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EVALUATION OF BOTHERSOME UROLOGICAL SYMPTOMS IN PERIMENOPAUSAL WOMEN ATTENDING GYNAECOLOGY CLINIC AND ITS CORRELATION WITH URODYNAMIC FINDINGS

Obstetrics & Gynaecology

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ABSTRACT

Aim: To evaluate the patient coming with urological symptoms and to provide a pathophysiological explanation by correlating the patient's symptoms with the urodynamic findings. **Materials And Methods :** A crossectional observational study analysing urodynamic study (UDS) findings of perimenopausal women presenting with lower urinary tract symptoms (LUTS) with American Urological Association (AUA) score >8. A detailed history of diabetes, neurological disease, drug history and pelvic surgeries taken followed by physical examination and urodynamic assessment. **Results :** In total **102** patients belonged to age group between 40 to 50 yrs of age were studied where **84%** had storage dysfunction followed by voiding dysfunction in **16 %.** In the storage dysfunction group majority **42.8** % had overactive bladder (OAB) followed by Mixed Urinary Incontinence(MUI) **35.7%** and Stress Urinary Incontinence(SUI) **21.5%** .Mean MCC (Maximum Cystometric Capacity) of continent was **500** ml and of UUI (Urgency Urinary Incontinence) patients having significantly reduced **333** ml. 76 patients had showed Idiopathic detrusor activity in their UDS findings of which **52%** had Terminal Overactivity and **24%** had Phasic Overactivity. Patients with incontinence was categorized to MUI **39.4%** followed by **36.8%** had UUI and **23.6%** had SUI. In the Voiding Dysfunction group , **62.5%** had Detrusor Underactivity and **37.5 %** had features of BOO(Bladder Outlet Obstruction). BOO was further categorised to early, compensated and late grades based on Q_{max} (Peak flow Rate) & $P_{det}@Q_{max}$ (Detrusor Pressure at peak flow velocity) In this study we had **66.7%** compensated BOO and rest had late BOO. **Conclusions :** Bothersome LUTS decreases quality of life in females in perimenopausal age group. Despite relative invasiveness of UDS, patients with bothersome LUTS in perimenopausal age group needs good history, physical examination along with urodynamic study for proper evaluation of patients which helps in appropriate diagnosis and management.

KEYWORDS

Perimenopausal, LUTS, urodynamic study, Bladder outlet obstruction, Incontinence

INTRODUCTION:

Perimenopause is the period of time during which a women passes from reproductive to non-reproductive stage during which menstrual cycles progress from a regular ovulatory and predictable pattern to irregular anovulatory cycles to eventual cessation of menses [1]. The mean duration of the menopausal transition is 2-8 years except of only 10 % woman ceased menstruating abruptly without any prolonged irregularity[2]. As the ovarian follicles decreases and become resistant to pituitary gonadotropins with increase in age, this stage is characterized by altered ovarian function where hyperestrogenism is seen followed by hypoestrogenism with decrease luteal phase progesterone excretion[3]. So the menstrual cycle change prior to menopause marked by elevated FSH level (>20IU/ML) despite continuous menstrual bleeding with slightly elevated level of Estradiol[4].During menopausal transition and subsequent menopause , there will be atrophic changes in vagina and lower urinary tract due to hormonal deficiency and down regulation of estrogen receptors as they share common embryological origin[5]. As well as loss of muscle tone and laxity of the ligaments namely Pubourethral, Cardinal and Arcus tendinous fascia pelvis will lead to uterine descent, pelvic relaxation, hypermobility of the bladder neck for which more than half of women will experience urological symptoms in this stage[1,6,7].Common urological problems which we encountered in gynaecology outdoor patient department like urinary incontinence, urgency, frequency, nocturia [7] .**Urinary incontinence** is mostly divided into 2 main subtypes, **Stress Urinary Incontinence (SUI)** and **Urgency Urinary Incontinence (UUI)** that either occur in isolation or they cooccur termed as **Mixed Urinary incontinence (MUI)**[8]. **LUTS**(Lower urinary tract symptoms) has a significant impact on quality of life, in terms of wearing protection or changing undergarments several times a day [7] and they are very commonly associated with embarrassment, anxiety and depression with less social interaction[9,10,11,12]. Many patients with LUTS suffer for an extended time before seeking medical attention due to embarrassment, financial concerns. [13,14]. Symptomatic evaluation of lower urinary tract dysfunction is difficult as bladder is known to be an "unreliable witness" because of subjective bias between physician and patients. So we have done urodynamic study**(UDS)** to investigate those problems which will help in clinical decision making[15], and to assess the correlation between urological symptoms with underlying pathophysiology.

MATERIALS AND METHODS :

This crossectional observational study on the LUTS in perimenopausal woman was conducted in a tertiary care hospital in India, from January 2021 to June 2022. 102 patients of AUA score >8 were included excluding those who are not ambulatory, having neuropathy, diabetes mellitus, malignancy, on anticholinergic, antipsychotic, antidepressant, alfa adrenergic medications. Ambulation is needed to do UDS specially in voiding phase to do flow cystometry. Diabetes Mellitus, Neurological diseases and use of such medication may reduce bladder sensation. In cases of malignancy infiltration of cancer cell or use of radiation may lead to alteration of bladder function.

After ensuring sterile urine culture and proper consent, Urodynamic study was done in HERMES Video Urodynamic Machine (ALBYN MEDICAL). With a constant communication, the following points were noted like (first sensation of bladder filling, first sensation to void, strong desire to void, urgency) .Patients were asked to void next. During voiding phase the flowmeter attached with urodynamic instrument gave the values of flow rate, voided volume, voiding time, maximum flow rate (Qmax) and Pdet at Qmax. Postvoidal residual value along with the other values was recorded on a defined urodynamic report card.

For statistical analysis data were entered into a Microsoft excel spreadsheet and then analyzed by SPSS (version 27.0) and Graph Pad Prism version 5. Data had been summarized as mean and standard deviation for numerical variables and count and percentages for categorical variables. Z-test (Standard Normal Deviate) was used to test the significant difference of proportions. *p*-value was obtained using a table of values from Student's t-distribution. P-value ≤ 0.05 was considered for statistically significant.

RESULTS

Out of these 102 patients in between 40-50 years with bothersome LUTS, majority 84% had storage dysfunction among which 42.8 % had overactive bladder followed by Mixed Urinary Incontinence (35.7%) and Stress Urinary Incontinence (21.5%) which is statistically significant at p<0·05. Among the OAB group 77.8% associated with leakage ie. OAB wet.

In the Voiding Dysfunction group, 62.5% had Detrusor Underactivity and 37.5 % had features of BOO. BOO was further categorised to early, compensated and late grades based on Qmax & Pdet @Qmax . In this study, we had 66.7% compensated BOO and 33.3% had features of late BOO [Figure1]

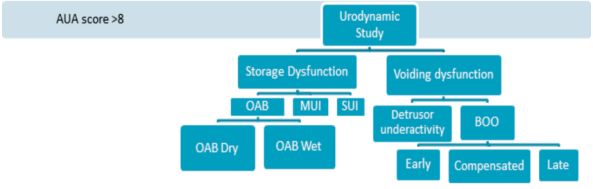

Figure 1: Classification of urological disorders in Urodynamic Study:

Majority of the patients 80 % had preserved bladder sensation with 10 % of patients had increased and 10 % had decreased bladder sensation. Among the patient with OAB, 52% had Overactivity Near Cystometric Capacity and 24% had Phasic Overactivity with a p value<0.003.Patients with incontinence were classified as MUI 39.4% followed by 36.8% had UUI and 23.6% had SUI [Table 1]

Table 1: Urodynamic Parameter Of Patients With Urological Symptoms

	Number	Mean	SD	Minimum	Maximum	Median
AUA Symptom Score	102	10.4000	4.2857	8.0000	21.0000	9.0000
MAX Cytometric Capacity	102	633.8400	325.2882	140.0000	1006.0000	518.0000
Voided volume	102	579.2200	342.7769	0.0000	1006.0000	475.0000
QMAX	102	17.3000	7.2654	0.0000	32.0000	18.0000
PVR	102	68.3200	106.3140	0.0000	410.0000	11.5000
Pdet @Qmax (cm/H2O)	102	36.4600	25.7010	0.0000	97.0000	25.0000
Voiding Time	102	53.1224	30.2652	8.0000	152.0000	62.0000
Time To MAX Flow	102	13.1800	14.8017	0.0000	58.0000	8.0000
BCI score	102	118.5600	39.9746	27.0000	185.0000	114.0000

Mean MCC of continent was 500 ml and of UUI patients having significantly reduced Mean MCC was 333 ml with a p <·0001 [Table 2].

Table 2 : Comparison Of Maximum Cystometric Capacity Among The Patients With Incontinence

		Number	Mean	SD	Minimum	Maximum	Median	p-value
Max Cystometric Capacity	Continent	2	500.2000	265.1070	140.0000	954.0000	455.00	<0.0001
	MUI	40	948.8000	221.5346	148.0000	1006.0000	1006.0	
	SUI	21	698.5556	270.0820	322.0000	1006.0000	684.00	
	UUI	37	333.6364	120.5374	226.0000	512.0000	252.0000	

DISCUSSION

In 1994, **LUTS** term was introduced to describe patient's symptoms without describing the cause of the symptoms[16,17]. There is large number of females among Indians between adulthood to menopause who presents with genitourinary symptoms. The symptoms are predominantly that of storage dysfunction symptoms, urinary incontinence and bladder emptying dysfunction symptoms [18,19].As compared to above studies, in our study, a significant number (84%) of patients presented with bothersome symptoms predominantly of storage dysfunction symptoms.

The National Overactive BLadder Evaluation (NOBLE) Program was initiated in 2003 to better understand the prevalence and burden of overactive bladder in a broad spectrum of the United States population >18yrs age where they have found the prevalence of OAB 16.9 % and prevalence of urge incontinence increases with age from 2 -19% with marked increase after 44 years of age[20] . The role of aging clearly appears from the increasing of complaint of urgency and occurrence of both detrusor overactivity and detrusor hypocontractility in the older age group of patients[21]. As our study population is mainly focused on perimenopausal age group with a mean age of 47 years, we found on UDS examination 42.8 % patients of the storage dysfunction group have detrusor overactivity and majority of them about 77 % associated with Urge Incontinence. As OAB was found to be more prevalent in this study, this have a great impact in future research of effectiveness of available pharmacological options and emergence of surgical options.

Women with complaints of urinary incontinence, especially those for whom surgery is contemplated, should undergo complete urodynamic evaluation when it is available [22]. In a normal UDS, strong desire to void starts when bladder filled with 500 ml[23], as we found mean MCC in our study population was 633.84 ml. Mean MCC was much lower in UUI (333ml) from continent (500ml) and SUI (698ml) which is also consistent to study results done by Geynisman-Tan [24].

Elmissiry et al showed that the maximum flow rate (Qmax) and detrusor pressure at maximum flow rate (Pdet@Qmax) are the two urodynamic parameters that are used in nomograms for the diagnosis of BOO and the threshold of these two parameters derived from receiver operating characteristic curves to define obstruction in women was 15 mL/s and 30 cmH_2O, respectively, with a sensitivity of 80% and a specificity of 70% [25]. In a large retrospective reviews of women referred for evaluation of LUTS, 2.7%–8% had urodynamic evidence of BOO[26] which is consistent with our study results as we got 6% cases of BOO in our study patients. However in 2017 in the UDS of postmenopausal women with bothersome LUTS, Choudhury et al categorised 45% women as clinically obstructed and 62% had established BOO [18].

In females with BOO can be classified into three groups [1] Early (Q_{max} of >15 ml/s and $P_{det}Q_{max}$ of <30 cmH_2O) [2] Compensated (Q_{max} of >15 ml/s and $P_{det}Q_{max}$ of >30 cmH_2O) [3] Late (Q_{max} of <15 ml/s and $P_{det}Q_{max}$ of >30 cmH_2O)[31]. Among the perimenopausal patients diagnosed with BOO, we found 66.7% compensated BOO and 33.3% had features of late BOO. However a study done among postmenopausal patients where 37.1% patients belonging to early BOO, 31.1% each in compensated BOO, and decompensated BOO each[18].

According to expert opinion, detrusor pressure greater than 60 cm H2O associated with a Qmax less than 10 mL/s is said to be urodynamically obstructed[23]. As in our study we only found 16% of voiding dysfunction, in which 37.5% had BOO , our mean Pdet@Qmax was 36.46 cm H2O and Qmax was 17.3ml/sec respectively. Only 10 patients out of 50 had detrusor underactivity that explains mean BCI of our study population came 118 (within normal range 100-150). This 10 patients were managed by intermittent self-catheterisation.

This study has potential limitations. Many of study subjects were found to have Urinary tract infection because of age related changes in the vagina and alteration of natural defense mechanism and they were excluded from this study.

CONCLUSIONS

Bothersome LUTS decreases quality of life in females in perimenopausal age group. Proper diagnosis and treatment of these bothersome LUTS is of utmost importance in these female population which require good history, physical examination along with urodynamic study. Flow cystometry may be an alternate to UDS but this has limitation in diagnosing and categorisation of storage dysfunction. For patients with SUI was mostly offered with surgical management whereas detrusor overactivity was managed with pharmacological treatment. Patients with MUI underwent surgical treatment after properly aware of their need for drugs post surgery. Patients with detrusor underactivity were made to learn about intermittent self catheterisation.

However this is an observational type of study, further research is needed in broader and diverse population.

Conflict Of Interest :
There are no conflicts of interest

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