

## HISTOPATHOLOGICAL PATTERN OF PROSTATIC DISEASES IN NIGERIANS

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**Objective:** This is a laboratory-based retrospective study of the histopathological pattern of prostatic lesions seen at Jos University Teaching Hospital (JUTH) over a 10 year period (1989-1998).

**Material and Methods:** In total, 493 prostatic lesions were seen representing 3.2% of the 15,424 surgical specimens obtained during the study period. After histological assessment, the tumors were classified according to the WHO recommendation. Histological grading/scoring of adenocarcinomas was done using the Gleason system.

**Results:** 372 (75.4%) prostatic lesions were benign prostatic hyperplasia (BPH) with co-existing chronic prostatitis in 23.6% of cases. The peak age of occurrence of BPH was in the seventh decade of life. Prostate cancer constituted 121 (24.6%) of all prostatic lesions with a peak age of occurrence in the seventh decade. 94.2% of the cancer cases were adenocarcinomas, while adenosquamous and squamous cell carcinoma represented 1.7% each of cases. Leiomyosarcoma and rhabdomyosarcoma

were noted in 0.8% each of cases. The adenocarcinomas were well, moderately and poorly differentiated in 85.1%, 7.9% and 7% of cases, respectively, and incidental carcinoma was detected in 12.3% of cases. The paucity of other rare lesions was also noted and, with few exceptions, the patterns of prostatic lesions were comparable to the findings in other parts of the world.

**Conclusion:** In preparation for a potential future increase in the incidence and mortality rates from prostate cancer, every effort should be made to improve diagnosis, staging and management facilities. Even though a small number of cancer cases was reported in the past, dietary and environmental risk factors may escalate the rates necessitating the need for screening by PSA assays and sextant biopsies under ultrasound guidance. This will ensure early diagnosis and treatment promising an improvement of the survival rates.

**Key Words:** prostate, cancer, prostatitis, BPH, Nigerians

### INTRODUCTION

Diseases of the prostate gland constitute a significant source of morbidity and mortality among adult males worldwide.<sup>1</sup> Within the last two decades, there has been a sudden increase of interest in diseases of the prostate, largely due to the perceived high incidence of prostate cancer in different geographical and ethnic groupings globally.<sup>2</sup> Of the diseases which affect the prostate the most frequently encountered in clinical practice are benign prostatic hyperplasia (BPH), prostate cancer and prostatitis.<sup>3</sup>

BPH is an extremely common condition in men over the age of 50 years and shows remarkable racial and geographic variations in incidence and mortality.<sup>4</sup> It is characterized by an increased number of prostatic cells and increased deoxyribonucleic acid (DNA) synthesis. Prostatitis, although of lesser clinical significance than BPH and prostate cancer, is categorized into acute, chronic and granulomatous forms.<sup>5</sup>

Prostate cancer is the most common male cancer in the United States of America (USA), where the highest incidence is found in

-American men.<sup>6</sup> In Western Europe, it ranks as the second most common cancer in men after lung cancer.<sup>6,7</sup> Within the African continent, despite earlier reports which suggested prostate cancer to be a rare disease among African men, it is now reported to be a surprisingly common disease.<sup>8-10</sup> The incidence of the condition rises almost exponentially after the age of 50 years and it is usually preceded by a spectrum of histopathologic changes within the acini referred to as high-grade prostatic intraepithelial neoplasia (PIN).<sup>8,11</sup> Histologically, most prostate cancers are acinar adenocarcinomas, while non-acinic carcinomas and sarcomas are relatively rare.<sup>12</sup> Of the various grading systems of acinar adenocarcinoma, the Gleason grading system has received the most wide-spread acceptance.<sup>13</sup>

Jos University Teaching Hospital (JUTH) is a federal tertiary health institution situated in Jos, Plateau State, Central Nigeria. The histopathology laboratory receives biopsy specimens from most government and private hospitals in Plateau and its neighboring states including the federal capital territory, Abuja. No study has, however, been undertaken to document the histopathological pattern of prostatic lesions in this referral center. The recent global perception of a rising incidence of prostatic diseases necessitates detailed descriptions of the patterns in view of the known geographical variations, hence the need for this study.

## MATERIAL AND METHODS

The material for this laboratory-based retrospective study consisted of slides and tissue blocks of all prostatic specimens received at the JUTH histopathology laboratory between January 1989 and December 1998. The tissue blocks and archival Hematoxylin and Eosin (H&E) stained slides of the tissues were retrieved and the slides reviewed. Fresh sections were taken from the blocks in some cases and stained with H&E, while periodic acid schiff (PAS) and mucicarmine were employed in staining adenocarcinomas. Phosphotungstic acid hematoxylin (PTAH) was also utilized in staining sections taken from the single case of rhabdomyosarcoma.

Following histologic assessment, the tumors were classified according to the World Health Organization (WHO) recommendation<sup>14</sup>, and histological grading/scoring of the adenocarcinomas was done using the Gleason

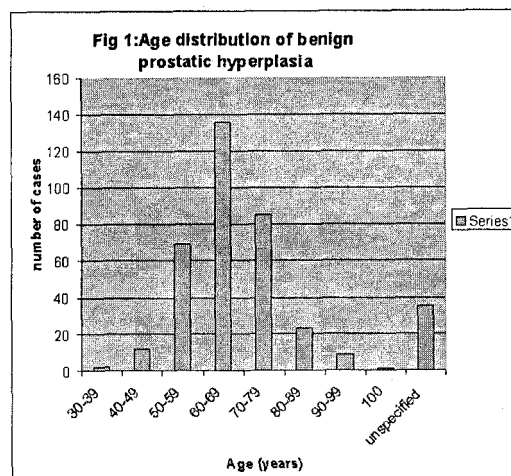


Fig. 1: Age distribution of BPH showing a peak in the seventh decade

system.<sup>13</sup> Information such as age, hospital and laboratory number of individual patients was extracted from the department of pathology register, cancer registry and the patients' case files for JUTH based patients and referring hospitals. The data were then analyzed using tables, figures, relative frequency and group percentages.

## RESULTS

A total of 493 prostatic lesions were recorded for the period between January 1989 and December 1998, constituting 3.2% of all surgical specimens received. In total, 372 (75.4%) were cases of BPH with an age range between 31 and 102 years and a peak in the seventh decade (Fig. 1).

Analysis of the histological pattern of BPH showed a glandulostromal pattern in 332 (89.2%) cases, while a predominant stromal pattern was observed in 40 (10.8%) cases most of which were in a younger age group. Chronic prostatitis co-existed with BPH in 23.6% of cases, acute prostatitis in 2.1%, but no case of granulomatous prostatitis was recorded (Table 1).

In total, 121 malignant tumors were also reviewed, constituting 24.6% of all prostatic lesions, and 50.2% of 241 urological malignancies seen during the same period.

**Table 1:** Histopathological Pattern of BPH

| Pattern  | No. of Cases | %     |
|--|--------------|-------|
| Glandulostromal hyperplasia                    | 332          | 89.2% |
| Stromal hyperplasia                            | 40           | 10.8% |
| Acute prostatitis                              | 8            | 2.1%  |
| Chronic prostatitis                            | 88           | 23.6% |
| High-grade prostatic intraepithelial neoplasia | 69           | 18.6% |
| Atypical adenomatous hyperplasia               | 63           | 16.9% |

**Table 2:** Histological Subtypes of Prostate Cancer Related to Age

| Age (yrs) | Adenocarcinoma |                  |              | Adenosquamous Carcinoma | SCC | TCC | Rhabdomyosarcoma | Leiomyosarcoma |
|-----------|----------------|------------------|--------------|-------------------------|-----|-----|------------------|----------------|
|           | well diff.     | moderately diff. | poorly diff. |                         |     |     |                  |                |
| 30-39     | 1              |                  |              |                         |     |     |                  |                |
| 40-49     | 3              | 1                |              |                         |     |     |                  |                |
| 50-59     | 15             |                  | 1            |                         |     | 1   |                  |                |
| 60-69     | 39             | 2                | 2            | 1                       | 1   |     | 1                |                |
| 70-79     | 22             | 4                | 4            | 1                       | 1   |     |                  |                |
| 80-89     | 6              |                  | 1            |                         |     |     |                  |                |
| 90-99     | 3              |                  |              |                         |     |     |                  |                |
| > 100     |                | 1                |              |                         |     |     |                  |                |
| Unspec.   | 8              | 1                |              |                         |     |     |                  | 1              |
| Total     | 97             | 9                | 8            | 2                       | 2   | 1   | 1                | 1              |

diff. = differentiated; TCC = transitional cell carcinoma; SCC = squamous cell carcinoma; unspec. = unspecified

Table II shows the histological patterns of prostate cancer and their distribution in the various age groups. Adenocarcinoma was detected in 94.2% of cases, adenosquamous and squamous cell carcinoma in 1.7% of cases each, while transitional cell carcinoma, leiomyosarcoma and rhabdomyosarcoma represented 0.8% each of the malignant tumors. Prostate cancer was observed to occur between the age of 35 and 102 years showing a steep rise with increasing age to reach its peak in the seventh decade after which a sharp decline in incidence was noted as depicted in Table II. The adenocarcinomas were well, moderately and poorly differentiated in 85.1%

7.9% and 7% of cases, respectively, while incidental carcinomas were detected in 12.3% of cases. High-grade PIN was found to co-exist with adenocarcinoma in 49.1% of cases, while the distribution of the 114 adenocarcinomas according to their Gleason scores demonstrated that 68.4% had a Gleason score of 4 and above (Table 3).

## DISCUSSION

In this 10-year retrospective study 493 histologically confirmed prostatic lesions were studied. We observed that 75.4% of them

**Table 3:** Distribution of the Adenocarcinoma Cases according to Gleason Score

| Gleason Score | 2    | 3     | 4     | 5    | 6    | 7    | 8    | 9    | 10   | Total |
|---------------|------|-------|-------|------|------|------|------|------|------|-------|
| No. of cases  | 10   | 26    | 63    | 2    | 2    | 1    | 2    | 3    | 5    | 114   |
| %             | 8.8% | 22.8% | 55.3% | 1.7% | 1.7% | 0.9% | 1.7% | 2.6% | 4.5% | 100%  |

were benign and 24.6% malignant lesions occurring in a ratio of about 3:1. This finding corroborates reports from other regions of Nigeria<sup>15-18</sup> but sharply contrasts with reports from Sudan where the ratio is 49:1.<sup>19</sup> This variation can be attributed to the rarity of prostate cancer in Sudanese who are products of centuries of intermarriage between indigenous Africans and Arab settlers among whom prostate cancer is known to be rare.<sup>19</sup>

This study confirms earlier reports from other regions of Nigeria and other African countries where the BPH incidence was found to reach its peak in the seventh decade.<sup>15-19</sup> This peak age of occurrence is earlier than that reported in most developed countries where a steady rise in incidence is shown with increasing age due to the population's longer life expectancy.<sup>20</sup> The histological subtypes of BPH encountered agree with a similar study on benign disorders of the prostate in Kuwait where the majority of cases had a glandulostromal pattern.<sup>21</sup> Similarly, chronic prostatitis was found to co-exist with BPH in about one quarter of the cases reviewed, which is not too different from other reports from Nigeria and elsewhere.<sup>1,21</sup> However, the proportion of cases with acute prostatitis (2.1%) differed remarkably from findings in Kuwait where 49.7% of cases had acute prostatitis. The variation is likely due to different criteria used in assessing prostatitis. In general, prostatitis is detected in 11-98% of prostatic specimens depending on the diagnostic criteria used.<sup>5</sup>

Of interest is the absence of granulomatous prostatitis in this study, particularly as schistosomiasis and tuberculosis are endemic in our environment. A similar paucity of such cases has however been noted in other Nigerian series.<sup>16,18</sup> Some investigators have emphasized the rarity of diagnosing tuberculous lesions in the prostate due to the fulminating course of the infection in tropical populations, with the prostatic infection being ignored or missed.<sup>22</sup> Furthermore, although digest studies are

known to improve the detection of schistosoma ova in tissues, it is acknowledged that there is a significant decline of ova rates after 40 years of age when prostatic diseases tend to be more common.<sup>23</sup>

With regard to prostate cancer, the findings in this study reaffirm reports from other regions of Nigeria and Africa confirming that prostate cancer is common, and that it is the most common male genital and urological malignancy.<sup>1,9,10,15-18,24</sup> It also dispels the contention that the condition is rare in Africa. However, whether the incidence in Nigerians is as high as in African-Americans as suggested by Osegbe<sup>10</sup> remains uncertain as most of the studies were carried out in tertiary health institutions putting a high selective index on the data since most of them act as referral centers.<sup>1,15-18,24</sup>

This study also recorded a seventh-decade age peak of prostate cancer in agreement with most African series, but differing from findings in European countries, America and Canada, where the incidence rises steadily with increasing age.<sup>6,25</sup> A consideration of the life expectancy of these populations may explain the variations observed, since only a small proportion of Africans live beyond the seventh decade in contrast to the developed countries where a longer life expectancy is observed.

Adenocarcinoma was the most common histological type of cancer found in this study just like in other parts of the world.<sup>12,26</sup> A predominance of well-differentiated adenocarcinomas of intermediate Gleason scores was also noted, similar to other Nigerian reports. Elem and Patil<sup>27</sup> found all prostatic malignancies in Zambia to be adenocarcinomas, 80% of which were between Gleason grades 3 and 5. Similar results were obtained in Sudan, despite earlier reports which had revealed a predominance of well and moderately differentiated adenocarcinomas.<sup>28,19</sup> The 12.3% frequency of incidental carcinoma detected in prostatectomy

specimens for clinically suspected BPH recorded in this study concurs with the 10% frequency reported by most investigators.<sup>29</sup> However, it is lower in Saudi Arabia (3.5%) which might be attributable to the wide use of prostate specific antigen (PSA) assays and trans-rectal ultrasound which increase the clinical detection rates of prostate cancer.<sup>30</sup>

The frequency of high-grade PIN co-existing with prostate cancer was low in this study (49.1%) in comparison to the 82%, 84.4% and 86% reported by Bostwick, Billis and Qian respectively.<sup>6,11</sup> This may be due to the technique of core needle biopsy of prostate at our center where only one to three cores of tissue are obtained instead of the recommended sextant or systematic five-region biopsy, consequently reducing the chances of detecting high grade PIN because of low tissue yield. Sarcomas are rarities constituting less than 0.1% of prostatic malignancies. However, they constituted 1.6% of our cases. The rarity of other histological subtypes of prostate cancer has been confirmed by this study in accordance with their known rarity in the literature.

Although the identification of specific risk factors was not part of the objectives of this study, certain observations were noted as probable contributory factors in this environment in light of the current knowledge of the epidemiology of prostate cancer. Prostate cancer is a common cancer seen in JUTH. This is of interest as it cannot be attributed to any clear-cut change in the life-style of this population or to improved medical care leading to a more frequent diagnosis. The apparent increased frequency of prostate cancer may be the result of several factors; these include an expanding population, improved detection facilities, a greater awareness of the condition on the part of patients leading to an improved utilization of tertiary health institutions and possibly an aging male population due to an increased life expectancy accompanied by a decrease in competing causes of death.

In preparation for a potential future increase in the incidence and mortality rates from prostate cancer, every effort should be made to improve diagnostic, staging and management capabilities. Even if a small number of cancer cases were reported in the past, dietary and environmentally related risk factors may escalate rates necessitating the need for screening by PSA assays and sextant biopsies under ultrasound guidance. This will ensure an early

diagnosis and treatment with improvement of the survival rates.

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## RESUME

### Modèle histopathologique des maladies prostatiques chez les Nigériens

**Objectifs :** C'est une étude rétrospective basée sur le résultat de laboratoire du modèle histopathologique des lésions prostatiques vues à l'hôpital universitaire de Jos (JUTH) sur une période de 10 ans (1989-1998). **Matériel et méthodes :** Un total de 493 lésions prostatiques ont été vues représentant 3,2% des 15.424 spécimens chirurgicaux reçus pendant la période d'étude. Après évaluation histologique, les tumeurs ont été classées conformément à la recommandation d'OMS. Grade/score histologique des adénocarcinomes a été fait en utilisant le système de Gleason. **Résultats :** 372 (75,4%) lésions prostatiques étaient à type d'hyperplasie prostatique bénigne (BPH) avec co-existence de la prostatite chronique dans 23,6% des cas. L'âge maximal de l'occurrence de BPH avait lieu dans la septième décennie de la vie. Le cancer de prostate a constitué 121 (24,6%) de toutes les lésions prostatiques avec un âge maximal d'occurrence dans la septième décennie. 94,2% des cas de cancer étaient des adénocarcinomes, alors que le carcinome à cellules adenosquameuses et squameuses représentait 1,7% chacun. Le leiomyosarcome et le rhabdomyosarcome ont été notés dans 0,8% des cas chacun. Les adénocarcinomes bien, modérément et mal différenciés ont été diagnostiqués dans 85,1%, 7,9% et 7% des cas respectivement, des carcinomes de découverte fortuite ont été détectés dans 12,3% de cas. Le manque d'autres lésions rares a été également noté et, à peu d'exceptions, les modèles des lésions prostatiques étaient comparables aux résultats dans d'autres régions du monde. **Conclusion :** En vue d'une future augmentation potentielle des taux d'incidence et de mortalité du cancer de prostate, des efforts devraient être fait pour le diagnostic, le staging et la prise en charge. Même si un nombre restreint de cas de cancer était rapporté dans le passé, les facteurs de risque diététiques et environnementaux peuvent faire escalader les taux rendant nécessaire le besoin d'examiner par des analyses de PSA et des biopsies en sextant sous guidage ultrasonographique. Ceci assurera un diagnostic et un traitement précoce avec une amélioration des taux de survie.

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