Recent Advances in the Diagnosis of Benign Prostatic Hyperplasia

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Benign prostatic hyperplasia (BPH) is a chronic and complex disease involving anatomical enlargement of the gland, real urinary obstruction and non-specific lower urinary tract symptoms (LUTS). LUTS are age-related lower urinary tract symptoms that affect 30-60% of men over the age of 40 years. LUTS could be due to causes related to the prostate, bladder or the central nervous system. Because the term “LUTS” is broader, it has replaced the term “prostatism”; the term LUTS/BPH is the preferred one in urological literature.

The natural history of LUTS/BPH is variable. Most men experience progression of the disease by reduction of the flow rate by 2% every year and increase of the international prostate symptom score (IPSS) by 0.18 points every year. Nevertheless, some men may remain stable and others even improve without treatment. Predictions of disease progression are prostate specific antigen (PSA) >1.5 mg/ml and prostate volume >30 g.

The first step in the management of a patient with LUTS is assessment and diagnosis. In the past few years there has been much controversy about the tests that should be used routinely for the initial and further assessment of a patient with LUTS. The aim of the present review is to illustrate the most recent advances in the diagnosis and assessment of LUTS/BPH.

International Guidelines for Diagnosis of LUTS/BPH

Clinical practice guidelines on recommended tests of BPH were recently collected from the web sites by Irani and Brown (1). Eight national and supranational practice guidelines were identified from Australia, the American Urological Association (AUA), the World Health Organisation (WHO), the European Association of Urology (EAU), the United Kingdom (UK), Germany, Malaysia and Singapore. There was considerable variation in the number and type of diagnostic tests recommended.

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All clinical practice guidelines agreed that the patient’s history should be taken and a physical examination including direct rectal examination (DRE) should be performed and the patient’s symptoms should be assessed using a validated symptoms score such as the AUA score or the International Prostate Symptom Score (IPSS). Urine analysis was recommended by all guidelines except by the EAU. A test of serum creatinine level was recommended also by all guidelines except Australia. Uroflowmetry and measurement of residual urine were recommended in six of the eight guidelines. Other tests including a voiding diary, ultrasonography of the urinary tract and the prostate, and serum PSA were recommended in fewer than half the guidelines.

Recent Advances in Diagnosis

Symptom Score
A validated symptom score is essential together with physical examination and DRE. It has a role in predicting progression to surgery, albeit less accurate than PSA or prostate volume. Sexual function assessment should be an integral part of BPH evaluations (2).

Voiding diary
The use of a voiding diary is underrated and is not popular in most of the urological centers. A voiding diary is the use of frequency volume charts to record the type and volume of fluids consumed and the times and volumes of urine passed. A voiding diary should be written because depending on the memory of the patient gives inaccurate information. A voiding diary provides inexpensive and easy to use information on urine production in a natural environment (3).

Uroflowmetry
Both the AUA and the International Consultation on BPH consider uroflowmetry as an optional investigation in cases of LUTS/BPH but it is extremely useful when the urine volume is >150 ml and when it is done in ambient circumstances.

Serum creatinine
This is no longer recommended in the routine work-up of LUTS/BPH because there is no correlation between the severity...
of LUTS/BPH and renal impairment. The number of patients presenting with renal impairment secondary to LUTS/BPH is less than one percent.

**PSA**

Measuring PSA as a routine test in patients with LUTS/BPH is controversial. The Fifth International Consultation on BPH recommended PSA as a part of the initial evaluation of LUTS/BPH, arguing that detection of prostate cancer may influence the management of bladder outlet obstruction and also the level of PSA is a good predictor of the prostate volume. On the other hand, the AUA do not recommend PSA as a routine investigation in patients with LUTS/BPH. The pros and cons should be discussed with the patients before requesting the test. Moreover, they limit the test to patients with life expectancy of >10 years.

**Pressure flow studies**

Although pressure flow studies (PFS) are the only means of diagnosing obstruction accurately, they remain optional. PFS should be considered if there is suspicion of neurogenic bladder, with previous unsuccessful invasive treatment and in patients with severe LUTS and small prostate volume (< 20 g) by DRE or transrectal ultrasonography (TRUS).

**Imaging of the prostate gland**

Both AUA and the International Consultation on BPH do not recommend routine imaging of the prostate. The two most commonly used methods of imaging the prostate are transabdominal ultrasound and transrectal ultrasound (TRUS). Transabdominal ultrasound is less invasive and allows evaluation of the urinary tract but it is less accurate than TRUS in the assessment of the prostatic volume. On the other hand TRUS is more invasive and provides no evaluations of the urinary tract but is more accurate in the measurement of the prostatic volume (whole gland and transition zone).

Currently there is a significant amount of ongoing clinical research on the aspect of imaging of BPH. Recently Watanabe and Miyagawa demonstrated that a prostate volume > 30 g corresponds closely with a urodynamically proven bladder outlet obstruction. Moreover, other studies showed that the size of the transition zone is closely related to the severity of LUTS. This seems logical as the adenoma that is to be surgically resected lies principally in the transition zone. More recent work has focused on the role of power Doppler ultrasound in visualizing the vascular architecture of the prostate and its correlation to LUTS. To evaluate this aspect, a recent study of 214 Japanese patients showed a significant correlation between the resistive index value of the prostatic capsular arteries and total prostatic volume, transition zone volume, IPSS and peak flow rate.

The role of ultrasound in predicting the risk of developing acute urinary retention was recently linked to bladder weight by Miyashita et al. Patients with an ultrasound-estimated bladder weight of >33 g were about thirteen times more likely to develop acute urinary retention. Trilobar enlargement of the prostate is expected to cause a “ball-valve” type of obstruction. Chia et al used pressure flow studies showed that the grade of intravesical prostatic protrusion related closely to confirmed bladder outlet obstruction and was better than other initial evaluation parameters for the assessment of BPH.

**Conclusions:**

The current trend in the evaluation of a patient with LUTS/BPH has been to identify those who are likely to show significant progression requiring intervention. The role of PSA in disease progression remains a fruitful area for future research. New imaging techniques in BPH have added a new dimension for evaluating patients. Both pressure flow studies and simpler non-invasive urodynamic techniques such as frequency volume charts and flow rates are useful but a challenge for the future remains to find a simple inexpensive and reliable test to assess detrusor function.

**References:**


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