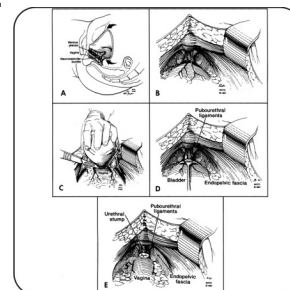


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ABSTRACT... drsajii1711@hotmail.com **Objective:** To describe the pattern of Urodynamic evaluation at Armed Forces Institute of Rehab Medicine, Rawalpindi. **Study Design:** Descriptive study. **Materials and Methods:** This study was conducted on 466 patients reporting for urodynamic evaluation at Urodynamic/Incontinence Clinic at A F Institute of Rehab Medicine from Feb 2003 to Dec 2006. We considered the age, gender, etiology, reason for referral, and presenting complaints whereas results were formulated according to Classification of voiding disorders by International society of Incontinence. Data was analyzed using statistical package for Social Science version 10. **Results:** In all (466) patients, 58% were males and 42% were females. Mean age was 46.8 years. Increased frequency (61%) and incontinence (52%) were the most common presenting complaints, 158(34%) had spinal cord injuries, 58 were cases of myelodysplasias and 128 reported with stress incontinence. Urodynamic studies showed that 152(33%) had hyperactive bladders, 110(24%) had a contractile/hypo-contractile bladders, 104(22%) had stress incontinence and

56(12%) cases had normal results. **Conclusion:** Urodynamics helps in diagnosis of potentially life threatening urinary problems. The availability of this equipment and trained staff must be encouraged at tertiary care hospital. More research is required in this regard in Pakistan, which shall help in formulating better management protocols in future.

Key words: Urinary incontinence, Overactive bladder, Urodynamics

INTRODUCTION

Urodynamics is the study of transport, storage and evacuation of urine by the urinary tract¹. The term Urodynamic was first used in 1953 by D.M Davis² and since then the knowledge about urodynamic has progressed rapidly in two decades. The patients with urological complaints that are complex and which cannot be diagnosed with simple tests, suffer due to lack of urodynamics. For example a study by Hacker et al, showed that 40% of all SCI patients die of renal insufficiency if they were left completely untreated³. The urodynamics plays a key role in understanding, evaluation and management of voiding dysfunctions, especially when history clinical exam and simple tests are not sufficient for diagnosis and instillation of treatment.

The most common sequel of voiding disorders and the most frequent reason for referral is incontinence, which may be a result of bladder dysfunction, sphincter dysfunction, or a combination of both. The International Continence Society (ICS) defines incontinence as "Involuntary loss of urine is a social or hygienic problem and is objectively demonstrable⁴". There are various classification of voiding disorders but we prefer International Continence Society classification of voiding disorders because the storage and voiding phases are described separately⁴.

To the best of our knowledge in Pakistan, the urodynamics is currently available in few centers in Pakistan and there is lack of advanced urodynamic equipment and trained staff. Literature search on Medline & local database 'Pakmedinet' with keywords 'urodynamic' and 'flowmetry' did not reveal even a single

article pertaining to urodynamic evaluation in Pakistan. This study was carried out to describe the pattern of urodynamic evaluation at tertiary care rehabilitation centre and to highlight its role and importance in management of voiding disorders.

MATERIAL AND METHODS

The study was conducted at Urodynamic/Incontinence Clinic, Armed Forces Institute of Rehabilitation Medicine Rawalpindi, Pakistan (AFIRM).it was a 03-year descriptive case series. Patient inclusion was started in Feb 2003 to Dec 2006. 466 consecutive patients who reported for Urodynamic evaluation at AFIRM were selected after their consent had been taken. The study was approved by the hospital ethics committee at the start.

Patients of all ages and both genders were included. Cases with anorectal pathologies, supra pubic catheters in situ, altered behavior and no anticholinergic medications were excluded. The detailed history included a detailed personal profile, presenting complaints, time of onset of complaints, reason for referral, mode of bladder evacuation/voiding referring specialist, any previous surgery/trauma, gynecological problems (In females) and any neurological complaints. The clinical examination included a detailed neurological and urological examination. The investigations including, previous urodynamic studies (if available), ultrasound urinary bladder and kidneys, urine culture and sensitivity reports were noted on a specifically designed proforma for study purpose. The data was entered and saved in two separate computers.

The tests were performed on Dantec® Menuet

Urodynamic Equipment. The various tests performed included Uroflowmetry for bladder outlet obstruction, water/voiding cystometries to rule out neurogenic bladders, abdominal leak point for patients who were unable to void and Valsalva Leak Point Pressures for stress incontinence. The uroflowmetry was performed on a spin disc flow-meter. The flow-metry was repeated twice to ascertain the results. Cystometries were performed by calculating intra vesical pressures by inserting two way, 8 Fr and 10 Fr disposal cystometry catheters and intra abdominal pressure by inserting disposable rectal balloon catheter. The EMG was recorded by catheter mounted ring electrode or surface EMG disposable catheter.

During cystometry, the fluid was infused at the rate of 30 ml/min and was adjusted accordingly. The Uninhibited detrusor contraction was defined as the contraction resulting in rise of more than 15 cm of water. Hyperreflexia was a spontaneous or provoked, involuntary detrusor contractions leading to urinary incontinence during attempted suppression by the individual. Areflexia was defined when there was no definite detrusor contraction. Detrusor Sphincter Dyssynergia was defined when the detrusor contraction was accompanied with increased sphincteric EMG activity¹.

Leak point pressures₁ were checked in areflexic bladders. Those Bladder having leakage pressures of less than 40 cms of water were labeled as low-pressure areflexic bladders where leakage occurred at more than 40 cms of water or did not leak at all were labeled as high-pressure areflexic Bladders.

Valsalva Leak point pressures were measured to ascertain the type of stress incontinence. The bladder was filled to 250 ml and patient was asked to generate increased abdominal pressures by performing Valsalva maneuver or coughing. If the leakage occurred at pressures, less than 60 cm of water the stress incontinence was labeled due to intrinsic sphincteric

deficiency whereas leakage above 90 cms of water was considered as due to hyper-mobile urethra. If leakage occurred between 60-90 Cm of water, it was considered as mixed type of genuine stress incontinence.

STATISTICAL ANALYSIS

The data was recorded on proformas specifically designed for the study. The data was analyzed on SPSS version 10. The descriptive statistics were used to calculate mean and frequencies were calculated for string data.

RESULTS

1. Gender and age

A total of 466 new patients were evaluated by undergoing various Urodynamic tests. In all (466) patients 270(58%) were males and 196(42%) were females. Mean age was 46.8 + 11.16 years (range 4-86 yrs). The peak of age distribution was seen in 50-60 yrs group (54%). Two hundred and Ninety six patients were married, with no history of venereal or sexually transmitted diseases.

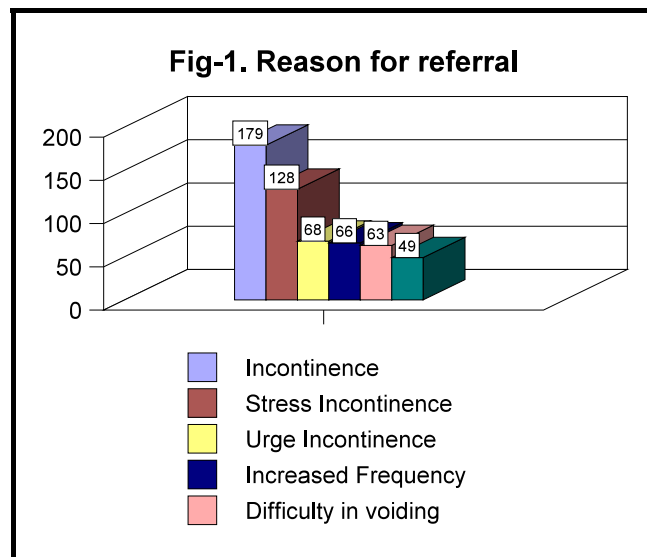
2. Reason of Referral

The most common reason for referral was incontinence followed by leakage of urine upon stress or during exertion. The various reasons for referral are shown in fig 1. Majority 56% was referred by urologists, 37% by Psychiatrists and 27% by gynecological. 402(86%) had seven or more visits to general practitioners before they were referred for urodynamics. In all 466 patients, 278(59%) patients had restricted social activities due to Incontinence.

3. Etiology

In all 466, there were 158(34%) cases of spinal cord injuries, 58(13%) cases of myelodysplasias, 128(27%) females presented with stress incontinence, 22(6%) patients had stroke, 44(9%) patients had signs and symptoms of Bladder outlet obstruction and 52(11%) cases presented other disorders. Of 152 patients exhibition detrusor hyperreflexia, 106(69%) patients had

Spinal cord injury, 24(15%) had Myelodysplasia and 16(10%) cases had stroke. 06(3%) cases had no diagnosed neurological disorders.



Of 110 cases of Hyporeflexic/Areflexic Bladders, 52(47%) had Spinal Cord injury, 34(31%) had myelodysplasias, 6(5%) had stroke and 18(7%) had other neurological disorders including Gullian Barre Syndrome 6(5%), Traumatic Brain Injury 6(5%) and pelvic Trauma/Multiple injuries 2 (1.8%). 4(3.5%) had unexplained urinary retention in absence of any neurological disorder. The 128 females reporting for evaluation of stress incontinence included 65(50%) post menopausal women whereas 31(24%) experienced stress incontinence after childbirth. 22(17%) had been operated upon pelvic/abdomen within last 02 years, whereas in 10(07%) cases history was inadequate.

4. Uroflowmetry

This procedure was performed by asking the patient to void in spin disc Uroflowmeter at sensed urgency. A total of 44 uroflowmetries were performed and it was that 16(36%) had severe Bladder Outlet obstruction, 9(20%) had moderate outlet obstruction, 15(34%) had normal flow rates and in 4(9%) patients uroflowmetry was invalid due to low volumes.

5. Cystometries

A total of 304 cystometries were performed and it was found that 152(33%) had Hyperactive Bladders and 110(23%) had contractile/hypo-contractile Bladders. Among the Hyperactive Bladders 78(51%) had detrusor Sphincter Dyssynergia (DSD) whereas 74(48%) had uninhibited detrusor contractions only. Among 110 a contractile bladders, Abdominal leak point pressures showed that 79(71%) had high pressure bladders and 31(28%) had low intra-vesical pressures. (Table I)

Table-I. Characteristics of Bladder

| n=466 | Detrusor hyperreflexia | Areflexia/hyporeflexia | Elevated ALPP >40 cms of water |
|--------------------|------------------------|------------------------|--------------------------------|
| Spinal Cord Injury | 106 | 52 | 112 |
| Stroke | 16 | 6 | 7 |
| Myelodysplasias | 24 | 34 | 41 |

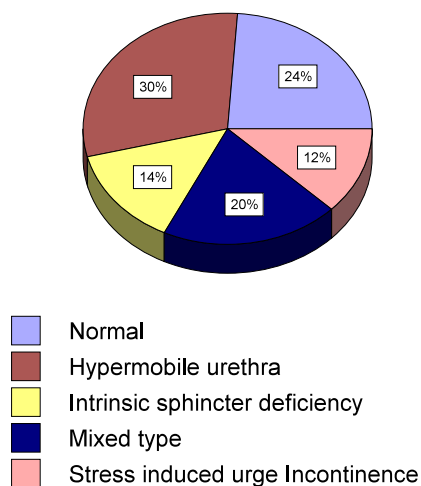
ALPP= Abdominal Leak Point Pressures

6. Valsalva Leak point Pressures: (AVLPP)

AVLPP were performed in 128 patients presenting with stress incontinence. 39(30%) had stress incontinence due to hyper-mobile urethra, 18(14%) due to intrinsic sphincter deficiency, 25(20%) had mixed type of stress incontinence and 15(12%) had stress induced urge incontinence. 31(24%) exhibited no leakage at all and were declared normal. (Fig.2)

7. Complications of the procedure

In all 466(100%) patients, there were 03(.06%) cases of cervical Spinal cord Injury in which test was discontinued due to sings and symptoms of autonomic dysreflexia. Only 12 (2.5%) developed acute signs and symptoms of Urinary Tract Infection which was dealt with antibiotics and hydration.

Fig-2. Results of valsalva leak point pressures

DISCUSSION

Urinary incontinence is cruel sequelae of various neurological and physiological disorders. It affects the patient's physical well being and has a negative role on patients self esteem by lowering the desire for social interactions^{5,6}. Persistent urinary incontinence also increases the burden on care givers⁷ and predisposes the patients to medical complications⁸. In this study, 59% patients had restricted social activities due to Incontinence.

The exact cause and type of voiding disorder cannot be assessed by history and clinical examination alone, and it requires help of Urodynamics to ascertain the condition as a Storage disorder, voiding disorder or a combination of both. Various studies show that clinical examination alone was unable to provide definite guidelines for bladder management^{9,10}. In our study 402(86%) had seven or more visits to general practitioners before they were referred for urodynamics. This finding was similar to developed countries as Wein and colleagues¹¹ noted that in a survey of primary care physicians, 80% did not examine patients with urinary complaints; 30% of those patients received no assessment at all.

In our study Spinal cord injury was a major group and detrusor hyperreflexia was seen in 89% of patients with supra sacral injuries. When it was compared with other studies, detrusor hyperreflexia was the most common feature in supra sacral lesions and in stroke as well¹³.

The other interesting fact in our study was that 128(27%) females presented with stress incontinence. 31(24%) patients had no evidence of stress incontinence whereas 30% females had stress incontinence due to hyper mobile urethra which is a treatable cause. Fifteen (12%) patients had stress induces urge incontinence which was again a treatable cause. Among these 15 patients, seven had been operated for sling surgery for stress incontinence, but they had no relief.

The study reveals that there were 160(34%) high bladders (ALPP> 40 cms of water) which if not treated may upper renal tract damage (Table-I). The procedure is very safe with low incidence of complications (3%) despite of its invasive nature. The major limitation of this study was that no reference values for urodynamics have yet been formulated after research.

CONCLUSION

Urinary incontinence is not a major disability for patients but also for his care givers. Urodynamic evaluation can both diagnosis the underlying disorder and direct the accurate management. Urodynamic remains underdeveloped and underutilized in Pakistan. It is recommended that more research in this regard should be done to formulate reference values in our local population. We also recommend that urodynamics must be used as an essential tool, before taking a decision to operate upon the case of stress incontinence and neurogenic Bladders.

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