Case Report

Usefulness and Interpretation of the Prostatic Protrusion Index (PPI)

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Abstract

Prostate is a gland that is located under the bladder and has important functions, particularly sexual ones. Benign growth of the prostate has been reported as the most frequent cause related to obstructive symptoms of the low urinary tract among men population. These low urinary symptoms can include storage and emptying that usually cause discomfort among those who suffering this disease, and it is one of the main reasons for medical consultation. Therefore, it is essential that healthcare professionals know all the diagnostic aids that they can use in these cases to provide comprehensive care to individuals suffering from urological conditions. In this sense, the objective of this report is to present the usefulness of the Prostatic Protrusion Index and how it should be interpreted in clinical practice.

Introduction

The prostate is a glandular tissue composed of parts of the urethra, the ejaculatory ducts, the seminal vesicles, and the ampullae of the vas deferens. Its external structure is composed of a prostatic capsule and stromal tissue, which predominates in the composition of the prostate gland and is responsible for benign growth (Figure 1). This gland develops with age, reaching maturity at puberty; its function is essentially sexual and intervenes in the secretion of the liquid seminal that accompanies semen during ejaculation, such secretion is formed by alkaline phosphatase, citric acid and several proteolytic enzymes such as the Prostate Specific Antigen (PSA) [1,2].

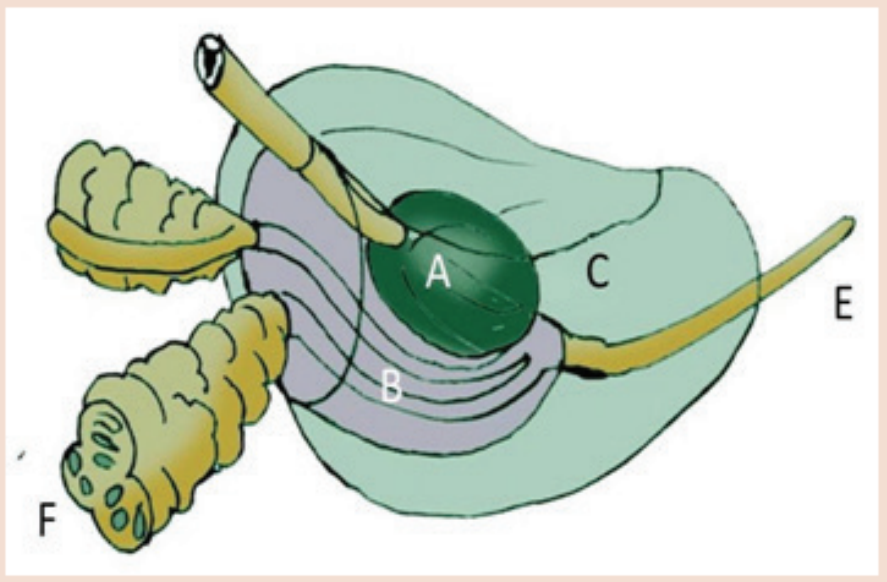

Figure 1: Anatomy of the prostate.
A: The area of transition surrounds the urethra in the portion proximal to the ducts ejaculatory ducts. B: The central zone surrounds the ejaculatory ducts and projects below the base of the bladder. C: The peripheral zone constitutes the greater volume of the apical portions, posterior and lateral of the prostate E: urethra. F: seminal vesicles.

Benign prostate growth has been reported as the most frequent cause related to with symptoms obstructive of the tract urinary low in the sex male. Furthermore, it has been reported that these symptoms are directly related to age and aging. In this regard, it is estimated that men around the age of 50 begin to experience to introduce symptomatology urinary of origin urological in a 40%, while to the 90 years, he 90% of these will present symptomatology of the tract urinary low[2]. These lower urinary symptoms are defined as storage and emptying symptoms that usually generate inconveniences between who the suffer and are one of the Main reasons for medical consultation. It has been established that these arise from the obstructive condition of a mechanical or functional type produced by prostate growth or by increased tone of the smooth muscle fibers of the prostate; in addition, these can manifest individually or in combination [1].

The growth prostatic is linear, starting from the area former toward side by the Transitional tissue, producing elliptical growth. Glandular growth in the stromal zone obeys, among other things, the law of least resistance; therefore, the disproportionate increase occurs in the transition zone, which in turn increases the anteroposterior diameter. This growth frequently occurs in the trilobular prostate, specifically in the middle lobe, which exhibits disproportionate growth. Similarly, a pyramid is inverted toward the inside of the bladder (Figure 2) [1].

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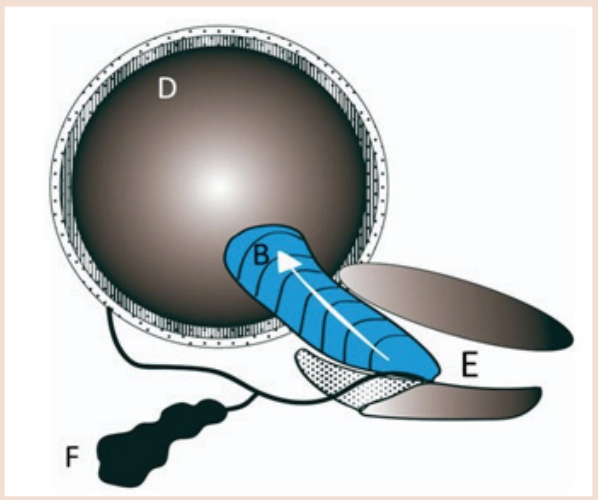

Figure 2: Illustration of the growth in pyramid inverted of the lobe half toward he inside the bladder.
B: prostate D: bladder AND: urethra F: vesicles seminal.

The aim of this report is to introduce the utility of Index of Protrusion Prostatic (IPP) and how it should be interpreted in clinical practice.

International Prostate Symptom Scale (IPSS)

The initial evaluation is based on a thorough and detailed clinical history, considering the duration of symptoms, the severity of symptoms, and how physical examination findings can provide a comprehensive picture of the individual's condition. For a more objective assessment of severity, measurement instruments such as the IPSS (Table 1) are available. Briefly, this scale allows patients to rate common symptoms and categorize them by severity to define patient management. It also allows for the monitoring of clinical response.

Ask	None	Less of 1 time of every 5 times	Less of half of the times	Approximately half the time	Further of half the time	Almost always	Score
In the last 30 days, how many times have you had the sensation of not completely emptying your bladder at the end of urination?	0	1	2	3	4	5	
In the last 30 days, how many times have you had to urinate in the next 2 hours after urination?	0	1	2	3	4	5	
In the last 30 days, how many times have you sensed that urinating presents an intermittent jet?	0	1	2	3	4	5	
In the last 30 days, how many times have you observed that urine stream is weak?	0	1	2	3	4	5	
In the last 30 days, how many times have you felt the urge to force or squeeze to begin to urinate?	0	1	2	3	4	5	
In the last 30 days, how many times have you had difficulty putting up with the desire to urinate?	0	1	2	3	4	5	
In the last 30 days, how many times should you have gotten up and interrupted your sleep to go to the bathroom?	0	1	2	3	4	5	
TOTAL							
Quality of life	**Happy**	**Very satisfied**	**Slightly satisfied**	**I don't feel difference**	**Not very satisfied**	**Unhappy**	**Very unhappy**
Yeah, had that pass the rest of life with the symptoms current urinals as it would feel.	0	1	2	3	4	5	6

Table 1: IPSS (International Prostate Symptom Scale).

The IPSS subjectively evaluates symptoms, giving a maximum score of 35 points; the higher the score, the greater the severity of the symptoms, with the following reference values: < 7 points (mild symptoms), between 8 and 19 points (moderate symptoms), and > 20 points (serious symptoms). Of the same mode, the quality of life is an aspect very important in this scale, reserving a last item to evaluate it. It is considered that the greater the severity of the symptoms, the lower the quality of life perceived by the patient [3].

Additionally, as part of the assessment of the patients itis necessary to expand studies through imaging and other diagnostic aids, which must have a clear and justified indication. In this sense, the use of diagnostic aids such as uroflowmetry and urodynamics provides precise information on the individual's urination status; urodynamics (flow/pressure) is currently considered the "reference standard" for diagnosing and evaluating lower urinary tract obstruction. However, other factors related to urodynamics must be considered, such as the fact that it is an invasive and uncomfortable study, can have adverse effects, is expensive, and requires more time. Furthermore, after the procedure, it may generate bothersome urinary signs and symptoms for the patient, such as hematuria, dysuria, and urinary tract infections. For all these reasons, less invasive methods are usually preferred, with ultrasound becoming an effective and useful tool [4-8].

In this sense, transabdominal ultrasound is a widely available diagnostic aid, that provides an image for the evaluation of urinary anatomy, assessing the renal parenchyma, bladder, prostate, and other anatomical structures. In addition, it is capable of providing information about the size of the prostate, allowing assessment of the area as an adult volume and determining whether the condition is toward the central part or peripheral, allowing a non-invasive measurement of its size that can correlate with the patient 's symptoms [9,6-8].

IPP

Although the assessment of the anatomical characteristics of the prostate and its shape through the use ofultrasound reports the configuration (bilobular or trilobular) of it, the IPP, or intravesical prostatic protrusion, should be part of the comprehensive evaluation of the patient.In this regard, the degree of protrusion into the bladder should be measured numerically.In cases of a trilobular prostate, this can be measured with transabdominal ultrasound [1,4,7]. Prostatic growth of the middle lobe is obtained by measuring the protrusion into the bladder. The measurement is performed by tracing a line parallel to the base of the lobe as a reference and a perpendicular line at the midpoint of the longitudinal axis of the prostate. The sizes obtained are divided into three degrees: less than 5mm, between 5-10mm, and greater than 10mm (Table 2). This extent was a proposal to predict the risk of failure after the removal of the urinary catheter in patients with urinary retention [10]. Patients who present with a prostate and lobe half further enlarged are those that have a higher index of protrusion, but not necessarily those with more symptoms [1].

Grade I	Grade II	GradeIII
<5 mm	5-10 mm	>10 mm

Table 2: Degrees of prostatic protrusion.

Based on obtaining these measures, we have a specific therapeutic orientation, providing a major benefit to the patient at the time of carrying out an intervention. The use of the IPP in the evaluation of patients has a positive predictive value (PPV) of 94% and a negative predictive value (NPV) of 79%, predicting obstruction in 75% of patients when the protrusion is greater than 10mm, having a very high correlation with the data obtained from performing urodynamic studies [4,6,8,11].

Utility of the IPP

Take the decision of toast therapy. It will depend on the symptoms manifested by the patient. In mild cases where the patient has a score <7 on the IPSS or those with higher scores that do not affect their quality of life, initial therapy should be lifestyle changes such as limiting fluid intake at least 3 hours before bedtime, avoiding beverages with high caffeine content, alcohol, and bladder irritants, being an extent enough to improve the mild symptoms [12].In patients with IPSS scores >7, they are considered moderate, and in this case, decision- making should be based on the findings of the physical exam and the

ultrasound for the choice of a better therapy [3]. In the choice of treatment, it has to consider the findings obtained in the physical examination, the ultrasound, and the IPP, as the use of pharmacological therapy in some patients with IPP > 10 could be insufficient or have a lower response compared with patients with lower IPP or in bilobular prostates.

To the due use of the combined medical therapy (α blocker + inhibitor of 5 alpha reductase), the reduction in glandular volume is clinically significant in decreasing size after at least 6 months of continuous therapy. In patients with a trilobular prostate and a high IPP (>10 mm), the reduction in overall prostate size does not provide significant improvement in symptoms; on the contrary, micturition symptoms can persist, in addition to bladder damage caused by obstruction generated by chronic prostatic growth and detrusor dysfunction as a consequence, as well as new episodes of retention in patients with previous episodes. The decision regarding treatment is subordinate to the severity of the symptoms and the patient 's application. If the patient does not express any degree of discomfort with urination, there is no need to intervene.

By the other side, the acute retention of urine (RAO) is one of the main causes of urological urgency due to its multiple symptoms, which require rapid resolution. It is also a consequence of the progression of prostatic hyperplasia. It is vitally important for physicians to recognize urinary retention and be careful. In the order of the withdrawal of the probe to prevent a new episode of retention, the decisions made must consider the information obtained in the physical exam, ultrasound, and the report made on the IPP [10].

Likewise, in patients with RAO, multiple strategies have been attempted to evaluate the failure or success of the withdrawal of the probe. One of the items to consider at the moment of making this decision is the configuration of the prostate (bilobular or trilobular). The use of alpha blockers in patients with trilobular prostates who also present with an IPP greater than 10 mm has a high probability of failure and new urinary retention. The use of combination therapy may have a modest benefit compared to monotherapy. When using combination therapy, specifically inhibitors of5 α-reductase, there is a benefit in reducing the overall size of the prostate gland over a period of 6 months. For this reason, in patients with an IPP >10 mm, monotherapy is not indicated, and prolonged combination therapy to prevent new episodes of urinary retention may not be sufficient; therefore, invasive therapy should be offered.

In patients with a PPI < 5mm, the probability of experiencing a new episode of urinary retention after catheter removal is lower compared to a PPI greater than 5 mm. In these patients, the use of medical therapy with α-blockers is pertinent. With a PPI of 5 – 10mm, there is a risk for the elderly of a new episode of urinary retention; these patients benefit from the use of combined therapy in the long term. In patients with a PPI > 10mm, one should consider offering early surgical intervention, while limiting drug therapy to short periods due to the progression of prostate growth, which will result in new urinary retention and the appearance of bladder damage that brings negative consequences in the normal urination process of the patient [8,10].

Patients with PPI > 10 mm benefit little from medical pharmacological management. In the long term, they have a high probability of introducing episodes of acute urinary retention, and in cases where catheter removal is attempted after a first episode, there is a greater probability of new retention episodes beyond pharmacological therapy than established (Figure 3). These patients must be referred promptly for urological assessment with the aim of offering them ideally early surgical therapy before possible progression and bladder dysfunction.

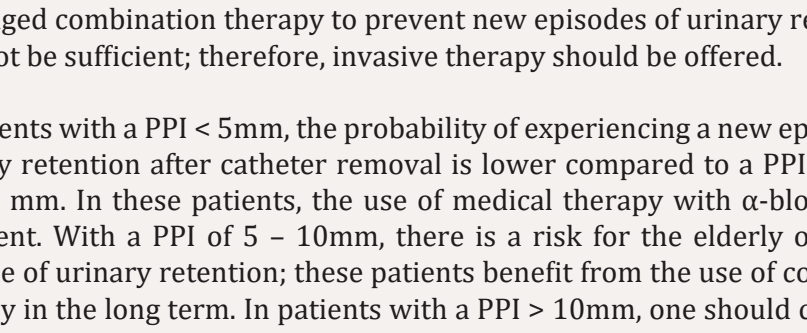

Figure 3: Option of management according to the degrees of the index of protrusion.

Conclusion

The growth of benign prostatic hyperplasia is a pathological condition of high incidence related to age and aging. As the male population increases its life expectancy, obstructive lower urinary symptoms will increase in a directly proportional manner. Its manifestations include urinary retention. In primary and emergency care settings, physicians must have the skills to provide an appropriate approach and initial management of this disease, as well as decision-making. Diagnostic aids, such as the prostate volume index, are essential for the evaluation of patients who consult emergency services or outpatient services with lower urinary tract symptoms and benign prostate growth.

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