



## Original Article

## Frequency of Urinary Tract Abnormalities on Ultrasound with Benign Prostatic Hyperplasia

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## ABSTRACT

Benign Prostatic Hyperplasia (BPH) is a common problem affecting men with increasing age which can cause many complications. **Objective:** To find out the frequency of Urinary Tract Abnormalities on Ultrasound associated with BPH. **Methods:** Descriptive study with a sample size of 230 patients, conducted at Gilani Ultrasound Centre Lahore and Sanabil Health Services from July to November 2021. All patients coming with BPH were included in this study and their KUB scan was done to diagnose any urinary tract abnormalities. A convex transducer with a frequency of 3.5 to 5MHz was used for transabdominal scanning. **Results:** A total of 230 patients were presented with benign prostate hyperplasia on Ultrasound scan, the minimum age ranged was 26 and the maximum age was 90. In this study, Normal patients were 77 with 33.3%, Bilateral Hydronephrosis was in 3 patients (1.3%), Bilateral hydronephrosis with right-sided Hydro ureter was in 1 patient (0.4%), Bilateral renal stones were in 3 patients (1.3%), Cystitis was in 50 patients (21.6%), and Left renal cyst was in 9 patients (3.9%). **Conclusions:** Our study concluded that the patients coming with BPH presented with different urinary tract abnormalities on Ultrasound. Vesicoureteral reflux may concur the extravasation of urine may rarely occur due to bladder outlet obstruction in patients with BPH. BPH is a risk factor to develop UTI, cystitis, hydronephrosis, and hydroureter.

## INTRODUCTION

The prostate secretes fluid that nourishes and protects sperm. During ejaculation, the prostate squeezes this fluid into the urethra, and it is expelled with sperm as semen [1]. The main function of the stromal compartment of the prostate gland is to ensure the appropriate micro-environment for the epithelial compartment [2]. The stromal compartment provides many supportive signals to retain or restore gland homeostasis in healthy conditions or during regeneration processes [3]. The prostate epithelial compartment has the main glandular function as it secretes the prostatic fluid that constitutes approximately one-fifth to one-third of the volume of the entire ejaculate [4]. During orgasm, the smooth muscle tissue in the prostate contracts in order to push semen

through the urethra [5]. Prostate sonography is a test that produces black-and-white images of the prostate by bouncing sound waves off the body's tissues [6]. This test is used to examine the prostate for the presence of any abnormalities, cancer, or other prostate-related conditions. This test is safe and can be done in less than an hour [7]. Ultrasound helps to diagnose symptoms such as difficulty urinating. It's also used to investigate a nodule found during a rectal exam, detect abnormalities, and determine whether the gland is enlarged [8]. Because ultrasound provides real-time images, it also can be used to guide procedures such as needle biopsies, in which a needle is used to sample cells (tissue) from an abnormal area in the prostate gland for later laboratory testing [9]. A

healthy person's prostate volume is equal to 25 to 30ml if the value increases it is an indication of BPH [10]. With this study, we want to find out whether the patients with BPH there is an increase of urinary tract abnormalities. The purpose of our study was to study the abnormalities of the urinary tract system as well as vesicoureteral reflux, timely diagnosis can lead to a patient at timely management.

## METHODS

A descriptive study consisting of a sample size of 230, was performed at Gilani Ultrasound center Lahore, for four months. Men of all ages diagnosed with BPH were a part of this research. The subjects with prostatic malignancies, who underwent mild urinary tract and/or prostate surgeries, and men with UTI or bladder calculi, were included in this experiment. Ultrasound study was performed using Toshiba Xario Prim ultrasound machine using a convex probe of 3.5-5MHz. The outcome variables were Prostate Volume Ratio (PMR). Subjects were examined with their bladder full and PMRV was noted after micturition. Mostly we used transabdominal ultrasound for the measurement of the prostate gland which is a cheap and convenient method [11]. For this procedure, first of all, the patient's bladder should be filled then the patient should be laid in supine position and we used a convex probe of 3 to 5 MHz [12]. In transabdominal ultrasound for the prostate gland, we took a total of three measurements in which one is in transverse view other two are in longitudinal view. Prostate volume is the sum of these three measurements [13].

## RESULTS

There were a total of 230 patients who were presented with BPH on Ultrasound scan, out of which 51(22%) patients had an age ranging between 26-35 years, 64 (27.6%) patients had an age ranging between 36 to 45 years, 46 (20.1%) patients had an age ranging between 46 to 55 years, 45 (19.5%) patients had an age ranging between 56 to 65 years, 22 (9.7%) patients had an age ranging between 66 to 75 years and only 2(0.8%) patients were between the age of 80 to 90 years (Table 1).

Age (Years)	Frequency	Percent
26-35	51	22
36-45	64	27.6
46-55	46	20.1
56-65	45	19.5
66-75	22	9.7
80-90	2	0.8
Total	230	100.0

**Table 1:** Age Range Frequencies

Out of total 230 patients, 77(33.3%) patients came out to be suffering from BPH on Ultrasound scan but there was no

other pathology present. 4 (1.7%) patients were diagnosed with bilateral hydronephrosis. 1 (0.4%) patient with hydronephrosis had right-sided hydroureter as well. Bilateral renal stones were found in 3 (1.3%) patients. 50 (21.6%) patients were diagnosed with cystitis, 13 (5.6%) were diagnosed with right renal cyst and 9 (3.9%) patients were diagnosed with left renal cyst, 14 (6.1%) patients were diagnosed with right renal stone and 23 (10.0%) patients were diagnosed with left renal stone, 10 (4.3%) patients were diagnosed with unilateral hydronephrosis on right side out of which one patient (0.4%) had right ureteric stone and 7 (3.0%) patients were diagnosed with unilateral hydronephrosis on left side out of which 1 (0.4%) patient had hydroureter as well, 9 (3.9%) patients had high post-micturition residual volume on Ultrasound, 1 (0.4%) had right renal cyst with cystitis, 1 (0.4%) patient had right renal stone with cystitis and only 1 (0.4%) had right renal stone with hydronephrosis. There were also 3 (1.3%) patients who were diagnosed with ureteric stone and 5 (2.2%) patients who were diagnosed with vesicle stone. (Table 2).

ULTRASOUND FINDINGS	Frequency	Percent
Bilateral Hydronephrosis	3	1.3
Bilateral Hydronephrosis with Right sided Hydro Ureter	1	.4
Bilateral Renal Stones	3	1.3
Cystitis	50	21.6
Left Renal Cyst	9	3.9
Left Renal Stone	23	10.0
Left sided Hydronephrosis	6	2.6
Left sided Hydronephrosis with Left sided Hydro Ureter	1	.4
Normal	77	33.3
Urinary Retention	9	3.9
Right Renal Cyst	13	5.6
Right Renal Cyst with Cystitis	1	.4
Right Renal Stone	14	6.1
Right Renal Stone with Cystitis	1	.4
Right Renal Stone with right-sided Hydronephrosis	1	.4
Right sided Hydronephrosis	9	3.9
Right sided Hydronephrosis with Right ureteric stone	1	.4
Ureteric Stone	3	1.3
Vesicle stone	5	2.2
Total	230	100.0

**Table 2:** Frequencies of Ultrasound Findings

USG Image shows enlarged prostate volume measuring 31.5grams with thickened Urinary bladder wall suggestive of cystitis (Figure 1).



**Figure 1:** USG image of enlarged prostate with thickened urinary bladder



**Figure 2:** USG image shows a stone in Mid pole of the Right kidney

## DISCUSSION

BPH is a common problem affecting men with increasing age which can cause many complications. Swyer et al., deduced in his study that BPH starts appearing in men with the age of 40 to 50 years old [16]. The results were matched with our study. However, Stephen J. Berry et al., conducted a study deduced that BPH appeared in the age group of 31 to 40 years and prevalence increased from 8 percent in this group to more than 70 percent in the age group of 61 to 70 years and even more than 90 percent in patients of 81 to 90 years old [17]. Similarly, another study conducted on PBH concluded that with increasing age, the prevalence and incidence of BPH rose. Despite the fact that older men had a higher risk of BPH than younger men, they were less likely to be tested at the time of diagnosis [18]. In our study, the youngest person with BPH was of 26 years old and the prevalence was around 22 percent in age group 26 to 35 years old. In patients of age 56 to 65 years old, the prevalence was 19.5%, the prevalence decreased in age groups of elder patients. Jae Hung Jung et al., found a relationship between BPH and lower urinary tract stones in adult men. Out of 221 patients who were having a BPH and lower urinary tract stones, 87.8% patients had bladder stones and 12.2% had urethral stones most of which had been possibly migrated from upper urinary tract [19]. However, in our study, no patient with urethral stone was diagnosed, but there were 5 patients with bladder stones, 3 patients with ureteric stones, and 40 patients had bilateral or unilateral stones in the kidneys. There are numerous medicinal and surgical therapy options available. Surgery

## CONCLUSIONS

Our study concluded that the patients coming with BPH were mostly presented with different urinary tract pathologies. The most common pathology was cystitis and the least common pathology was a simple cyst. Vesicoureteral reflux may concur the extravasation of urine may rarely occur due to bladder outlet obstruction in patients with BPH. BPH is a risk factor to develop UTI, cystitis, hydronephrosis, and hydroureter.

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