Urinary Tract Infection After Urodynamic Study in Women

Anny Wai Mei TONG APN, RM
Willy Cecilia CHEON MRCOG, FHKAM (Obstetrics and Gynaecology)
Department of Obstetrics and Gynaecology, Queen Elizabeth Hospital, 30 Gascoigne Road, Kowloon, Hong Kong

Objective:
To assess the prevalence of urinary tract infection after urodynamic study in healthy women and its natural history.

Method:
210 consecutive incontinence women were recruited. All women screened for urinary tract infection before urodynamic study by mid-stream urine culture at least 1 to 2 months before investigation. All women then received a standard urodynamic investigation.

Results:
The incidence of bacteriuria before and after urodynamic studies were 3.8% and 3.6% respectively. Bacteriuria was transient in 3 of the 7 women but persisted in 3 women. Only 1 of 7 bacteriuria gave rise to symptoms. Irritative bladder symptoms occurred in 49.7% and 17% of women on the day of procedure and day 2 after procedure respectively.

Conclusion:
Urodynamic investigations were associated with a high incidence of transient irritative symptoms but a low incidence of bacteriuria (3.6%). Bacteriuria was asymptomatic in most patients. Its natural history was transient but may be persistent. In this population, urodynamic studies are associated with a low level of morbidity.
HKJGOM 2005; 5:22-25

Keywords: Urinary tract infection, Urodynamics

Introduction

Diagnostic multichannel pressure flow study is routinely performed in the investigation of women with lower urinary tract disease/dysfunction before invasive therapy. However, the investigation has risk of infection. The incidence of bacteriuria after urodynamic studies in women is not clear as the reported incidence of bacteriuria ranges from 1.5-30%[1-7]. There has been associated irritating symptoms e.g. urinary frequency, urgency and dysuria following urodynamic investigation but are not typical of a urinary tract infection[7-9]. The aim of the study was to assess the safety of urodynamic studies in women attending a urogynaecology clinic, to establish the incidence of bacteriuria after the test, and to study the natural history and the effects on the patients.

Materials and Method

It is a prospective study in the urogynaecology clinic in Queen Elizabeth Hospital, Hong Kong. A total of 210 consecutive women referred for urodynamic study in 2004 were included except those who required prophylactic antibiotics or were taking antibiotics. Local research ethics committee approval was obtained.

A clean mid-stream urine (MSU) specimen was saved right before the procedure. Before

Correspondence to: Anny Wai Mei TONG, Department of Obstetrics and Gynaecology, Queen Elizabeth Hospital, Kowloon, Hong Kong.
Tel: 2958 6049 Email: atongwm@yahoo.com.hk

catheterization, the vulva and external urethral meatus were washed with aqueous solution containing chlorhexidine gluconate 0.015% w/v and centrimide 0.15% w/v. After adequate lubrication with a sterile lubricating gel, catheterization was performed under aseptic technique. Catheters were then connected to the urodynamic machine and were filled with sterile normal saline. The catheters and connectors were disposable and were replaced after each urodynamic investigation.

After the procedure, women were advised to increase fluid intake. Women were asked to complete 3-day diary of irritating symptoms and events including urgency, frequency, dysuria and suprapubic pain. Women were also required to save a clean MSU sample for culture on the 2nd day following the procedure. Women were instructed how to prevent contamination when collecting a MSU specimen.

If the urine culture of the day-2 specimen showed significant bacteriuria (quantitative culture of $>10^5$ cfu/mL) and the irritating symptoms are positive, a course of antibiotics was prescribed according to sensitivity. If the urine culture of day-2 specimen showed significant bacteriuria without irritating symptom, another MSU was saved on day 7. Women were instructed to call back promptly once irritating symptoms were positive.

Results

All patients first attending the urogynaecology clinic were screened for bacteriuria, using microscopy and culture. Only patients with a negative urine culture were considered eligible to take part in the study. A total of 210 consecutive women (mean age, 55.6; mean parity, 3) attending for urodynamic studies were included in the study. From a total of 210 recruited women, 8 (3.8%) were excluded from the analysis because they were later found to have bacteriuria already before urodynamics (Figure 1). Of the remaining 202 women, 197 (97.5%) were able to provide urine specimen at 2 days after test. Bacteriuria was detected in 7 (3.6%) patients. Only 1 of the 7 bacteriuria was symptomatic, the remaining 6 were asymptomatic. Half the 6 asymptomatic women remained having positive culture on day 7 and were given antibiotics. Half of them had negative culture on day 7 even without treatment. All of the 6 women remained asymptomatic throughout.

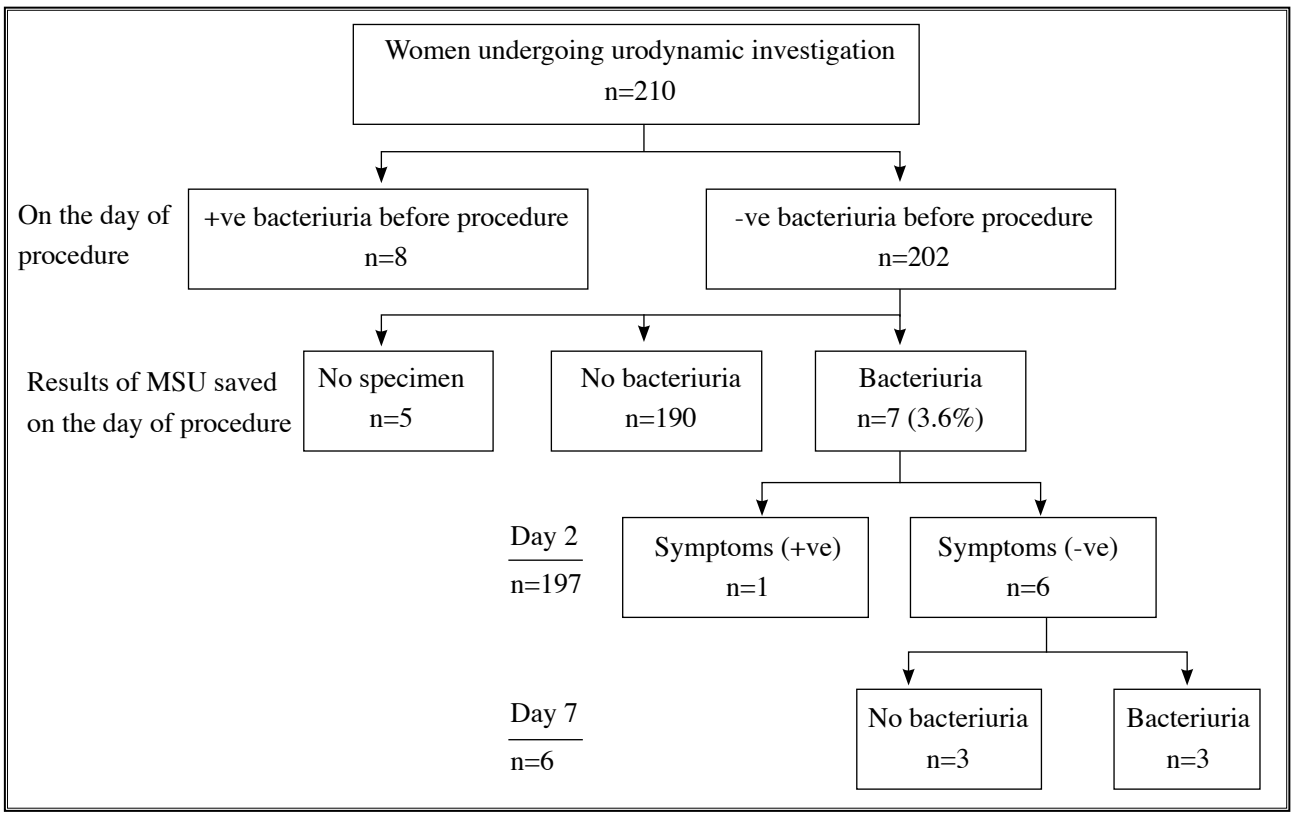
The organisms causing bacteriuria were *Escherichia coli* in 6 and pseudomonas in 1 of the 7 women, all were susceptible to all commonly used antibiotics. The 3-day diary of irritating bladder symptoms was completed by 197 (97.5%) women. Irritating bladder symptoms of dysuria, frequency, urgency and/or mixed symptoms were detected in 98 (49.7%) women on the day of procedure and was reduced to 35 (17.7%) women on day 2 after the urodynamic study.

Discussion

It was well known that there was increased risk of urinary tract infection after urodynamic investigation due to the catheterization procedure. In the study, screening test immediately before urodynamic study was not done as it was not uncommon that unexpected urinary tract infection at the time of investigation was reported despite stringent screening protocols were performed[2]. In the study, it demonstrated that the incidence of significant bacteriuria before and after urodynamic investigation was 3.8% and 3.6% respectively. The incidence rate of significant bacteriuria after urodynamic study was relatively low and was similar with other studies on urinary tract infection after urodynamic investigation[3,10].

Irritating bladder symptoms commonly occurred after urodynamic investigation, affecting 34-60% according to previous studies. There was a poor correlation between the occurrence of irritative symptoms and the development of bacteruria[1,7,9]. There were 17% of women reported irritating bladder symptoms on day 2 after the investigation, only few women demonstrated either symptomatic urinary tract infection or bacteriuria (7 women) and most of them had normal culture on day-2 urine specimens. The significance and natural history of bacteriuria seems unpredictable, since the acquired bacteriuria was transient in 3 out of the 6 acquired asymptomatic bacteriuria when MSU was negative on day 7. This result was similar to the previous studies[1]. Moreover, all patients remain asymptomatic even bacteriuria persisted on day 7. MSU may become negative sometimes later if we can repeat MSU frequent enough

Figure 1. Bacteriuria in mid-stream urine (MSU) specimens in women with urodynamic investigation



to avoid the complications of urinary tract infection.

The causative microorganisms is mainly *E coli*, which is largely similar to the other studies[3,6,8,11]. In the study, there was one sample showing *Pseudomonas aeruginosa*, which is sensitive to simple antibiotics after urodynamic investigation, in an asymptomatic woman. *Pseudomanas aeruginosa* are usually hospital-acquired and related to urinary tract catheterization, instrumentation or surgery.

In conclusion, we found that the incidence of bacteriuria before and after urodynamic investigation in our centre are small (3.8% and 3.6%). In most cases, bacteriuria remained asymptomatic and in some women it was a transient event. It was shown to persist in only half of the cases and still remained asymptomatic. The natural course is unknown in our study. Women should be warned of the possibility of infection. Urodynamic investigation is a well-tolerated procedure and the risk of bacteriuria is low and therefore it is a safe procedure to be practiced.

References

1. Bombieri L, Dance DA, Rienhart GW, et al. Urinary tract infection after urodynamic studies in women: incidence and natural history. *BJU Int* 1999; 83:392-395.
2. Okorocha I, Cumming G, Gould I. Female urodynamics and lower urinary tract infection. *BJU Int* 2002; 89:863-867.
3. Almallah YZ, Rennie CD, Stone J, et al. Urinary tract infection and patient satisfaction after flexible cystoscopy and urodynamic evaluation. *Urology* 2000; 56:37-39.
4. Sabanathan K, Duffin HM, Castleden CM. Urinary tract infection after cystometry. *Age Ageing* 1985; 14:291-295.
5. Klingler HC, Madersbacher S, Djavan B, et al. Morbidity of the evaluation of the lower urinary tract with transurethral multichannel pressure-flow studies. *J Urol* 1998; 159:191-194.

6. Porru D, Madeddu G, Campus G, et al. Evaluation of morbidity of multi-channel pressure-flow studies. *Neurourol Urodyn* 1999; 18:647-652.
7. Carter PG, Lewis P, Abrams P. Urodynamic morbidity and dysuria prophylaxis. *Br J Urol* 1991; 67:40-41.
8. Yip SK, Fung K, Pang MW, Leung P, Chan D, Sahota D. A study of female urinary tract infection caused by urodynamic investigation. *Am J Obstet Gynecol* 2004; 190:1234-1240.
9. Cutinha PE, Potts LK, Fleet C, Rosario D, Chapple CR. Morbidity following pressure flow studies—are prophylactic antibiotics necessary? *Neurourol Urodyn* 1996; 14:440-441.
10. Benness C, Manning J. Patient evaluation of urodynamic investigations. *Neurourol Urodyn* 1997; 16:110-111.
11. Brostrom S, Jennum P, Lose G. Morbidity of urodynamic investigation in healthy women. *Int Urogynecol J Pelvic Floor Dysfunct* 2002; 13:182-184.
12. Peschers UM, Kempf V, Jundt K, Autenrieth I, Dimpfl T. Antibiotic treatment to prevent urinary tract infections after urodynamic evaluation. *Int Urogynecol J Pelvic Floor Dysfunct* 2001;12:254-257.