CAN WE AFFORD TO TAKE SHORT CUTS IN THE MANAGEMENT OF STRESS URINARY INCONTINENCE?

R K W Ng, A Murray

ABSTRACT

Is urodynamics necessary in the management of female stress urinary incontinence? This has remained a point of contention among urologists and gynaecologists alike. In this prospective study we evaluated 28 patients urodynamically to assess our diagnostic accuracy and to audit our intended management. These patients had complained solely or predominantly of stress incontinence. None of them had previous abdominal or vaginal surgery for stress urinary incontinence or a history suggestive of voiding disorder. All 28 of them were listed for either a Burch colposuspension or Stamey endoscopic bladder neck suspension operation based on demonstrating the sign stress incontinence clinically or radiologically on screening cystography. In all these cases the diagnosis of genuine stress incontinence was presumed and urodynamics would not have been performed preoperatively, if not for this study. As a result, there was a 21% overall change in the intended management. Routine but simplified urodynamics (to include pad test, provocative cystometry, uroflowmetry and residual urine measurement) would appear to be a pre-requisite of genuine stress incontinence surgery, even in patients complaining solely of stress incontinence.

Keywords: *Urodynamics, female urinary stress incontinence*

SINGAPORE MED J 1993; Vol 34: 121-124

This paper was presented at the 19th International Continence Society Meeting, Ljubljana, Yugoslavia in September 1989[1].

INTRODUCTION

There have been contradictory reports in the literature regarding the role of urodynamics in the management of female genuine stress incontinence.

Kaufman[2] in a prospective study on 86 women, 31 of whom had failed prior surgical repairs and 58 complained of urge incontinence, concluded that the overwhelming majority do not need urodynamics.

Farrar et al[3], Cantor and Bates[4] and Hastie and Moisey[5] wrote that some cases will warrant it. They argued that women presenting with the symptoms of urge incontinence together with stress incontinence should be offered urodynamic assessment before surgery for incontinence.

On the other hand, Cardozo and Stanton[6], Jarvis et al[7], Byrne et al[8], Haylen and Frazer[9], Phua et al[10] were of the opinion that all patients should have it.

METHODS

A detailed history (including gynaecological and urological), clinical examination and urine culture were done at the gynaecological clinic. A detailed, standard, computerised urodynamic questionnaire was completed prior to the urodynamic assessment which included a two-hour pad test as described by Sutherst et al[11] and modified by Richmond et al[12]; urine flowmetry and measurement of residual urine volume; supine medium-fill water subtraction cystometry with erect provocation as well as coughing and heel bouncing; supine fluid-perfusion urethral profilometry at rest (Brown and Wickham[13]); urethral stability at maximum urethral pressure; supine and erect fluid bridge test (Sutherst and Brown[14]). We used the Lectromed multispeed, 6-channel chart recorder. At the end of the investigations, the size 12 FG. Glen-Rowan double-lumen bladder urethral catheter (Portex) and rectal catheter (size 8 FG. feeding tube-Pennine) were removed. The patient was asked to cough, repeatedly if possible, in the erect posture with her legs apart and labia parted, to demonstrate the sign stress incontinence.

Methods, definitions and units conform to those of the International Continence Society, except where specifically noted[15].

RESULTS

Their ages ranged from 26 to 67 with a mean of 46.9 years. Fifteen (53.6%) were premenopausal, 6 (21.4%) post-menopausal and 7 (25%) have had a total abdominal hysterectomy. The mean age of the latter group was 49.9 years. Their parity ranged between 0 and 5.

Subdivision of symptoms in the 28 patients with presumed genuine stress incontinence is shown in Table I; in all cases stress incontinence was the predominant symptom.

All urine cultures were noted to be negative before urodynamic investigations.

The results of the urodynamic investigations are shown in Table II.

Table I - Subdivision of symptoms in the 28 patients with presumed genuine stress incontinence

Symptoms	No.	(%)
Stress incontinence	15	(54)
Stress incontinence and other symptoms except urge incontinence	8	(29)
Mixed stress and urge incontinence with/without other symptoms	5	(17)

Department of Gynaecology
Arrowe Park Hospital
Wirral, Merseyside
UK

R K W Ng, MBBS, LRCP, LRCS, LRCPS, MRCOG, M Obstet Gynaec (Liverpool)
Senior Registrar

A Murray, MBChB, FRCOG, MD (Liverpool)
Consultant

Correspondence to: Dr R K W Ng
Department of Reproductive Medicine
Kandang Kerbau Hospital
1 Hampshire Road
Singapore 0821

Table II - Results of urodynamic investigations

Urodynamic investigations	Range	Mean (S.D.)
1. Pad test (gram/hour)	0-79.5	26.2 (28.8)
2. Maximum cystometric capacity(ml)	350-760	543 (126.5)
3 (a) Maximum urethral closure pressure(cmH_20)	27-80	55.5 (15.5)
(b) Functional profile length (cm)	2-3.5	2.8 (0.5)
4 (a) Maximum flow rate(ml/s)	18-75	40 (14.3)
(b) Residual urine volume(ml)	0-100	31.6 (32.6)

Three patients had a negative pad test result (<1 g/h). Two of these were considered to have mild genuine stress incontinence as they had stable detrusors and stress incontinence was demonstrated prior to and at the end of urodynamic testing as described in the Abstract and Methodology respectively. The third patient was categorised as normal because the sign stress incontinence was not elicited urodynamically. The latter revealed that she had a stable detrusor and a positive fluid bridge test which was most probably a false positive result.

Two patients had unstable detrusors and urge incontinence only on erect provocation; both had a maximum cystometric capacity of 700 ml. They were both considered to have mixed genuine stress incontinence and unstable detrusor.

No patient had a "low pressure urethra", ie a maximum urethral closure pressure (MUCP) <20 cm H_2O[29]. The MUCP had a wide range between 27 and 80 cm H_2O (Mean 55.5) which was scattered among the pre and postmenopausal as well as post-hysterectomised patients.

Urethral stability at maximum urethral pressure revealed that all patients had a stable urethra.

One patient had a negative fluid bridge test. This was regarded as a false negative because stress incontinence was seen clinically and she had a stable detrusor. The remaining patients had a positive fluid bridge test, thus supporting the diagnosis of genuine stress incontinence, apart from the one who had a false positive result (as mentioned above).

No patient had an abnormal maximum flow rate (<10th centile for volume voided on the Liverpool Nomograms for female voiding, Haylen et al[16]. No patient had a significant residual urine volume (>100ml).

Presumed genuine stress incontinence was correct in 25 patients; one patient was normal urodynamically (including a negative pad test); unsuspected unstable detrusor was present in 2 patients (7.1%), the diagnosis was mixed genuine stress incontinence and unstable detrusor; no patient had an unsuspected voiding disorder. (Table III)

Of the original 28 patients with presumed genuine stress incontinence on the waiting list for suprapubic bladder neck surgery (either Burch colposuspension or Stamey endoscopic bladder neck suspension):

* Three had a change in the intended operation to prolapse repair (of whom 2 had a negative pad test and the other was diagnosed as mixed genuine stress incontinence with unstable detrusor).

Table III - Urodynamic diagnosis in the 28 patients with presumed genuine stress incontinence.

Urodynamic diagnosis	No. of patients
Genuine stress incontinence (GSI)	25
Mixed GSI and unstable detrusor	2
Normal	1
Total	28

* Three had no operation at all - one was discharged (she had a normal urodynamic investigation including a negative pad test), another was treated with anticholinergics (for mixed incontinence) and the remaining patient was managed with physiotherapy (for a positive pad test of 6.9 g/h but a normal urodynamic investigation). There was a 21% overall change in the intended management as a result of preoperative urodynamics. (Table IV)

Table IV - Urodynamic tests responsible for the change in the intended management in 6 out of the 28 patients (21%) with presumed genuine stress incontinence.

Urodynamic test	Change in the intended operation		Operation cancelled	
	No.	Change to	No.	Change to
Pad test	2[a]	Prolapse repair	1[c] 1[a]	Discharged Physiotherapy
Provocative cystometry	1[b]	VH & BNR	1[b]	Anticholinergics

VH=Vaginal hysterectomy BNR= Bladder neck repair

Urodynamic diagnosis:

a= Mild genuine stress incontinence (GSI)

b= Mixed GSI & Unstable detrusor

c= Normal

DISCUSSION

Genuine stress incontinence is the involuntary loss of urine occurring when, in the absence of a detrusor contraction, the intravesical pressure exceeds the maximum urethral pressure. Stress urinary incontinence was used to mean presumed genuine stress incontinence because the diagnosis was not proven urodynamically.

Prior to this study we were forced to take short cuts in the diagnosis of stress urinary incontinence mainly because of the large number of patients and limited time and resources for urodynamic investigations in a busy District General Hospital. We believed then that by the careful selection of patients we could presume genuine stress incontinence. The rationale then was that if unstable detrusor coexisted with predominant genuine stress incontinence, sphincter weakness will require correction before or after treatment for unstable detrusor.

This study showed that our clinical presumption of genuine stress incontinence was incorrect in 2 out of 28 cases (7.1%) based on provocative cystometry. Following this study we firmly believe that it would be more appropriate to diagnose unstable detrusor per se or mixed with genuine stress incontinence prior to suprapubic bladder neck surgery. The 3 reasons for this are:

(1) Unstable detrusor should be treated first by conventional treatment by way of behaviour modification techniques or pharmacotherapy. Successful treatment of unstable detrusor will save the patient an unnecessary and incorrect operation which may exacerbate her unstable detrusor. When Stanton et al[17] reported their results from colposuspension in a group of 60 women with stress incontinence of both "detrusor stable" and "detrusor unstable" types they found an objective cure rate of only 43% in those with detrusor instability, compared with 85% in those with genuine stress incontinence.

(2) In patients with detrusor instability, or combined genuine stress incontinence and detrusor instability, for whom the symptom of stress incontinence is a major element of their complaint, and who have failed to respond to conventional treatment, surgery may be offered. However they must be forewarned that surgery is aimed at improving rather than curing their incontinence, and that they may have residual frequency and urgency. Several authors[18-23] have studied this group of patients and reported subjective cure rates of around 80% and objective cures in approximately 60% of patients with suprapubic procedures, although only 30% from vaginal repair[23].

(3) Suprapubic bladder neck surgery by way of colposuspension[21,24], Stamey[25,26] and suburethral sling[27,28] gives rise to an 8 to 27% complication rate of unstable detrusor. Most of these studies were based on the preoperative diagnosis of genuine stress incontinence. Thus this complication would most probably be higher if the unstable detrusor was not identified by urodynamics preoperatively.

None of the previous studies mentioned in the Introduction have included the pad test as part of their urodynamic investigations in this controversial debate "Is routine urodynamics necessary in the diagnosis of genuine stress incontinence?". The pad test is an objective test to demonstrate incontinence qualitatively and quantitatively and also to provide objective assessment of the patient following incontinence surgery.

In our study we found that the pad test was the most useful investigation in that it alone changed our intended management in 3 patients (10.7%). These 3 patients had a negative pad test result and were removed from the waiting list for corrective surgery: one had improved with self-taught pelvic floor exercises and stress incontinence was no longer seen, she was discharged. Two patients were obese and had genital prolapse which appeared to be the main problem. Both were advised to diet before prolapse surgery would be considered. (Table IV)

Provocative cystometry was equally essential; it picked up 2 (7.1%) cases of unsuspected unstable detrusor and the probable diagnosis was mixed genuine stress incontinence and unstable detrusor, one of whom originally complained only of stress incontinence and the other had mixed stress and urge incontinence. Their intended management was also changed: one had her operation changed from Burch colposuspension to vaginal hysterectomy with bladder neck repair as she also had utero-vaginal prolapse. The other was treated with anticholinergics. (Table IV)

The urethral pressure and the urethral closure pressure are idealised concepts which represent the ability of the urethra to prevent leakage. However, measurement of resting urethral pressure gives little practical guide to urethral function, because of the overlap between measurements found in healthy asymptomatic patients and those with urethral sphincter incompetence. This study has also demonstrated a wide range of results in the maximum urethral closure pressure (MUCP). In our opinion this test could be excluded from the urodynamic assessment of primary stress urinary incontinence. However, there is good evidence that a low urethral pressure mitigates against successful surgical treatment[29-32]. On the other hand it remains unproven to take the preoperative MUCP of 20 cm H_2O as an absolute cut-off[33].

The fluid bridge test is a non-radiological method for the detection of the smallest entry of fluid into the proximal urethra. Fluid descending into the urethra will establish a fluid bridge between the bladder and the test point in the proximal urethra, which can be detected with a double lumen fluid bridge catheter. This test is not essential if stress incontinence can be demonstrated clinically or radiologically. This is because it can give rise to both false negative and false positive results (one of each in this study). The former result could be caused by the double lumen catheter preventing fluid entry into the urethra. The false positive result could be due to a technical error or bladder base descent on the fixed catheter, without actual bladder neck incompetence.

Despite excellent correlation between subjective and objective assessment in this study uroflowmetry and measurement of residual urine volume should be routinely performed before any procedure designed to modify the function of the outflow tract. This is because such surgery ie colposuspension[21,34], Stamey[25,35] and-sub-urethral sling[25,27] gives rise to a voiding dysfunction complication rate of up to 40%! It would seem that preoperative urodynamic evaluation is important in the prediction of postoperative voiding difficulties. In patients with compromised voiding on preoperative assessment it is often appropriate to select a procedure with a lower risk of obstruction, accepting that this may carry a slightly poorer prognosis for the cure of incontinence. This is another reason for the wisdom of preoperative urodynamics.

Careful selection based on a detailed history, clinical examination, clinical diagnosis of stress urinary incontinence; supported by screening cystography in doubtful cases appears to be an inadequate means of selection for stress incontinence surgery. The conclusion that all patients warrant urodynamic investigation is inescapable.

We have changed our clinical practice as a result of this study. We feel that despite the small number, a 21% overall change in the intended management is sufficient evidence to justify testing all patients, prior to suprapubic bladder neck surgery, especially if this facility is available.

In our opinion, the essential urodynamic investigations should include pad test, provocative cystometry, uroflowmetry and residual urine measurement.

ACKNOWLEDGEMENT

We would like to thank Mrs Hilary Dunbar; Sister Ann Edwards, SEN Sue Chesters and the nursing staff; Mrs Pat Murphy, Ms Margery Wilding, Ms Kala Ramaiya and Mdm Diana Koo for their urodynamic, nursing, administrative and secretarial help respectively. I wish to thank Mr Adrian Murray, John Sutherst and Dave Richmond, my teachers.

REFERENCES

1. Ng RKW, Murray A. The place of routine urodynamics in the management of female genuine stress incontinence. Proceedings of the nineteenth annual meeting of the International Continence Society, Ljubljana, Yugoslavia. Neurol Urodynam 1989;8:307-8.
2. Kaufman JM. Urodynamics in stress urinary incontinence. J Urol 1979;122:778-82.
3. Farrar DJ, Whiteside CG, Osbourne JL, Turner Warwick RT. A urodynamic analysis of micturition symptoms in the female. Surg Gynaecol Obstet 1975;141:875-81.
4. Cantor TJ, Bates CP. A comparative study of symptoms and objective urodynamic findings in 214 incontinent women. Br J Obstet Gynaecol 1980;87:889-92.
5. Hastie KJ, Moisey CU. Are urodynamics necessary in female patients presenting with stress incontinence? Br J Urol 1989;63:155-6.

6. Cardozo LD, Stanton SL. Genuine stress incontinence and detrusor instability-a review of 200 patients. Br J Obstet Gynaecol 1980;87:184-90.
7. Jarvis GJ, Hall S, Stamp S, Millar DR, Johnson A. An assessment of urodynamic examination in incontinent women. Br J Obstet Gynaecol 1980;87:893-6.
8. Byrne DJ, Hamilton Stewart PA, Gray BK. The role of urodynamics in female urinary stress incontinence. Br J Urol 1987;59:228-9.
9. Haylen BT, Sutherst JR, Frazer MI. Is the investigation of most stress incontinence really necessary? Br J Urol 1989;64:147-9.
10. Phua SM, Low JJH, Chew SY. The role of urodynamics in evaluating incontinent females. Singapore Med J 1992;33:139-42.
11. Sutherst JR, Brown MC, Shawer M. Assessing the severity of urinary incontinence in women by weighing perineal pads. Lancet 1981;i:1128-9.
12. Richmond DH, Sutherst JR, Brown MC. Quantification of urine loss by weighing perineal pads. Observation on the exercise regimen. Br J Urol 1987;59:224-7.
13. Brown M, Wickham JEA. The urethral pressure profile. Br J Urol 1969;41:211-7.
14. Sutherst JR, Brown M. Detection of urethral incompetence in women using the fluid bridge test. Br J Urol 1980;52:138-42.
15. Abrams P, Blaivas JG, Stanton SL, Anderson JT. The standardisation of terminology of lower urinary tract function (Produced by the International Continence Society Committee on Standardisation of Terminology). Scand J Urol Nephrol, 1988;114(Suppl):5-19.
16. Haylen BT, Ashby D, Sutherst JR, Frazer MI, West CR. Maximum and average urine flow rates in normal male and female populations - the Liverpool Nomograms. Br J Urol 1989;64(1):330-8.
17. Stanton SL, Cardozo LD, Williams JE, Ritchie D, Allan V. Clinical and urodynamic features of failed incontinence surgery in the female. Obstet Gynecol 1978;51:515-20.
18. Meyhoff HH, Walters S, Gerstenberg T et al. Incontinence surgery in females with motor urge incontinence. Proceedings of the tenth annual meeting of the International Continence Society, Los Angeles, USA. Neurol Urodynam 1980:109-12.
19. Lockhart JL, Vortsman B, Politano VA. Anti-incontinence surgery in females with detrusor instability. Proceedings of the thirteenth annual meeting of the International Continence Society, Aachen, Federal Republic of Germany. Neurol Urodynam 1983:208-1.
20. Koonings P, Bergman A, Ballard CA. Combined detrusor instability and stress urinary incontinence: where is the primary pathology? Gynecol Obstet Invest 1988;26:250-6.
21. Langer R, Ron-El R, Newman A, Herman A, Caspi E. Detrusor instability following colposuspension for urinary stress incontinence. Br J Obstet Gynaecol 1988;95:607-10.
22. Karram MM, Bhatia NN. Management of co-existent stress and urge urinary incontinence. Obstet Gynecol 1989;73:4-7.
23. Jorgensen L, Lose G, Molsted-Pedersen L. Vaginal repair in female motor urge incontinence. Eur Urol 1987;13:382-5.
24. Cardozo L, Stanton SL, Williams JE. Detrusor instability following surgery for genuine stress incontinence. Br J Urol 1979;51:204-7.
25. Hilton P. A clinical and urodynamic study comparing the Stamey bladder neck suspension and suburethral sling procedures in the treatment of genuine stress incontinence. Br J Obstet Gynaecol 1989;96:213-20.
26. Kirby RS, Whiteway JE. Assessment of the results of Stamey bladder neck suspension. Br J Urol 1989;63:21-3.
27. Jarvis GJ, Fowlie A. Clinical and urodynamic assessment of the porcine dermis bladder sling in the treatment of genuine stress incontinence. Br J Obstet Gynaecol 1985;92:1189-91.
28. Stanton SL, Brindley GS, Holmes DM. Silastic sling for urethral sphincter incompetence in women. Br J Obstet Gynaecol 1985;92:747-50.
29. Mcguire EJ. Urodynamic findings in patients after failure of stress incontinence operations. Clin Biol Res 1981;78:351-60.
30. Hilton P, Stanton SL: Urethral pressure measurement by microtransducer: results in symptom-free women and in those with genuine stress incontinence. Br J Obstet Gynaecol 1983;90:919-34.
31. Sand PK, Bowen LW, Panganiban R, Ostergard DR. The low pressure urethra as a factor in failed retropubic urethropexy. Obstet Gynecol 1987;69:399-402.
32. Bowen LW, Sand PK, Ostergard DR, Franti CE. Unsuccessful Burch retropubic urethropexy: a case controlled urodynamic study. Am J Obstet Gynecol 1989;160:452-8.
33. Hilton P, Mayne CJ. The Stamey endoscopic bladder neck suspension: a clinical and urodynamic evaluation including actuarial follow-up over four years. Br J Obstet Gynaecol 1991;98:1141-9.
34. Galloway NT, Davies N, Stephenson TP. The complications of colposuspension. Br J Urol 1987;60:122-4.
35. Ashken MH, Abrams PH, Lawrence WT. Stamey endoscopic bladder neck suspension for stress incontinence. Br J Urol 1984;56:629-34.