

Comparative Epidemiological Profiles in Prostate Cancer Algerian and Mauritanian Patients: Retrospective Study of 124 Cases

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Abstract: Prostate cancer (Pca) is a common neoplasia in elderly men. Its incidence increased over the last two decades in the Northern Africa. This study aimed to perform a comparison between epidemiological profiles of Pca in patients from two Maghreb countries (Algeria and Mauritania). This is a retrospective study carried out during 2014-2016, on population of 124 cases including 64 Pca Algerian patients recorded in the Oncology Department of Saida hospital, the Urology Department of Oran University Hospital and 60 Pca Mauritanians patients recruited in the National Oncology Center and the Friendship Hospital in Nouakchott. For these Pca patients of different ethnic origin, demographic characteristics were studied and biological monitoring of the tumor marker PSA (prostate specific antigen) was performed in medical biological analysis laboratories using the same methods of serum-PSA assay. The mean age was significantly different in both groups of Pca Algerian and Mauritanian patients (respectively 74 vs 70 years). No significant positive correlation between the age and the PSA, in both groups, was recorded ($R = 0.00796$ vs $R = 0.127$) ($p > 0.05$). The mean serum- PSA levels were 156.5 ± 76.4 (Pca Algerians) and 179.3 ± 52.1 ng / mL (Pca Mauritanians). Histological evidence was obtained in 54.6 % (Pca Algerians) and 23.3 % (Pca Mauritanian patients). 15 Pca Patients with metastatic tumor stage and 17 cases of death were found. Prostate cancer essentially affects men old over 50 years in both Northern African countries and this comparative study showed the same methods of screening, diagnosis and therapeutic treatment of Pca used in these two areas.

Keywords: Prostate cancer, Neoplasia, Retrospective study, Oncology, Urology, Prostate specific antigen.

INTRODUCTION

Prostate cancer (Pca) is a common neoplasia in elderly men. It rarely appears before 50 years except in the case of a Pca family history [1]. Its incidence has clearly increased over the last two decades. Pca is a multifactorial pathology. Male aging, wild urbanization, blind adoption of western lifestyle, abusive and anarchic use of chemicals, environmental degradation, unhealthy nutrition, heredity and hormonal factors are the potential risk factors associated with in Pca [2]. Almost 70 % of prostatic adenocarcinoma Pca remains the main cause of male mortality in Northern Africa particularly in neighboring countries as Algeria and Mauritania, which is the subject of this study. According to Agency International on Cancer Research (AICR), it was reported during the last 5 years that Pca incidence and prevalence are 6.3 new cases / 100000 inhabitants per year and 8.8 % (in Algeria) and 17.1 new cases / 100000 per year, and 27.8 % (in Mauritania) [3]. In the same period, mortality rates in both countries appeared different. Mortality rate by Pca, in Mauritanian patients,

is relatively higher than that of Algerians. So, it noticed mortality rates by Pca were respectively 16.2 % and 5.5 % [3]. Almost 70 % of prostate cancers are located in the peripheral zone of the gland, 10 % in the central zone and 20 % in the transition zone which is the target for the development of benign prostate hyperplasia [4]. Dorsal-lateral and ventral prostate lobes are the preferred sites for the carcinogenesis in humans and rodents [5].

A high Pca incidence is associated to the lack of the prevention, the taboo of disease, late diagnosis, precarious infrastructures, shortage of qualified medical personnel and the difficulties in accessing care. Northern African countries have been able to implement national cancer control plans throughout the creation of regional and national cancer registries supported by the availability of data and information on any of cancer. In these countries, classical and clinical diagnostics such as rectal examination, PSA and ultrasound are still ongoing and urologists have always used this type of screening to detect early Pca. This present study, first in Northern Africa, was carried out on two groups of Pca cases with various ethnic and geographical origins, a different lifestyle and specific diet although these Arabic communities practice the same religion and use the same language. This study

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aims to establish a comparison between two populations of Pca patients throughout a descriptive analysis of the epidemiological and clinical aspects in the oncology and urology departments of the Algerian and Mauritanian hospitals.

MATERIAL AND METHODS

Population Study and Data Collection

It is a retrospective descriptive study conducted on a population of 124 Pca cases, aged between 45-90 years and native of two neighboring Northern African countries namely Algeria and Mauritania. This study occurred during the period of 2014-2016. A group of 64 Pca Algerian patients were recruited at the Saida hospital and the Oran university hospital, located in the western Algeria, and a group of 60 Pca Mauritanian patients were interned at the oncology center and Nouakchot Friendship Hospital. Information have been gathered from clinical and technical medical records of Pca patients. This study was performed on patients with confirmed Pca on histology. Variants or parameters selected were age, family history, consultation time, clinical and para-clinical characteristics, biological examination and follow-up of tumor markers such as prostate specific antigen (or PSA). The pre-therapeutic assessment included a clinical examination, an ultrasound, bone scintigraphy and serum-PSA monitoring. Data have been collected through a structured questionnaire. All patients were made aware of the study's objective and written informed consent was obtained from all participating subjects. The selected Pca patients were free of any other disease, had a non-critical health, an accepted nutritional status and followed the same biological analysis method that is a serum-PSA immuno-enzymatic assay with a normal threshold value of 4 ng / mL.

Serum-PSA Assay

Prostate cancer screening had been carried out using TPSA-serum level. Volume samples about 10 ml of blood were collected intravenously in a dry tube. The blood was centrifuged and serum was frozen at -20°C until to be used in the assay. The sera were stored for a period not exceeding three months. Serum-PSA levels were measured by mini VIDAS automate analyzer (Bio Merieux, Marcy-l'Étoile, France). The method used was an enzyme-linked fluorescent assay, which is an enzyme immunoassay ELISA "sandwich" in heterogeneous phase where the molecules of PSA are caught between two monoclonal antibodies of murine

nature. The levels of the PSA were obtained in two stages to a final detection by fluorimetry. A quality control was performed for each used kit VIDAS-PSA to validate the results.

Statistical Analysis

The statistical analysis were performed with the software *SigmaPlot* version 11.0. Pearson's chi-squared test was used to establish correlation between age and PSA in both groups of Pca patients. Student's test was used to compare both groups of Pca patients with level of significance (p) = 0.05.

RESULTS

A total number of 124 Pca cases, deemed to be exploitable, were selected. The dominant age group for the both populations of Pca patients was 70 – 79 years (Figure 1). It was revealed that no Pca was found under the age of 50 years in Algerian patients, except for the Mauritanian patients it was reported only one Pca case for this age group (Figure 1). In the same context, two cases older more than 90 years were found in the Algerian population while no Pca patient older than 90 years was reported in the Mauritanian group (Figure 1). The mean age was significantly different for both groups of patients ($p = 0.002$), so the Algerian and Mauritanian Pca patients had respectively 74 and 70 years (Table 1). No statically significant difference was recorded about the tumor marker PSA ($p = 0.8$). The mean value of PSA was 156.5 ± 76.4 ng / mL with extremes of 0.52 and 4891.2 ng / mL for the Pca Algerian group and 179.3 ± 52.1 ng / mL with extremes of 0.68 and 2002 ng / mL for the Pca Mauritanians (Table 1).

Figure 2 shows the PSA distribution in Pca patients in both Pca groups. Through the results displayed in Figure 2, it was observed 35.9 % of Pca Algerian patients (ie 23 / 64) had serum-PSA level between 50 – 100 ng / mL and 9.3 % (6 / 64) had PSA greater than 100 ng / mL, few patients (3 cases) had PSA under the normal threshold value (4 ng / mL). Concerning Pca Mauritanian patients, 23.3 % (14 / 60) had PSA between 50 – 100 ng / mL and 20 % (12 / 60) with PSA higher than 100 ng / mL. Moreover, 11 % (7 / 60) had PSA lower than 4 ng / mL (Figure 2). Figures 3 and 4 indicate that there is no a really significant positive correlation between variables PSA and age in groups of Pca Algerian and Mauritanian patients with respectively a correlation coefficients $R = 0.00796$ and 0.127 ($p > 0.05$).

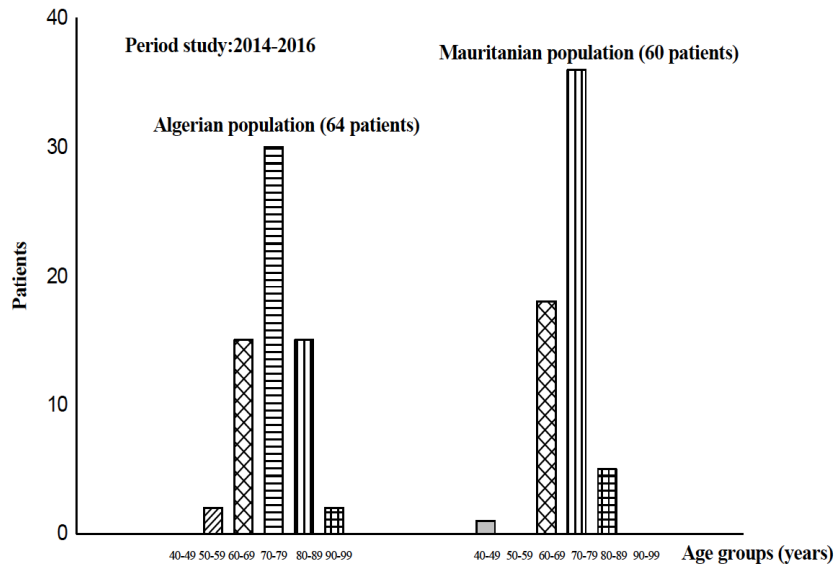


Figure 1: Distribution of Pca patients by age group.

Table 1: Clinical Assessment and Distribution of Pca Patients According to Age, PSA, Therapy and Tumor Stage

Clinical characteristics	Algerian population	Mauritanian population	p-Value ($\alpha = 0.05$)
PCa patients	64	60	
Age (years)			
Mean \pm SEM	74 \pm 0.9	70 \pm 0.8	0.002
Min-Max	57 – 91	45 – 70	
CI 95 %	1.9	1.7	
PSA (ng / mL)			
Mean \pm SEM	156.5 \pm 76.4	179.3 \pm 52.1	0.8
Min-Max	0.52 – 4891.2	0.68 – 2002	
CI 95 %	152.8	104.2	
Diagnosis			
Rectal examination	02 (1.6 %)	02 (1.6 %)	
Biopsy	01 (0.8 %)	01 (0.8 %)	
Bone scintigraphy	- (0 %)	06 (4.8 %)	
Therapy			
Medical supervision	03 (2.4 %)	03 (2.4 %)	
Chemotherapy	- (0 %)	07 (5.6 %)	
Prostatectomy	11 (8.8 %)	11 (8.8 %)	
Tumor grade (Gleason)			
Score 4	02 (1.6 %)	- (0 %)	
Score 5	03 (2.4 %)	02 (1.6 %)	
Score 6	04 (3.2 %)	03 (2.4 %)	
Score 7	05 (4 %)	04 (4 %)	
Score 8	06 (4.8 %)	- (0 %)	
Score 9	07 (5.6 %)	05 (4 %)	
Score 10	08 (6.4 %)	- (0 %)	
Tumor stage			
Metastasis	09 (7.2 %)	06 (4.8 %)	
Non-metastatic	- (0 %)	- (0 %)	
Death	10 (8 %)	07 (5.6 %)	

Pca: prostate cancer; SEM: standard error of mean; Min: minimum; Max: maximum; CI: confidence interval; PSA: prostate specific antigen.

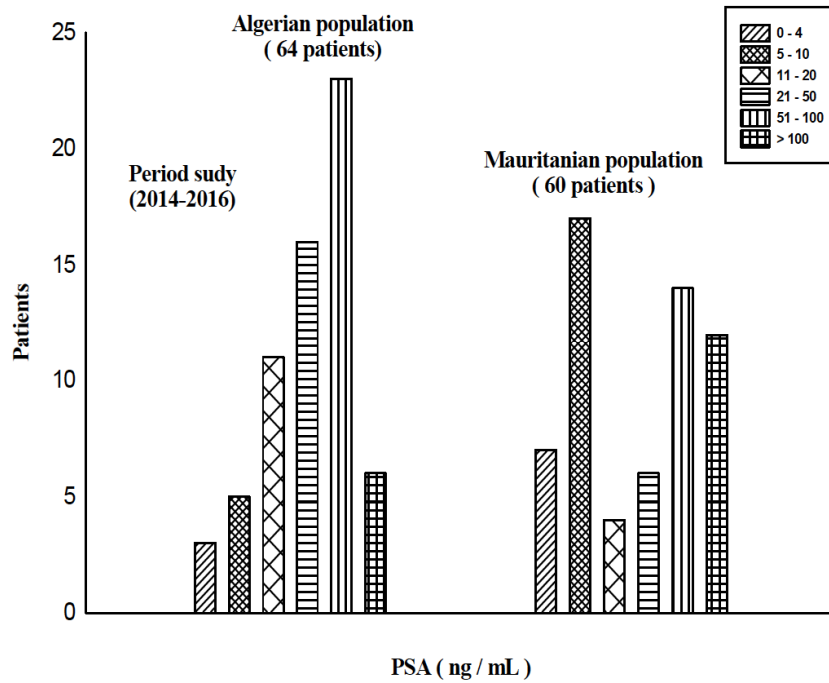


Figure 2: Distribution of Pca patients according PSA.

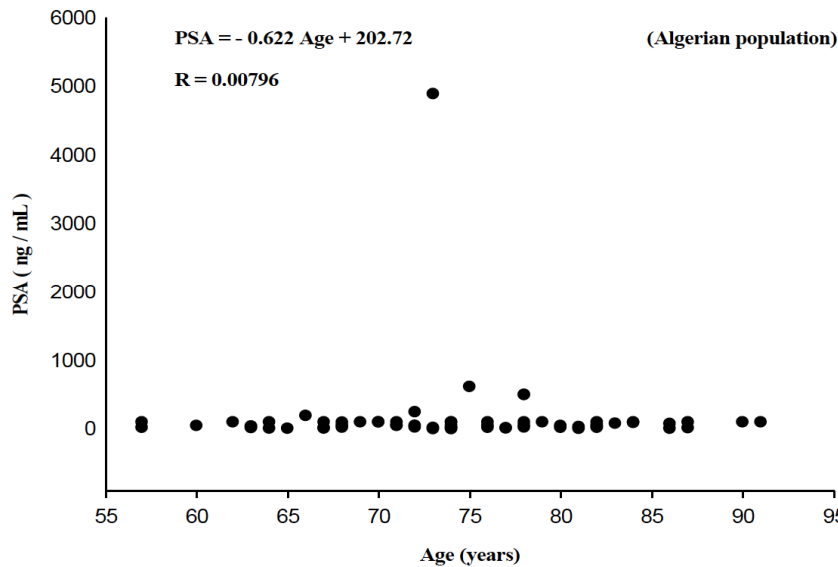


Figure 3: Correlation PSA-age in Algerian population.

The diagnosis circumstances are shown in Table 1. The rectal examination, evocative in all cases, objectivized a nodular and stony prostate in four cases. The clinical signs were dominated by the bone scintigraphy (6 cases). As urgent treatment because of the advanced stage, a prostatectomy was performed. Histological evidence was obtained in 54.6 % of Pca Algerian patients (35 / 64) and 23.3 % of Pca Mauritanian patients (14 / 60). This study revealed that 50 % of Pca medical records contained histologic examinations established by the pathologists but 50 %

of the remaining medical records did contain histologic data. In addition, More than 50 % of Pca patients probably changed their hospitals and did not return to complete their treatment, or perhaps had died. For this reason, our results showed 10 to 30 % had definitive treatment. Concerning data about TNM stage, Pca patients' medical records were incomplete and it was only found the Gleason score. It is worth recalling that this work is just a retrospective study limited to the history of the disease. The Gleason scores 8 (9.3 %), 9 (10.9 %) and 10 (12.5 %) were predominant in the Pca

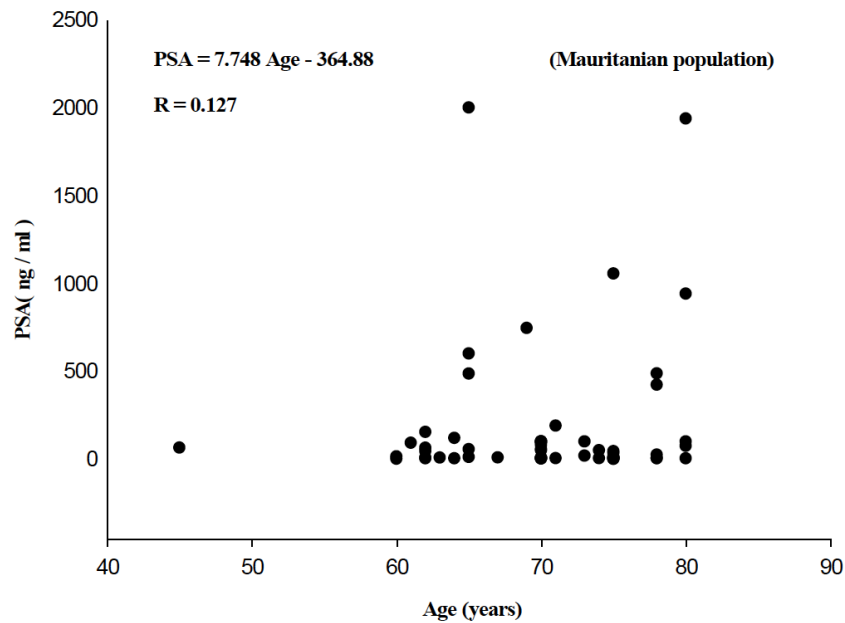


Figure 4: Correlation PSA-age in Mauritanian population.

Algerian patients whereas the Gleason score 9 (8.3 %) was omnipresent in the Pca Mauritanian patients. In this study, 15 Pca Patients with metastatic tumor stage (9 Algerians and 6 Mauritanians) and 17 cases of death (10 Algerians and 7 Mauritanians) were recorded.

DISCUSSION

Progression of Pca incidence varies through the world with the highest in America and Europe and the lowest in Asia [6,7]. The most attractive that's Pca begins increasing in the Northern Africa and particularly in Algeria, Libya, Morocco, Mauritania and Tunisia [8]. Pca incidence is associated with various factors such as genetics, diet, environment, chemicals and lifestyle [9]. Few studies were carried out in the Northern Africa particularly in the Maghreb [10]. The Pca Algerian and Mauritanian patients had respectively a mean age of 74 and 70 years ranging between 45 and 90 years, similar to those found in studies performed in the sub-Saharan Africa [11] and the Maghreb [12]. There is no significant difference about the median age reported in the West like the median age of 72 years recorded in France [13]. These data show that Pca remains a disease related to the elderly. The mean age, at Pca diagnosis, often is high which always related to the advanced tumor stages. The late diagnosis is linked to the natural Pca history and the apprehensions that men had to come to consult with urologists in this area of the North Africa. To this is added the lack of a real policy of information and public awareness on this condition. The association rectal examination-PSA remains

essential in the Pca diagnosis in this present study. A high PSA level was recorded in the most patients with values exceeding 100 ng / mL. In African studies, a mean PSA level reaching the value of 120 ng / mL was reported (0.1 – 6354 ng / mL) [14]. There is a correlation between the blood PSA level and the Pca extension. Thus, an extension outside the prostate capsule was probable with values greater than 50 ng / mL that is the case of 44.3 % of our Pca patients. Similar results were found in Africa [11]. These results confirm the delay of the Pca diagnosis. The availability of the serum-PSA assay remains the main problematic in these study areas. In addition, the PSA test is expensive and inaccessible for most Pca patients. According to European and American studies, a lack of positive correlation between PSA and age of Pca patients has been suggested [15-18]. Our results are consistent with these data. According to this study, the most common type of Pca is the adenocarcinoma with score 10 in Algeria and score 9 Gleason in Mauritania. Pca is the second male cancer after the lung cancer in Algeria. The Pca incidence, in this country, is rising sharply, from 10 new cases in 1999 to 746 new cases in 2008 [19]. Mauritania is not far from this situation because for 10 years Pca is ranked 2nd in men after skin cancers [19]. The metastatic tumor stage of Pca was common in both ethnic groups, due to different modes of patient recruitment followed mainly by the treatment of Pca at a late stage. In this study, one Pca case old less than 50 years was reported, this justifies that the hereditary factor is involved in the Pca development. A member of the family with Pca

increases the risk of the tumor among the other members of the same family, mainly in brothers and uncles where the risk is 5 to 10 times greater [20,21]. Our study has identified the main elements already described by previous studies. This study revealed that the therapeutic pathways followed are similar in both countries. Various Pca diagnosis and screening tools are used such as biopsy, histological examination, rectal examination, serum-PSA assay, ultrasound, magnetic resonance imaging, bone scintigraphy, prostatectomy, chemotherapy, hormone therapy and radiotherapy. These diagnostic and therapeutic means are regularly indicated in most studies conducted on prostate cancer [22].

CONCLUSION

Prostate cancer is a frequent affection and its management encounters difficulties of various kind such as the delay in consultation, the low purchasing power and the inaccessibility of the means of investigation. Data of this study do not reflect the reality of the whole Northern African population. Although these results are limited in time and space but they are benefit to drawing an epidemiological profile of Pca for two neighboring countries. Ethnic and geographical origins, lifestyle and diet of patients influence the Pca incidence and the mortality by Pca in these countries. Prostate cancer affects much older men in both countries. Prostate adenocarcinoma is the most common histological type in these same regions. Screening and analysis methods are almost similar for the two Maghreb populations. This study, first in the Northern Africa, could serve as a support and reference for other studies allowing scientific exchanges between students and researchers from both countries although study populations are not representative.

ETHICAL APPROVAL

All protocols and strategy, in this study, were approved by the Health Research and Ethic Committees of Oran University Hospital, Saida Hospital, Algeria and Friendship Hospital, Nouakchot, Mauritania.

CONFLICTS OF INTERESTS

The authors declare that they have no financial or non-financial conflicts of interest related to the subject matter or materials discussed in the manuscript.

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