ROLE OF URODYNAMIC TESTING IN THE EVALUATION OF PERSISTENT URINARY INCONTINENCE IN POSTMENOPAUSAL WOMEN

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ABSTRACT

AIM

To evaluate the importance of Urodynamic assessment in postmenopausal women for confirmation of the type of Incontinence, which is valuable in guiding the management by conservative or surgical measures.

MATERIAL AND METHODS

This is a multicentric prospective study conducted from Nov 2010 - May 2012 on 88 postmenopausal women who presented with complaints of Urinary Incontinence at Outpatient dept. of Tertiary Teaching Hospital, Govt. Maternity Hospital, Petlaburz, Hyderabad and at Hyderabad Nursing Home, Basheerbagh, Hyderabad. Out of 88 patients who were recruited and evaluated, 26 patients responded to initial management and the remaining 62 patients were enrolled for Urodynamic study but 3 patients deferred and lost for follow up. UDS was conducted in these 59 patients, cystoscopy was optional and essential in 5 cases and hence it was performed in these cases.

Methods and units of multichannel conventional UDS used in this study maintained the standards recommended by the international continence society. Filling, voiding cystometry and uroflowmetry was done.

RESULTS

The distribution of the patients in our study according to age, parity, BMI, Literacy and mode of delivery were analysed. The presence of precipitating factors (1 or more), associative with cystocele and history of prior surgeries were also recorded. In our study out of 59 patients, Detrusor underactivity (37.28%) were seen in maximum number of patients followed by mixed incontinence (25.42%) and OAB (18.64%). Clinical experience and the literature suggests that older women have decreased detrusor contractility, increase in OAB and mixed incontinence and decrease in pure stress symptoms. Our results support this statement.
In our study UDS has completely changed the course of management in many cases and guided us to specific and appropriate treatment. Established voiding and continent centres have advised that these patients should thoroughly evaluated with UDS and their treatment should be individualized according to their symptoms with team approach.

CONCLUSION

Urodynamic study is gold standards in evaluation of urinary incontinence which guide us for specific management with better results. UDS provide enough information for treatment decision and prognosis in cases of UI. Research is critically needed to provide data that will allow better understanding of the unique nature of this urologic disease in these older postmenopausal women.

KEYWORDS

Urinary Incontinence (UI), Urodynamic Study (UDS), Quality of Life (QOL), Overactive Bladder (OAB, Body Mass Index (BMI).

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INTRODUCTION

Urinary incontinence is underdiagnosed and undertreated all over the world. It is a common distressing medical disorder that effects approximately 50% of women during their lifetime. It is associated with significant decrement in function and Quality of Life (QOL) of women.[1,2] Incontinence has a larger economic impact than many chronic conditions and diseases.[3]

INCIDENCE

The overall incidence all over the world in post-menopausal women was 30-40%. A 3.5 million in UK, 13 million in USA suffer from urinary incontinence according to 2012 census.

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It is three times more common in women than men. According to International Continence Society and American Urological Society the definition of urinary incontinence is "The complaint of any involuntary loss of urine that is a social or hygienic problem."[4]

Five types of incontinence (Abram et al., 2002, 2009b)

- Stress Urinary Incontinence.
- Urge Incontinence (OAB).
- Overflow Incontinence (Results from underactive detrusor muscle or bladder outlet obstruction).

(OSCEs) which can assess the student's all three domains cognitive, psycho-motor and affective.

The objective of this study was to assess the perception of the students and faculty members about Objective Structured Clinical Examinations (OSCEs) in General Medicine. Sandvik Severity Index Scoring System was used to characterize the degree of urinary incontinence taking into consideration both the amount and frequency as parameters.[5,6]

SCORE	AMOUNT	FREQUENCY
1)	FEW DROPS/SMALL AMOUNT	MORE THAN MONTHLY
2)	MODERATE/LARGE AMOUNT	MONTHLY
3)	_	WEEKLY
4)	_	DAILY

Score is calculated by (1-8)	= AMOUNT (1-2)	X	FREQUENCY (1-4)
Grading by score			
MILD	1-2		
MODERATE	3-4		
SEVERE	6-8		

This score is comparable with PAD weighing test: MEAN PAD WT (gm./24hrs).[7]

MILD	: 2-14GMS
MODERATE	: 15-30GMS
SEVERE	: 31-65GMS

Urodynamics is "The dynamic study of the pressure flow relationship between the bladder and urethra for the purpose of defining functional status of the lower urinary tract."
The role of Urodynamics in clinical practice was explained by Hooker and Colleagues (2009).

1. To identify type of bladder dysfunction, overactive (Causing failure to store) or underactive (Causing failure to empty) or bladder outlet obstruction in incontinence women.
2. To predict the consequence of lower urinary tract dysfunction on the upper urinary tract.
3. To understand the reasons for failure of previous treatment.
4. To predict the outcome of treatment.

Types of Urodynamics

1. Conventional Multichannel UDS
2. Ambulatory UDS
3. Videourodynamics.

Limitation of Conventional UDS are

It is performed under unphysiologic circumstances in special laboratory. This strange and hostile environment may influence micturition or incontinence significantly. Ambulatory UDS is used to overcome these problems and is more physiological and is done through many natural filled void cycle.[8,9] Videourodynamic evaluation uses fluoroscopy with concurrent measurement of bladder and urethral pressure, which gives simultaneous evaluation of structure and function. It is a procedure of choice for documenting bladder neck dysfunction.

ADVANTAGES OF VIDEOURODYNAMICS

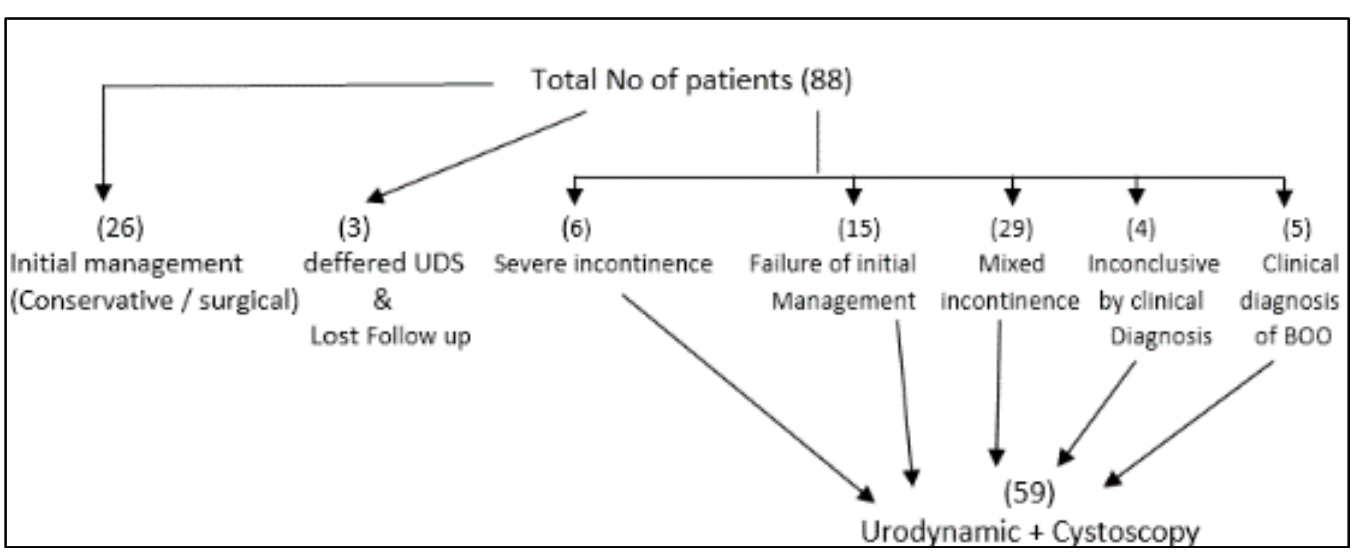
1. No need for EMG routinely.
2. Sphincter and bladder neck can be evaluated fluoroscopically throughout bladder filling and during stress maneuvers.
3. Is method of choice when diagnosis cannot be made on conventional UDS in evaluation of female incontinence.
4. Precisely diagnose intrinsic sphincter deficiency, urge incontinence and urethral hypermobility.

DISADVANTAGES OF VIDEOURODYNAMICS

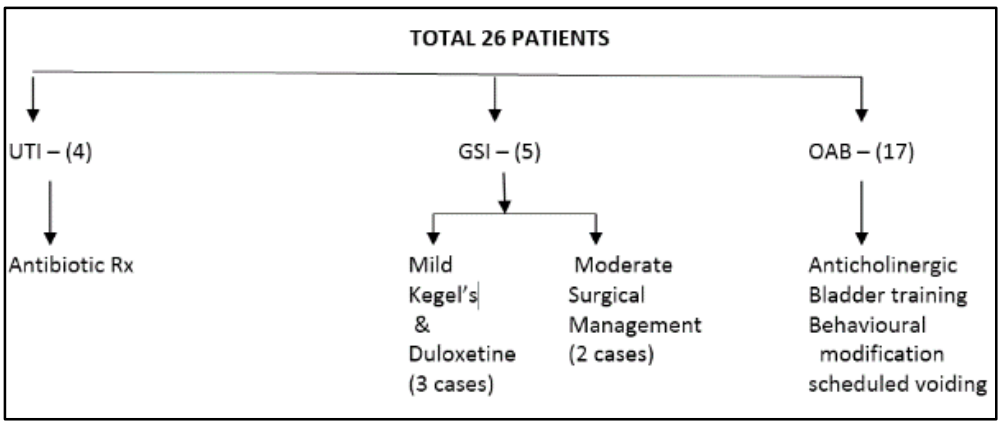
1. Costly.
2. Not available at all centres.
3. Radiation due to usage of fluoroscopy.

MATERIAL AND METHODS

This is a multicentric prospective study conducted from Nov 2010 - May 2012 on 88 postmenopausal women who presented with complaints of Urinary Incontinence at Outpatient Dept. of Tertiary Teaching Hospital, Govt. Maternity Hospital, Petlaburz, Hyderabad and at Hyderabad Nursing Home, Basheerbagh Hyderabad. Out of 88 patients who were recruited and evaluated, 26 patients responded to initial management and the remaining 62 patients were enrolled for Urodynamic study but 3 patients deferred and lost for follow-up. UDS was conducted in these 59 patients, cystoscopy was optional and essential in 5 cases and hence it was performed in these case.



Treated with Initial Conservative/Surgical Management



In lines of Sandvik index scoring system, we categorized degree of incontinence and managed.

Degree of urinary incontinence

		Initial conservative / initial surgery Medical management	Urodynamic study
Mild	48	26	56 (3 DEFERRED UDS)
Moderate	34		
Severe	06	-	06

Initial conservative management is mandatory before going for UDS in mild and moderate degree of UI.[10] If definite diagnosis of Genuine Stress Incontinence is established by history, appropriate conservative/surgical management can be tried before taking up for UDS.[10,11] UDS is recommended before any decision of surgical correction of urinary incontinence other than GSI and in case of surgical failure, failure of initial management, to investigate mixed, complicated and severe urinary incontinence.[11,12] 32.95% of the postmenopausal women in our study reported with symptoms of mixed urinary incontinence. This is similar to one large French study, where 49% reported with mixed urinary incontinence symptoms.[13]

All these postmenopausal women with urinary incontinence were evaluated with thorough history taking utilizing incontinence specific questionnaire, fluid intake/urinary voiding diary for at least 2 days, detailed examination of neurological and urogenital system, Bonney's test for Stress Urinary incontinence. Later diagnostic tests like CUE and URINE C/S and USG TAS/TVS, post-voidal residual urinary volume estimation were done.

Inclusion Criteria

1. Persistent urinary incontinence even after initial conservative medical management for 3 months.
2. Mixed incontinence.
3. Severe incontinence as per scoring.
4. Failed previous incontinence surgery.

Exclusion Criteria

1. Cerebrovascular accident.
2. Spinal cord injury/any spinal surgery.
3. Parkinson's disease.
4. Multiple sclerosis.
5. Carcinoma of bladder.

Method and Components of UDS

Written informed consent was taken from all these patients Methods and units of Multichannel Conventional UDS used in this study maintained the standards recommended by the International Continence Society.[14] Filling and voiding Cystometry was done with the patient in a sitting position.

Bladder was filled at a rate of 50ml/min. A 6-Fr triple lumen transurethral was inserted into the urethra, a 5-FR rectal balloon catheter was inserted at the anus to measure abdominal, intravesical and detrusor pressures at resting, filling and voiding. Electromyographic electrodes were attached at both sides of anus to measure striated perineal muscle (External) sphincteric activity.

In filling cystometrogram first, strong desire to void, Valsalva leak point pressure, pressure/volume relationship (Compliance), filling volume (Bladder capacity) were noted. During voiding, pressure in the Bladder (Detrusor pressure at Q-max) and urine flow rate while emptying (Pressure-flow studies) were measured.

Then Uroflowmetry was conducted when the patient felt a normal desire to void and rate of urine flow over time (Q-max), urethral pressure profile, time to Q-max, total voiding time, voiding volume were analysed. Later on post-voidal residual urine volume was measured as assessment of bladder emptying.

RESULTS

The distribution of the patient in our study according to age, parity, BMI, Literacy and mode of delivery were analysed. (Tables-1.2.3.4.5)

Age in Yrs.	No. of Cases	Percentage
45 – 50	04	6.45%
51 – 60	24	38.70%
61 – 70	27	43.54%
> 70	7	11.29%

Table 1: Age

Incidence of urinary incontinence increases linearly with age. Increase in severity of UI with age in our study is similar to the pattern seen in the Norwegian study.[15]

	No. of Cases	Percentage
Nulliparous	6	9.67%
Primipara	8	12.90%
Multipara	41	66.12%
Grand Multipara(> 5)	7	11.29%

Table 2: Parity

The incidence of urinary incontinence is high in multiparous individuals (66.12%) than in Nulliparous women (9.67%)

	No. of Cases	Percentage
22 – 25	15	24.19%
25 – 30	23	37.09%
30 – 35	21	33.87%
> 35	03	4.83%
Table 3: BMI		

	No. of Cases	Percentage
Literate	48	77.41%
Illiterate	14	22.58%
Table 4		

Most of the patients in our study were educated and belongs to socio economic status class IV.

	No. of Cases	Percentage
Vaginal	44	70.96%
Difficult vaginal forceps/vaccum	04	6.45%
Caesarean	14	22.58%
Table 5: Mode of Delivery		

The presence of precipitating factors (One or more), association with cystocele and history of prior surgeries were also recorded (Tables 6,7,8)

Chronic Constipation Chronic Cough	5
Smoking / Alcoholism	04
Anxiety & Depression	12
Medical co-morbidity	24
Pelvic organ prolapse	28
Table 6: Precipitating Factors	

Diabetes is the main comorbid condition we observed in our study.[16] Out of 62 patients, prevalence of POP was seen in 28 patients, De Boer and Collega (2010) reported a higher prevalence of OAB in patients with POP than those without POP.[4] Another study which was done on 4103 women by Lawrence et al 2008 found prevalence of 60%.

Approximately 40% of patients with POP had describe stress urinary symptoms (Grody 1998).[4]

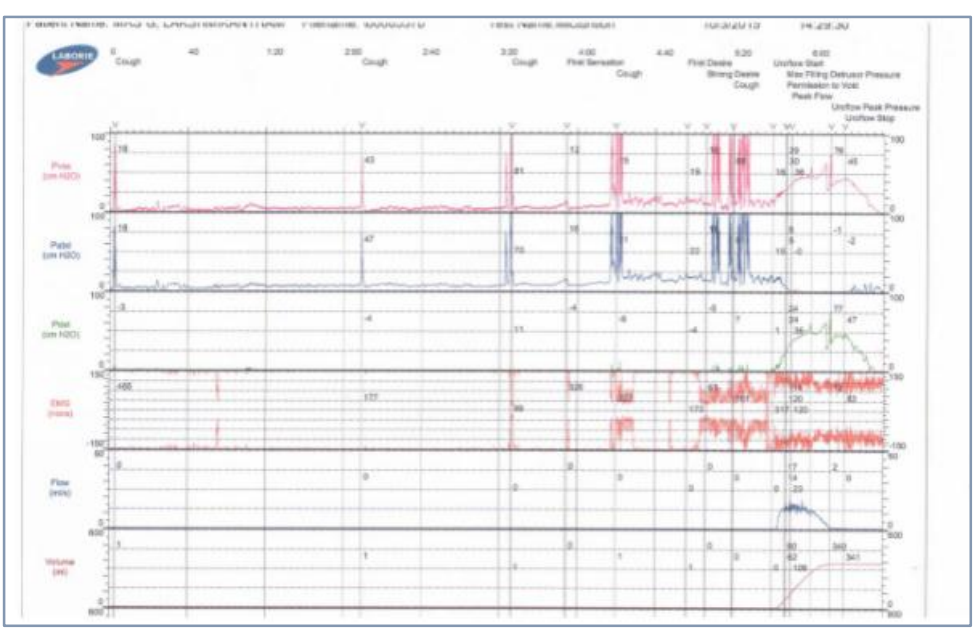
Present Grade I Grade II Grade III	24(38.70%) 9 11 4
Absent	38(61.30%)
Table 7: Associated with Cystocele	

In our study presence of cystocele with urinary incontinence was observed in 38.7% of cases which is similar in incidence in the study done by Cardozo and Stanton 1980. More than 40% of women with UI have a significant cystocele.[4] Enhorning (1961) found that women with mild cystocele had a 20% incidence of detrusor overactivity and the incidence increases to 52% in those with moderate-to-severe cystocoele.[4]

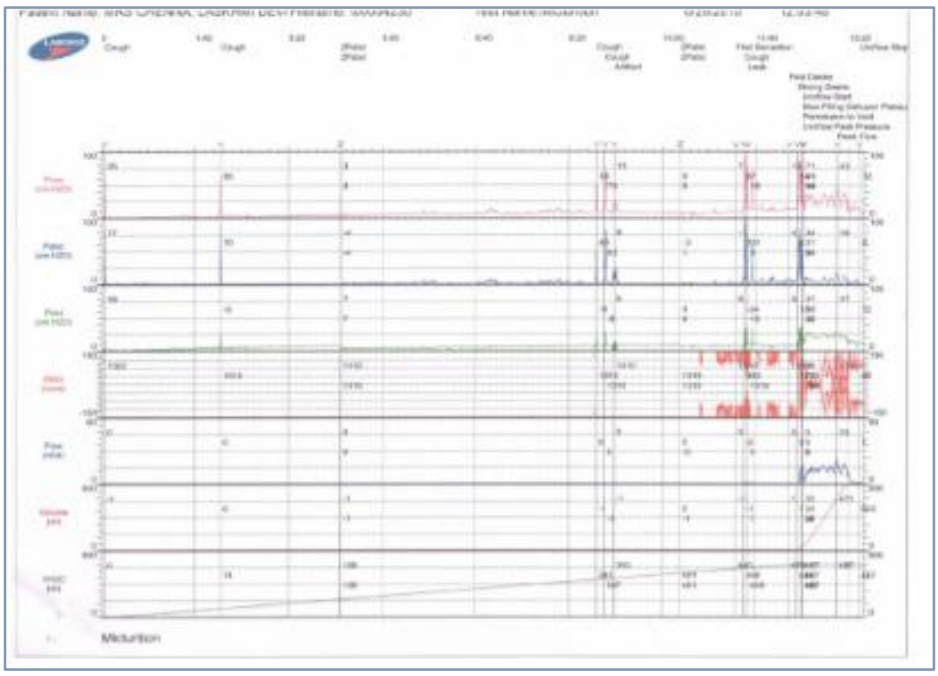
Hysterectomy Abdominal Vaginal Laparoscopic	 11 13 4
Previous H/o of Cystocele repair	1
No Previous H/o surgery	27
Previous H/o incontinence surgery (TOT)	02
Table 8: Prior Surgeries	

	No. of Cases	Percentage
Overactive bladder	11	18.64
Mixed (Stress urinary continence + overactive bladder)	15	25.42
Detrusor underactivity	19	37.28
Detrusor under activity + poor compliance	3	
Normal	3	5.08
Genuine stress incontinence	2	3.38
Bladder outlet obstruction	3	5.08
DSD (Detrusor sphincter dyssynergia)	2	3.38
Table 9: (Urodynamic results of 59 patients) (3 patients deferred urodynamic testing)		

NORMAL



GENUINE STRESS INCONTINENCE



DISCUSSION

In our study maximum number of incontinence patients are between 61-70 years of age (43.54%) and 51-60 years of age (38.70%) which is comparable with other studies[17,18].The number of patients reported to OPD after 70 years of age are few. Older women will have worsened voiding function with increase in micturition frequency, nocturnal enuresis, decreased bladder capacity, bladder sensation, bladder contractility and urethral sphincter function. Research has suggested that apoptosis of the rhabdosphincter cells may be one of the primary causes of sphincter dysfunction in older post-menopausal women. The incidence of U.I increases with parity, which is observed in our study (66.12% in multi vs. 12.90% in primi). With each delivery there is 17% rise in incidence of UI.[17,19]

In our study more number of patients were with BMI 25-30(37.09%), (33.87%). Obesity is a single independent factor significantly associated with UI.[17,20] 70.96% of patients had vaginal delivery, compared to 22.58% of patients had caesarean delivery in our study with UI. Similar observation is also noted in other studies.

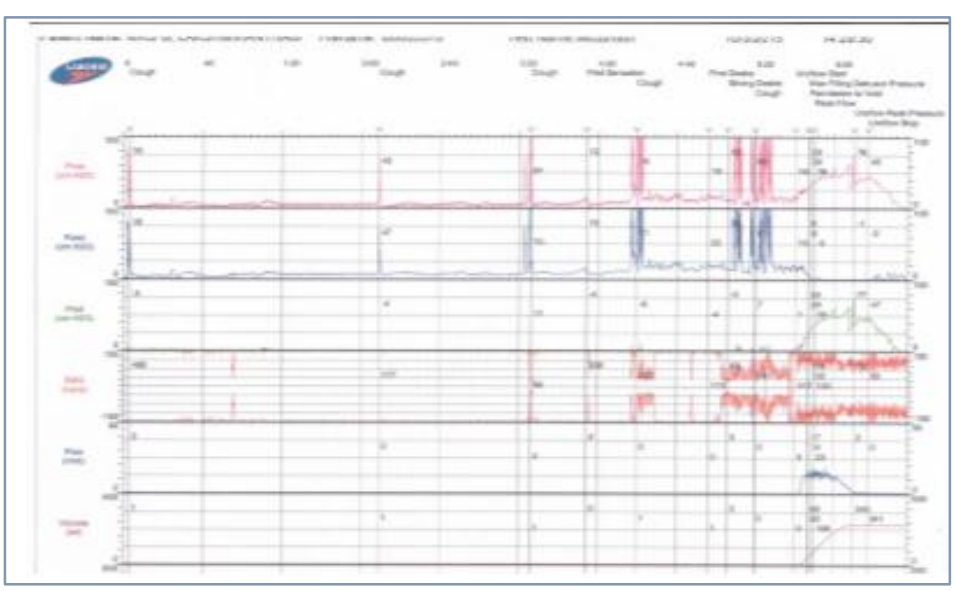
Damage to supporting structures and innervation of the pelvic floor muscles has been implicated in the development of UI following vaginal delivery.[7,19,21,22] Many studies have emphasised the possible protective role of caesarean deliveries.[23]

Past history of hysterectomy with UI in our study is about 28 out of 62 patients. Major studies have shown higher rate of UI in women who underwent hysterectomy and found 33% incidence of hysterectomy in their studies.[17,24,25] Few studies have not confirmed this association.[26]

Precipitating factors that we observed in our study are presence of Diabetes.[16] anxiety and depression.[17,27,28] and pelvic organ prolapse.

In our study Detrusor underactivity (37.28%) was seen in maximum number of patients followed by mixed incontinence (25.42%) and OAB (18.64%). Clinical experience and the literature suggest that older women have decreased bladder contractility, increase in OAB and mixed incontinence and decrease in pure stress symptoms.[29] Our results support this statement.

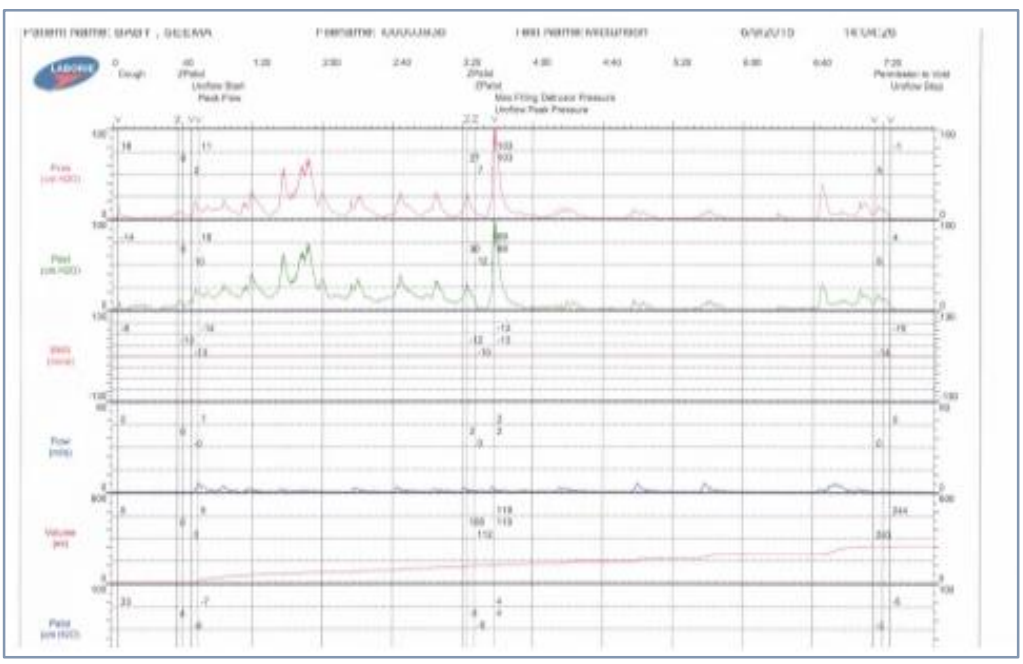
UNDERACTIVITY



Detrusor underactivity was observed in patients of OAB who have failed medical management (15 cases).These patients are subjected to UDS and found to have Detrusor underactivity and improved with parasympathomimetics. Detrusor overactivity was seen along with Stress incontinence in 15 patients. In these patients preoperative assessment with UDS enabled us to start anticholinergics which improved surgical success rate.[30]

In our study UDS has completely changed the course of management in many cases and guided us to give specific and appropriate treatment.[31] To mention a few cases. Two patients were referred to us with features of Genuine Stress incontinence and after evaluation with UDS, they were found to have OAB and treated accordingly and avoided surgery.

OAB



With clinical diagnosis of BOO, two post-hysterectomy patients have underwent repeated urethral dilatation before referral to us. After UDS they were found to have DSD and treated with anticholinergics and Alpha blockers.

Detrusor Sphincter Dyssynergia (DSD)

One patient with clinical diagnosis of severe stress UI, planned for TOT and on evaluation with UDS had Detrusor underactivity with continuous urinary leakage due to severs intrinsic sphincter deficiency. Her symptoms controlled with cholinergics and Duloxetine and subjected to suburethral injection of bulking agents.

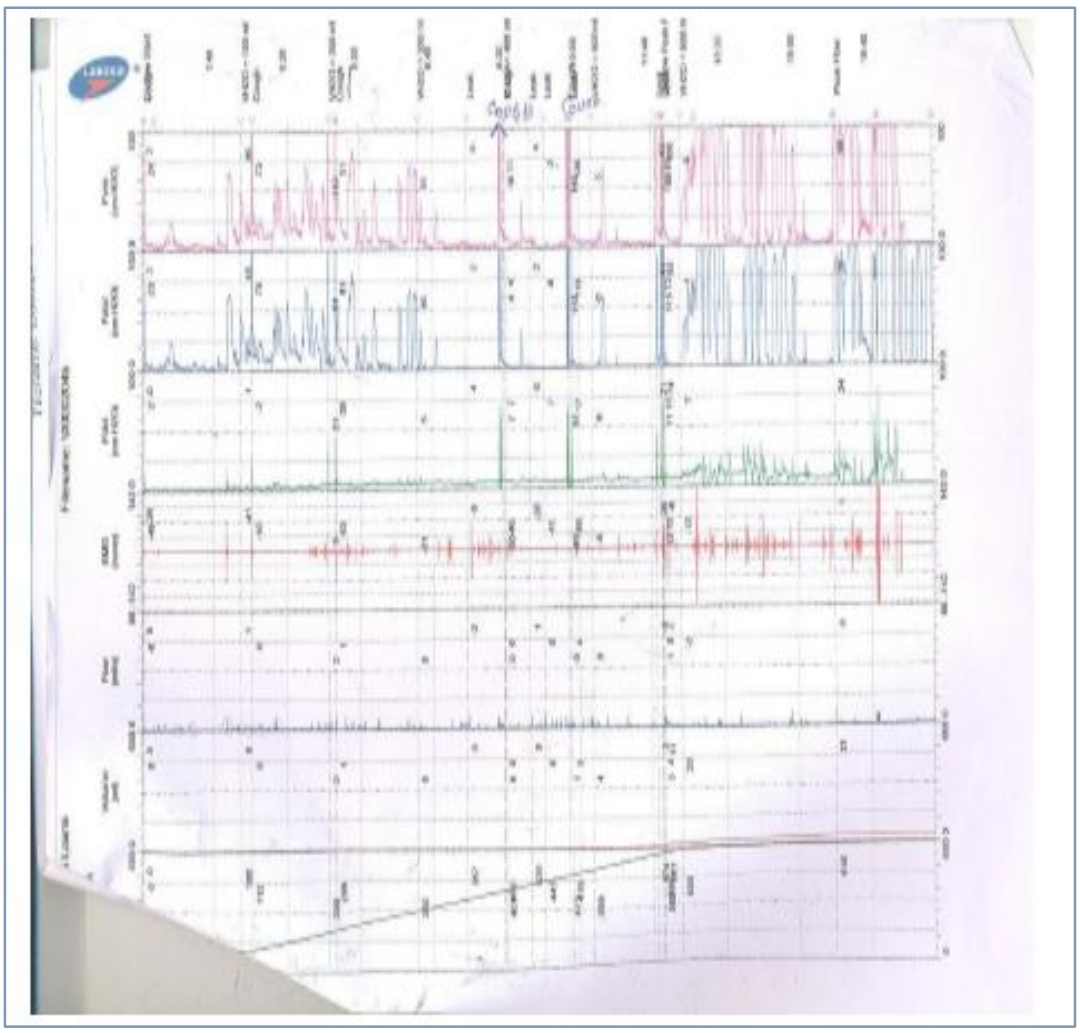


Fig: Severe Intrinsic Sphincter deficiency with detrusor underactivity

Established voiding and continent centres have advised that these patients should thoroughly evaluated with UDS and their treatment should be individualized according to their symptoms with team approach.[30,31]

CONCLUSION

Urodynamic study is a gold standard in evaluation of urinary incontinence which guide us for specific management with better results. UDS provide enough information for treatment decision and prognosis in cases of UI. Research is critically needed to provide data that will allow better understanding of the unique nature of this urologic disease in these older postmenopausal women.

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