

## **BLADDER NECK DESCENT ON TOTAL PELVIC FLOOR ULTRASOUND DOES NOT CORRELATE WITH URODYNAMIC STRESS INCONTINENCE FINDINGS**

### Hypothesis / aims of study

Urodynamics is used in routine practice to diagnose bladder storage symptoms, including urodynamics stress incontinence, once first line conservative treatments have failed. Its findings can determine the consequent treatment management for the patient, whether surgical or otherwise. However, urodynamics is invasive, has a risk of causing urinary tract infections for the patient, and video urodynamics poses radiation risks due to x-ray use. Thus there is a need to develop a more low-risk diagnostic tool.

Integrated total pelvic floor ultrasound (endoanal, transvaginal and transperineal) assessment is performed in routine practice in our tertiary colorectal unit on patients with pelvic floor defaecatory dysfunction. Both anterior transvaginal ultrasound and transperineal ultrasound can be used to assess the bladder. By asking patients to squeeze up and push down, the degree of bladder neck descent on anterior transvaginal ultrasound and the presence of a cystocele on transperineal ultrasound can be determined. Although still invasive, it does not pose the infection and radiation risks associated with urodynamics.

Many of our colorectal defaecatory dysfunction patients also have urinary symptoms and progress to urodynamic investigations. We hypothesised that there would be an association between the degree of bladder neck descent as observed on ultrasound and the degree of urodynamic stress incontinence. We also hypothesised that there would be an association with urinary symptoms. This was with the view that total pelvic floor ultrasound could become a safer, and just as accurate alternative, to urodynamic testing.

### Study design, materials and methods

A retrospective study was conducted of all female patients who had undergone integrated total pelvic floor ultrasound and urodynamic assessment from 2010 – 2016 in a single tertiary colorectal unit (461 patients underwent total pelvic floor ultrasound; 45 of these also underwent urodynamic tests and were included in the analysis).

Transvaginal ultrasound was performed using a BK 8838 axial type endoscopic probe with a 10 MHz transducer (B & K Medical, Sandhoften, Denmark) rotated to get an anterior 2D view of the bladder, bladder neck, urethra and pubic ramus. Patients were asked to squeeze up and push down. Bladder neck descent was calculated as the difference between the distance of the bladder neck to the pubic symphysis at rest and on bearing down or coughing. A difference of 2cm or more was considered poor.

Transperineal ultrasound was performed using a BK 8802 curved array probe with a 6 MHz transducer, placed onto the perineum to view the rectum, vagina and bladder. Patients were again asked to squeeze up and push down. The presence and grade of cystocele was assessed by bladder descent in relation to the vagina (grade I – prolapse of the bladder onto the vagina; grade II – falls into the vagina; grade III – bladder prolapses through the vagina).

There were 38 patients who had urodynamics performed using Laborie equipment, 6 used Precision Urodynamics Life Tec equipment, 3 used Dantec equipment and 1 was unspecified. All patients underwent filling of their bladder via urethral catheterisation until their maximum tolerated volume and then asked to void.

Symptoms were assessed by analysis of patient case notes.

Statistical analysis was performed using Stats Direct.

### Results

There were 45 women (mean age 53.8 years, median 56, 29 – 82) who underwent both integrated total pelvic floor ultrasound and urodynamics.

There were 21 with symptoms of urinary frequency, 32 with urgency, 19 with nocturia and 34 with stress urinary incontinence.

There were 30 with good bladder neck support, 3 with moderate bladder neck support and 12 with poor. The mean bladder neck height on anterior transvaginal ultrasound was 2.3cm (median 2.5, range 1 – 3.5). The mean bladder neck height during pushing or coughing was 1.2cm (median 1.3, range 0 – 3). The mean bladder neck descent was 1.4cm (median 1, range 0 – 4.5). There were 26 patients with a cystocele on transperineal ultrasound (15 grade I, 7 grade II and 4 grade III).

There were 26 women who underwent video urodynamics, 18 simple urodynamics and 1 unspecified.

There were 20 women with urodynamic stress urinary incontinence and 8 with urodynamic detrusor overactivity.

There was no significant difference in the mean bladder neck height on pushing/ coughing or the mean bladder neck descent in those with urodynamic stress incontinence or symptoms of stress incontinence than those without (unpaired T test ( $p=0.9, 0.7, 0.4, 1$ )).

There was no significant correlation between the presence of a cystocele and urodynamic stress incontinence (Fisher's exact test ( $p = 0.2$ )).

Poor bladder neck support on ultrasound had a 60% positive predictive value and 60% negative predictive value for finding urodynamic stress incontinence during urodynamics.

#### Interpretation of results

There was no association found between bladder neck descent on anterior transvaginal ultrasound and symptoms of or urodynamic proven stress urinary incontinence. If there is poor bladder neck support on anterior transvaginal scanning then the positive predictive value for urodynamic proven stress urinary incontinence is 60% (negative predictive value 60%).

Many of these ultrasound scans were performed at the beginning of our learning curve without any standardisation of bladder filling and so may underestimate bladder neck descent. Moreover, this retrospective study does not include validated symptom severity questionnaires. Further prospective work will be performed with this information.

#### Concluding message

This series has not shown any association between degree of bladder neck descent on anterior transvaginal ultrasound and urodynamic stress urinary incontinence, thus with this data, urodynamics is still the preferred diagnostic method for urinary stress incontinence over total pelvic floor ultrasound. However, if there is poor bladder neck descent on ultrasound scanning there is a 60% positive predictive value of urodynamic stress urinary incontinence.

#### Disclosures

**Funding:** None to disclose **Clinical Trial:** No **Subjects:** HUMAN **Ethics not Req'd:** The research was retrospective audit analysis **Helsinki:** Yes **Informed Consent:** No