

A COMPARISON STUDY OF METHODS IN THE DIAGNOSIS OF DETRUSOR UNDERACTIVITY

Hypothesis / aims of study

Detrusor underactivity (DU) has recently received more scientific attention due to the increase research about this dysfunction. The International Continence Society defines DU as a contraction of reduced strength and/or duration, resulting in prolonged bladder emptying and/or a failure to achieve complete bladder emptying within a normal time span [1]. This entity occurs in both genders.

The aim of the study is to correlate the diagnosis of detrusor underactivity and lower urinary tract symptoms (LUTS) with micturition time, urinary flow, Abrams-Griffiths nomograms, Schafer nomograms, Bladder Contraction Index (BCI) and Watts Factor (WF).

Study design, materials and methods

This is a cross-sectional study where 60 patients with LUTS whose urodynamic diagnoses were detrusor underactivity. The study included all patients with DU present in the database of urodynamics service. Patients with neurological disorders (spinal cord injury, myelomeningocele, multiple sclerosis, and postoperative pelvic exenteration) and concomitant diagnosis of detrusor overactivity were excluded.

Clinical data were collected from the 40 remaining patients. The clinical data analysed were: age, sex, comorbidities, international prostatic symptoms score (IPSS) and category of symptoms (emptying and storage); laboratory data: renal function, urinalysis and urine culture; abdominal ultrasound data: measurement of detrusor thickness and post-voiding residue; and finally, the urodynamic data: urinary flow, micturition time, Abrams-Griffiths nomogram, Schafer nomogram, BCI and WF.

To describe the sample profile according to study variables frequency tables were made of categorical variables with absolute frequency values (n) and percentage (%), and descriptive statistics of numerical variables, mean values, standard deviation, minimum, maximum and median. To study the relationship between categorical variables we used the chi-square test and, when necessary, Fisher's exact test. For numerical variables we used the Mann-Whitney test and Spearman correlation. The level of significance for the study was 5%.

Results

Of the 40 patients studied, the prevalence was male 26 (65%) and the age ranged from 27 to 92 years with a mean of 66.5 years (SD 13.6). Of the 11 patients who completed the IPSS questionnaire, five (45.45%) severe symptoms, five (45.45%) moderate and one (9.09%) mild. The mean IPSS score was 18.91 (SD 8.86). High blood pressure was the most common comorbidity observed in 16 patients (40%). Of the 18 patients who performed abdominal ultrasound, three (7.5%) had increase detrusor thickness, one (2.5%) ureterohydronephrosis and six (15%) renal impairment signals. The extent of post-micturition residue was equal or over to 100mL in 25 (65.8%) patients and mean of 174.15 mL (SD 125.69). Laboratory tests showed impaired renal function in 10 (45.45%) patients and urinary tract infection in two (9.52%). The results of the urodynamic study showed that: mean micturition time was 79.67s. (SD 63.11), mean Qmax 8.4mL/s. (SD 4.6), mean Qmed 3.29mL/s. (SD 2.67), the Abrams-Griffiths nomogram showed 37 (97.4%) of patients were in doubt and not obstructed zone, the Schaefer nomogram identified 33 (91.6%) patients with weak detrusor. All 40 (100%) patients had BCI below 100 and the Watts Factor (WF) showed that 21 (52.5%) patients were below 7.

Using the Spearman correlation for numeric values observed a significant correlation between BCI and WF ($\rho=0.8245$, $p<0.0001$); between micturition time and WF ($\rho=0.6304$, $p<0.0001$); between micturition time and BCI ($\rho=0.4867$, $p=0.0014$); Qmax with BCI ($\rho=0.5263$, $p=0.0005$); PVR to Qmax ($\rho=-0.4933$, $p=0.0017$) and PVR and Qmed ($\rho=-0.6476$, $p<0.0001$).

Interpretation of results

Aging has been identified as a risk factor for DU and this was observed in this study. Moreover, other studies showed no difference between gender, and in this study was nearly two-thirds of the cases were represented by men. Regarding the IPSS score in cases of DU literature is scarce. In this study the IPSS does not classify DU when compare to urodynamics data. Increase PVR is related to bladder dysfunction, but can not classify as DU.

There is wide variation in urodynamic criteria for DU diagnosis [2], but we emphasize two aspects: some measures only evaluate detrusor contraction strength and others are estimated correlated force with Pdet and Qmax, being taken as reference values has the average base in historical series. The micturition time and urinary flow presented a correlation with BCI and WF in diagnosis of DU. The nomogram of Abrams-Griffiths does not the diagnosis of DU. However the nomogram of Schafer, classified most of patients with very weak and weak detrusor according to others authors. BCI <100 means weak detrusor, according to this criteria, this measurement identifies all patients with DU. The Watts Factor classified the majority of patients in DU group according to others studies.

Concluding message

Aged patients with LUTS and increased PVR should be monitored for DU and the confirmation of this diagnosis is made by urodynamic evaluation taking into consideration the time of micturition, the urinary flow, BCI and WF.

References

1. Abrams P, Cardozo L, Fall M, Griffiths D, Rosier P, Ulmsten U, van Kerrebroeck P, Victor A, Wein A. The standardization of terminology in lower urinary tract function. www.icsoffice.org, 2016.
2. Rademakers K, van Koevinge G, Oelke M. Detrusor underactivity in men with lower urinary tract symptoms/benign prostatic obstruction: characterization and potential impact on indications for surgical treatment of the prostate. www.co-urology.com. 2016, 26: Number 1.

Disclosures

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