

# Urodynamics prior to surgery for urinary stress incontinence

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## Introduction

Urodynamics refers to wide range of invasive or non-invasive testing of the lower urinary tract. Invasive testing includes multi-channel cystometry, videocystometry and ambulatory bladder pressure monitoring.

Non-invasive testing includes mid-stream urine culture, uroflowmetry, frequency/volume chart, stress test as well as post-void residual urine volume measurement by ultrasound scan. Urodynamics attempts to qualify and quantify the lower urinary in two phases of bladder function namely bladder filling/storage and bladder emptying. The primary goal of urodynamics (UDS) is to reproduce lower urinary tract symptoms during the study. Generally multi-channel cystometry is referred to as urodynamics.

The value of UDS prior to surgical treatment of urinary stress incontinence (USI) is a widely debated topic among urogynaecologists, yet the use of UDS is well established in the western countries and recommended by experts<sup>1,2</sup>. Countless guidelines exist regarding the management of USI, however the significance of UDS within the management varies remarkably between different units. Neither the value of UDS nor its cost effectiveness has been assessed in randomized trials.

## For pre-operative urodynamics

When strict criteria applied, only 5.2% of patients who presented with urinary stress incontinence in a tertiary care unit would have pure urinary stress incontinence. Out of these, 25% of them had a diagnosis excluding urodynamic stress incontinence<sup>3</sup>. In another sizable prospective study, 78.5% of patients with pure USI had urodynamic stress incontinence, a further 7.5% had Detrusor Overactivity and 11.4% had inconclusive diagnoses<sup>4</sup>.

Further, cough provoked Detrusor Overactivity (DO) can be elicited during the cough test but could only be differentiated from USI by UDS. Mid-urethral

slings are not the proposed treatment option in a cough provoked DO.

In mixed urinary incontinence, mid-urethral tapes can potentially lead to worsening of urgency and urge incontinence, which often influences the offer of surgical option in mixed incontinence.

In the UK, a survey in 2002 revealed 84.5% of the units carried out cystometry in all women with urinary incontinence, furthermore a wide variation in practice was noted<sup>5</sup>. Recently a survey between Dutch Gynaecologist and Urologists related to UDS testing in women with USI, only 37% performed standard pre-operative urodynamics. 80% of them indicated that they would operate on a patient with a positive stress test without urodynamics SUI, whereas only 21% would do this also in case the clinical stress test was negative. Many would not undertake primary surgical treatment when pre-operative DO is found<sup>6</sup>.

## Against routine pre-operative urodynamics

Urodynamics is considered unpleasant by many patients and does carry a small risk of urinary tract infections. This is not considered a physiological way of testing the lower urinary tract. There is lack of standardization of the values and parameters. There is inconsistent reproducibility within the same patient and false negative findings. Not all the abnormalities found during UDS may have a clinically significant value.

USI could be due to intrinsic sphincter deficiency or urethral hyper-mobility. Nevertheless introduction of mid-urethral slings led to the treatment of USI in the same way irrespective of the type of USI. Though UDS may change clinical decision making, there was no evidence to suggest whether this would result in improved outcomes and recommends more substantial randomised trials (Cochrane 2012).

In 25-30% of the women with symptoms of USI, Urodynamic Stress Incontinence is not demonstrated which could be due to the artificial nature of the test<sup>7</sup>. It is widely now accepted that Urodynamic measures do not predict stress incontinence outcomes after surgery for USI.

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There are very few publications regarding USI surgery without UDS. Laurikainen E<sup>8</sup> performed a study in which 191 patients that had tension free-vaginal tape (TVT) without UDS. At a mean follow-up of 17 months, cure rates for USI was 97% for pure USI and 69% for mixed incontinence.

At a 10.5 year follow-up, objective and subjective cure rates were 90% and 78% respectively (72% evaluated out of 191). Subjective cure rate was significantly lower in patients with mixed incontinence. Remarkably, even in recurrent stress incontinence patients, they observed high cure rates<sup>9</sup>.

A recent randomised trial of urodynamic testing before stress-incontinence surgery published in the *New England Journal of Medicine* concluded that outcomes of surgery for uncomplicated stress incontinence are similar in women who undergo office evaluation only, without urodynamics testing. OAB and voiding dysfunction were more likely to be diagnosed with pre-operative UDS but they did not

lead to significant differences in outcomes. The treatment outcome was measured at 12 months post-operatively<sup>10</sup>.

### Current recommendations

See chart below.

### Future research

In the Netherlands, a VUSIS study is underway to assess the value of urodynamics prior to stress incontinence (*BMC Women's Health* 2009, 9: 22).

Conversely all the patients would undergo UDS. In the UK, INVESTIGATE-1 (INvasive Evaluation before Surgical Treatment of Incontinence Gives Added Therapeutic Effect?) is looking at the feasibility of future randomised controlled trials of the clinical utility of invasive Urodynamic testing (Murdoch *et al*, *Trials* 2011; 12: 169). Currently it is only a pilot trial, with the intention to assess the feasibility of a large multi-centre trial.

## Chart

The following chart summarizes the current recommendations by various organizations on urodynamics and urinary stress incontinence.

Organization	Place of UDS in USI
NICE (UK, 2006 & 2012)	Does not need UDS if pure USI (CG40) Does not need if conservative management of urinary incontinence Does not need routine UDS in neurological patients if risk of renal damage is low (e.g. multiple sclerosis) (CG148)
Society of Obstetricians and Gynecologists Canada <sup>12,13</sup>	Does not recommend if diagnosis is clear
American College of Obstetricians and Gynecologists (ACOG, 2005)	Does not recommend if diagnosis is clear
French College of Obstetricians and Gynaecologists <sup>11</sup>	Does not require if pure USI and a comprehensive assessment carried out
International Continence Society (2005)	Not required if type of incontinence is clear and there are no complicating factors involved
Dutch Urological Association, Dutch Society of Obstetricians and Gynaecologists, European Association of Urology	Recommend UDS prior to any surgical measures for USI

## Conclusion

Focused history taking, QoL questionnaires, voiding diary, pelvic examination including cough test, demonstration of mobility of the urethrovesical junction (by ultrasound scan), post-void residual urine volume measurement, urine analysis/urine culture and uroflowmetry should be part of basic evaluation of a patient with USI prior to primary surgery<sup>12,13</sup>.

It is widely accepted that recurrent urinary incontinence following surgery requires more detailed evaluation including UDS. Performing UDS prior to pelvic organ prolapse is controversial at present.

The outcome of the future randomized trials could potentially help the clinicians in deciding the role of UDS in the management of USI.

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