

DOES DETRUSOR PRESSURE AREA UNDER THE CURVE DURING VOIDING (AUCDET) CORRELATE WITH DIAGNOSIS?**Hypothesis / aims of study**

The pressure flow study is a useful test for bladder outlet obstruction, but limited data are available regarding its use in other lower urinary tract symptoms (LUTS). A recent trial (1) has found correlations between detrusor pressure (ODP), closing detrusor pressure (CDP), detrusor pressure at maximum flow rate (PdetQmax), peak flow rate (Qmax) and urodynamic diagnosis. The area under the detrusor pressure curve during voiding (AUCdet) is a novel parameter that correlates with the work performed by the bladder. There is a statistically significant correlation between Qmax, PdetQmax, PvesQmax, urethral resistance (RU) and AUCdet adjusted for the volume voided in symptomatic women attending urodynamic assessment clinic (2). A previous study (3) has reported a correlation between AUCdet adjusted for the volume voided and bladder outlet obstruction. The aim of this study was to analyse the new parameter AUCdet in correlation with urodynamic diagnoses.

Study design, materials and methods

186 women with lower urinary tract symptoms referred for urodynamic investigation were studied. Assessment consisted of uroflowmetry, subtracted videocystometry and pressure-flow study using 4.5 french intravesical and rectal catheters. Patients with voided volumes less than 250 ml or significant post-void residual urine were excluded from the study. Voided volume for each pressure flow study was recorded and AUCdet calculated by measuring the area under the voiding detrusor pressure curve. Data were analysed using statistical software (SPSS 11.0 for Windows, SPSS Inc., Chicago, Illinois).

Results

Of the 186 women recruited, the following urodynamic diagnoses were made: 56 urodynamic stress incontinence (USI), 47 idiopathic detrusor overactivity (DO), 30 mixed urinary incontinence, 37 normal urodynamics (NUDS).

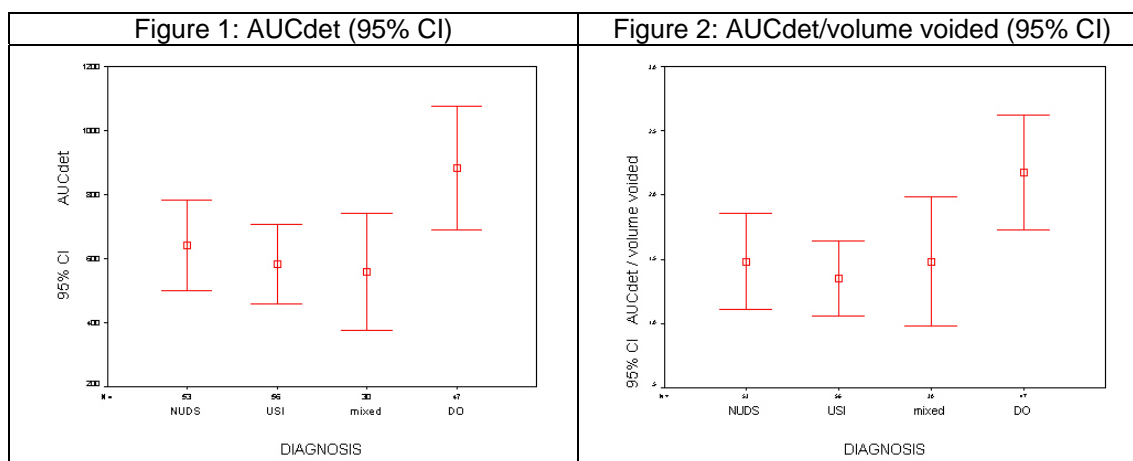
Mean value, standard deviation and 95% CI for AUCdet and AUCdet adjusted for volume voided (AUCdet/volume voided) for each diagnostic group are shown in Table I-II and Figure 1-2.

Tab.I AUCdet (cmH2O.sec)

| | N | Mean (SD) | 95% CI | |
|--------------|----|---------------|--------|--------|
| | | | Lower | Upper |
| NUDS | 53 | 642 (510) | 501.5 | 782.6 |
| USI | 56 | 582.5 (464.1) | 458.2 | 706.8 |
| Mixed | 30 | 558.8 (488.3) | 376.4 | 741.1 |
| DO | 47 | 883.6 (659.8) | 689.8 | 1077.3 |

Tab.II AUCdet/volume voided

| | N | Mean (SD) | 95% CI | |
|--------------|----|-------------|--------|-------|
| | | | Lower | Upper |
| NUDS | 53 | 1.48 (1.34) | 1.11 | 1.85 |
| USI | 56 | 1.35 (1.1) | 1.05 | 1.64 |
| Mixed | 30 | 1.48 (1.34) | 0.98 | 1.98 |
| DO | 47 | 2.17 (1.51) | 1.72 | 2.6 |



Women with DO have significantly higher volumes of AUCdet compared to women with USI ($p < 0.01$), mixed urinary incontinence ($p < 0.05$) and NUDS ($p < 0.05$). When adjusting AUCdet for the volume voided, the discrimination between the group with DO and the groups without detrusor overactivity was more marked.

There was no significant difference in terms of AUCdet alone or adjusted for volume voided between women with stress incontinence and those with mixed incontinence or normal urodynamics.

Interpretation of results

Women with detrusor overactivity had a larger area under the curve of detrusor pressure during voiding (AUCdet) compared to women with stable detrusor function during urodynamic test. This study agrees with previous findings that women with detrusor overactivity generate higher opening and closing detrusor pressure, as well as higher detrusor pressure at maximum flow (1). This could be related to some degree of hypertrophy of the urethral sphincter muscle in women with DO that causes an increase in “work” performed by the detrusor muscle. The difference between the group with detrusor overactivity and those with urodynamic stress incontinence could be ascribed to the reduced detrusor pressure needed to exceed the low urethral resistance of the incompetent urethral closure mechanism in this last group of women.

Concluding message

The measurement of the area under the curve of detrusor pressure during voiding is significantly increased in women with detrusor overactivity compared to women with normal bladders. This difference increases when corrected for the volume voided and may be of use to discriminate between women with detrusor overactivity and urodynamic stress incontinence.

References

1. Pressure flow study: a useful diagnostic test of female lower urinary tract symptoms. *Neurourol Urodynam* 2004;23:104-108
2. Relationship between the area under the curve of detrusor contraction during micturition and the usual parameters of flow-pressure rate in women. *Prog Urol* 2002;12(2):268-73
3. Diagnosis of female bladder outlet obstruction and relevance of the parameter area under the curve of detrusor pressure during voiding: preliminary results. *J Urol* 2002;167:2083-8