

SINGLE-CHANNEL CYSTOMETRY: A SIMPLE OR POOR TEST?

Hypothesis / aims of study

Dual-channel cystometry is considered the gold-standard for evaluation of lower urinary tract symptoms. More recently, portable urodynamic devices that measure vesical pressure alone have been proposed as an alternative, these machines are smaller and have limited display capabilities.

Previous studies comparing multi-channel and single-channel cystometry have found that the diagnostic rate of detrusor overactivity has been found to be similar [1,2]. However single-channel cystometry may not have the same discrimination for urodynamic stress incontinence and also the use of the newer devices which use recording paper/screens with a narrow width may make the interpretation of traces difficult or impossible. At present there are no minimum standards for the display of pressures on a urodynamic machine.

The aim of our study was to assess whether urodynamic diagnosis using a "single channel" with a limited display capability is as sensitive or specific when compared to conventional dual channel cystometry on a urodynamic machine.

Study design, materials and methods

Women with lower urinary tract symptoms attending a tertiary Urogynaecology unit underwent urodynamics using a standardised protocol. After uroflowmetry, the urinary residual was drained through a 12 F filling catheter and measured. The bladder was then filled with room temperature saline at 100 ml/min. Fluid filled 4.5F catheters were used to measure the intra-vesical and rectal (abdominal) pressures. The filling catheter was removed when the woman developed a strong desire to void or 500 ml had been infused into the bladder. Filling was performed with the women sitting. Provocative manoeuvres were then employed with woman standing: the woman coughed once, three and five times with maximal effort, to detect any incontinence of urine by direct visualisation of leakage. Other provocative tests were listening to running water (turning the tap on) and washing hands in cold water. Finally the women were seated for the pressure-flow study which was performed in private. All traces were annotated to record urgency and leakage. A primary diagnosis was then made.

All terms, definitions are in accordance with the International Continence Society (ICS).

The traces were then modified electronically such that the abdominal and detrusor pressure lines were removed leaving the vesical pressure recordings and volume infused. The scale of the vesical line was altered to be the same as a portable system to produce an output similar to that found on a "small-screen". Traces with inadequate annotation were discarded. Three experienced observers, with a minimum of 2 years urodynamic interpretation skills, were asked to analyse the traces, blinded to the primary diagnosis obtained during dual-channel cystometry. These diagnoses were then compared with the primary diagnosis.

Results

50 women attended for investigations, of which 5 had urodynamic traces were inadequate for analysis. 6 had normal urodynamic studies, 10 had urodynamic stress incontinence (USI) 25 had detrusor overactivity (DOA) and 4 had a combination of urodynamic stress incontinence and detrusor overactivity.

The specificity and sensitivity of each of the three investigators for each urodynamic diagnosis are presented in Table One.

Table One – Sensitivity and specificity of single-channel cystometry analysis for urodynamic diagnosis

	Investigator One	Investigator Two	Investigator Three
USI			
Specificity	50%	80%	70%
Sensitivity	97%	91%	94%
DOA			
Specificity	80%	44%	68%
Sensitivity	55%	95%	90%
Mixed urodynamic incontinence			
Specificity	--	100%	100%
Sensitivity	97%	97%	95%

USI = Urodynamic stress incontinence

DOA = Detrusor overactivity

Mixed urodynamic incontinence = urodynamic stress incontinence & detrusor overactivity

Interpretation of results

Interpretation of single-channel cystometry shows wide-variability between investigators for diagnosis of detrusor overactivity and urodynamic stress incontinence, or both. The variability is highest in those who had the diagnosis of detrusor overactivity and of these they were misclassified as normal urodynamics but in two cases as having urodynamic stress incontinence.

Concluding message

Interpretation of single-channel cystometry shows wide-variability and therefore the reproducibility is questionable. Although the specificity for diagnosis of urodynamic stress incontinence was high, the sensitivity was poor, suggesting that single-channel cystometry on a portable device with limited display or output capabilities may not be adequate to guide treatment especially if surgical procedures are contemplated.

Those women who were primarily diagnosed with detrusor overactivity often were misdiagnosed and had been wrongly classified as having urodynamic stress incontinence in some cases and this could have led to inappropriate treatment.

With standardisation of lower urinary tract evaluation and emphasis on improving patient care, clinicians should not base treatment on the results of single channel cystometry using a portable device with limited display capabilities.

References

1. J Urol 1988;140:1482.
2. Br Med J 1984;288:1720