

THE ROLE OF URODYNAMICS IN EVALUATING INCONTINENT FEMALES

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ABSTRACT

A total of 84 patients had urodynamic evaluations. Twenty-two patients complained of stress incontinence, 41 patients complained of stress incontinence with other urinary symptoms and 21 complained of other urinary symptoms but not stress incontinence. Of those complaining of stress incontinence alone, 4 (18.2%) had detrusor instability, 11 (50%) had genuine stress incontinence and 7 (31%) had neither condition. Of those complaining of stress incontinence with other symptoms, 16 (39%) had detrusor instability, 19 (46.3%) had stress incontinence and 6 (14.6%) had neither condition. Of those complaining of other urinary symptoms except stress incontinence, 5 (23.8%) had detrusor instability, 3 (14.3%) had stress incontinence and 13 (61.9%) had neither condition. Urinary symptoms were found to have little correlation with the final diagnosis except for enuresis which was associated with detrusor instability.

Keywords: Female incontinence, urodynamics, stress incontinence, detrusor instability.

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INTRODUCTION

Urodynamic studies have improved our understanding of lower urinary tract dysfunction and have in many instances completely altered our approach to management.

Despite the fact that accurate diagnosis prior to treatment must be the logical approach to management, many clinicians are still reluctant to send every patient for tests for which she may have to wait a long time before treating her. Moreover, opinions regarding the necessity of preoperative urodynamic evaluation varies from the view of Korda et al (1987) that all patients with incontinence require a full urodynamic evaluation⁽¹⁾ to the view of Kaufman (1979) that the overwhelming majority of patients do not need it⁽²⁾. It has also been claimed that women with pure stress incontinence do not need urodynamic assessment while women with stress incontinence and other symptoms will require urodynamic tests⁽³⁾.

The purpose of this study is to find out the incidence of genuine stress incontinence and detrusor instability in women complaining of stress incontinence alone and in comparison with those complaining of stress incontinence associated with other urinary symptoms, as well as in those complaining of other urinary symptoms but not of stress incontinence. It is important to be able to demonstrate genuine stress incontinence objectively so as to avoid unnecessary surgery in patients without genuine stress incontinence.

PATIENT SELECTION

A total of 84 women are included in this study. They complained of varying degrees of urinary incontinence and/or other urinary symptoms and were suspected of suffering from stress incontinence or detrusor instability. They were referred to our department from general practitioners and from gynaecolo-

gists in the other two obstetrical and gynaecological departments in our hospital. Patients with known or suspected neurological disease, urinary fistulae or ectopic ureters were excluded from the study.

METHODS

The first 24 patients were evaluated using the Dantec 5000 Cystometric Urodynamic Machine. The tests were done by the first author at the Urology Department of the Singapore General Hospital. The subsequent 60 patients were evaluated with the Dantec Minulet Urodynamic Machine at our own hospital.

Each patient was asked to empty her bladder before the test commenced. An epidural catheter was inserted into the bladder using a 16F Pennen Nelaton catheter to carry it into the bladder. The epidural catheter was filled with fluid and connected to a pressure transducer which measured intravesical pressure. An umbilical catheter with a fluid-filled balloon on the end was used to measure rectal pressure. The multi-channel recorder automatically subtracted rectal pressure to give true detrusor pressure. The patient's bladder was filled at a rate of approximately 100ml/min and she was kept lying flat till a desire to void was experienced, which was noted. The patient then stood up and was asked to cough and strain to ascertain if stress leakage was present. A diagnosis of instability was made if a detrusor contraction of 15 cm water or greater was recorded at any time during the study, excluding the voiding phase. After the patient felt her bladder was full, coughing and straining were repeated if stress incontinence had not been demonstrated up to this point. The patient was then asked to void while detrusor pressure was continually measured. When voiding was completed, the study was terminated. Methods and diagnostic criteria were according to recommendations published in the report on standardization by the International Continence Society⁽⁴⁾.

RESULTS

Eighty-four patients were included in the study (Table I). Twenty-two complained of stress incontinence alone, without any other associated symptoms; 41 complained of stress incontinence associated with other urinary symptoms while 21 complained of other urinary symptoms but not stress incontinence. These symptoms include frequency, urgency, urge incontinence, nocturia, enuresis and sensation of incomplete emptying of the bladder.

Of the 22 who complained of stress incontinence alone, 4 (18.2%) were found to have detrusor instability; 11 (50%) were found to have genuine stress incontinence while 7 (31.8%) were found to have neither detrusor instability nor stress incontinence.

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Table I - Urodynamic Results of the 3 Groups of Patients

Symptoms	Stress Incontinence alone	SI with other symptoms	No SI Has other symptoms	Total (n=84)
Detrusor Instability	4 (18.2%)	16 (39.0%)	5 (23.8%)	25 (29.8%)
Genuine Stress Incontinence	11 (50.0%)	19 (46.3%)	3 (14.3%)	33 (39.3%)
No DI No GSI	7 (31.8%)	6 (14.6%)	13 (61.9%)	26 (30.9%)
Total No. of Patients	22 (26.2%)	41 (48.8%)	21 (25.0%)	84 (100.0%)

Of the 41 women who complained of stress incontinence with other associated symptoms, 16 (39%) were found to have detrusor instability; 19 (46.3%) were found to have genuine stress incontinence while 6 (14.6%) were found to have neither detrusor instability nor stress incontinence. Overall, amongst all the patients who complained of stress incontinence, the incidence of detrusor instability was found to be 31.7%.

There were 21 women who complained of other urinary symptoms but not stress incontinence. Of these, 5 (23.8%) were found to have detrusor instability; 3 (14.3%) had genuine stress incontinence while 13 (61.9%) were found to have neither detrusor instability nor stress incontinence.

We next analysed the urinary symptoms (frequency, urgency, urge incontinence, nocturia, nocturnal enuresis and sensation of incomplete emptying of the bladder) in relation to the presence of detrusor instability and stress incontinence. There is a wide spectrum of normality with regard to symptoms of micturition disorders, and definition of these terms is therefore necessary. We consider frequency to be a regular desire to micturate at less than two hourly intervals; urgency to be a strong desire to void accompanied by fear of leakage or fear of pain; urge incontinence to be a strong desire to void accompanied by leakage and hence a more severe form of urgency; nocturia to be the regular arousal from sleep to micturate at least once every night; and enuresis to be bed-wetting during sleep.

Table II shows the incidence of individual symptoms in 3 groups of patients, namely those found to have detrusor instability (unstable group); those without detrusor instability (stable group); and those found to have genuine stress incontinence (genuine stress incontinence group).

Frequency, urgency and nocturia were the commonest symptoms encountered. Frequency occurred in 51.5% of the stress incontinence group; 44% of the unstable group and 54.2% of the stable group. Urgency occurred in 33.3% of the stress incontinence group, 36% of the unstable group and 32.2% of the stable group. Nocturia occurred in 15.2% of the stress incontinence group, 20% of the unstable group and 18.6% of the stable group.

In the stress incontinence group, the other symptoms present included urge incontinence in 12.1% and a sensation of incomplete emptying of the bladder in 9.1% of these patients. None of them complained of enuresis.

In the unstable group, the fourth most common symptom was enuresis in 12%. Urge incontinence and sensation of incomplete emptying of the bladder were equally uncommon symptoms (4%) in this group.

In the stable group of patients, urge incontinence was fourth

most common in 11.9%, followed by sensation of incomplete emptying in 8.5%. None of them complained of enuresis.

Table II - Incidence of individual symptoms according to urodynamic results.

Bladder type Symptoms	Genuine SI (n=33)	Unstable Bladder (n=25)	Stable Bladder (n=59)*
Frequency	51.5%	44.0%	54.2%
Urge Incontinence	12.1%	4.0%	11.9%
Urgency	33.3%	36.0%	32.2%
Urgency and/or Urge Incontinence	45.4%	40.0%	44.1%
Nocturia	15.2%	20.0%	18.6%
Incomplete Emptying	9.1%	4%	8.5%
Enuresis	0%	12.0%	0%

* Number of patients with genuine SI (33) + number of patients with no genuine SI or detrusor instability (26)

In the analysis of individual symptoms (Fig 1), all 3 patients who complained of enuresis were found to have detrusor instability. 32.1% of all those complaining of urgency and 35.7% of those with nocturia had detrusor instability. On the other hand, only 12.5% of patients who complained of urge incontinence had detrusor instability.

DISCUSSION

The success of an operation for female incontinence depends on an accurate diagnosis and this requires a correct appraisal of symptoms and a careful physical assessment. And yet, the symptoms associated with voiding disorders and incontinence in the female are notoriously misleading⁽¹⁾. Jeffcoate and Francis (1966) found in their experience that 2 out of every 3 women with a provisional diagnosis of stress incontinence proved to suffer from urgency incontinence⁽²⁾. It is generally agreed that female incontinence is attributable to either sphincter weakness (genuine stress incontinence) or detrusor instability or a combination of both⁽⁶⁾. The clinical differentiation of these is not always easy. Svigos and Matthews (1977) in an assessment of the accuracy of clinical appraisal of urinary incontinence found it disquieting that interested clinicians were apparently unable to recognise bladder dysfunction by clinical appraisal alone⁽⁷⁾. Both detrusor instability and atonic forms of bladder dysfunction went unrecognized. Yet, detrusor instability is one of the causes of failure following incontinence surgery^(6,8,9). This difficulty in assessing presence of detrusor instability may well explain the diversity of surgical results in different reported series, ranging from 69% success rate in stable bladders to 3% when unstable bladders were included⁽⁶⁾.

Many workers have attempted to analyse individual symptoms and symptom complexes related to urinary incontinence and have concluded that urge incontinence associated with frequency and nocturia together has a high relation with detrusor instability⁽³⁾. In addition, when 2 or 3 "key" symptoms are present, the incidence of detrusor instability rises from 64% to 81% respectively⁽¹⁰⁾. Nocturia, urge incontinence and enuresis were all found to be more common in the detrusor instability group compared to the stable bladder group. In this study, amongst those women who had nocturia and urge incontinence, the majority, 64.3% and 87.5% respectively, were

found to have stable bladders (Fig 1). All 3 patients complaining of enuresis were found to have detrusor instability. Urge incontinence was found to be in fact more common in the stable group compared to the unstable group (Table II) - 12.1% and 4% respectively, but this difference in incidence was not statistically significant ($p > 0.05$). The incidence of urgency in both groups was quite similar - 32.2% and 36% respectively.

When urgency and/or urge incontinence were considered together as a single symptom, the incidence was also quite similar in both stable and unstable groups - 44.1% and 40% respectively. The incidence of nocturia was higher in the unstable group (20%) than in the stable group (18.6%); but this difference is not statistically significant ($p > 0.05$). 12% of the patients in the unstable group complained of enuresis but there was no complaint of enuresis amongst the patients with stable bladders ($p < 0.01$).

These results show that symptoms and symptom complexes are inconsistent and unreliable and although they may be used to predict the presence of detrusor instability, this cannot be done with any degree of accuracy, nor can their absence categorically preclude detrusor instability. It is also clearly impossible to analyse all the various permutations of micturition symptoms in the female.

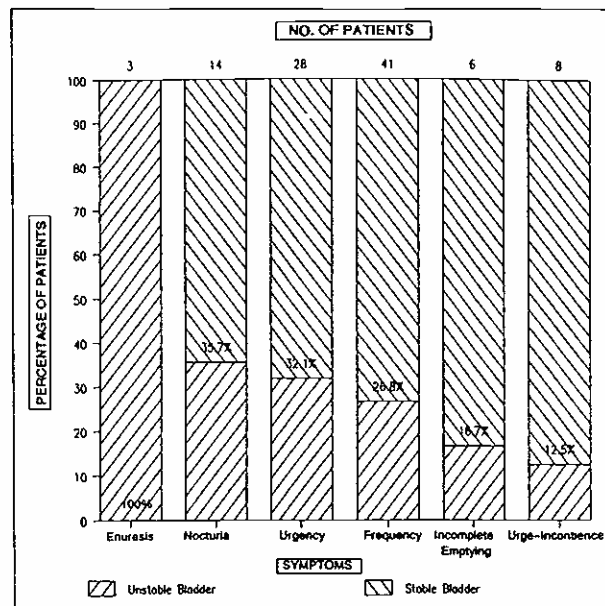
It has been stated that those females who complain of stress incontinence without other symptoms⁽³⁾ or whose symptoms apart from stress incontinence were diurnal frequency and urgency⁽²⁾ usually have stable bladders and therefore do not require urodynamic assessment. However our results indicate that 18.2% of patients with a clinical history of stress incontinence only have in fact detrusor instability. When stress incontinence was associated with other symptoms, the incidence of detrusor instability rises to 39%. Even when there was no complaint of stress incontinence, up to 23.8% of these patients were found to have detrusor instability.

Our figures compare well with those reported in other recent series.

Author	Year	Patient complaint	% unstable bladders
Byrne	1987	si only	12
Korda	1987	si only	27.5
Authors of KKH	1991	si only	18.2
Korda	1987	si +/- other symptom	30.7
Thiede	1987	si +/- other symptom	32
Jarvis	1980	si +/- other symptom	17.1
Svigos	1977	si +/- other symptom	33.3
Arnold	1973	si +/- other symptom	48
Moolgoaker	1972	si +/- other symptom	43.2
Authors of KKH	1991	si +/- other symptom	31.7

Urinary symptoms in the female can be extremely misleading and do not form a scientific basis for treatment. Even during a careful clinical examination, the signs elicited may not be conclusive. Most of these patients have been found to be able to demonstrate leakage of urine on coughing. In patients with detrusor instability, coughing may stimulate detrusor contraction thus inducing voiding. A diagnostic dilemma arises when the patient is then able to cut off the voiding with the aid of the external sphincter after only a small escape of urine. Even astute clinicians may mistake this for stress incontinence caused by sphincter weakness and surgery in such patients will only worsen the condition. In patients with retention of urine with overflow incontinence, a chronic form may exist in which instead of continuous dribbling, the patient voids chiefly by straining. Therefore, a transient rise in intraabdominal pressure such as a cough will provoke an escape of urine. This is again easily mistaken as stress inconti-

Fig 1 - Percentage Incidence of Detrusor Instability related to individual symptoms



nence. Any form of surgery undertaken to support or tighten the region of the bladder neck inevitably worsens the situation. The urinary bladder in such patients is not usually palpable or tender, and if the symptoms have been present for a considerable period of time the patients will not admit to voiding with a poor stream. Passage of a soft rubber catheter may meet with some resistance in some of these patients, but cystoscopy will show the presence of bladder trabeculations in the great majority. The Bonney's test in such patients has also been found to be unreliable in revealing the underlying cause for incontinence or in providing a guideline for treatment^(9,11).

Since the clinical features of female incontinence are so unreliable, there is therefore an important place for using urodynamics to evaluate these patients before considering surgery. This approach avoids unnecessary bladder neck surgery in females whose incontinence is due to detrusor instability. It would also avoid uneconomical use of hospital facilities as these patients would be otherwise hospitalised for several days. This accords with the opinions of Korda (1987)⁽¹⁾, Stanton (1978)⁽⁸⁾, Jarvis et al (1980)⁽¹²⁾, Byrne (1987)⁽¹³⁾ and Thiede (1987)⁽¹⁴⁾.

In patients who complained of stress incontinence associated with other urinary symptoms, 46.3% were found to be suffering from genuine stress incontinence. The difficulty in trying to categorise these patients especially those with stress incontinence, urgency and urge incontinence, has been a problem for urodynamicists for a long time⁽¹⁵⁾, as it is difficult to detect which of these symptoms is primary. Urodynamic evaluation is therefore useful in defining the underlying problem thus enabling the correct management for these patients. Furthermore, 39% of these patients were found in fact to have detrusor instability. This incidence is more than twice those who complained of stress incontinence alone. This makes it even more relevant to subject these women to urodynamic studies in order to identify the 39% for whom surgery will have little benefit.

All 3 patients who complained of enuresis were found to have definite detrusor instability. They also had daytime symptoms of frequency, urgency, urge incontinence and stress incontinence. This is an agreement with the findings of Whiteside (1975) that enuresis associated with diurnal urinary symptoms are associated mainly with abnormal detrusor function⁽¹⁶⁾.

It is interesting to note that about one-fifth (20.6%) of all the patients complaining of stress incontinence (with or with-

out other symptoms) had neither genuine stress incontinence nor detrusor instability. A large number of these patients may actually be suffering from the urethral syndrome. This is a recognised entity with symptoms of lower urinary tract irritation in the absence of urethral or bladder abnormality and significant bacteriuria. It is thought that as many as 20% of women may suffer from the urethral syndrome in their reproductive years. Its diagnosis is made primarily by exclusion. The diversity of synonyms for this symptom complex, which include aseptic urethrotigonitis, pseudomembranous trigonitis, chronic urethritis, senile or hypoestrogenic urethritis, reflects the fact that its underlying pathophysiology is still uncertain. Various causes have been postulated, including a chronic inflammation of the posterior urethral glands. Fastidious pathogens, especially *Chlamydia trachomatis* which has been widely studied, have been implicated as the cause of this inflammation. Amongst postmenopausal women, estrogen deficiency is known to cause irritative voiding symptoms. Other authors have suggested urethral stenosis, autoimmune mechanisms or urethral spasms as possible causes of this problem. Its management as such depends on whether a pathogen can be identified and therefore treated. In postmenopausal women, estrogen replacement will very often lead to resolution of these symptoms, especially sensory urgency when accompanied by atrophic urethritis⁽¹⁷⁾. Other forms of treatment that have been tried include urethral dilatation and massage, periurethral steroid or anaesthetic injections, urethral cryotherapy or electrocautery, urethroplasty, urethrotomy and sacral neurostimulation⁽¹⁸⁾. As in our own experience, results of treatment are often unsatisfying especially when the etiology is unknown, and larger controlled studies are still awaited to prove the efficacy of the various treatment modalities. Nevertheless it is certainly important to exclude other serious conditions such as a neoplasm before making this diagnosis.

Finally, it is well-recognised that urinary symptoms are often variable and may not reflect true pathology, and may indicate a disturbed psychological state⁽¹⁹⁾. As emphasized by Frewen (1979), such patients may experience intervals of painless urgency during periods of psychosocial and environmental stress, with wide variations in the duration and severity of the symptoms⁽²⁰⁾. These intervals are usually of a transient though recurring nature and often respond promptly to bladder antispasmodics and sedatives. This could also explain the finding of normal urodynamic results in the presence of abnormal symptomatology.

CONCLUSION

Women with stress incontinence and other urinary symptoms should be evaluated with urodynamic tests since the incidence of detrusor instability is known to be high (39% in our study). The incidence of genuine stress incontinence in this group was found to be 46.3%. However, those with pure stress incontinence should also be evaluated with urodynamic tests since a significant proportion of them in fact have detrusor instability (18.2%). The incidence of genuine stress incontinence in this group was found to be 50%.

Urodynamic evaluation thus prevents performance of unnecessary operations for "stress incontinence" and may also improve results of surgical operations since those without genuine stress incontinence had been eliminated before operation.

The present diversity in operative success rates bear witness to the difficulty in arriving at an accurate diagnosis based solely on clinical appraisal. This can however be achieved if clinical assessment is augmented with urodynamic studies if surgery is being considered.

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