urine was the most common symptom among both the groups (82% in Group I and 64% among Group II) [Table 2]

Based on the LUTS the patients were classified into three main categories: [Table 3]

- Predominant bladder outlet obstruction (BOO) or clinically obstructed (46% in Group I and 50 % in Group II)
- Predominant storage LUTS or clinically overactive bladder (26% in Group I & 20% in Group II)
- Urinary incontinence (28% in Group I and 30% in Group II).

Table-1: Distribution of genital symptoms

	NATURAL MENOPAUSE (50)		SURGICAL MENOPAUSE (50)	
SYMPTOMS	Actual numbers	Percentage	Actual numbers	Percentage
Dryness of vagina	13	26%	20	40%
Pruritus	23	46%	27	54%
Burning sensation	22	44%	26	52%
Vaginal discharge	14	28%	29	58%
dyspareunia	17	34%	25	50%

Table-2: Distribution of Lower Urinary Tract Symptoms

	NATURAL MENOPAUSE (50)		SURGICAL MENOPAUSE (50)	
SYMPTOMS	Actual numbers	Percentage	Actual numbers	Percentage
Frequency	41	82%	32	64%
Urgency	28	56%	31	62%
Sense of incomplete voiding	22	44%	20	40%
Straining	15	30%	25	50%
Hesitancy	11	22%	8	16%
Intermittency	10	20%	10	20%
Dysuria	9	18%	12	24%
Nocturia	29	58%	27	54%
Stress incontinence	10	20%	10	20%
Urge incontinence	16	32%	11	22%
Mixed incontinence	3	6%	6	12%

Table-3: Categorization and etiology of LUTS

TYPE OF LUTS		NATURAL MENOPAUSE		SURGICAL MENOPAUSE	
		ACTUAL NUMBERS	TOTAL (%)	ACTUAL NUMBERS	TOTAL %
BOO	PROLAPSE	16	23 (46%)	11	25 (50%)
	URETHRAL STRICTURE	7		14	
STORAGE	DO	9	13 (26%)	5	10 (20%)
	NORMAL	4		5	
INCONTINENCE	UI	7	14 (28%)	5	15 (30%)
	SUI	5		4	
	MI	2		6	

All the patients were subjected to urodynamic study for evaluation and confirmation of their LUTS.

There were a total of 48 clinically obstructed patients who underwent urodynamic evaluation. The most common etiological factor for bladder outlet obstruction (BOO) is genital prolapse among the naturally occurring menopause patients and urethral stricture is more common cause of BOO among the surgical menopause patients. Comparing these patients in both the groups, there was a significant decrease in the Qmax among the surgical menopause group (9.8+/-3.4 in surgical menopause vs. 12.32+/-4.2 in natural menopause ($p<0.05$)). Although there was statistically significant increased residual volume of urine and decreased Pdet Qmax was seen among the surgical menopause patients ($p<0.05$), the other urodynamic parameters (total voided volume, voiding time, first bladder sensation, maximum voided volume and maximum cystometric capacity) showed no significant difference among both the groups [Table 4].

Among the patients with storage symptoms,70% patient had demonstrable detrusor over activity (DO) in UDS among the naturally occurring menopause group as compared to 50 % among the surgical menopause group ($P<0.05$). However, when the individual parameters of UDS were compared among the storage LUTS patients in both the groups, there were no significant differences noted [Table 4].

The patients who had demonstrable DO had a significant higher Pdet Qmax ($p<.001$) and Pdetmax ($p<0.05$) and lower Qmax ($P<0.05$) in both the groups. However, when these parameters were individually compared between the two groups of patients (surgical vs. natural menopause); the values were comparable without any significant differences.

Urgency incontinence was more common among natural menopause patients (50% patients with incontinence) whereas mixed incontinence was predominant among the surgical menopause group (40%). Urodynamic study confirmed the clinical symptoms in all these patients. There was no significant difference in the UDS parameters of the patients with incontinence in both the groups [Table 4].

Table-4: Urodynamic findings in natural and surgical menopause groups

	BOO		STORAGE		INCONTINENCE	
	Natural	Surgical	Natural	Surgical	Natural	Surgical
Total voided volume (ml)	250.8	266.2	342.8	306.9	240.9	276.5
Peak Flow Rate (Qmax) (ml/s)	12.32	9.86	26.07	23.7	23.5	24
Residual volume(ml)	158.04	186.56	24.61	20.03	15.07	13.53
First bladder sensation(ml)	196.5	250.8	210.6	198.6	199.6	205.8
Maximum bladder capacity(ml)	449.43	472.8	364.61	353.4	320.35	323.4
Maximum voided volume(ml)	265.26	257.88	337.53	318.8	269.85	288.93
Pdet Max(cm of water)	45.39	40.96	38.69	37.7	40.97	35.26
Pdet at Qmax(cm of water)	37.08	31.52	26.46	25.5	27.78	24.33
Involuntary detrusor contractions (number of positive patients/ total patients	6/23	10/25	9/13	5/10	9/14	11/15

DISCUSSION

The mean age of menopause is about 59 years in general population [2]. A survey from India found that the mean age of natural menopause in India was 44.69 ± 3.79 years [3]. In our study the mean age of the patients was 52.54± 8.3 years. It usually takes about 5 to 6 years for the urogenital symptoms to develop among the post-menopausal females and hence the average age groups of menopause is similar to the study above mentioned and also in concordance with other similar such studies [4, 5]. There was also no significant difference noted in the age distribution among the two groups.

With menopause there is decreased circulatory estrogen and hence after a certain period, urogenital problems are commonly seen. In fact almost fifty percent of patients may be affected with genital and LUTS among these patients [6]. This is common among both the groups of population, those who attain natural menopause and also those who underwent total abdominal hysterectomy and salpingo-ophorectomy, resulting in surgical menopause.

In this study we intended to document and compare the lower urinary tract symptoms and genital symptoms along with the urodynamic study findings among post-menopausal female patient with surgical and natural menopause. Among the patients with voiding symptoms, genital prolapse was significantly higher among the natural menopause group ($p<0.05$) and urethral stricture was higher among the surgical menopause group ($p<0.05$).Though the clinical symptoms are of limited value in diagnosis of BOO in women, yet voiding symptoms such as inadequate stream, hesitancy, sense of incomplete voiding and straining can be suggestive of BOO [7].Among the cohort of BOO patients (48 patients), except for the symptom of straining which was significantly higher ($p<0.05$) among the surgical menopause patients (21 out of 25 patients) as compared to natural menopause patients (13 out of 23 patients) , the rest of the voiding symptoms were not significantly different among the two groups.

Like in men the voiding function is evaluated with pressure flow study using urodynamics [8]. The Qmax and the PdetQmax are the urodynamic parameters used in various normograms in diagnosis of BOO [9, 10]. No definite criteria have been laid down for diagnosis of BOO among females [11]. Nitti et al defined BOO as radiological sign of urethral occlusion along with sustained detrusor contraction of any amplitude in conjunction with a decreased flow rate [12]. Diokno et al suggested that detrusor pressure in excess of 60 cm of water and peak flow rate of less than 15 ml/sec should be accepted as obstruction in women provided there is video evidence of funneling of the bladder neck and relaxation of the urethral sphincter during voiding [13]. Blaivas and Groutz introduced the first nomogram for BOO in women. In their study, Qmax of <12 ml/s and Pdet Qmax of >20 cm were taken for BOO diagnosis. The nomogram also classified the degree of obstruction in the form of mild, moderate, and severe [14]. The classical picture of obstruction, by pressure-flow study, thus, is a low maximum urinary flow rate and a high voiding detrusor pressure. Chassagne et al showed that the best threshold for Qmax and PdetQmax derived from receiver operating characteristic curves to define obstruction in women was 15 mL/s and 30 cmH2O, respectively, with a sensitivity of 80% and a specificity of 70% [15]. Post void residue was also an important parameter in the urodynamic assessment of the patients with BOO.

In our study the mean Qmax among the BOO cohort was <15ml/sec and the mean PdetQmax was >30 cm of water. When we compared the urodynamic parameters among both the groups there were a significant decreased Qmax and increased post void residual volume among the surgical menopause group ($p<0.05$), however the Pdet Qmax was comparable in both the groups [Table 4]. Thus urodynamically the surgical menopause group had more severe BOO features. The cystometric filling phase showed a higher

value for first bladder sensation for surgical menopause patients than the natural menopause patients. Also the idiopathic detrusor contraction was more prevalent among the surgical menopause patients (10 out of 25 patients) as opposed to 6 out of 23 natural menopause patients. Even in the background of predominantly voiding symptoms, significant number of surgical menopause patients had coexisting urodynamic overactive bladder symptoms.

There were a total of 23 patients with predominant storage symptoms in the whole cohort of patients. Among the surgical menopause patients, only 20% patients had predominant storage symptoms with only 50% of them having proven urodynamic detrusor over activity. In contrast among the natural menopause group 26% patients presented with predominant storage symptoms with almost 70% of them having proven urodynamic detrusor overactivity. Therefore urodynamically proven overactive bladder was more prevalent among the natural menopause group. This is extremely significant as this would dictate the management difference among these patients. The other urodynamic parameters however were comparable among the storage LUTS cohort of both the groups.

The prevalence of postmenopausal urinary incontinence is between 16% and 29% and urge urinary incontinence, in particular, occurs more frequently after the menopause [16, 17]. Aging is clearly a significant factor in the pathogenesis of urinary incontinence, but the evidence seems to indicate that menopause and estrogen deficiency are also implicated [18].

In our study the incidence of urinary incontinence was similar in both the groups. Urgency incontinence was most common type in the natural menopause patients (7 out of 14 patients) and mixed incontinence was more common among the surgical menopause patients (40%). Urodynamic parameters were similar in both the groups except for a higher incidence of detrusor over activity among the surgical menopause group (73%) as compared to natural menopause group (64%).

CONCLUSION

The declining estrogen levels with aging put the post-menopausal women at risk for various urogynaecological dysfunctions that can affect the quality of life. Good history along with physical examination and urodynamic study delineate the appropriate diagnosis and thus help in proper management of these patients. Postmenopausal status can be attained either naturally or because of surgical intervention. Except for a few subtle differences, essentially the symptomatology and the urodynamic parameters are essentially similar among both these groups.

The limitation of this study is that it is a cross-sectional analysis of the urogynaecological problems of the patients. A longitudinal study with a long term follow up may be helpful in delineating any further differences among these groups.

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