ROLE OF URODYNAMIC STUDIES IN EVALUATION OF LOWER URINARY TRACT SYMPTOMS

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ABSTRACT

Objectives: To emphasize the role of urodynamic studies in the evaluation of lower urinary tract symptoms and to describe the technique and report results of tracings from a urodynamic centre in a tertiary care settings.

Study Design: Descriptive Study

Place and Duration of study: This study was carried out at Armed Forces Institute of Urology, Rawalpindi, over thirty months from January 2003 to June 2005.

Patients and Methods: Sixty seven patients referred to the urodynamic centre of AFIU, Rawalpindi with complaints of urinary incontinence or voiding disorders were evaluated with conventional urodynamic tests. During cystometry, the detrusor activity, bladder sensation, bladder capacity and bladder compliance were measured with simultaneous urinary flow measurement in those who were able to void. Results were grouped into eight different types of urodynamic diagnoses.

Results: There were 51 females (76%) and 16 males (24%) patients. Majority of patients (48%) were in age group of 20 – 50 years. Ages ranged from 5 – 84 with a mean of 41.3 ± 17.3 years.

Majority of the patients found to have neuropathic bladder (25.3%) followed by patients with pure stress incontinence (23.9%). In 38 female patients who presented with urinary incontinence, majority of them i.e. 16 (42.1%) were found to have pure stress incontinence on urodynamic evaluation while 11 (28.9%) patients had normal cystometric findings and 5 patients (13.1%) had hypersensitive cystometrogram signifying sensory urge incontinence while motor urge incontinence implying detrusor instability occurred in 1 patient(2.7%) .

Conclusion: Urodynamic studies are useful in evaluation of lower urinary tract symptoms not responding to conventional medical treatment as they help clinician in identifying the underlying causes for the symptoms, and to quantify the related pathophysiological processes. Treatment of the underlying pathophysiology facilitates better treatment of symptoms.

Keywords: Urodynamics, urinary incontinence, cystometry, stress incontinence

INTRODUCTION

Lower urinary tract symptoms have a high prevalence in the community. Literature search revealed that about 5% of children aged 10 wet the bed, while 15% of women and 7% of men have troublesome incontinence; and in elderly men of 75, benign prostatic hyperplasia occurs in more than 80% of individuals, with benign prostatic enlargement coexisting in up to half this group and half of these having bladder outlet obstruction [1 – 4].

Traditionally, these patients have been managed on the basis of their symptoms alone; however, the need to support the clinical assessment with objective measurement has become accepted by most clinicians specializing in the care of patients with lower urinary tract symptoms (LUTS) since these symptoms can represent wide variety of conditions affecting lower urinary tract.

Some practitioners believe that urodynamic evaluation is not routinely warranted and prefer to employ a symptom based empirical management strategy. LUTS are non-specific, however, and should be used mainly to identify what bothers the patient. Urodynamic studies define the underlying pathophysiology. Treatment of the underlying pathophysiology facilitates better treatment of symptoms [5].

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Received: 23 May 2008; Accepted: 13 Sep 2008

The introduction of urodynamic investigation not only caused reappraisal of the traditional concept, but also identified new criteria for the selection of the patients for the operative treatment. Just as cardiac surgery changed so many of the previous concepts of cardiology, so the study of urodynamics has changed our understanding of the function of the lower urinary tract.

These are functional studies and results should not be used as a pathological or clinical diagnosis. Urodynamic diagnosis should be discussed in terms that are objective, definable and should be applicable to the whole range of abnormality.

Urodynamic diagnosis is the arbiter of truth' meaning explanation for the patient symptomatic complaints must unfold as the urodynamic investigation proceeds [6].

Urodynamic studies include uroflowmetry, filling cystometry, voiding cystometry (pressure/flow cystometry), urethral pressure profilometry, electromyographic studies (EMG) and synchronus uro-videocystourethrography (SVCUG)

The purpose of our study is to report the results of tracings from the urodynamic centre of a tertiary urology facility in patients presenting with symptoms of lower urinary tract dysfunction.

PATIENTS AND METHODS

This descriptive study was carried out in the urodynamic centre of Armed Forces Institute of Urology (AFIU) Rawalpindi from January 2003 – June 2005.

Sixty seven patients referred to the centre with complaints of urinary incontinence or voiding disorders were evaluated with conventional urodynamic tests on a Dantec® Menuet Compact, Denmark.

All patients had detailed history, physical examination and standard urological laboratory and radiological investigations including Urine routine examination, renal function tests, Ultrasound KUB and Intravenous Urography (IVU) before the conduct of urodynamic tests. Patients with active urinary infection were deferred till the resolution of infection with appropriate antibiotics.

After explanation about the procedure and obtaining informed consent, the patients were asked to empty their bladder in privacy. With patient in supine position, a 7 Fr. Double lumen catheter with tip mounted transducer was placed under aseptic technique. Simultaneously, a 12 Fr. Rectal balloon catheter mounted with tip transducer was placed in rectum for recording intra abdominal pressure. Normal saline at room temperature was used for filling the bladder with motorized pump at a constant rate of 50 ml/s. Integrity and correct placement of transducers were checked with positive cough response on test tracing. Patients were asked to notify the filling sensations according to the standard feelings.

During filling cystometry, the detrusor activity, bladder sensation, bladder capacity and bladder compliance were measured. Detrusor pressure (Pdet) was measured digitally by subtracting the intra abdominal pressure (Pabd) from the intravesical pressure (Pves).

Voiding cystometry comprised of recording of pressure in the bladder with simultaneous urinary flow measurement in those who were able to void. Contractility of the detrusor with voiding detrusor pressure and pressure/flow relationship was determined.

The methods, definitions and units conform to the standards recommended by International Continence Society [7].

Results were grouped into eight different types of urodynamic diagnoses [8].

All patients had a three day course of ciprofloxacin after the procedure.

All statistical data was analyzed using SPSS 13.0. Descriptive statistics i.e. mean ± SD and percentages were used to describe the data.

RESULTS

A total of 67 patients were included in the study. There were 51 females (76%) and 16

males (24%) patients with male to female ratio of 1:3. Majority of patients (48%) were in age group of 20 – 50 years followed by (42%) > 50 years and (10%) in < 20 years age group. The ages ranged from 5 – 84 with a mean of 41.3 ± 17.3 years.

Neuropathic bladder was the commonest urodynamic diagnosis (25.3%) followed by patients with pure stress incontinence (23.9%). About 15 patients (22.4%) were found to have normal unobstructed bladder on urodynamic testing despite having symptoms of lower urinary tract (Table –1).

Urinary incontinence was the presenting complaints in majority of the patients i.e. 53 patients (79%). In all, 16 (30.2%) patients had mixed incontinence as primary symptom followed by 14 (26.4%) patients having stress incontinence and 11 (20.7%) patients with urge incontinence (Table – 2).

In 38 female patients who presented with urinary incontinence, majority of them i.e. 16 (42.1%) were found to have pure stress incontinence on urodynamic evaluation while 11 (28.9%) patients had normal cystometric findings and 5 patients (13.1%) had hypersensitive cystometrogram signifying sensory urge incontinence while motor urge incontinence implying detrusor instability occurred in 1 patient(2.7%) (Table- 3).

DISCUSSION

Urodynamic evaluation is the gold standard for the assessment of persistent lower urinary tract symptoms and consists of simultaneous registration of pressure in the bladder and rectum during the whole cycle of the filling and emptying phase of micturition.

The aim of clinical urodynamics is to reproduce symptoms whilst making precise measurements in order to identify the underlying pathology, and to quantify the related pathophysiological processes. By doing so, it should be possible to establish objectively the presence of a dysfunction and understand its clinical implications. Thus, we may either confirm a diagnosis or give a new, specifically urodynamic, diagnosis [9]. A good study is one that is easy to read and one from which any experienced urodynamicist will abstract the same results and come to the same conclusions [10].

Urodynamics can be complicated, and it has not yet achieved the wide acceptance in urology, gynaecology and allied subjects. Many gynaecologists who frequently operate for female urinary incontinence do not have access to urodynamic investigations or do not utilize urodynamic investigations [11].

Indications for urodynamic evaluation are prior to invasive therapy or where previous medical or surgical therapy has

Table-1: Urodynamic diagnoses of 67 patients

Urodynamic diagnosis	Number of patients	%
Normal Unobstructed	15	22.4
Unstable Unobstructed	3	4.5
Hypersensitive Unobstructed	9	13.4
Stress Incontinent Unobstructed	16	23.9
Normal Obstructed	6	9
Hypersensitive Obstructed	1	1.5
Neuropathic Bladder	17	25.3

Table-2: Types of incontinence in patients with urinary incontinence complaint

Type of Incontinence	No. of patients	%
Urge incontinence	11	20.7
Stress incontinence	14	26.4
Mixed incontinence	16	30.2
Post Op incontinence	3	5.7
Neurogenic incontinence	9	17

Total number of patients = 67
Patients with Urinary Incontinence complaint = 53 (79%)

Table-3: Urodynamic diagnoses in female patients with urinary incontinence

Urodynamic diagnosis	No. of Patients	%
Normal unobstructed	11	28.9
Unstable bladder	1	2.7
Stress Incontinent	16	42.1
Hypersensitive unobstructed	5	13.1
Hypersensitive obstructed	1	2.7
Neuropathic	4	10.5

Total number of patients = 67
Females with Urinary Incontinence complaint = 38 (56.7%)

failed, after pelvic surgery or pelvic irradiation, in patients with signs or symptoms suggestive of an emptying disorder, in neurological disorders such as cerebro-vascular accidental (CVA) , or where there is any doubt about the diagnosis [12 - 14]. 12% of women with apparently pure stress incontinence can be shown to have detrusor overactivity rather than urinary stress incontinence (USI) as the cause of their symptoms [15].

In the present study, majority of the patients were female and most common presenting complaint was urinary incontinence as in most studies conducted worldwide. Majority of patients were middle aged and neuropathic bladder was the most common urodynamic diagnosis followed by stress incontinence. Only Six (15.7%) patients had hypersensitive or unstable detrusor in thirty eight female patients referred for the evaluation of urinary incontinence contrary to the clinical assumption of overactive bladder in most cases. Bladder hypersensitivity is a urodynamic diagnosis made for individuals with increase bladder sensation characterised by an early first sensation of filling and an early first desire to void which persists into a normal and a strong desire without a break. In bladder hypersensitivity the bladder capacity is less than 250 mls.

Urodynamic stress incontinence defined as the involuntary leakage of urine, during increased abdominal pressure, in the absence of detrusor activity and desire to void [9] was the commonest abnormality detected in our study which conforms to the world wide incidence of stress incontinence being the commonest cause in 40 – 60% in women with urinary incontinence [16].

A significant proportion of patients (22.4%) had normal urodynamic investigation despite having LUTS which would otherwise be thought of having disorders requiring treatment on the basis of symptoms alone.

Patients with neurogenic bladder as presenting problem should ideally undergo video-urodynamics as finding of high detrusor pressure during micturition with a non-relaxing bladder neck on fluoroscopy and normal external sphincter relaxation is pathognomonic of bladder neck obstruction known as Detrusor – Sphincter – Dyssynergia (DSD) [13]. Commonest finding of neuropathic bladder diagnosis in present study was unstable high pressure bladder (41.7%) followed by findings suggestive of DSD, although video – urodynamic evaluation was not done in these cases. Management of these neuropathic bladders is greatly facilitated by the urodynamic evaluation and understanding of underlying pathophysiological processes involved.

Since the introduction of urodynamics in our setup, management of patients with LUT dysfunctions have been revolutionized and appropriate medical and surgical treatment have been contemplated benefiting the patients immensely. We acknowledge the learning curve in practicing good technique during these tests and problem of majority of our patients being illiterate, however, over the time a pretty set standard of technique and enthusiasm of the investigator have solved much of the problem.

CONCLUSION

Urodynamic studies are a set of investigation that define underlying pathophysiology and facilitates better treatment of symptoms. Urodynamic studies are the best diagnostic tool in the management of patients with LUTS.

Being invasive and time consuming, it is unnecessary to perform urodynamic tests in each and every patient with LUTS. However, in patients undergoing any surgical procedure designed to modify the function of the lower urinary tract, an objective assessment by urodynamic evaluation is mandatory.

Patients with recurrent LUTS after initial medical treatment or patients with persistent symptoms after adequate treatment should be referred for urodynamic studies before undertaking further definitive treatment.

Availability of equipment and dedicated staff is the requirement in all urological

centers offering treatment to patients with lower urinary tract dysfunction.

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