Original Article

Clinicopathological Characteristics of Benign Prostatic Hyperplasia and Prostate Cancer in a University Teaching Hospital in Nigeria

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Abstract

Introduction: Benign prostatic hyperplasia and prostate cancer are common pathologies of the prostate which could lead to morbidity and quality of life problems in urological patients. The study aimed to determine and compare the demographic, clinical, and pathologic characteristics of patients histologically diagnosed with these pathologies in our center. **Methods:** This was a prospective study carried out in 105 consecutive patients with the histological diagnosis of benign prostatic hyperplasia or prostate cancer over a period of 1 year. Information on demographic details, clinical presentation, prostate volume, prostate-specific antigen level, and histopathologic data was obtained. Data were analyzed using the Statistical Package for the Social Sciences with $P < 0.05$ considered statistically significant. **Results:** Benign prostatic hyperplasia and prostate cancer were diagnosed in 71.4% and 28.6% of the patients, respectively. Patients with prostate cancer had a significantly higher prostate-specific antigen ($P = 0.001$) and prostate volume ($P = 0.005$) than those with benign prostatic hyperplasia. Difficulty in urination was the most common presenting symptom in both pathologies (90% vs. 92%, $P = 0.713$), whereas the occurrence of erectile dysfunction was significantly higher in patients with prostate cancer (50% vs. 24%, $P = 0.010$). The mean Gleason's score in the patients was 7, and the majority of the prostate cancer patients (96.7%) had advanced disease. There was associated histologic prostatitis in 10.7% of patients with nodular hyperplasia. **Conclusion:** Benign prostatic hyperplasia is more commonly diagnosed than prostate cancer in our center. Except for erectile dysfunction, the burden of other complications is similar in these patients. There is the need for community advocacy to encourage early presentation in those with lower literacy level, especially patients with prostate cancer, in order to reduce the morbidities associated with the disease.

Keywords: Benign prostatic hyperplasia, clinical features, histopathology, prostate cancer

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Introduction

Benign prostatic hyperplasia and prostate cancer are common pathologies of the prostate.[1] In hospital-based settings, the prevalence of clinical benign prostatic hyperplasia ranges from 30% to 50%, whereas it is estimated to occur in 18.1%–25.3% in community-based settings.[1] Prostate cancer is the most commonly diagnosed cancer and the leading etiology of cancer death among men in Sub-Saharan Africa.[2]

Transitional zone of the prostate is the site of origin of benign prostatic hyperplasia, whereas cancer of the prostate mostly originates from the peripheral zone of the prostate.[3] These pathologies are major causes of morbidity in urological patients.[4] Onset and progression of symptoms can occur in patients with benign prostate hyperplasia leading to difficulty in urination, urinary retention, hematuria, urinary tract infection, and renal failure.[5] These are usually not lethal but could significantly affect the quality of life of the

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patients.[1] On the other hand, patients with prostate cancer might be asymptomatic in localized disease, progress to have a varying degree of symptoms in locally advanced disease, and widespread metastasis or die from the disease.

The pattern of prostatic lesions following tissue diagnosis varies with the setting where it is carried out. Furthermore, the clinicodemographic and pathological features of these common conditions are rarely compared in most researches. There is the need for more robust data on the demographic, clinical, and pathological features of these diseases in tertiary hospitals to provide a solution to the growing need for information needed for local health awareness to prevent the complications of benign prostatic hyperplasia and combat the menace of prostate cancer.

This study aimed to determine and compare the demographic, clinical, and pathologic characteristics of patients histologically diagnosed with benign prostatic hyperplasia and prostate cancer in our center.

Methods

This prospective study was carried out on patients with the histological diagnosis of benign prostatic hyperplasia or prostate cancer in the urology division of Ahmadu Bello University Teaching Hospital, Zaria between June 2016 and June 2017. Patients having a coexisting lower urinary tract pathology were excluded from this work. The research was approved by the institutional review board, and written informed consent was obtained from patients.

Using a pro forma based on close-ended questions, information on the demographic characteristics (age, educational level, and occupational status) and the presenting symptoms of the patients was obtained. Laboratory assay for prostate-specific antigen (ng/ml) and imaging by transrectal ultrasound scan for the determination of prostate volume (grams) using the ellipsoid formula was done. Prostate-specific antigen density level (prostate-specific antigen [ng/ml] divided by prostate volume [grams]) was calculated. The histological diagnosis, the Gleason's grade and score (if applicable), associated prostatitis, and the presence of prostate intraepithelial neoplasia were noted following the histological analysis of the six tissue cores obtained following transrectal ultrasound-guided prostate biopsy of the prostate in the patients. Staging of patients with prostate cancer was done using a combination of transrectal ultrasound scan, abdominopelvic ultrasound scan, and lumbosacral X-ray. Additional imaging in the form of pelvic magnetic resonance imaging and bone scan was done for any patient with findings suggestive of localized disease for more accurate staging. Data collected were recorded in the study pro forma.

Statistical Package for the Social Sciences (SPSS) software, version 20.0 (IBM Corp., Armonk, New York, USA) was used for data analysis. Continuous variables were presented as median and interquartile range, whereas categorical variables were expressed as frequency and percentages. Analysis of association was done using the Mann–Whitney U-test for the comparison of continuous data, and the Chi-square test was used for the comparison of categorical data with $P < 0.05$ considered statistically significant.

Results

One hundred and five patients were enrolled within the study duration. Seventy-five (71.4%) were diagnosed with benign prostatic hyperplasia, whereas 30 (28.6%) were diagnosed with prostate cancer. Benign prostatic hyperplasia and prostate cancer were more commonly diagnosed in men who were educated to the tertiary level, 32 (42.7%) and 14 (46.7%), respectively, and among those who work in the upper strata of the society, 45 (60.0%) and 16 (53.3%), respectively [Table 1].

In comparison to patients with benign prostatic hyperplasia, patients with prostate cancer had a significantly higher prostate-specific antigen (69.2 ng/ml vs. 15.5 ng/ml, $P = 0.001$), prostate volume (67.2 g vs. 49.5 g, $P = 0.005$), and the prostate-specific antigen density (0.96 ng/ml/g vs. 0.33 ng/ml/g, $P = 0.002$) [Table 2].

Difficulty in urination, low back pain, urinary retention, erectile dysfunction, hematuria and chronic renal failure occurred in 96 (91.4%), 47 (44.8%), 40 (38.1%), 33 (31.4%), 24 (22.9%), and 5 (4.8%) of the entire study population. Among those with urinary retention, 33 (31.4%) of the study population had acute urinary retention, whereas 7 (6.7%) had chronic urinary retention. The distribution of clinical presentation according to the primary prostate pathology is shown in Table 3. In patients with benign prostatic hyperplasia, lack of tertiary education ($P = 0.004$) and a higher prostate

Table 1: Baseline characteristics of the study population

Variables	Overall, *n* (%)	BPH, *n* (%)	Prostate cancer, *n* (%)
Age groups (years)			
40-49	1 (1.0)	1 (1.3)	0 (0.0)
50-59	16 (15.2)	12 (16.0)	4 (13.3)
60-69	43 (41.0)	31 (41.3)	12 (40.0)
70-79	40 (38.1)	26 (34.7)	14 (46.7)
80-89	5 (4.8)	5 (6.7)	0 (0.0)
Educational status			
No education	25 (23.8)	20 (26.7)	5 (16.7)
Primary education	17 (16.2)	11 (14.7)	6 (20.0)
Secondary education	17 (16.2)	12 (16.0)	5 (16.7)
Tertiary education	46 (43.8)	32 (42.7)	14 (46.7)
Occupational status			
Class I	61 (58.1)	45 (60.0)	16 (53.3)
Class II	19 (18.1)	14 (18.7)	5 (16.7)
Class III	25 (23.8)	16 (21.3)	9 (30.0)

Class I: Higher managerial, administrative, and professional occupations, Class II: Intermediate occupations, Class III: Routine and manual occupations, BPH: Benign prostatic hyperplasia

Table 2: Prostate-specific antigen, prostate volume, and prostate-specific antigen density according to the primary prostate pathology

Variables	Overall	BPH	Prostate cancer	*P*
PSA	18.6 (10.5-43.6)	15.5 (9.3-24.2)	69.2 (19.7-100.1)	0.001
Prostate volume	55.4 (40.2-77.6)	49.5 (34.3-73.2)	67.2 (49.8-102.7)	0.005
PSA density	0.39 (0.18-0.73)	0.33 (0.17-0.51)	0.96 (0.31-1.32)	0.002

Values are expressed as median (IQR), $P<0.05$ (Mann-Whitney U-test) is statistically significant. BPH: Benign prostatic hyperplasia, PSA: Prostate-specific antigen, IQR: Interquartile range

Table 3: Comparison of presenting symptoms in benign prostatic hyperplasia and prostate cancer

Presenting symptoms	BPH, *n* (%)	Prostate cancer, *n* (%)	*P*
Difficulty in urination	69 (92.0)	27 (90.0)	0.713
Low back pain	35 (46.7)	12 (40.0)	0.535
Urinary retention	33 (44.0)	7 (23.3)	0.141
Erectile dysfunction	18 (24.0)	15 (50.0)	0.010
Hematuria	16 (21.3)	8 (26.7)	0.557
Chronic renal failure	3 (4.0)	2 (6.7)	0.622

$P<0.05$ (Chi-square test) is statistically significant. BPH: Benign prostatic hyperplasia

volume ($P = 0.001$) were significantly associated with the occurrence of urinary retention, whereas in those with prostate cancer, tertiary education was significantly associated with the presence of erectile dysfunction ($P = 0.003$) and hematuria ($P = 0.024$) [Tables 4 and 5].

Eleven of the prostate cancer patients (36.7%) had metastatic prostate cancer, 18 (60.0%) had locally advanced disease, whereas 1 (3.3%) was confirmed to have an organ-confined disease. There were associated histologic prostatitis and prostate intraepithelial neoplasia in 8 (10.7%) and 3 (4.0%) patients with nodular hyperplasia and none in those with prostate cancer. The mean Gleason's score in this study was 7. The pattern of Gleason's grade and score in patients with prostate cancer is shown in Figure 1.

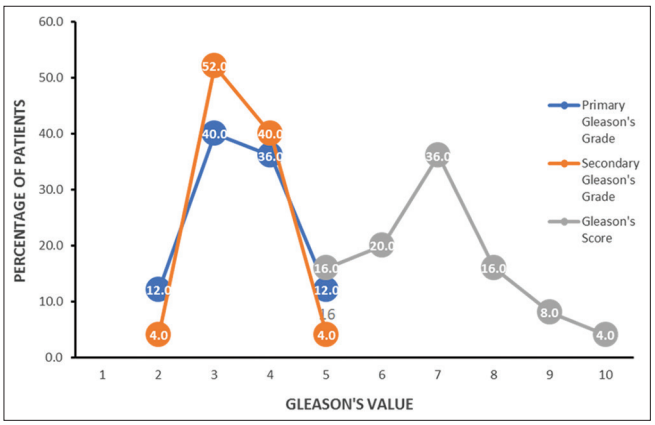

Figure 1: Pattern of Gleason's grades and scores in patients with prostate cancer in the study population

Discussion

This study showed that the ratio of the frequency of diagnosis of benign prostatic hyperplasia to prostate cancer was 2.5:1.0. This is similar to the findings of Nwafor *et al*., who reported a ratio of 2.1:1.0 following their histopathological study of prostate lesions.[4] The present study thus reiterates the observation that benign prostate hyperplasia is more common than malignant prostate lesions. Odubanjo *et al*., however, reported a slightly lower rate of diagnosis of benign prostatic hyperplasia in relation to prostate cancer (1.5:1.0).[6] Unlike this present study where only results obtained from needle biopsy cores were analyzed, the inclusion of tissue samples obtained from transurethral resection of the prostate and simple prostatectomy procedures in their clinicopathological study could account for the difference in the ratio reported.

The peak age group of diagnosis of benign prostatic hyperplasia in this study was in the seventh decade of life, which is consistent with the observation of Yeboah in Ghana.[3] Prostate cancer was, however, more commonly diagnosed in the eighth decade of life. The fact that these cancer patients were commonly educated to the tertiary level and work at higher managerial, administrative, and professional levels could mean that they had better awareness of the disease and relatively stronger health-seeking behavior, especially at the retirement age, compared to those in the lower socioeconomic strata.

The prostate-specific antigen level of patients in this present work was significantly higher in those with prostate cancer. Ajape *et al*. reported a prostate-specific antigen level of 69.5 ng/ml in their prostate cancer patients, whereas Nazar *et al*. reported a value of 11.4 ng/ml in their benign prostatic hyperplasia patients.[5,7] Leakage of prostate-specific antigen through a disrupted prostate basement membrane layer could account for the higher prostate-specific antigen level in the cancer patients. As prostate cancer spreads from the peripheral zone to involve the rest of the prostate, so does an increase in tumor volume and an increase in the total volume of the prostate gland occur. The presentation of the cancer patients in an advanced stage of the disease could thus explain the relatively larger gland in them.

There was a higher, although statistically insignificant, rate of difficulty in urination and urinary retention among patients with benign prostatic hyperplasia compared to those who were diagnosed with prostate cancer. This could be because the presence of symptoms usually forms the basis for presentation

Table 4: Association of educational status with some bladder outlet obstruction complications according to the primary prostate pathology

Presenting symptoms	BPH			Prostate cancer		
	No tertiary education	Tertiary education	*P*	No tertiary education	Tertiary education	*P*
Erectile dysfunction	11 (25.6)	7 (21.9)	0.710	4 (25.0)	11 (78.6)	0.003
Urinary retention	25 (58.1)	8 (25.0)	0.004	5 (31.2)	2 (14.3)	0.273
Hematuria	12 (27.9)	4 (12.5)	0.107	7 (43.8)	1 (7.1)	0.024
Renal failure	2 (4.7)	1 (3.1)	1.000	1 (6.2)	1 (7.1)	1.000

P<0.05 (Chi-square test) is statistically significant

Table 5: Association of prostate volume with some bladder outlet obstruction complications according to the primary prostate pathology

Presenting symptoms	Prostate volume in BPH			Prostate volume in prostate cancer		
	Symptoms absent	Symptoms present	*P*	Symptoms absent	Symptoms present	*P*
Erectile dysfunction	52.3 (37.7-72.8)	42.3 (29.7-76.8)	0.292	76.5 (55.4-103.1)	64.1 (49.3-102.6)	0.254
Urinary retention	43.8 (29.6-62.4)	64.7 (48.0-102.6)	0.001	65.0 (47.5-102.6)	76.7 (64.1-103.5)	0.249
Hematuria	48.0 (34.1-71.7)	70.6 (49.2-93.7)	0.068	61.7 (48.9-102.7)	82.2 (67.7-208.9)	0.122

P<0.05 (Mann-Whitney U-test) is statistically significant. Values are expressed as median (IQR). BPH: Benign Prostatic Hyperplasia, IQR: Interquartile range

and subsequent diagnosis of benign prostatic hyperplasia in hospital-based settings. Besides, a larger prostate gland could increase the risk of urinary retention as shown in this study and in line with the findings of Marberger *et al*.[8] Erectile dysfunction was, however, significantly higher, about double the rate of occurrence, in patients with prostate cancer compared to those with benign prostatic hyperplasia (50.0% vs. 24.0%, $P = 0.010$). While the etiopathogenesis of poor erectile function in benign prostatic hyperplasia is unclear, its occurrence in prostate cancer might be related to late patient presentation and the neoplastic infiltration of periprostatic nerves in locally advanced prostate cancer because a significant relationship was observed between tertiary education and erectile dysfunction in this present study.[9]

The finding that the majority of patients in this study (96.7%) presented at an advanced stage of the disease is similar to the result of other authors in the West African subregion.[7,9] Ikuerowo *et al*., however, diagnosed 26.0% of their participants with localized prostate cancer in a community-based study.[10] The stage of prostate cancer at presentation may thus be a reflection of the degree of access to specialized care by patients in all settings.[9] There is the need for greater access to specialized urological care as well as better health education and robust health insurance cover to facilitate the diagnosis of the disease at an early stage where curative treatment can be offered to the patients.[7,9]

In this study, only patients with benign prostatic hyperplasia had associated histologic prostatitis (10.7%). Ikuerowo *et al*. reported that inflammation was associated with benign prostatic hyperplasia in 11.7% of patients. Nwafor *et al*., however, observed a higher rate of prostatitis (31.9%) in their study.[4] Unlike the latter study where high-grade prostate intraepithelial neoplasia was seen in 1% of patients, it was diagnosed in 4% of the patients in the present study.[4] The presence of high-grade prostate intraepithelial neoplasia underlies the need for repeat biopsy, especially in patients with high prostate-specific antigen levels.[4]

The only histological pattern seen in the prostate cancers diagnosed in this work was adenocarcinoma. The mean Gleason score in this study was 7. Nwafor *et al*. and Ikuerowo *et al*. noted that Gleason score 7 was the most common score in their prostate cancer patients.[4,10] Gleason's score has a good correlation with the clinical behavior of the tumor, and it is important in cancer prognostication and making treatment decisions.[4]

Conclusion

Benign prostatic hyperplasia is more commonly diagnosed than prostate cancer in our center. Although the rate of presentation with most complications appeared similar in the two groups of patients, its burden tends to be worse in those with lower literacy level. There is the need for community advocacy to encourage better health-seeking behavior, especially in patients with prostate cancer, in order to reduce the morbidities associated with these prostate pathologies.

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Conflicts of interest

There are no conflicts of interest.

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