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Epidemiology of Prostate Tumors in Inpatient Care at the Islamic Clinic of Adamaoua

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Abstract

Background: Prostate tumors are common causes of urinary disorders after 50 years of age. Despite therapeutic advances, they remain an important source of mortality. Diagnosis is based on clinical examination, PSA assay, and prostate biopsy, while management is mainly surgical, possibly requiring a multidisciplinary approach in case of malignancy. **Objectives:** To determine the epidemiological, clinical, and therapeutic aspects of prostate tumors at the Islamic Clinic of Adamaoua. **Methodology:** This was a descriptive cross-sectional study with retrospective data collection, in medical records of patients managed for prostate tumors between January 1, 2018, and December 31, 2022, at the clinic. **Results:** A total of 4549 hospitalizations were recorded, 890 (19.6%) for prostate tumors. The majority of patients (96.63%) came from other healthcare centers, reflecting the referral role of the clinic. The age group mode was 60 - 69 years, with an average age of 67.31 ± 9.8 years. This elderly population is the typical clientele for prostate pathologies. Among these patients, 52.58% had moderate symptoms and 43.48% had severe symptoms according to the IPSS score, highlighting the need for early screening and management. The main reasons for consultation were dysuria (80.40%) and acute urinary retention (25.84%), reflecting prostate obstruction. The most common comorbidities were hypertension (47.64%) and diabetes (8.43%). Notably, 76.07% of patients had used traditional treatment before their consultation, underscoring the importance of an integrated approach. From an ana-

tomical perspective, nearly 40% of patients had a transurethral catheter, and one-third had a bladder globe, indicating the significance of prostate obstruction. On imaging, 57.98% had a moderately enlarged prostate, and 39.89% had a large prostate, the classic characteristics of benign hyperplasia. Histological analysis revealed 49.01% benign lesions, 21.24% intraepithelial neoplasia, and 15.62% adenocarcinomas, mostly of high grade, highlighting the need for appropriate management. Regarding management, 95.47% of patients with benign hyperplasia underwent surgical treatment, mainly transurethral resection (82.42%). The high 1-year (98.80%) and 5-year (98.20%) survival rates reflect the effectiveness of this surgical management in this context. **Conclusion:** Prostate tumors are common in the northern regions of Cameroon. Dysuria is the main reason for consultation, and the diagnosis is made by combining digital rectal examination and paraclinical data (medical imaging and biology). Histologically, it is benign hyperplasia in 3/4 of the cases, and cancer had non-negligible proportions. Surgical treatment is endoscopic in 83.6% of cases. The prognosis of cancer is poor due to delayed diagnosis, lack of infrastructure, and the absence of a multidisciplinary approach in the locality.

Keywords

Prostate Tumors, Benign Prostatic Hyperplasia, Prostate Cancer, Diagnosis, Treatment

1. Introduction

Prostate Tumors (PT) are defined by an abnormal proliferation of prostate cells [1]. Two entities are distinguished: Benign Prostatic Hyperplasia (BPH) and Prostate Cancer. Benign Prostatic Hyperplasia (BPH) is defined by the World Health Organization in 2001 as an increase in prostate volume without clinical signs of malignancy, causing variated degrees of bladder outlet obstruction and it is the main pathology involved in urinary disorders in 50% of men over 50 years of age [2]. Prostate cancer is an abnormal, anarchic proliferation of more or less differentiated prostate cells, with the frequently encountered histological type being prostate adenocarcinoma at 80% [2]. The incidence of prostate tumors seems to be unequally distributed worldwide. They are in progressive evolution due to the increase in life expectancy and the improvement of screening techniques [3]. Prostate cancer has become a public health problem in recent years with more than 899,000 new cases worldwide from 2000 to 2008, accounting for 13.6% of cancers in general. It is the second most common cancer after bladder cancer and the second leading cause of cancer death of elderly men in developed countries after lung cancer, and the fourth leading cause of cancer death in both sexes [4] [5]. In 2011, the incidence of prostate cancer in France was estimated at 71,000 cases [6]. In Algeria, in the Algiers tumor registry: An increasing incidence between 2000 and 2007, with 300 new reported cases recorded annually. In Cameroon, out of 2371 urogenital tumors, a series largely dominated by prostate tumors

with 512 malignant tumors (32.7%) against 1066 BPH (67.3%) [7].

The symptomatology of prostate tumors varies according to the histological type and the progressive clinical stage of the disease, with lower urinary tract symptoms (LUTS) being the main problem. Initially, dysuria (56%) is the frequent reason for consultation in urology departments, and progressively, complications such as acute urinary retention (AUR) at 80% are the most frequent urological emergency, with prostate tumors being the main etiology [8] [9]. The clinical picture of malignant tumors, such as prostate adenocarcinoma, is dominated by bone pain; a reflection of the metastatic nature of the tumor osteophilia with a positive extension assessment in 75.9% of cases, overshadowing the associated LUTS [10]. The first-line diagnosis of a prostate tumor is clinical, based on a digital rectal examination (DRE) showing an enlarged prostate, in association with a total PSA assay. A suspicious DRE is an indication for a prostate biopsy to establish the histological confirmation diagnosis after pathological analysis [10] [11]. Renal-bladder-prostate ultrasound and endorectal ultrasound allow assessing the volume, contour and appearance of the prostate and evaluating the impact on the upper urinary tract. Radiotherapy, chemotherapy and surgery have modified the prognosis of prostate cancer, with hormone therapy remaining the most widely used due to the diversity of available techniques [12]. In Mali, prostate adenoma surgery is the main activity of the various urology departments, and transurethral resection was the reference treatment for BPH in Senegal; However, it is dominated by prostate adenomectomy in sub-Saharan Africa [4] [13].

In Cameroon, a study at the Laquintinie Hospital in Douala in 2021 highlights bladder AUR (48.2%) as a frequent reason for consultation and the main urological emergency, with prostate tumors being the major etiology at 91.9% [14]. As we aimed to characterize PT in a northern Cameroonian population, given the region's high prevalence of acute urinary retention (AUR) and limited research on PT in this specific locality; we carried an investigation on the epidemiological, clinical, and therapeutic aspects of prostate tumors (PT) among inpatients at the Islamic Clinic of NGaoundéré, Cameroon, over a five-year period.

2. Method

We conducted a descriptive cross-sectional study with a retrospective data collection.

The study was carried out at the Islamic Clinic of N'Gaoundéré, which is a reference center for urological cancer in the northern part of Cameroon. Indeed, northern Cameroon covers three administrative regions: Adamaoua (with N'Gaoundéré as the main city), Far North (Maroua) and North (Garoua). Consequently, the Islamic Clinic of N'Gaoundéré, located in the heart of this vast northern region, represents a reference center for urological pathologies in this part of the country, which has more than 40% of the country's population. Our study was conducted over a period of five (5) years, from January 2018 to December 2022. The study population consisted of patients who were diagnosed with a prostate tumor. All medical records of patients with a prostate tumor who received care

during our study period were included.

Patients who did not receive care and incomplete or unusable records were excluded. The study was conducted by consecutive and exhaustive sampling, as all data were collected from the records of all patients received during the study period and meeting the eligibility criteria. Data collected were socio-demographic, clinical and therapeutic informations. Diagnosis of prostate tumore was confirmed based on histologic findings. File records with incomplete data were excluded from our study. Pyelocaliceal dilation was evaluated according to the Society of Fetal Urology Classification. The study received the approval of the University's ethics committee and administrative authorization. Confidentiality of the data was ensured by the principal investigator through limited access to the study database. Data were entered and analyzed using Epi-Info software. The descriptive parameters used were proportions for categorical variables and means for quantitative variables. The frequency was calculated by reporting the number of prostate tumors received during the study period to the total number of patients received during the period.

3. Results

From January 1, 2018, to December 31, 2022, a period of 5 years, we recorded 4549 hospitalizations in the urology department of the Islamic Center of Adamaoua, and 890 were primarily for the management of prostate tumors. This translates to a prostate tumor frequency of 19.6% (890/4549) in this healthcare setting (Figure 1). The majority of our patients were referred from another healthcare facility

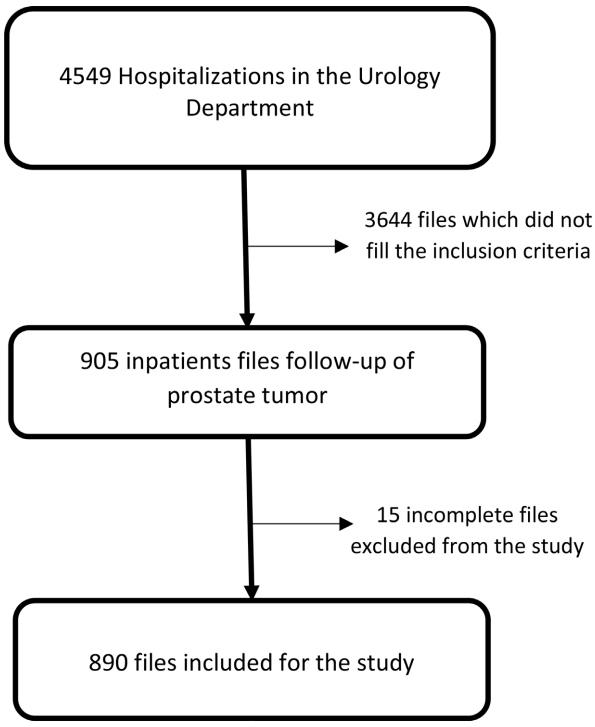

Figure 1. Flow chart.

(860/890; 96.63%) of cases, compared to 3.37% of cases received in the emergency outpatient clinic (Figure 2).

According to Table 1, the most represented age group in the study population, particularly patients followed for prostate tumors, was [60-69[years. Accounting for 35.62% of cases, with a mean age of 67.31±9.8 years and extremes ranging from 36 to 98 years. 33.33% of patients were not schooled (294/890; 32.99%), and 66.97% were schooled; 33% had formal employment, 24% were fully retired, 18% were farmers, 14% were unemployed, and 11% had informal employment. The distribution of patients according to their region of origin shows a strong predominance of those from the Adamaoua region, the study region (32.58%), the Far North (30.67%), and the North (27.87%). These three regions in the northern part of Cameroon represented nearly 91.12% of the total sample. Foreign patients accounted for 3.48% and came from Nigeria, Chad, and the Central African Republic.

The most common reason for consultation was dysuria (80.40%) of cases, followed by acute urinary retention in 25.84% of cases (Figure 3). It should be noted that multiple symptoms could be associated. According to the IPSS score evaluation of the patients, a moderate symptomatology was found in the majority of cases (52.58%) and severe in 43.48% of cases; these symptoms dated back less than 6 months in 42.36% of patients (Table 2).

Hypertension was the most common medical history (47.64%), followed by diabetes in 8.43% of cases. The most common surgical history was inguinal hernia repair (11.91%), followed by appendectomy (6.63%), transurethral prostate resection (TURP) (3.15%), hydrocele repairs (2.70%), and adenectomy in 1.69% of cases. The most common urological histories were schistosomiasis (18.56%), urinary tract infections (16.29%), recurrent acute urinary retention (12.37%),

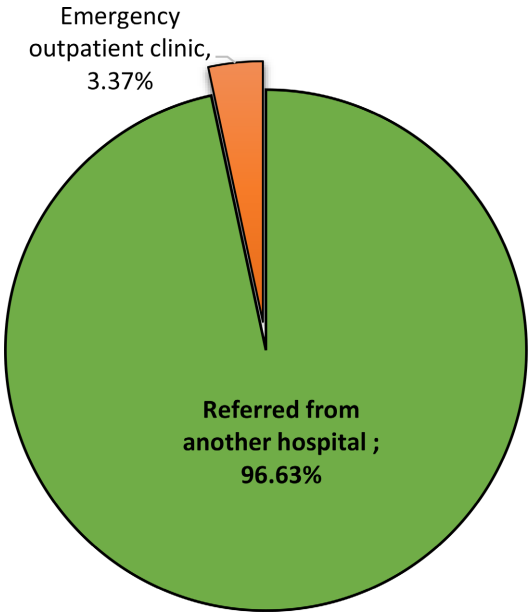

Figure 2. Distribution according to referral sources of inpatients in the Urology Department of the Islamic Clinic of N'Gaoundere.

Table 1. Distribution of inpatients followed up for prostate tumor by their sociodemographic characteristics.

Sociodemographic characteristics	Number (N = 890)	Proportion (100%)
Age Groups (years)		
<50	26	2.92%
[50 - 59[	168	18.88%
[60 - 69[	317	35.62%
[70 - 79[	269	30.22%
[80 - 90[	100	11.24%
≥90	10	1.12%
Occupation		
Farmer	160	18%
Formal employment	297	33%
Informal employment	99	11%
Fully retired	211	24%
Unemployed	123	14%
Region of Origin		
Adamawa	290	32.58%
Far North	273	30.67%
North	248	27.87%
Center	33	3.71%
Littoral	15	1.69%
Foreigners (Nigeria, Chad and Central African Republic)	31	3.48%
Level of education		
Unschooled	294	33.03%
Schooled	596	66.97%
Primary	182	20.45%
Secondary	280	31.47%
Supérieur	134	15.06%
Marital Status		
Married-monogamy	466	52.36%
Married-polygamy	221	24.83%
Single	170	19.10%
Widow	33	3.71%

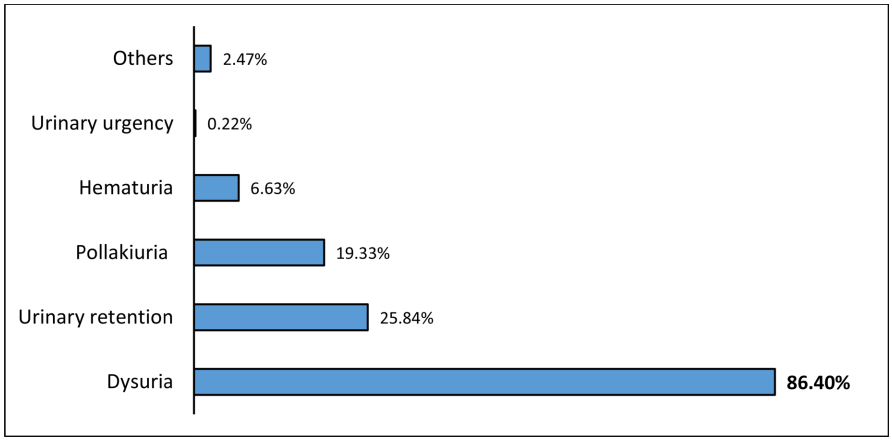

Figure 3. Distribution of inpatients followed up for prostate tumor by reason for consultation.

Table 2. Distribution of inpatients followed up for prostate tumor based on symptom severity and duration

Symptoms descriptions	Number (N = 890)	Proportion (100%)
International Prostate Symptom Score (*IPSS*)		
Mild symptoms	35	3.93%
Moderate symptoms	468	52.58%
Severe symptoms	387	43.48%
Duration of Symptoms (months)		
<6 months	377	42.36%
6 to 12 months	185	20.79%
13 to 24 months	165	18.54%
25 to 48 months	139	15.62%
>48 months	24	2.70%

urinary tract trauma (16.08%), and family history of prostate tumors in 5.57% of cases. The vast majority of patients, *i.e.*, 76.07% of cases (Table 3), had used traditional treatment.

Upon admission, 52.60% of patients had no urinary catheter, 32.99% had a bladder outlet obstruction, and 47.40% had an indwelling urinary catheter (39.80% transurethral versus 7.60% suprapubic). All patients underwent Digital rectal examination was performed, of which 19% had a stony hard prostate, 90.56% had prostate pain and 27.75% had an obliterated median groove (Table 4). The predominant presumptive clinical diagnosis was benign prostatic tumor in 81.30% of cases, compared to 18.70% of prostate neoplasia after clinical examination (Figure 4).

Severe anemia was found in 4.94% of patients, moderate in 16.95%, and mild in 11.80%. leukopenia was found in 0.79% of patients and leukocytosis in 2.25%. serum creatinine level was performed in 83.60% of patients, and showed impaired

Table 3. Distribution of inpatients followed up for prostate tumor based on their medical history.

History	Number (N = 890)	Proportion (100%)
Medical History		
HTA	106	11.91%
Diabetis	59	6.63%
Overweight or obesity	28	3.15%
Kidney failure	24	2.70%
Head failure	15	1.69%
Surgical History		
Inguinal hernia repair	106	11.91%
Appendectomy	59	6.63%
Transurethral Resection of the Prostate (TURP)	28	3.15%
Hydrocele	24	2.70%
Adenomectomy	15	1.69%
Uro-genital History		
Bilharziasis	165	18.56%
Urinary tract infection	145	16.29%
Recurrent acute urinary retention	110	12.37%
Urinary tract trauma	143	16.08%
Family history of prostate tumors	50	5.57%
Treatment History		
Phytotherapy	677	76.07%
Medical	165	18.54%
Surgical	48	5.39%

Table 4. Distribution of inpatients followed up for prostate tumor based on their physical examination.

Physical examination	Number (N = 890)	Proportion (100%)
Status of Urinary Catheterization		
Indwelling Transurethral Catheter	354	39.80%
Indwelling Suprapubic Catheter	68	7.60%
No Catheter	468	52.60%
Bladder Distension		
Presence	294	32.99%
Absence	596	67.01%

Continued

Digital Rectal Examination (Prostate Status)		
Prostate Size		
Hypertrophic	880	98.88%
Prostate Consistency		
Soft	457	51.34%
Nodular	264	29.70%
Stony Hard	169	19.00%
Prostate pain		
Absence	84	9.44%
Presence	806	90.56%
Median Sulcus Status		
Effaced	247	27.75%
Present	643	72.25%

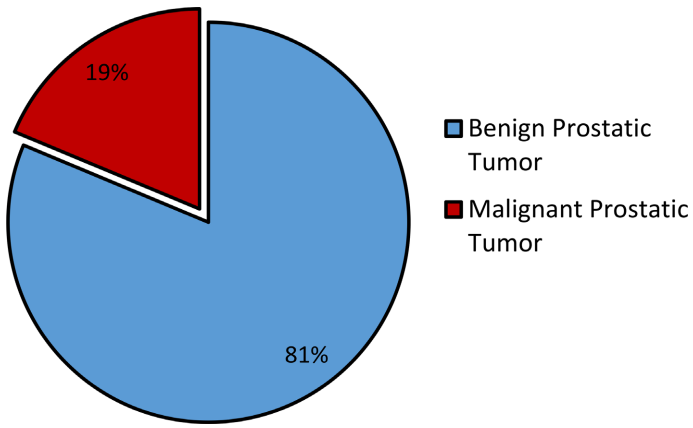

Figure 4. Distribution of inpatients according to presumptive clinical diagnosis.

renal function in 34.43% of patients. only a small proportion (11.96%) had normal PSA levels (<4 ng/ml), while the majority had elevated PSA levels, with 34.85% between 10 - 20 ng/ml, 21.65% between 20 - 100 ng/ml, and 11.55% above 100 ng/ml. The most common positive serology was Syphilis with 13.71% of cases, 2.02% of cases had positive HIV serology; the most common organism found in urine culture was Escherichia coli in 6.60% of patients and the test was sterile in the majority of cases (89.70%); it should be noted that several patients carried multiple bacteria (Table 5).

The ultrasound structure of the prostate was heterogeneous in 22.92% of patients. The majority of patients (57.98%) had a moderately enlarged prostate volume (30 - 80 ml), a significant proportion (39.89%) had a large prostate (>80 ml), while only 2.13% had a normal prostate volume (<30 ml). Renal-bladder ultrasound revealed signs of bilateral pyelocalyceal dilatation, with 13.81% of patients

presenting with stage 2 and 16.94% with stage 3. Furthermore, uroflowmetric measurements showed signs of severe urinary obstruction in 34.72% of patients and moderate obstruction in 42.13%, with a mean maximum flow rate (Q_{max}) of 8.08 ± 9.91 ml/s. These results, combined with a post-void residual volume of 241.5 ± 268.0 ml (Table 6).

Table 5. Distribution of inpatients followed up for prostate tumor based on their biological test results.

Biological characteristics	Number (N = 890)	Proportion (100%)
Hemoglobin rate (g/dL)		
Normal (14 - 18)	590	66.29%
Mild Anemia (10 - 12)	105	11.80%
Moderate Anemia (8 - 10)	151	16.96%
Severe Anemia (<8)	44	4.94%
Leukocytes/mm³		
Leukopenia (>10,000)	7	0.79%
Normal (4000 - 10,000)	863	96.97%
Leukocytosis (<4000)	20	2.25%
Level of creatinine in the blood (mg/dL)		
Abnormal (>1.2)	307	34.43%
Normal (<1.2)	437	49.10%
Not Available	146	16.40%
Prostate Specific Antigen (PSA) in ng/ml		
<4	107	11.96%
[4 - 10[	178	20.00%
[10 - 20[	310	34.85%
[20 - 100[	193	21.65%
≥100	102	11.55%
Infectious Disease Assessment		
Chlamydia		
Negative	734	82.47%
Positive	25	2.81%
Unavailable	131	14.72%
Syphilis		
Negative	640	71.91%
Positive	122	13.71%
Unnavailable	128	14.38%

Continued

Mycoplasma		
Negative	735	82.58%
Positive	27	3.03%
Unavailable	128	14.38%
HIV		
Negative	744	83.60%
Positive	18	2.02%
Unavailable	128	14.38%
Urine		
Sterile	798	89.66%
Escherichia coli	59	6.60%
Klebsiella pneumonae	18	2.0%
Staphylococci	6	0.70%
Proteus mirabilis	6	0.70%
Not available	172	19.30%

Table 6. Distribution of inpatients followed up for prostate tumor based on morphologic and functional exploration.

Characteristic	Number (n)	Proportion (%) or Average ± SD
Prostate ultrasound		
Prostate Texture		
Homogeneous	679	76.13%
Heterogeneous	204	22.92%
Not available	7	0.83%
Prostate Volume		
Volume normal (<30 ml)	6	**0.67%**
Moderately increased volume	516	**57.98%**
30 -45 ml	79	8.88%
46 - 60 ml	198	22.29%
61 - 80 ml	239	26.79%
Enlarged volume	355	**39.89%**
81 - 100 ml	142	15.91%
>100 ml	213	23.92%
Renal-Bladder Ultrasound		
Bilateral Pyelocalyceal Dilatation Stage 2	123	13.81%

Continued

Bilateral Pyelocalyceal Dilatation Stage 3	151	16.97%
PVR (Post-Void Residual)	-	241.5 ± 268.0
Uroflowmetry		
Mild	4	0.45%
Obstruction (Q_{max} < 15 ml/s) Moderate	375	42.13%
Obstruction (Q_{max} < 15 ml/s) Severe	309	34.72%
Associated Urethral Stenosis	18	2.02%
Q_{max}	-	8.08 ± 9.91

The analysis of the distribution of histological types among hospitalized patients followed for prostate tumors reveals a spectrum ranging from benign conditions (49.01%), such as chronic prostatitis (9.10%), adenoma (10.67%), and leiomyoma (7.64%), to precancerous lesions like prostatic intraepithelial neoplasia (PIN) (21.24%), up to the cancerous stage with adenocarcinoma (15.62%) (Figure 5(a)). Furthermore, the analysis of the distribution of prostate adenocarcinoma subtypes reveals a predominance of ISUP grade 4 (38.13%), followed by ISUP grade 1 (25.18%), ISUP grade 2 (12.95%), ISUP grade 3 (9.35%), ISUP grade 5 (3.60%), and 10.79% of cases classified as "unspecified" (Figure 5(b)).

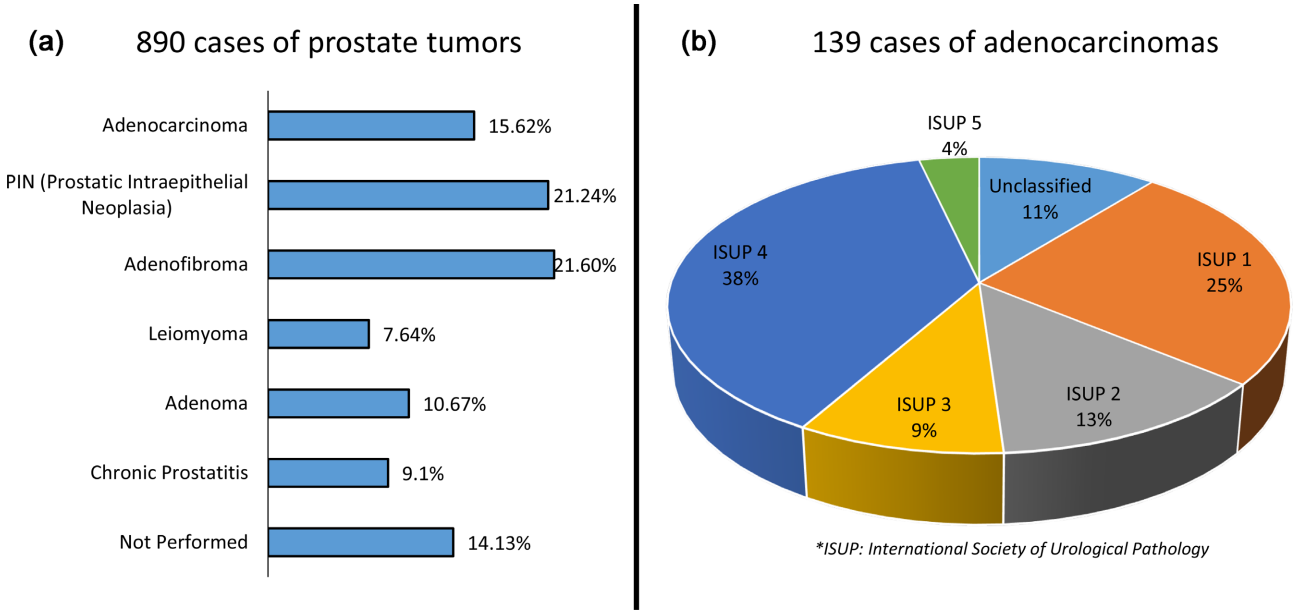

Figure 5. Distribution of inpatients followed up for prostate tumor based on histopathological analysis results. (a) The histological type of tumors; (b) The ISUP* gradation (Gleason Score) of adenocarcinomas.

Table 7 presents the distribution of the 139 hospitalized patients diagnosed with prostate adenocarcinoma according to their management. It is noted that the majority received palliative treatment, such as hormone therapy (4.32%), bilateral orchiectomy (11.51%), transurethral resection of the prostate (7.91%), or trans-

vesical adenomectomy (4.32%). No patient received curative treatment by radical prostatectomy, radiotherapy, brachytherapy, or high-intensity focused ultrasound.

Table 7. Distribution of inpatients diagnosed with prostate cancer according to their management.

Management	Number (N = 139)	Proportion (100%)
Palliative Treatment (Medical or surgical)		
Hormone Therapy (LH-RH agonist or antiandrogen)	06	4.32%
Bilateral orchidectomy	16	11.51%
Transurethral resection of the prostate (TURP)	11	7.91%
Transvesical adenomectomy (AVH)	06	4.32%
Curative Treatment		
Radical prostatectomy	0	0
Radiotherapy/curietherapy/high-intensity focused ultrasound	0	0

Table 8 deals with the 751 hospitalized patients who had been diagnosed with Benign Prostatic Hyperplasia (BPH); it can be seen that the majority of patients (95.47%) received surgical treatment, with Transurethral Resection of the Prostate (TURP) as the most frequent procedure (82.42%); the other surgical techniques used were High Vesicograde Adenomectomy (2.93%), Cervico-Prostatic Incision (1.06%), TURP associated with Orchiectomy (6.39%), and Transurethral Prostatectomy associated with Orchiectomy (2.66%); only a small proportion of patients (5.27%) received medical management, solely by the use of alpha-blockers; regarding the surgical procedures, it is noted that the majority of interventions (93.08%) were performed under spinal anesthesia; the main anatomical features found during surgery were median lobe hypertrophy (49.80%), trilobar hypertrophy (31.96%), and lateral lobe hypertrophy (13.71%). Some patients underwent additional surgical procedures such as bladder stone extraction (13.98%), inguinal hernia repair (6.52%), hydrocele repair (2.53%), and bladder diverticulectomy (1.06%).

Table 9 reveals that out of a total of 717 patients who underwent surgical treatment for benign prostate tumor, 6% developed the Transurethral Resection of the Prostate (TURP) syndrome, a potentially serious complication related to the intervention. The majority of patients (94%) did not present this complication; as for early complications, they occurred in 52.05% of patients; the most frequent were urinary tract infections (31.54%), transient urinary incontinence (9.70%), urinary retention (8.40%), wound infections (1.90%), pulmonary embolisms (1.20%), and more rarely, enterocutaneous fistulas (0.13%); regarding late complications, they were observed in 10.40% of patients. The most common are urethral strictures (2.90%), persistent urinary incontinence (2.30%), and exceptionally, pubic osteitis (0.13%).

Table 8. Distribution of inpatients diagnosed with Benign Prostatic Hyperplasia (BPH) according to their management.

Management	N = 751	100%
Medical Management	**34**	5.27%
Alpha-Blockers	34	5.27%
Surgical Management	**717**	**95.47%**
- Transurethral Resection of the Prostate (TURP)	619	82.42%
- Upper Adenomectomy (AVH)	22	2.93%
- Cervico-Prostatic Incision (CPI)	8	1.06%
- TURP + Orchiectomy	48	6.39%
- TA+ Orchiectomy	20	2.66%
Anesthesia		
Spinal Anesthesia	699	93.08%
General Anesthesia	18	2.40%
Surgical Findings		
Middle Lobe Hypertrophy	374	49.80%
Trilobar Hypertrophy	240	31.96%
Lateral Lobe Hypertrophy	103	13.71%
Additional surgical treatment		
Vesical Stone Extraction	105	13.98%
Inguinal Herniorrhaphy	49	6.52%
Hydrocele Repair	19	2.53%
Bladder Diverticulectomy	8	1.06%

Table 9. Distribution of inpatients surgically treated for begin prostate hyperplasia based on their postoperative complications.

Postoperative Complications	Number (N = 717)	Proportion (100%)
Transurethral Resection of the Prostate (TURP) Syndrome		
Yes	45	6%
No	706	94%
Early Complications:	**391**	52.05%
Urinary Tract Infection	237	31.54%
Transient Urinary Incontinence	73	9.70%
Urinary Retention	63	8.40%
Wound Infection	14	1.90%
Pulmonary Embolism	9	1.20%

Continued

Enterocutaneous Fistula	1	0.13%
Late Complications:	**78**	10.40%
Urethral Stricture	22	2.90%
Persistent Urinary Incontinence	17	2.30%
Osteitis Pubis	1	0.13%

The study also looked at the mortality and survival of these patients. In the short term, over a one-year period, the mortality rate was 1.20%, resulting in a survival rate of 98.80%; however, in the longer term, over a five-year period, the mortality rate had slightly increased to 1.85%, leaving 98.20% of patients still alive (Figure 6).

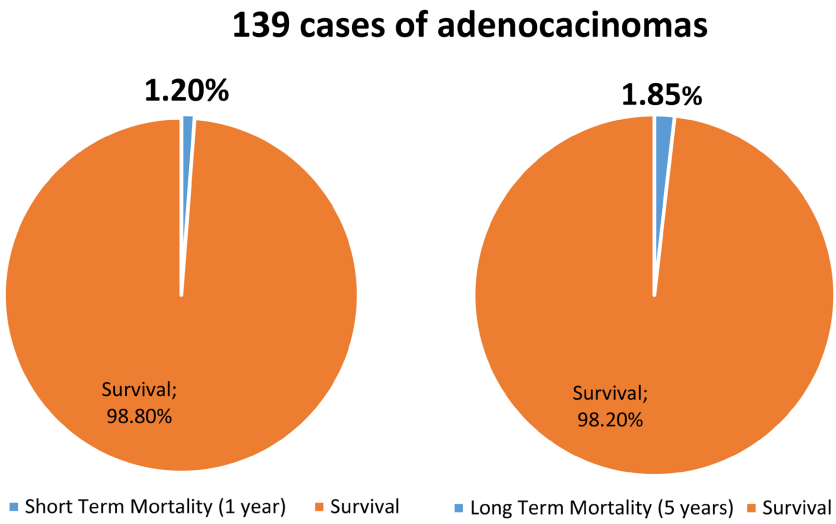

Figure 6. Distribution of inpatients treated for prostate adenocarcinoma based on mortality.

4. Discussion

4.1. Hospital Frequency of Prostate Tumor

The prostate tumor frequency observed in the urology department of the Islamic Center of Adamaoua (890 cases/4549 hospitalizations recorded) was slightly higher than the findings reported in other relevant studies conducted in Africa. Specifically, the study by Ndjitoyap *et al.* in Cameroon in 2018 found a prostate tumor frequency of 16.2% (360/2220) [15], while Zaghloul *et al.* in Egypt in 2014 reported a rate of 18.5% (421/2275) [16]. Additionally, the systematic review by Ferlay *et al.* in 2018 on sub-Saharan Africa estimated an average prostate tumor frequency of 12.1% [17]. Although the 19.6% frequency observed at the Islamic Center of Adamaoua is higher than these averages, it remains within a comparable range, suggesting that the prevalence of prostate tumors in this particular healthcare setting may be slightly elevated compared to other parts of the region, though further studies would be needed to fully understand the underlying factors

influencing this difference.

4.2. Sociodemographic Characteristics

The majority of our patients were between 60 and 79 years old, with a mean age of 67.33 ± 9.83 and a range of 36 to 98 years. The Cameroonian studies by Mbakop *et al.* (1998) [1] and Fouda *et al.* (2008) [2] corroborate our results, reporting mean ages of patients with prostate tumors/cancers of 66.82 and 67.33 years, respectively, with a predominance in the 60 to 79 age group [18]. This consistency in the epidemiological data between different studies conducted in Cameroon reinforces the validity of your observations on the age profile of patients with prostate tumors in this African context. These results are similar to those of Barry M *et al.* [19] in Cotonou, Toure M.L. *et al.* in Mali [20], and Tengue *et al.* at the Sylvanus Olympio University Hospital in Togo [10]. This similarity in mean ages suggests that prostate tumors typically occur around the age of 70, in line with the literature that prostate tumor pathology is a disease of the elderly (>50 years). In our series, most of the patients were married men, mainly monogamous. These proportions are slightly similar to those reported by Diarra B [21], who found 88.2% of married men, with 64.7% monogamous. However, they differ from the results of Yacouba Lassine [22], who found 99.2% of married men, but with a majority of polygamists (52.4%). Significantly, the majority of our patients, were referred to the Islamic Clinic of N'Gaoundéré from other hospital facilities in the northern region. This trend is similar to the observations of TESSOUGUE Boubakar [23], who had 73.3% of patients referred from another center. In contrast, BARRY M *et al.* [24] in Guinea, AKPO *et al.* [25] in Benin, and NOURI *et al.* [26] in Morocco had 87%, 51.5%, and 40% of their patients, respectively, arriving at the outpatient department as emergency cases. These differences can be explained by the fact that the Islamic Clinic of N'Gaoundéré is a reference center for the management of urological pathologies, including cancers, in the northern part of Cameroon.

4.3. Clinical Characteristics

Dysuria was the most frequent symptom, present in most of our patients, followed by acute urinary retention in 25.84% of cases. These results are similar to those of Diakité *et al.* [27] with dysuria more frequent in 56% of cases followed by acute urinary retention in 36.27% of cases. Similarly, Coulibaly A [28] in Mali found 26.7% of dysuria for 16.3% of acute urinary retention. These results corroborate that the clinical symptomatology of lower prostatic obstruction can be variable.

Furthermore, the vast majority of patients had moderate to severe symptoms according to the IPSS scale. Moreover, most patients had symptoms for less than 2 years, indicating a relatively rapid progression of their prostate tumor. These data reinforce the observation that patients with prostate tumors generally present with severe symptoms and a relatively rapid progression of the disease, underscoring the importance of early screening and management.

Hypertension was the most common medical history in our study, similar to

that of Kante [29] in Mali with 20.6% of cases.

Urinary schistosomiasis was the most common urological history, found in 18.56% of patients. Similarly, Kante *et al.* found urinary schistosomiasis as the predominant urological history in 41.5% of cases; This was also confirmed in the study by Coulibaly A [30] where it was in first place with a rate of 45.3%. This can be explained by the fact that the northern part of Cameroon, including the Regions of the Far North, North and Adamawa, is an endemic area for urinary schistosomiasis caused by Schistosoma haematobium, with prevalence rates that can reach up to 80% in some localities [31].

Inguinal hernia dominated the surgical history with a frequency of 12%. The study by Coulibaly A [32] found a rate of 20.1%. This is also the case in the study by Noutacdié [33] where it was found in 20.57% of cases, which corroborates with the data in the literature stating that most patients with prostate tumor have an associated hernia.

The digital rectal examination, the basis for the examination of a patient with a prostate tumor, found an enlarged prostate in almost all cases and most of patients had a benign prostatic hypertrophy appearance compared to 19% with a malignant appearance. Similarly, in a study conducted in Mali by Diakite *et al. [34]*, it was in favor of benign hypertrophy in 76.47% of cases and cancer in 23.53% of cases. In Morocco, NOURI *et al. [35]* made the same observation in the vast majority of their patients, AKPO *et al. [36]* in Benin found an enlarged prostate in 92.7% of patients but lower than that of Barry *et al.* [37] in Conakry (93% of BPH).

4.4. Paraclinical Characteristics

PSA level was measured in all patients; 87.9% had an increased rate. In our series, most patients had a total PSA level above 10 ng/ml, and the majority was between 11 and 20 ng/dl, accounting for 34.85% of cases. Similarly, Barry *et al.* [17] had a total PSA level above 10 ng/ml in 72.06% of cases, and in 37.2% (n = 96) it was between 11 and 20 ng/ml.

Its assay, performed in almost all of our patients, revealed an elevated rate with impaired renal function in 34.43% of cases. Similarly, in Congo, TESSOUGUE Boubakar [29] found 20% of cases with an elevated creatinine level in his series. This is most often due to kidney intoxication by vesico-ureteral reflux consecutive to chronic urinary retention. This could be explained by the fact that the high average duration of symptoms beyond 6 months before the first consultation constitutes a factor of continuous renal aggression, which gives patients time to present with chronic complications (CKD).

Urine culture was performed in 391 patients. Escherichia coli was the most frequently isolated pathogen in 6.60% of cases. Similarly, Adama S Diabaté [30] and Coulibaly A [26] found a frequency of 23.9% and 27.1%, respectively. This could be explained by the fact that E. coli would have a high tropism for the urinary system. In our series, we found 76.13% of cases of prostatic hypertrophy (PH) with a homogeneous structure, against 22.92% with a heterogeneous structure, with a

prostatic volume predominantly varying between 30 and 100 ml in 97.87% of cases. Our results are superimposable to those of Utzmann O. *et al.* *[31]*, who found all these characteristics. Similarly, in Mali, Diakite ML *et al.* *[8]* found 74.51% of homogeneous hypertrophy and 20.50% of heterogeneous hypertrophy.

Among the 890 cases of prostate tumors collected in our study, 49.01% had benign lesions, 20.6% had precancerous lesions requiring close monitoring, and 15.62% had malignant tumors in the form of adenocarcinomas. This result corroborates the conclusions of most African series. In Guinea, Barry M *et al.* [15] reported 36% benign tumors and 26% malignant tumors, while Diakite ML *et al.* [8] in Mali found 74.47% benign tumors and 23.53% malignant tumors. Similarly, in Benin, a study of 206 cases of prostate tumors at the CNHU in Cotonou by Hounnassou *et al.* [16] revealed 71% benign tumors and 28.2% malignant tumors. Not very similar to the Western situation, with a 2014 American study on 77,718 prostate biopsies showed that 58.1% had benign lesions, 10.8% had precancerous lesions and 31.1% had prostate cancer [18]; and a 2019 European study on 25,798 biopsies found that 60.1% were benign, 9.2% precancerous and 30.7% cancerous [19]. These differences in the histological profile of prostate tumors between the African and Western contexts underline the importance of ethnic, environmental and socio-economic factors in understanding the global epidemiology of prostate cancer. Furthermore, for the 139 cases of adenocarcinomas observed, our results showed that the ISUP Gleason score 4 was predominant (38%), indicating severe aggressiveness and a poor prognosis. Similarly, Adama S Diabaté [31] had found a Gleason score of 8 (5 + 3), also indicating a poor prognosis. However, the work of Kante *et al.* *[5]* revealed a predominance of the Gleason score of 6 (4 + 2), reflecting low aggressiveness and a good prognosis.

4.5. Management

The majority of the 139 hospitalized patients diagnosed with prostate adenocarcinoma received palliative treatments, such as hormone therapy (4.32%), bilateral orchiectomy (11.51%), transurethral resection of the prostate (7.91%), or transvesical adenomectomy (4.32%), indicating a likely advanced stage of the disease and with the aim of unblocking the urinary tract to improve urination (prostate drilling surgery). No patient benefited from curative treatment by radical prostatectomy, radiotherapy, brachytherapy, or high-intensity focused ultrasound due to incomplete technical facilities. In cases of BPH, we performed suprapubic adenomectomy (SPT) in 2.93% of patients and TURP in 82.42% of patients. In contrast, Kambou *et al.* [35] performed 90% SPT and 10% TURP in their study on the surgical treatment of BPH.

4.6. Prognosis

Our 5-year in-hospital mortality rate was 1.85% (n = 9). In contrast, Diakite ML *et al.* [8] had an almost zero mortality rate of 0.01%, reflecting European series and significantly higher than some rates in the subregion (0.9%). This is related

to the aggressiveness of prostate tumor processes, the progressive development of endoscopic surgery, and the unavailability of multidisciplinary therapeutic modalities (Radio-Chemotherapy), which gradually but slowly reduces the mortality and morbidity of the pathology in the subregion [24].

5. Conclusion

In conclusion, this retrospective study conducted at the Islamic Clinic of Adamaoua provided insights into the management of prostate tumors, a common pathology and a significant source of mortality despite therapeutic advances. The results underline the importance of early diagnosis and appropriate management, primarily based on surgical intervention, to limit the morbidity and mortality associated with these pathologies. However, the retrospective nature of this study was a limitation in data collection, with incomplete clinical, biological, and ultrasonographic information at times. Additionally, the rural background of the majority of patients represented a financial constraint for the performance of additional diagnostic and exploratory examinations, as well as for the complete therapeutic management, particularly due to the unavailability of certain modalities such as chemotherapy or radiotherapy. Despite these limitations, the main strength of this work was to enable the investigation of the sociodemographic, clinical, paraclinical, and therapeutic characteristics of patients with prostate tumors in the northern regions of Cameroon. This has thus allowed for a better appreciation of the specialized management of this pathology in these localities. Furthermore, to our knowledge, this is the very first study conducted on this subject in northern Cameroon, constituting a foundation for future studies. This work also highlights the need for a multidisciplinary approach, combining conventional and traditional medicine, for optimal management of patients with prostate tumors in this region.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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