

Aims of study

Pressure-flow study is currently the gold standard for the diagnosis of bladder outlet obstruction in men [1]. It is essentially an invasive test. In addition to the discomfort and embarrassment for the patient, the pressure-flow study is expensive, requires a specialized medical team and considerable time to perform.

As an invasive test, it poses risks to the individual of infection, hematuria and pain. Over the years, alternative methods have emerged proposing the minimally invasive measurement of bladder pressure. We have developed an alternative method for minimally invasive measurement of bladder pressure.

The method is based on the device called urethral connector (Figure). The device is essentially a hollow cylindrical tube that is introduced into the penile urethra about 1 to 2 cm and fits into the navicular fossa. A side outlet allows to connect it to a pressure sensor which in turn is connected to recording device. The urine is drained from another outlet. During micturition, the patient is instructed to manually occlude the urine output, and a measurement of bladder pressure is taken. In this way, values of maximum interrupted flow (Qinter) and isometric bladder pressure (Piso) are obtained.

The objectives are to carry out tests on male participants to determine normal and bladder outlet obstruction values and verify adverse effects of this method.

Interpretation of Results

Study participants were asymptomatic volunteers aged 20 to 30 years, individuals concerned about screening for prostate cancer aged 40 to 60 years, and patients with lower urinary tract symptoms who were being followed up at the Urology outpatient clinic.

This distribution of individuals by age made it possible to calculate the normality value that demonstrated significance when compared with the equation that was developed in a previous study in which urodynamic assessment was compared with minimally invasive urodynamic assessment.

The symptoms of the lower urinary tract are the main reason for the patient to seek medical treatment. Although the International Prostatic Symptoms Score (IPSS) questionnaire was developed for patients with benign prostate enlargement, it is not specific.



Table - Measures of position and dispersion of Piso and Qinter by obstruction group according to age classification (greater than 40 years).

Classification	Variable	Number	Mean	Standard deviation	Median
Unobstructed	Piso	68	95.71	25.6	91.75
	Qinter	68	11.50	14.05	9.66
Obstructed	Piso	25	135.98	29.88	124.50
	Qinter	25	5.38	1.81	5.33

Results

Of the 152 participants, 115 completed the study, with ages ranging from 20 to 79 and an average of 59 years. Twenty-six did not undergo minimally invasive urodynamics and 11 were unable to perform the exam.

To classify the participants as obstructed or not obstructed, the following equation was used: $(68,708) - (0,679 * \text{Mean Pressure}) + (0,004 * \text{Mean Pressure}^2) - (1,254 * \text{Mean Flow})$, if response >40 the subject is considered obstructed. This equation was made in a previous study when noninvasive urodynamic assessment was compared with urodynamic assessment. Using this equation, it was possible to identify 29 (24.79%) participants with bladder outlet obstruction.

Another way of classifying participants without bladder outlet obstruction was by age. Of the volunteers studied, 22 were under 40 years of age and were considered to be unobstructed.

Based on the results of participants younger than 40 years, participants who had pressure greater than 91,75 and flow less than 9,66 were considered as having bladder outlet obstruction (Table).

Another question of the study was to verify whether lower urinary tract symptoms (LUTS), assessed using the International Prostatic Symptoms Score (IPSS), are related to bladder outlet obstruction. The analysis of the results using Fisher's exact test showed no correlation.

Conclusion message

With the results obtained and the confirmation of the statistical analysis, it leads us to the understanding that the minimally invasive urodynamic evaluation can identify patients with bladder outlet obstruction with the advantages that is minimally invasive and easy to repeat when following up is necessary. Future studies may confirm whether early diagnosis and treatment can preserve bladder function.

References

1 - Bladder outlet obstruction index, bladder contractility index and bladder voiding efficiency: three simple indices to define bladder voiding function. *BJU Int.* 1999 Jul;84(1):14-5.

2 - A novel intraurethral device diagnostic index to classify bladder outlet obstruction in men with lower urinary tract symptoms. *Advances in Urology*, v. 2009, Article ID 406012, 6 pages, 2009.