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Ong H[1], Wu S[1], Lee C[1], Tian J[1], Kuo H[1]
***1.*** *Department of Urology, Buddhist Tzu Chi General Hospital and Tzu Chi University, Hualien, Taiwan*

# URODYNAMIC CHARACTERISTICS OF DETRUSOR UNDERACTIVITY IN MALE AND FEMALE PATIENTS WITH VOIDING DYSFUNCTION

Hypothesis / aims of study
Detrusor underactivity (DU) common urodynamic finding in patients with voiding dysfunction. This study retrospectively analyzed the urodynamic characteristics of DU in male and female patients.

Study design, materials and methods
Male and female patients presented with voiding dysfunction not responding to medical treatment were investigated by video urodynamic study. In male patients, normal tracing, bladder outlet obstruction without detrusor overactivty (BOO), poor relaxation of external sphincter (PRES), and DU were diagnosed in 138, 500, 522 and 164, respectively. In female patients, normal tracing, dysfunctional voiding (DV), PRES, and DU were noted in 56, 325, 336 and 337 patients. Urodynamic parameters including first sensation of filling (FSF), full sensation (FS), compliance, detrusor pressure (Pdet), maximum flow rate (Qmax), postvoid residual (PVR), cystometric bladder capacity (CBC), bladder contractility index (BCI), voiding efficiency (VE), bladder outlet obstruction index (BOOI) were compared among groups in male and female patients.

Table 1. Video urodynamic parameters in male patients with detrusor underactivity in comparison with other voiding dysfunction groups

| | Normal (n=138) | DU (n=165) | BOO (n=501) | PRES (n=525) | ANOVA |
|---|---|---|---|---|---|
| Age (years) | 62.9±10.2 | 71.1±11.7* | 65.6±10.5 | 65.3±11.3 | 0.000 |
| FSF (mL) | 171±78.9 | 214±117* | 156±66.8 | 148±71.2 | 0.000 |
| FS (mL) | 299±96.2 | 324±127* | 260±85.6 | 255±101 | 0.000 |
| Compliance | 98.5±88.1 | 73.1±93.3* | 73.0±70.6 | 72.7±68.6 | 0.000 |
| Pdet ($cmH_2O$) | 31.3±9.94 | 9.74±10.6* | 45.1±24.4 | 29.1±22.3 | 0.000 |
| Qmax (mL/s) | 19.3±4.24 | 1.92±3.30* | 8.19±5.15 | 9.40±4.72 | 0.000 |
| PVR (mL) | 28.0±65.3 | 348±188* | 94.6±134 | 69.4±100 | 0.000 |
| CBC (mL) | 526±151 | 409±150* | 371±125 | 348±136 | 0.000 |
| BCI | 128±23.1 | 19.3±23.6* | 86.2±39.1 | 76.0±34.5 | 0.000 |
| VE (%) | 95.6±6.28 | 17.6±31.1* | 74.7±31.7 | 79.1±26.9 | 0.000 |
| BOOI | -7.23±13.3 | 5.91±9.39* | 28.7±24.3 | 10.3±23.1 | 0.000 |

Table 2. Video urodynamic parameters in female patients with detrusor underactivity in comparison with other voiding dysfunction groups

| | Normal (n=56) | DU (n=337) | DV (n=325) | PRES (n=336) | ANOVA |
|---|---|---|---|---|---|
| Age (years) | 54.0±14.3 | 67.8±14.5* | 61.1±16.5 | 56.5±15.9 | 0.000 |
| FSF (mL) | 167±71.6 | 196±106* | 130±69.1 | 154±64.0 | 0.000 |
| FS (mL) | 290±103 | 289±129* | 197±95.1 | 254±89.8 | 0.000 |
| Compliance | 84.8±72.1 | 70.1±92.8 | 63.4±77.4 | 85.0±95.2 | 0.000 |
| Pdet ($cmH_2O$) | 17.3±8.2 | 8.5±9.8* | 45.7±18.3 | 17.3±11.7 | 0.000 |
| Qmax (mL/s) | 24.1±7.82 | 4.93±5.32* | 9.35±6.12 | 9.55±6.21 | 0.000 |
| PVR (mL) | 19.5±28.8 | 271±198* | 121±123 | 104±127 | 0.000 |
| CBC (mL) | 508±120 | 387±169* | 300±145 | 352±143 | 0.000 |
| BCI | 138±40.1 | 33.2±30.2* | 92.4±34.6 | 65.1±35.9 | 0.000 |
| VE (%) | 96.4±4.95 | 33.7±33.8* | 62.3±30.6 | 71.0±29.6 | 0.000 |
| BOOI | -31±17.5 | -1.33±12.9* | 27.0±22.6 | -1.78±14.7 | 0.000 |

Results

Video urodynamic findings in patients with DU presented with a slowly increased detrusor pressure, intermittent detrusor contractions, or early decline of detrusor contraction, resulting in a low Qmax and large PVR. The bladder outlet showed no narrowing at bladder neck, prostatic urethra or urethral sphincter. In comparison with other groups, older age, FSF was significantly reduced, low Pdet, low Qmax, large PVR, low BCI and low VE in DU patients. VE was 17.6±31.1% in male DU and 33.7±33.8% in female DU patients, which was significantly lower than male patients with normal tracing (95.6±6.28%), BOO (74.7±31.7%), and PRES (79.1±26.9), or female patients with normal tracing (95.6±6.28%), DV (74.7±31.7%) and PRES (79.1±26.9%).

Interpretation of results

Patients with DU present with reduced fist sensation of bladder filing, low contractility and decreased VE, indicating that DU involves both sensory and motor functional impairment. Female DU patients usually void by abdominal straining and may have a relatively higher VE than male DU patients. DU should be considered in patients with voiding dysfunction with a VE of less than 67% and sensory impairment.

Concluding message

Urodynamic DU shows a reduced bladder filling sensation and low detrusor contractility, resulting in a low VE and large PVR. DU involves both sensory and motor function impairments.

Disclosures

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