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Prostate Cancer in the Thies Region, Senegal: Epidemiological, Diagnostic and Therapeutic Aspects

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Abstract

Introduction: Prostate cancer is the leading urological cancer. It is the most common cancer in men over 50. **Objective:** To determine the epidemiological, diagnostic and therapeutic characteristics of prostate cancer in hospitals in the Thiès region. **Patients and Methods:** We conducted a descriptive study from January 1st, 2015 to December 31st, 2020. We included all cases of primary prostate cancer confirmed on histology. **Results:** We collected data on 318 cases of primary prostate cancer during the study period. Mean patient age was 72.7 years (Range: 49; 94 years). Family history of prostate cancer was found in 22 patients (6.91%). The average consultation time was 18.6 months. The circumstances of discovery were dominated by obstructive voiding disorders (97.16%). Digital Rectal examination was suggestive in 55.40% of patients. PSA level was above 20 ng/ml in 76.7% of patients. Prostatic adenocarcinoma was the only histological type (100%). Localized cancer represented 7.2% and locally advanced cancer occurred in 36.5% of cases, while metastatic cancer accounted for 56.3%. Radical prostatectomy was performed in 3.18% of cases. Mortality rate was estimated at 8.50% after 1 year. **Conclusion:** Prostate cancer is the leading urological cancer in the Thies region. It is characterized by the predominance of locally advanced and metastatic forms.

Keywords

Prostate Cancer, Epidemiology, Histology, Metastasis,

Mortality, Thies

1. Introduction

Prostate cancer (PCa) is the most common cancer in men over the age of 50 and represents the second cause of cancer death after bronchopulmonary cancer [1], [2]. In Senegal it is the leading urological cancer [3]. The incidence is increasing due to the use of prostate-specific antigen (PSA) testing [3]. Its incidence is higher among African-Americans as well as in the French West Indies where the prevalence and mortality rates are higher than in metropolitan France [4]. PCa has traditionally been diagnosed by digital rectal examination (DRE) and prostate-specific antigen (PSA) blood test, followed by transrectal ultrasound (TRUS) guided biopsy. In Senegal this cancer is still diagnosed at a locally advanced or metastatic stage and few studies concerning screening have been carried out [3] [5] [6] [7] [8]. Prostate cancer remains the second leading cause of cancer mortality in men over 50 after lung cancer [1]. In Africa as in Senegal, data on prostate cancer are relatively rare. However, in Nigeria, Osegbe *et al*. [9] in 1997 found a hospital incidence of 127 per 100,000 for an annual mortality of 20,000. The objective of this work was to describe the epidemiological, diagnostic and therapeutic particularities of prostate cancer in the Thies region.

2. Patients and Methods

We carried out a descriptive study between January 1st, 2015 to December 31st, 2020 in the different hospitals in the Thies region: Public hospitals of Thies, Mbour, Tivaouane and Saint Jean de Dieu hospital. Data were collected from patient medical records, hospitalization and pathology registries. The diagnosis of prostate cancer was established based on digital rectal examination data, total PSA level results and histological results of samples obtained from a series of prostate biopsy and adenomectomy or specimens of transurethral resection of the prostate (TURP). The extension assessment included a clinical examination, abdominal ultrasound, thoraco-abdominopelvic tomography (CT-TAP), standard radiography, bone scintigraphy. Staging was carried out according to the TNM 2016 classification. We also used the D'Amico cclassification. Treatment consisted of radical prostatectomy, hormonal therapy, and bilateral surgical pulpectomy. Patients were followed up every 3 months.

We included all patients followed for prostate cancer whose pathology examination confirmed by biopsy samples or surgical specimens. Excluded from this study are all cases of cancer occurring in people not living in the Thies region, recurrences or metastases of a cancer revealed before the study period.

The parameters studied were frequency, age of patients at diagnosis, family history of prostate cancer, clinical signs, DRE, total PSA blood test, pathology type, Gleason score, tumor stage, treatment and evolution after treatment.

Data entry and analysis were carried out using Word and Excel 2016 software.

3. Results

3.1. Epidemiological Results

3.1.1. Frequency of PCa

During the study period, we recorded 318 cases of prostate cancer out of a total of 478 urogenital cancers, with an average of 70.6 cases per year and a proportion of 87.4% of all urologic cancers. The largest number of cases (28.3%) was recorded during 2018 (Figure 1).

3.1.2. Age Distribution of Patients

The average age of patients was 72.7 years (Age range 30 to 94 years). Of our cohort, patients under 50 ages at diagnosis represented 1.87% and 55% of them were over 70 years. The age group between 70 and 80 years was the most represented. Figure 2 shows the representation of PCa cases according to age group (Figure 2).

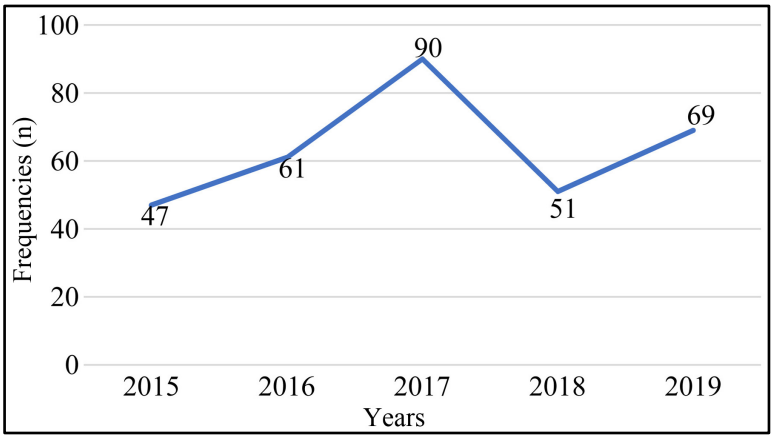

Figure 1. The number of cases of PCa diagnosed per year.

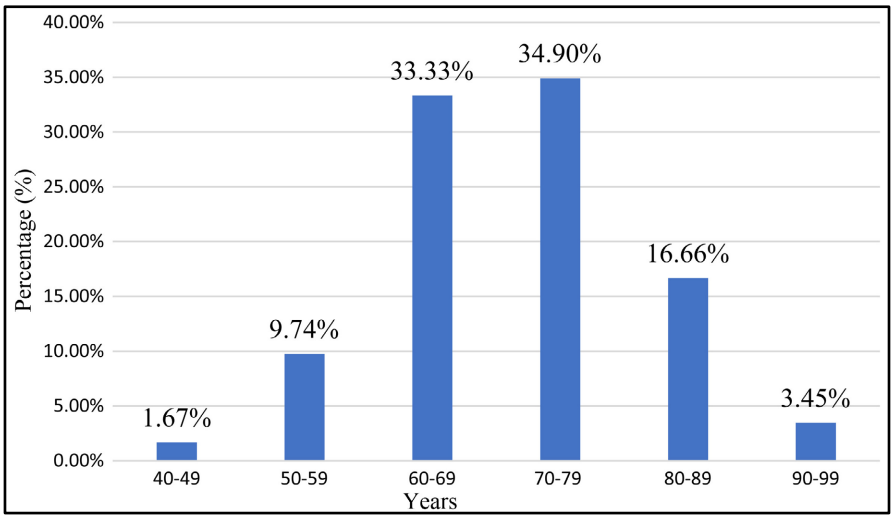

Figure 2. Distribution of the patients according to age ranges.

3.2. Distribution of Prostate Cancers According to the diagnosis

A family history of prostate cancer was noted in 22 patients (6.91%).

Clinical features included lower urinary tract obstructive symptoms in 166 (52.2%), a urinary retention 75 (23.6%), a hematuria 96 (30.1%), bone pain 72 (22.64%). Table 1 shows a distribution of PCa according to the circumstances of discovery. General condition was maintained in 41% of patients. On digital rectal examination (DRE), the prostate was suspicious of malignancy in the form of indurated, nodular or pelvic shielding appearance in 55.4% of patients. Total PSA was less than 10 ng/ml in 6.31% of patients and greater than 100 ng/ml in 35.53% of cases. Table 1 shows a distribution of prostate cancers according to DRE and PSA results (N = 318).

Table 1. Repartition of patients according to epidemiological, diagnosis results.

Variables	Effective	Percentage (%)
Mean age = 72, 7 years (age range = 30 - 94 years)		
Risk factors		
Ethnicity (African people; black race)	318	100
History family of PCa	22	6.91
Circumstances of discovery		
Obstructive urinary disorders (Dysuria)	166	52.2
Frequency	131	42.45
urinary retention	75	23.6
Hematuria	96	30.1
Bone pain	72	22.64
Erectile dysfonction	41	12.9
Systematic discovery (operative specimen, resection shavings)	145	39.3
Results of digital rectal examination (DRE)		
DRE normal	37	11.6
DRE benign aspect	105	33
DRE suspect of malignacy	176	55.4
Total PSA testing (ng/ml)		
<10	1	0.3
10 - 20	19	6
21 - 50	111	34.9
51 - 100	72	22.6
100 - 1000	90	28.3
>1000	23	7.23
Imaging		
Ultrasound	285	89.6
CT-Scan	251	78.9
MRI	02	0.6
Lombosacral spine X-ray	74	23.3
Bone scan	3	0.95

The different imaging explorations carried out are summarized in Table 1. Technetium 99 bone scintigraphy was performed in 3 patients.

3.3. Anatomopathological Results

Prostatic adenocarcinoma was the only histopathological type (100%). Figure 3 shows a distribution of prostate cancers according to Gleason score (N = 318). Gleason score very high between 7 and 10. The tumor was well differentiated in 39.9% and poorly differentiated in 6.29% patients.

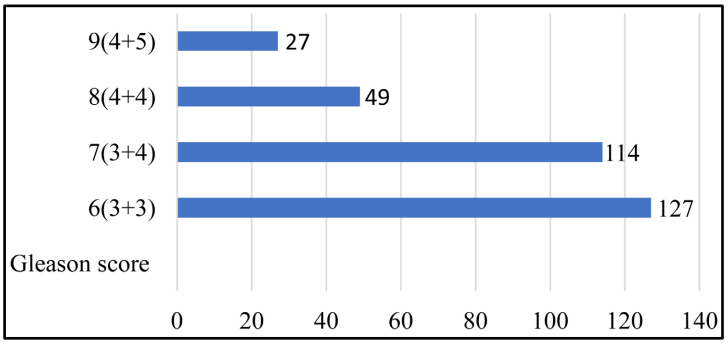

Figure 3. Distribution of patients according Gleason score.

Table 2. Reartition of patients according tumour stage, therapeutic modalities and evolution.

Variables	Frequencies	Pourcentage (%)
Tumour Stage		
Localized PCa	23	7.2
Localized low risk	13	4.08
Localized intermediate risk	10	3.18
Localized high risk	7	2.20
Locally advanced PCa	116	36.5
Metastatic PCa	179	56.3
Therapeutic aspects		
Radical Prostatectomy	10	3.18
Bilateral pulpectomy (surgery castration)	71	22.3
Antiandrogen	161	50.6
Bilateral Pulpectomy + Antiandrogen	23	7.25
LHRH analogue	15	4.75
Evolution (1 year)		
Survival rate	291	91.50
Mortality rate	27	8.50
Local recurrence after prostatectomy	9	3

3.4. Tumor Stage and Therapeutic Modalities

At the end of the extension assessment and according to the 2016 cTNM classification, localized cancer represented 7.2% and locally advanced cancer occurred in 36.5% of cases, while metastatic cancer accounted for 56.3%. The locations of the metastases were bone (92.6%), visceral (19.8%) and lymph node (13.8%).

The urological management of PCa is reported in **Table 2**. Open radical prostatectomy was performed in 10 patients (3.18%). Bilateral orchiectomy alone was performed in 71 patients (22.32%) and in combination with anti-androgens in 23 patients (7.23%). LHRH agonists in combination with antiandrogens, to achieve complete androgen blockade, were used in 16 patients (5.03%). Castration resistance was observed in 26 patients (8.17%) of patients placed on hormonal therapy.

The overall survival rate was observed in 91.50% of patients after 1 year.

4. Discussion

4.1. Epidemiology

Prostate cancer is the second most common cancer in men worldwide with 1.4 million new cases worldwide [1] [2]. In our series, the annual frequency was 70.6 cases and prostate cancer accounted for 87.4% for all urogenital cancers. In our region, prostate cancer ranks first among urogenital cancers. Osegbe *et al.* [9] reported a hospital-based incidence of 127 per 100,000.

However, in Europe, Prostate cancer is the most common cancer in men with an estimated number of 382,000 cases occurring during 2008 [10]. The highest incidence rate of prostate cancer was seen in Australia/New Zealand, in North America and the Caribbean and South Africa [1].

Prostate cancer is the third leading cause of deaths from cancer in men. Prostate cancer is the third leading cause of death cancer in men and the mortality rate increases with age. The practice of early detection and the improvement of therapeutic management, particularly for metastatic forms of the disease, have contributed to the reduction in specific mortality due to PCa [4] [10].

The average age at diagnosis is currently 70 years [2] [4]. In our study it was 72.7 years. Which is consistent with the age of predilection for prostate cancer as in most African, European and American series [2] [3] [4] [6] [10]. However, there is a significant difference in the average ages noted by other authors in Ghana, Togo and Burkina Faso who reported 60 years [11]-[16].

Identified risk factors for CaP include age, ethnicity, and family history of prostate and breast cancer [4]. PCa is the most frequently diagnosed malignancy in elderly men [1] [10]. It has been observed that the risk increases especially after age 40 in black men or men with a family history of prostate cancer and after age 50 in white men with no family history of prostate cancer [1]. The incidence of prostate cancer and mortality are twice as high in the French West Indies as in mainland France [4]. Hereditary and environmental factors are known to play some role in the genesis of PCa [4] [17]. Additionally, 10% of hereditary PCa

occur in relatively young patients [4] [17].

4.2. Diagnosis

In our series, the circumstances of prostate cancer diagnosis were mainly represented by lower urinary tract symptoms (LUTS). For some authors, the existence of clinical signs in CaP reflects a locally advanced or metastatic stage [4].

Palpation of irregularity or nodule during DRE still remains an indication for prostate biopsy regardless of the level of PSA [18]. In our study, DRE was suspicious of malignancy in 55.4% of cases and was an indication for prostate biopsy regardless of the PSA value. Niang *et al*. [19] found a suggestive EDR in 87% of patients followed for advanced prostate cancer. According Descott *et al*. [20] more than 60% of PCas are diagnosed in asymptomatic patients, with normal DRE and elevated PSA.

A high PSA greater than 20 n/ml was noted in a large proportion of patients. This corroborates data observed in the literature regarding African studies where patients had elevated total PSA levels at the time of diagnosis, which demonstrates the absence of early detection and screening policy for prostate cancer in our regions [11]-[16] [21] [22] [23]. For Gueye *et al*. [3] as well as Cussenot *et al*. [24], the high mean PSA level is correlated with the long course of the disease. For Niang *et al*. [19], it is established that there is extra-prostatic involvement in 80% of cases for PSA values above 50 ng/mL.

Digital Rectal examination (DRE) and PSA measurement play a key role in the diagnosis of prostate cancer. In addition, this association makes it possible to detect cases of CaP early. Individual detection, based on fair and honest information of the patient, is based on the search for risk factors, digital rectal examination and PSA measurement, whereas screening consisting of systematically searching for a disease in an asymptomatic population remains controversial.

Prostatic adenocarcinoma was the only histological type in our series [4]. Ndoye *et al*. [25] reported a case of primary prostate sarcoma.

Ultrasound is not specific and is not sensitive for detecting CaP. It has no place in detection and staging [4]. It is used for post-void voiding assessment residual urine, prostate volume assessment and to guide biopsies [4] [24]. Mutiparmetric MRI makes it possible to measure prostate volume; to describe each suspicious area (or target) identified and analyzed with the Prostate Imaging Reporting and Data System (PI-RADS) version available and to carry out the assessment of locoregional extension. However we do not have MRIs in hospitals in the Thies region [4].

4.3. Staging

A combination of DRE results, total PSA value and ISUP biopsy score improves the prediction of pT stage and lymph node spread [26]. Total PSA is correlated with the risk of metastasis, especially above 20 ng/ml [27]. In case of a locally advanced disease or lymph node or bone metastases, the thoraco-abdomino-pelvic

CT scan remains useful to detect visceral metastases [28]. Also the number of positive biopsies is correlated with the risk of positive margins, extraprostatic extension and SV involvement [26]. Currently CT scanning is unnecessary if prostate MRI with lymph node acquisition is available. However, it remains indicated in cases of contraindication to MRI [29]. A nomogram associated with MRI data, biological data (PSA levels) and histological data of systematic and targeted biopsies can predict risk of lymph node extension and could avoid up to 60% of heals lymph nodes [30]. Whole body diffusion-weighted MRI allows a global evaluation of the skeleton and lymph node chains without irradiation or contrast product [31]. The performance of MRI is superior to scintigraphy coupled with standard radiography for identifying bone metastases and is identical to a CT scan for lymph node evaluation [31] [32]. In our context of daily practice in the region of Thies, in Senegal we do not have MRI and bone scintigraphy. Furthermore, few patients are eligible for these means of diagnostic assistance due to a delay in treatment.

In our series the proportion of locally advanced and metastatic cancers remains high, reflecting the delay in treatment. Gueye *et al.* [3] diagnosed 40% of tumors at advanced stages.

4.4. Treatment

According to the guidelines of the Cancerology Committee of the French Society of Urology (CCAFU), active surveillance (AS) must be based on the performance of a clinical examination, total PSA, MRI and a control biopsy is necessary 12 months after the start of the SA [4]. Also, it recommends stopping AS is indicated in the event of the appearance of a higher grade (ISUP 2 or higher) on control biopsies [4].

The high prevalence of metastatic and locally advanced tumors in elderly patients reflects on the choice of our treatment and reduces the possibilities of radical surgical treatment. This explains on the one hand the low rate of radical prostatectomy (RP) performed in our series (3.18%), on the other hand the use of anti-androgen treatment. Radical prostatectomy (RP) can be offered to patients with low and intermediate risk PCA, depending on the co-morbidities and the life expectancy (>10 years) [4] [33] [34]. Several authors have established the benefit of performing RP with extensive dissection, without preserving the nerve bands, in patients with high-risk or locally advanced CaP [4] [33] [35]. The indications are those for curative treatment of localised or locally advanced PCA. Lymphadenectomy includes bilateral excision of the ilio-obturator, internal iliac and external iliac lymph nodes up to the iliac bifurcation [36] [37].

Currently in hospitals in the Thiès region, Senegal, we do not have radiotherapy or laparoscopy. However, as part of the multidisciplinary consultation, our patients are sometimes referred to Dakar which only has one radiotherapy center. In our study none of the patients had received radiotherapy.

Thus bilateral testicular pulpectomy (surgical castration) was the most used

method in our series due to the low socio-economic level of our patients. Fall *et al*. [38] in Dakar as well as Diallo *et al*. [5] in Thies demonstrated the effectiveness of surgical castration which improves the clinical symptoms of patients. Surgical castration was also the most used treatment in the series of Kaboré *et al*. [14] and Tengue *et al*. [15] with respectively 43.4% and 80.5% of testicular pulpectomy performed. Even if new generation hormone therapies have led to an improvement in symptoms and quality of life with good clinical and biological tolerance, in Africa as in Senegal, the use of medical hormone therapy is generally limited due to its high cost and its inaccessibility.

Survival is related to histopathologic feature, stage of disease and therapeutic response. In our study, the 1 year survival rate after treatment is 91.50%. Survival rates for prostate cancer are better in developed countries than in underdeveloped countries due to early detection of the disease.

5. Conclusion

Prostate cancer in the Thiès region of Senegal is the leading urological cancer. It is characterized by the predominance of locally advanced and metastatic forms; hence the need to encourage our populations to practice early detection of PCa and for health policy decision-makers to improve the diagnostic and therapeutic technical platform. The diagnosis of prostate cancer was late in our context, the treatment was limited by lack of resources; hence the need to improve the medical technical platform of hospitals.

Ethical Considerations

A written informed consent was obtained for the publication of data and photos from patient.

Author Contributions

All authors contributed to the development of this work. All authors read and approved the final version of the manuscript.

Conflict of Interests

The authors declare that they have no conflict interest for this article.

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