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Prostate biopsy and its outcome in a tertiary hospital in southern Nigeria

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Abstract

Background: Diagnosis of prostatic diseases is via a prostate biopsy and subsequent histology. So, a prostate biopsy should be carried out to get a histological diagnosis when indicated.

Materials and Methods: This is a five-year retrospective study conducted at the University of Port Harcourt Teaching Hospital. Ethical approval for the study was sought and gotten from the hospital's ethical committee. The information gotten included history, duration of symptoms, examination findings, age of the patient, Gleason grade and histological diagnosis. The data from the folders were collected and evaluated. Frequencies, percentages, the mean and standard deviation were used to summarize the data as appropriate.

Results: The age range was from 45 to 96 years with a mean age of 68.10 ± 9.11 years. A hundred and fifty patients had prostate cancer. The commonest grade of cancer was the Gleason grade 5 (46.67%). No statistically significant relationship between Gleason grade and age.

Conclusion: The mean age of patients in this study was 68.10 ± 9.11. Over 50% of patients biopsied had prostate cancer, and 46.67% had a high-grade disease. Health awareness campaigns and screening programs in Africa to make people aware of prostatic diseases. Earlier presentation to the hospital when symptomatic will lead to better treatment.

Keywords: Biopsy; Prostate cancer; Prostatitis; Gleason grade; Benign; Malignant

1. Introduction

The prostate gland is shaped like a chestnut and located beneath the bladder in the pelvis. It produces a component of the ejaculate 1. The normal volume of the prostate is 20- 30 g 2. The prostate is composed of glands and fibromuscular stroma1, 3. Prostatic growth and development depend on testosterone. Prostate diseases are more common with advancing age.1 Benign prostate hyperplasia (BPH), prostatitis and prostate cancer (PCa) are the most common causes of prostate diseases 1,4. Diagnosis of these conditions is via a prostate biopsy and subsequent histology.

The prostate is divided into zones and this zonal arrangement was popularized by McNeal. BPH most commonly involves the periurethral transitional zone of the prostate while PCa arises mostly from the peripheral zones. Seventy percent of men above 60 and 90% above 80 have BPH 3. Several studies have reported the rising incidence of PCa 5,6,7,8. It is the most common malignancy among men. It constitutes about 5% of all cancers and 10% of all cancer-related deaths 9. Prostatitis may coexist with BPH and PCa. It occurs in 10-15% of men. Prostatitis is classified into acute, chronic specific or nonspecific and granulomatous prostatitis. In chronic prostatitis, there is infiltration of peri glandular tissue by lymphocytes, histiocytes and plasma cells 10. Prostatic intraepithelial neoplasia (PIN) can also be

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histologically diagnosed from prostate tissue.10 High-grade PIN is a premalignant lesion for adenocarcinoma of the prostate 11.

In Port Harcourt, several studies on prostatic diseases have been carried out 7,8,12-18. Few have concentrated on the pathological basis of prostatic diseases 14,18. We are unaware of any study on the histological pattern of prostatic diseases. This study aimed to determine the histological pattern of prostate diseases in Port Harcourt, Southern Nigeria.

2. Material and methods

This was a five-year retrospective study. This study was carried out in southern Nigeria. Histological diagnoses of 296 prostate specimens were collected. All patients who presented with features suggestive of prostatic disease that had either an elevated PSA, elevated PSA density or an abnormal Digital Rectal Examination DRE between January 2015 and December 2020 at the University of Port Harcourt Teaching Hospital UPTH were included in the study. Ethical approval for the study was sought and gotten from the hospital's ethical committee.

Data were retrieved from all patients listed in the medical records department as having been treated for prostatic disease and having a prostate biopsy during the study period. Also, data were obtained from ward admission registers, theatre, and discharge records. The data included history, examination findings, patient age at presentation, and post-operative complications. Patients were also categorized into three categories based on the severity of the symptoms. Patients with incomplete records were also excluded from the study.

Patients whose histology shows benign small cystically dilated glands lined by two layers of the cell (inner epithelial and outer basal cell layer) were termed atrophic prostate. Patients whose histology shows small-sized glands lined by a single layer of epithelial cells devoid of basal cell layer were termed as having prostate cancer and their Gleason grade was identified accordingly.

Each patient had ciprofloxacin and metronidazole before the prostate biopsy and an enema before the biopsy. Each patient also had an anal pack after the biopsy procedure. Patients who had either transurethral resection of the Prostate or an open prostatectomy also had histology of the samples.

The data from the folders were collected and entered using Microsoft Excel 2016 version and transferred into the statistical package for social sciences (SPSS) for windows (version 25) (IBM SPSS Inc. Chicago, IL) for analysis. Ninety-five per cent confidence interval and a p-value less than 0.05 was considered significant. Frequencies, percentages, the mean and standard deviation was used to summarize the data as appropriate. Categorical data were presented in the form of frequencies and percentages using tables. Continuous variables were presented in means and standard deviation. Results were presented in tables and charts.

All data collected was imputed in Microsoft Excel® version 2010 spreadsheet and transferred into the statistical package for social sciences version 23 (SPSS Inc., Chicago, USA) for analysis. Data are presented as frequencies and percentages using tables and charts.

3. Results

Four hundred and two patients were evaluated for this study but only 296 met the inclusion criteria and were then included in the study

Table 1 Age of the patients

Age (years)	Frequency (n)	Percentage (%)
Less than 60 years	56	18.8
60 to 69 years	104	35.2
70 to 79 years	104	35.2
80 years and above	32	10.8
Total	296	100

Table 1 shows the age distribution of patients, the 60 to 69-year and 70 to 79-year age groups had the highest frequency and the 80 and above age group had the lowest percentage

Age range 45 to 96years

Mean age 68.10 ± 9.11

Table 2 Patients who had prostate cancer from those who had benign disease

Diagnosis	Frequency n	Percentage %	Minimum	Maximum	Mean ± SD
CAP	150	50.67	49	91	68.25±9.43
NON-CAP	146	49.33	45	96	67.95±8.81
OVERALL	296	100	45	96	68.10±9.11

Table 2 shows the age of participants and histological diagnosis. Among participants whose biopsies returned positive, the mean age was 68.25 as compared to 67.95 among participants whose biopsies returned negative for prostate cancer.

Table 3 Different grades of patients with prostate cancer and their percentages

Classification	Frequency (n)	Percentage (%)
Grade one	31	20.6
Grade two	18	12
Grade three	7	4.6
Grade four	27	18
Grade five	67	46.67
Total	150	100

Table 3 shows the distribution of the different ISUP grades. The commonest grade of cancer among the study population according to the Gleason score is grade 5 (46.67%) followed by grade 1 (22.2%) grade 4 (17.6%), grade 2 (11.8%), and grade 3 (4.6%)

Table 4 Association between ISUP grade and age

Variable	Characteristics	Age (mean ± SD)	F	p-value
Cancer grade	Grade one	67.65 ± 10.10	0.601	0.663
	Grade two	69.29 ± 9.18		
	Grade three	65.00 ± 9.22		
	Grade four	66.00 ± 8.75		
	Grade five	68.63 ± 9.42		

Table 4 shows the association between age and ISUP cancer grades. A one-way analysis of variance showed no statistically significant difference between the age of participants and the ISUP Grade of prostate cancer ($f(4) = 0.601$, $P = .663$).

A one-way analysis of variance (ANOVA) test conducted to ascertain the relationship between age and the histology characteristics of non-cancer biopsies revealed that there was no relationship between both variables ($F(4, 141) = 0.312$, $p = .869$

Table 5 Association between age and histology of non-cancerous biopsies

Variable	Characteristics	Age (mean ± SD)	F	p-value
Non-cancer biopsy	Atrophic prostate	68.73 ± 8.32	0.312	0.869
	BPH	67.30 ± 9.10		
	BPH with chronic prostatitis	69.21 ± 7.81		
	Chronic prostatitis	69.00 ± 9.35		
	High-grade pin	68.50 ± 9.87		

4. Discussion

The incidences of prostatic diseases vary across different geographical zones. They constitute a significant cause of morbidity and mortality among men above 40 years 19. African men are more likely to have aggressive diseases, present late with complications and die from prostate cancer.8 Prostatic disease constitutes a bulk of the indications for urological consults 20,21.

The mean age of patients in this study was 68.10 ± 9.11. Patients aged 60-69 and 70-79 had the highest frequency of 104 (35.2%) each. Those below 60 years and above 80 years were 56 (18.8%) and 32 (10.8%) respectively the mean age was 68.10 ± 9.11 (Table 1). This is similar to a study by Nwafor et al 22 in which the age groups 60-69 and 70-79 had the highest frequency. Mital et al 2 also reported that prostate diseases are common among men in the fifth decade of life. Previous studies conducted in Port Harcourt, have similar mean ages. The mean age in a study conducted by Raphael et al.8 was 68.88years±9.75, with the modal age range being the 60-69year group. The mean age was 69.9 years in a study conducted by Ekeke et al 13. Another study conducted by Abhulimen et al 7 had a mean age of 68.71 years. These studies concentrated more on prostate cancer and this may have contributed to the slightly increased mean age.

The mean age of patients with prostate cancer was slightly higher (68.25±9.43) than that of patients without prostate cancer (67.95±8.81) as shown in Table 2. It is generally believed that prostate cancer affects older men and Benign prostatic enlargement affects older men 23, 24. The same finding was noted in a prospective study conducted by Abhulimen et al.25 on patients with symptomatic benign prostatic enlargement in Port Harcourt, the mean age of the patients was 64.71± 9years.

The most common histological diagnosis in this study was Prostate cancer and 150 patients (50.67%) had prostate cancer as shown in Table 2. This shows that over half of the time clinical suspicion of prostate cancer was accurate, probably because patients presented late with obvious symptoms. Another study analyzed prostate tissue from prostatectomies and trucut biopsies giving a low percentage (7%) of prostate cancer 2. However, tissues from simple prostatectomies are usually benign because the adenoma is usually in the periurethral transitional zone of the prostate, this may have resulted in a low percentage of prostate cancer in the study. At a glance, one may erroneously think that prostate cancer incidence is that high in Southern Nigeria. The reason for the high percentage of patients with prostate cancer in this study is that most of these patients were biopsied because we felt they had prostate cancer from either their symptoms, signs or investigations. Patients without symptoms or signs of prostate cancer with low PSA values are treated empirically as having Benign prostatic enlargement BPE. These patients usually do not have a prostate biopsy even though there are asymptomatic patients with normal PSA who have prostate cancer 26-28. Inflammation of the prostate is a known cause of elevated PSA. Patients with elevated serum PSA who are suspected to be secondary to prostatitis were treated for 4 weeks and then the serum PSA was repeated after treatment. If the PSA is reduced significantly to normal levels a biopsy is avoided. If the PSA remains the same or increases during the treatment a biopsy is carried out. Another study noticed PSA normalization after antibiotic treatment in 33.2% of patients (95% confidence interval [CI] 24.9–42.8) 29. Patients treated with antibiotics in this manner should be followed up closely and a biopsy performed if indicated.

The grade of cancer cells assesses how much the cancer cells resemble normal cells. The higher the cancer grade the less the cells resemble normal cells and vice versa. Grading of Prostatic adenocarcinoma was first carried out by an American pathologist, Dr Donald Gleason in 1966 24. This initial grading system has been upgraded over time 30,31. The commonest grade of cancer among the study population according to the Gleason score is grade 5 (46.67%) as shown in Table 3. A retrospective study conducted in Port Harcourt noted that 37% of patients presented with poorly differentiated cancers and in the study, 35% of patients not having a Gleason grade 7. We feel if they provided a Gleason

grade the 37% may have been higher. Another study conducted in Port Harcourt (41.6%) had a Gleason score of 8-10 13 the reason for this high-grade disease was the late presentation in both studies 7, 13.

An association between age and ISUP grade revealed no statistically significant difference between the age of participants and the ISUP Grade of prostate cancer (f (4) = 0.601, P = .663) as shown in Table 4. A Fisher exact test conducted to test for association between age categories and ISUP cancer grades showed a statistically non-significant relationship between both variables (p = .723). Similar findings were also noted in an earlier study by Raphael et al 8.

The association between the age categories of participants and the histology of non-cancerous biopsies was also statistically non-significant as shown in Table 5.

5. Conclusion

The mean age of patients in this study was 68.10 ± 9.11. Over 50% of patients biopsied had prostate cancer, and 46.67% had high-grade disease.

Recommendation

- Health awareness campaigns and screening programs in Africa to make people aware of prostatic diseases.
- Earlier presentation to the hospital when symptomatic will lead to better treatment

Limitations of the study

- Small sample size
- Retrospective study

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare no conflict of interest

Statement of ethical approval

Ethical approval was sought and obtained from the Hospitals' ethical committee

Statement of informed consent

This was a retrospective study and so no informed consent was obtained from patients.

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