

## OBESITY IS ASSOCIATED WITH DETRUSOR OVERACTIVITY BUT NOT URODYNAMIC STRESS INCONTINENCE

### Hypothesis / aims of study

Obesity has been widely studied as an independent risk factor for lower urinary tract symptoms in women. Epidemiological studies indicate a strong relationship between increased body mass index (BMI) and the prevalence, incidence and severity of UI, with a dose dependent effect of weight on urinary incontinence (UI). Surgical or behavioural weight loss has been shown to significantly improve urinary incontinence symptoms. Interventional studies have demonstrated that a 5 to 10% reduction in weight is sufficient to reduce the frequency of incontinence episodes (1). However, the relationship between increased BMI and urodynamic diagnosis has not been reported. The aim of this study was to investigate the relationship between body mass index (BMI) and urodynamic diagnosis.

### Study design, materials and methods

Women with lower urinary tract symptoms were recruited from a tertiary centre urogynaecology clinic between April 2012 and March 2015. All eligible women completed a three-day frequency-volume chart and underwent urodynamics using a standardised protocol and according to ICS guidelines. Weight and height were directly measured, and BMI was categorised following WHO guidelines. The relationship between BMI and urodynamic diagnosis was assessed using chi-square and t-tests. Analysis was performed using SPSS Version 20, IBM.

### Results

491 women (mean age 52, range 21-84 years) were included in the study. Overall 64% (n=314) of women had BMI  $\geq 25$  kg/m<sup>2</sup>, and 28.1% (n= 138) of women had a BMI  $\geq 30$  kg/m<sup>2</sup> and 9.4% (n=46) of women had a BMI  $\geq 35$  kg/m<sup>2</sup>. Detrusor overactivity (DO) was the urodynamic diagnosis in 193 women (39.3%). 81 (16.5%) women had a urodynamic diagnosis of urodynamic stress incontinence (USI). 89 (18.1%) had a mixed urodynamic diagnosis (MUI) of DO and USI, while in 128 women (26.0%) there was no demonstrable UI. Overall detrusor overactivity (DO) was diagnosed in 283 women (57.7%), and 164 women (33.4%) had urodynamic stress incontinence (USI). Women with a BMI  $\geq 25$  kg/m<sup>2</sup> were more likely to have DO (either DO alone or in association with USI) rather than USI alone (Chi Sq, p=0.006). A BMI  $\geq 25$  kg/m<sup>2</sup> was not associated with an increased incidence of USI (Chi sq, p=0.257).

	BMI <25 n (%)	BMI 25-29 n (%)	BMI 30-34 n (%)	BMI $\geq 35$ n (%)
DO	65 (36.7%)	72 (40.9%)	35 (38.0%)	21 (45.7%)
USI	32 (18.0%)	28 (15.9%)	15 (16.3%)	6 (13.0%)
MUI	24 (13.5%)	28 (15.9%)	28 (30.4%)	9 (19.6%)
Inconclusive	56 (31.6%)	48 (27.3%)	14 (15.2%)	10 (21.7%)
Total Patients	177	176	92	46

Table. Number and percentage of women showing different urodynamic diagnosis in each BMI subgroup.

### Interpretation of results

Our results demonstrate a clear relationship between increased BMI and DO. This is in line with previous epidemiological studies demonstrating strong associations between obesity and overactive bladder syndrome (OAB). In the population based FINNO study, obesity tripled the risk of urge urinary incontinence (UUI) and in EPINCONT, the largest population based study of urinary symptoms; a high BMI was associated with urge incontinence. Furthermore, in longitudinal cohort studies obesity has been associated with incident UUI and OAB, providing evidence for a temporal relationship between a possible cause and an outcome (2). The relationship between raised BMI and detrusor overactivity is likely to be mediated through metabolic syndrome (MetS). Obesity is a central component of this common disorder which describes the clustering of central obesity, dyslipidaemia, hypertension, insulin resistance and glucose intolerance. A recent systematic review has clearly demonstrated an association between obesity, MetS and OAB and LUTS (3). This may be the result of MetS inducing inflammatory sympathetic overactivity or due to pelvic ischemia resulting from atherosclerosis. Insulin resistance caused by obesity is also a significant component of MetS and it is also argued that a pro-inflammatory state, increased free fatty acids, hypercoagulability, and cellular oxidative stress lead to premature vascular disease which may result in detrusor overactivity.

### Concluding message

A raised body mass index is associated with increased incidence of DO. Surprisingly there was no such association with urodynamic stress incontinence. Resolution of DO should be tested in interventional weight loss trials to further elucidate the mechanisms behind this link.

### References

1. Obstet Gynecol. 2010 Aug;116(2Pt1):248-92 2
2. Obstet Gynecol. 2007 Aug;110(2 Pt 1):346-53 3
3. Int J Clin Pract, February 2015, 69, 2, 199-217

Disclosures

**Funding:** Nil **Clinical Trial:** No **Subjects:** HUMAN **Ethics Committee:** NRES Committee London- Chelsea **Helsinki:** Yes  
**Informed Consent:** Yes