

# Vesica



Sydney Urodynamic Centres newsletter for medical practitioners

## Urinary tract infection after urodynamic studies

Instrumentation of the lower urinary tract by urethral catheterisation is the most common procedure performed in hospitals, occurring in one in five of all admissions.

Urinary tract infection (UTI) occurs in approximately one in three of all patients catheterised in hospital and is the cause of 40% of all hospital-associated infections.

Urinary tract instrumentation and catheterisation is complicated in 80% of all nosocomially acquired genito-urinary tract infections. Women with catheter-associated bacteruria may be asymptomatic or be unwell with pyrexia and urinary tract symptoms.

Urinary infections usually respond quickly to catheter removal and/or antibiotic treatment but can occasionally lead to acute and chronic pyelonephritis, bacteraemia and death and have significant financial implications for both hospital and community health services.

Hospital-associated urinary tract infection has three times the mortality rate of matched non-bacteriuric patients. Moreover, women with bacteraemic UTI who had an indwelling urethral catheter have a higher mortality rate than non-catheterised bacteriuric patients.

Women with urinary tract infection have a 1 to 4% risk of bacteraemia, which has a one in ten mortality rate.

Pathogenic microorganisms may enter the bladder from the peri-urethral or perineal areas at the time of the catheter insertion. The technique of catheterisation in a normal healthy bladder may not be of such relevance, as randomised studies of sterile to non-sterile urethral catheterisation techniques have shown no statistical difference in the outcome of development of UTI.

Instrumentation of the lower urinary tract is performed for a variety of diagnostic and therapeutic indications. Diagnostic procedures used in the evaluation of lower urinary tract function include cystourethroscopy, urodynamic study and radiological investigations.

Single in-and-out urethral catheterisation may be performed to overcome temporary impairment of bladder emptying, to collect urine for microscopy, to estimate the post-voiding residual volume and prior to surgery to ensure that the bladder is empty.

The risk of a urinary tract infection following in-and-out urethral catheterisation has been estimated to be between 1 and 2% but

may be higher in women with incomplete bladder emptying and when immunological competence has been compromised by drugs, age or disease.

Urodynamic studies are common investigative procedures used in both sexes for the assessment of urinary incontinence, voiding difficulties and other lower urinary tract symptoms. The storage and emptying functions of the lower urinary tract are evaluated by measuring the pressure volume relationship during bladder filling and pressure-urinary flow relationship during bladder emptying.

Small diameter urethral catheters are inserted to measure bladder and urethral pressure during bladder filling and emptying. A further catheter is placed in either the vagina or rectum to measure abdominal pressure. Intravesical pressure is calculated by subtracting intra-abdominal pressure from total bladder pressure.

Radiological visualisation or ultrasound examination of the lower urinary tract is performed synchronously with urodynamic pressure measurements by filling the bladder with either a radiolucent or a sonolucent material. In these procedures the duration of catheterisation is approximately 20 minutes.

Significant bacteruria has been reported to occur in 15 to 18% of women following urodynamic investigations. In our experience the rate of acquired urinary tract infections following urodynamic studies is 8.2%.

### Reducing the risk of infection

Urodynamic equipment and catheters can be a source of infection. It is important that pressure domes used in urodynamic laboratories be discarded preferably after each patient but if used for several patients these should definitely be discarded after one clinic.

Although significant bacteruria may be detected in a clean catch urine specimen a few days following urodynamic studies, most patients do not develop symptomatic infections, as bacteria clear spontaneously with the physiological flushing of bladder emptying.

In most urogynaecology departments the prevalence of unsuspected bacteruria in women presenting for urodynamic evaluation is high, approximately 7 to 10%. It is much higher in women with impaired bladder emptying (19%) than women with normal micturition.

*E. coli* and *Klebsiella* are the commonest organisms isolated.

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Blood culture after urodynamic studies has been reported to grow bacteria in 7% of patients, despite strict aseptic techniques. The incidence of bacteraemia is higher in women who have bacteruria prior to the study.

Tubing line should never be re-used and should be disposable. In addition to using sterile disposable catheters, the proximal and distal tubes should also be sterile for each patient. Gloves should always be changed after insertion of the rectal catheter.

Most units recommend routine testing of urine prior to urodynamic evaluation so that therapy can be initiated and guided by the susceptibility results.

More importantly however, incontinent women should provide a fresh urine sample in a sterile container for dipstick urinalysis, for microscopy and culture. The former might be positive for glucose, protein, leukocyte, nitrite or blood. Women suspected on this basis of having diabetes mellitus must have a random blood glucose or glycosylated haemoglobin level checked to confirm the diagnosis, following which appropriate endocrine referrals should be made. Proper glycaemic control results in reduction in polydipsia, frequency and nocturia.

The results of urine microscopy and culture may reveal underlying urinary tract infection, diagnosed when bacteria and pus cells are detected and when an isolated culture of more than ten to the five organisms per millilitre of urine is apparent. Laboratory reporting of antibiotic sensitivity directs antibiotic prescription.

The confirmed presence of microscopic haematuria in the absence of bacteria or pus cells raises the possibility of pathologies other than infection. Similarly, persistent proteinuria without an infection warrants comprehensive assessment by a physician.

## The importance of detection

The importance of detecting urinary tract infection prior to a urodynamic study is three-fold. Firstly, irritative symptoms associated with infection mimic the symptoms of an overactive detrusor. Resolution of symptoms following a course of antibiotics obviates the need for further investigation.

Secondly, pre-existing urinary tract infection may be present in up to 19% of patients presenting for urodynamic studies. The morbidity associated with urethral catheterisation is likely to be increased if such infection remains untreated before urodynamic studies.

Thirdly, the presence of urinary tract infection has a direct influence on cystometric variables and thus impacts on the reliability of urodynamic diagnosis.

## Prophylactic antibiotics

The role of prophylactic antibiotics after urodynamics is controversial. There is universal agreement that antibiotic prophylaxis after urodynamics should be used in women with significant bacteruria or high-risk patients who have diabetes, voiding dysfunction and a history of recurrent urinary tract infections.

Data obtained by our group, suggests that post-urodynamic urinary tract infection can be significantly reduced from 8.2% to 2.6% with a single dose of antibiotic following urodynamics. We always recommend this practice.

In the current medicolegal climate patients must be counselled about this potential complication prior to undergoing urodynamic investigations.

## Posterior vaginal wall prolapse: When does it matter?

Posterior vaginal wall prolapse is very common in women presenting with lower urinary tract problems and pelvic organ prolapse.

### A common occurrence

In our own data, well over 50% of women have clinical posterior compartment prolapse. Usually we call this a 'rectocele' and assume that this 'lump' is due to a sacculation of the anterior rectal wall, but often it's not.

In a recently published series using translabial ultrasound<sup>1</sup> we showed that of 112 clinical rectoceles, only 63 (56%) showed an actual herniation of rectal wall and contents into the vagina due to, or so we assume, a defect of the rectovaginal septum or 'Denonvillier's fascia' (see Figure 1).

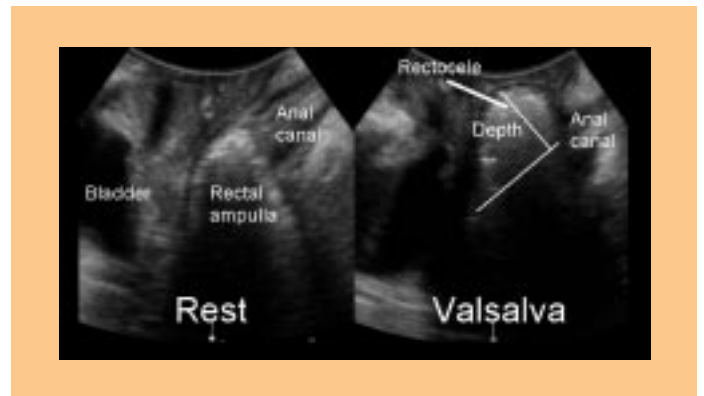


Figure 1. Defect of the rectovaginal septum as seen on translabial ultrasound. Image at rest (left) and on Valsalva (right)



Figure 2. Perineal hypermobility as seen on translabial ultrasound. Image at rest (left) and on Valsalva (right). As opposed to Figure 1, there is no sacculation of the anorectum, ie. no defect of the rectovaginal septum.

In eight women (7%) there was perineal hypermobility without fascial defect, that is, the rectal ampulla descended to below the symphysis pubis, but without any sacculation forming (see Figure 2).

In three women (3%) there was an isolated enterocele. In 38 (34%), no sonographic abnormality was detected.

This distinction is important because it is only 'true rectoceles', that is, herniations of rectal wall and contents into the vagina, that are associated with the symptoms that we usually attribute to a rectocele - straining at stool, the sensation of incomplete emptying and digitation, ie., the need to place a finger in the vagina to help defecation. The deeper the defect or herniation is, the more likely are those symptoms.<sup>2</sup>

### The cause of prolapse symptoms

Of course, rectoceles can also cause symptoms of prolapse ie. the sensation of a vaginal lump, fullness or dragging. Judging from recent work done at our unit and about to be published, even second degree posterior compartment descent is only about 30% likely to cause symptoms of prolapse. Uterine descent and Cystoceles seem more likely to cause symptoms for the same degree of descent.

Finally posterior compartment prolapse, especially enteroceles, can affect voiding, very likely by direct compression of the urethra.<sup>3</sup> In fact, posterior compartment prolapse can increase urethral resistance sufficiently to protect women against stress incontinence. Put another way, fixing an asymptomatic 'rectocele' may uncover 'occult' stress incontinence and make the patient leak.

These are important considerations when it comes to the question of surgical repair. One probably should not operate on posterior compartment descent that is asymptomatic unless there is some other indication for surgery, as any scar in the posterior vaginal wall means potential dyspareunia.<sup>4</sup>

### Prolapse – is it likely to get worse?

Another interesting issue is whether such a prolapse is likely to get worse. This question is commonly asked by patients, especially those who feel they can cope with the situation as it is but would like to sort things out before they get much older.

From our own data we can draw the following conclusions - any form of posterior compartment prolapse, even enterocele, can be found in young, nulliparous, asymptomatic women.

Childbirth however, seems to cause enlargement of some pre-existing true rectoceles, and is associated with new defects observed postpartum. Also, even if there is no actual rectocele, vaginal childbirth results in increased downwards displacement of the rectal ampulla.<sup>5</sup>

Finally, while there is a weak positive relationship between age and posterior compartment descent, both on ultrasound and on clinical assessment, this is only true for the years until menopause. Afterwards there seems to be little change in the degree of prolapse - things don't seem to get worse in those age groups we normally operate on!

### To summarise:

- Posterior compartment prolapse is very common in parous, middle-aged women seen for urogynaecological problems.
- It's unlikely to get worse in a hurry.
- It may be due to a 'true rectocele', ie. a fascial defect and a herniation of rectal wall and contents into the vagina, the result of simple rectal descent without defects, an enterocele, or be only apparent due to a deficient perineum.
- Only a 'true rectocele', ie. a fascial defect, is associated with symptoms of obstructed defecation such as straining at stool, incomplete emptying and digitation.
- Any form of posterior compartment descent can cause symptoms of prolapse, but even second degree posterior compartment descent is commonly asymptomatic.
- Consider potential benefits of surgery against the risks of dyspareunia and unmasking occult stress incontinence.

### References

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2. Dietz, H.P. and A. Korda, Which bowel symptoms are most strongly associated with a true rectocele? *Aust NZ J Obstet Gynaecol*, 2005. 45: p. 505-508.
3. Dietz, H.P., B.T. Haylen, and T.G. Vancailie, Female pelvic organ prolapse and voiding function. 1. *International Urogynecology Journal*, 2002. 13(5): p. 284-288.
4. Kahn, M.A. and S.L. Stanton, Posterior vaginal wall prolapse and its management. *Contemporary reviews in Obstetrics and Gynecology*, 1997. 9: p. 303-310.
5. Dietz, H. P. and V. Lanzarone, Does vaginal childbirth cause defects of the rectovaginal septum? *Int Urogynecol J*, 2005. 16(S2): p. S74- 75.

## Who are 'Sydney Urodynamic Centres'?

Sydney Urodynamic Centres has been providing the women of New South Wales and their doctors with a comprehensive urodynamic service for the past 20 years. They are able to scientifically assess female urinary incontinence and lower urinary tract dysfunction, provide an accurate diagnosis to the referring doctor and advise on clinical management.

The service is run by three urogynaecologists, trained and accredited in this sub-specialty by the Royal Australian and New Zealand College of Obstetricians and Gynaecologist (RANZCOG). These partners are assisted by a group of highly trained nurses who are adept at making the experience more pleasant for the women. There are seven centres around Sydney where studies can be performed in order to facilitate easy access to the service for most women.

### These locations are:

#### SYDNEY

Sydney Urodynamic Centre  
Basement, 135 Macquarie Street, Sydney

#### CHATSWOOD

North Shore Urodynamic Centre  
Suite 70, Chatswood Village  
47 Neridah Street, Chatswood

#### CAMPERDOWN

Camperdown Urodynamic Centre  
Suite 404, RPAH Medical Centre  
100 Carillon Avenue, Newtown

#### CONCORD

Concord Urodynamic Centre  
Level 2, Concord Hospital Medical Centre  
209 Hospital Road, Concord West

#### BANKSTOWN

Bankstown Urodynamic Centre  
Suite 2, Level 1, 56 Kitchener Parade, Bankstown

#### LIVERPOOL

Liverpool Urodynamic Centre  
Suite 20, 2nd Floor, 17 Moore Street, Liverpool

#### PENRITH

Penrith Urodynamic Centre  
Nepean Private Specialist Centre  
Suite 1, 1A Barber Avenue, Penrith

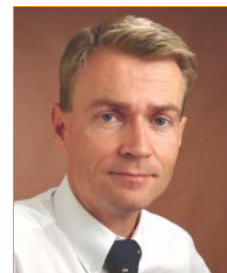
**For all appointments call (02) 9790 6969**

### Associate Professor

#### Hans Peter Dietz

MD PhD FRANZCOG DDU CU

Associate Professor Dietz graduated from Heidelberg University, Germany, in 1988. After first emigrating to New Zealand, he arrived in Australia in 1997 and completed his FRANZCOG training in 1998. Between 1999 and 2002, Associate Professor Dietz undertook urogynaecology subspecialty training in Sydney, in addition to presenting a PhD thesis at the University of NSW. His major research interests include the interaction between pelvic floor biomechanics and childbirth, pelvic floor imaging, as well as the effects of anti-incontinence surgery on anatomy and voiding function. Today, he is employed as Associate Professor of the Obstetrics and Gynaecology Unit at the Nepean Campus of the University of Sydney, as well as a specialist in urogynaecology at the Sydney Urodynamic Centres.



### Associate Professor

#### Christopher Benness

MBBS MD FRCOG FRANZCOG CU

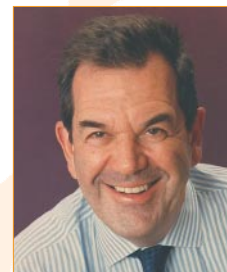
Following graduation from Sydney University, Associate Professor Benness did his specialty and sub-specialty training in both Sydney and London. An accredited sub-specialist in urogynaecology with the RANZCOG, he is a trainer and examiner in this field. He is a senior specialist in gynaecology at the Royal Prince Alfred Hospital, where he is also Head of the Department of Urogynaecology and Chairman of the Medical Board. He is active in both teaching and research, and is a Clinical Associate Professor at the University of Sydney. His main research interests are improving surgical procedures for stress incontinence and prolapse. Married to a GP, he has three young sons.



### Dr Andrew Korda

MA MHL MB BS FRCOG FRANZCOG CU  
FACLM

Following graduation from the University of Sydney, Dr Korda did his speciality training at the Royal Prince Alfred Hospital in Sydney, with further training in Oxford and New York. He is an accredited sub-specialist in urogynaecology, pelvic floor disorders, and reconstructive pelvic surgery. Dr Korda is also a senior specialist in gynaecology at the Royal Prince Alfred Hospital, where he is Chairman of the Pelvic Floor Unit. He is a clinical lecturer in gynaecology at the University of Sydney, and is involved in both teaching and research. Dr Korda was Chief Examiner in Urogynaecology and past Chairman of the Urogynaecology Sub-specialty Committee of the RANZCOG. He is also trustee of the Australian Bladder Foundation.



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