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PREVALENCE OF PROSTATE ADENOCARCINOMA ACCORDING TO RACE IN AN UNIVERSITY HOSPITAL

MILTON S. BARROS, VENCESLAU R.S. SILVA, GLADSTON B. SANTOS, ALEXANDRE HUGHES, MARCO A. SILVEIRA

Section of Urology, School of Medicine, Federal University of Bahia, Salvador, Bahia, Brazil

ABSTRACT

Objectives: To determine the prevalence of prostate cancer and to assess potential associations between race and prostate adenocarcinoma according to age in patients followed in an outpatient service of general urology in an university hospital.

Materials and Methods: Retrospective study of men aged from 40 to 79 years, followed during the period from 1999 to 2001. Patients were classified according to race in White, Mulatto and Black. Those with abnormal digital rectal examination and/or serum level of prostate specific antigen (PSA) > 4.0 ng/ml, underwent a transrectal prostate biopsy.

Results: 580 patients with mean age of 60.7 ± 10.0 years were studied, with 116 Whites (20.0%), 276 Mulattos (47.6%) and 188 Blacks (32.4%). There was no significant difference regarding the mean age (p = 0.62), serum level of PSA (p = 0.65) and prevalence of prostate adenocarcinoma between Whites, Mulattos and Blacks (p = 0.36). While studying the association between race classified in 2 groups (Whites versus Mulattos and Blacks) and prostate adenocarcinoma according to age, no association was found when the total group was assessed, neither among those with age above 60 years old. In the group between 40 and 60 years, even though without statistical significance, the estimate of prevalence ratio was 2.2 (CI 95%: 0.52 to 9.0; p = 0.38).

Conclusion: Prostate adenocarcinoma was found in 16.6% of the patients aged between 40 and 79 years. We did not find a racial influence in our population.

Key words: prostatic neoplasms; prevalence; race; prostate-specific antigen
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INTRODUCTION

Prostate cancer is becoming a major public health problem in the world, being one of the most frequent causes of malignant neoplasia in men (1). Estimates of incidence and mortality due to prostate cancer in Brazil for the year 2002 were 29.7 and 9.1 per 100,000 inhabitants, respectively, according to the Cancer National Institute - INCA (2). Studies developed in other countries have demonstrated a higher prevalence of prostate adenocarcinoma in Blacks than in Whites in several centers (3,4). However, other studies have not found any statistically significant difference when comparing prostate adenocarcinoma in Whites and in Blacks (5). Similarly, in Brazil the majority of screening studies did not demonstrate a higher prevalence of this tumor in Blacks than in Whites (6-8).

The objective of this study was to determinate the prevalence of prostate cancer and to assess potential associations between race, age and prostate adenocarcinoma in patients followed in the general urology outpatient service within a college hospital.

MATERIALS AND METHODS

We retrospectively studied men aged from 40 to 79 years, attended and followed in the gen-

eral urology outpatient service, in an university hospital in the period from 1999 to 2001.

Besides careful anamnesis and physical examination, all patients underwent a digital rectal examination, performed by urologists. Patients were classified according to race in Whites, Mulattos and Blacks, being considered as Mulatto the skin color between white and black. All patients underwent a determination of prostate specific antigen (PSA) by chemoluminescence technique (Immulite) and abdominal ultrasonographic evaluation for estimating the volume and the presence of hypoechoic nodules in the prostate. In cases where the serum level of PSA was higher than 4.0 ng/ml and/or prostate abnormalities were found on digital rectal examination, patients underwent transrectal biopsy, with fragments being collected by sextant sampling and submitted to pathological analysis. Diagnosis of prostate adenocarcinoma was based in histological findings and defined by Gleason score.

Continuous variables were described through mean ± standard deviation and by median and categorical through their percentages. For comparison of continuous variables, the "t" test or ANOVA was performed, when indicated. The χ^2 test or Fisher's exact test was performed for comparison of categorical variables. The frequency of prostate adenocarcinoma was compared with races, classified in 2 groups (Whites versus Mulattos or Blacks), and the prevalence ratio (PR) was calculated. This approach aimed to assess an association between race and prostate adenocarcinoma, considering a group with the total of patients and other group with those submitted to prostate biopsy. Additionally, aiming to assess a potential influence of age on the association between race and prostate adenocarcinoma, this approach was performed, separating patients with ages under or above 60.7 years. It was considered significant when the "p" value (bi-caudal) was lower than 5%. The variation in the sample was estimated by means of the confidence interval (CI) of 95%. Analyses were performed using the Statistical Package for the Social Sciences (SPSS) software for Windows, version 10.0.

RESULTS

Main demographic and clinical data of 580 patients studied with ages between 40 and 79 years, are presented on Table-1.

No significant difference was found between racial groups as for the studied variables (Table-2). There was no significant difference regarding mean age, presence of symptoms, assessment by prostate ultrasound and mean serum level of PSA in the racial groups. As for the prostate consistency alterations on digital rectal examination, there was a higher prevalence among Blacks (22.3%) when compared with Mulattos (14.9%) and Whites (12,9%), even though without statistical significance (p = 0.48). Diagnosis of prostate adenocarcinoma was made in 16 White (13.8%), 40 Mulatto (14.5%) and 37 Black patients (19.7%), and the difference was not statistically significant (p = 0.25).

Table-3 shows the results of pathological examinations of 162 patients submitted to prostate biopsy, according to race. Prostate adenocarcinoma was the most frequent diagnosis among the 3 racial groups followed by benign prostatic hyperplasia (BPH) and prostatitis. Figure-1 shows the degree of malignancy

Table 1 – *Demographic and clinical data of 580 patients followed in the urology outpatient service.*

Age (years)	
Mean ± SD	60.7 ± 10.0
Median	61
Race	
White	116 (20.0%)
Mulatto	276 (47.6%)
Black	188 (32.4%)
Digital rectal examination (abnormal)	98 (16.8%)
PSA > 4.0 ng/mL	176 (30.3%)
PSA (ng/ml)	
Mean ± SD	6.6 ± 12.9
Median	2.0
Biopsied	162 (27.9%)

PSA – prostate specific antigen.

Table 2 – *Some clinical-pathological characteristics of 580 patients according to race.*

	White	Mulatto	Black	p value
Nº of patients	116 (20.0%)	276 (47.6%)	188 (32.4%)	-
Age (years)	62.3 ± 9.8	60.6 ± 10.0	59.8 ± 10.1	0.1
Symptoms	55 (47.4%)	144 (52.2%)	86 (45.7%)	0.36
Ultrasound (prostate)*	37.1 ± 22.7	38.1 ± 23.9	39.6 ± 26.8	0.65
PSA	7.1 ± 16.3	6.0 ± 11.5	7.1 ± 12.6	0.57
Biopsy	30 (25.9%)	75 (27.2%)	57 (30.3%)	0.65
Adenocarcinoma	16 (13.8%)	40 (14.5%)	37 (19.7%)	0.25

*PSA – prostate specific antigen; * - volume in ml.*

of prostate adenocarcinoma by the Gleason score distributed among the racial groups. The histological grade of intermediary prostate adenocarcinoma (Gleason 5 - 7) was the most frequent in the 3 groups.

Analyzing the distribution of race in the 162 patients submitted to prostate biopsy (Table-4), there was no significant difference concerning age (p = 0.62), PSA level (p = 0.65) and diagnosis of prostate adenocarcinoma (p = 0.36).

When evaluating the association between prostate adenocarcinoma and race classified in 2 groups (Whites versus Mulattos and Blacks) in the total of patients, after excluding those who refused prostate biopsy, it was found in 16 of the 112 White (14.3%) and 77 of the 448 Mulatto and Black men (17.2%). In patients aged from 40 to 60 years, 2 of 51 Whites (3.9%) and 19 of the 217 Mulattos and Blacks (8.7%) had the diagnosis of prostate adenocarcinoma. In those with age above 60 years (Table-5), 14 of the 61 Whites (22.9%) and 58 of the 231 Mulattos and Blacks (25.1%) were found to have prostate adenocarcinoma.

Table 3 – *Histological diagnosis of 162 patients submitted to prostatic biopsy.*

	White	Mulatto	Black	Total
Nº of patients	30 (18.5%)	75 (46.3%)	57 (35.2%)	162 (100.0%)
Adenocarcinoma	16 (53.3%)	40 (53.3%)	37 (64.9%)	93 (57.4%)
BPH	12 (40.0%)	22 (29.3%)	13 (22.8%)	47 (29.0%)
Prostatitis + BPH	2 (6.7%)	11 (14.7%)	4 (7.0%)	17 (10.5%)
Prostatitis	0	2 (2.7%)	3 (5.3%)	5 (3.1%)

BPH – benign prostatic hyperplasia.

Table 4 – *Pathological data and age range of 162 patients submitted to prostatic biopsy according to race.*

	White	Mulatto	NBlack	p value
Nº of patients	30 (18.5%)	75 (46.3%)	57 (35.2%)	-
Age (years)	68.6 ± 7.0	67.3 ± 7.6	67.0 ± 17.1	0.65
PSA (ng/dl)	22.0 ± 27.3	18.1 ± 16.8	19.3 ± 17.1	0.65
Adenocarcinoma	16 (53.3%)	40 (53.3%)	37 (64.9%)	0.36

PSA – prostate specific antigen.

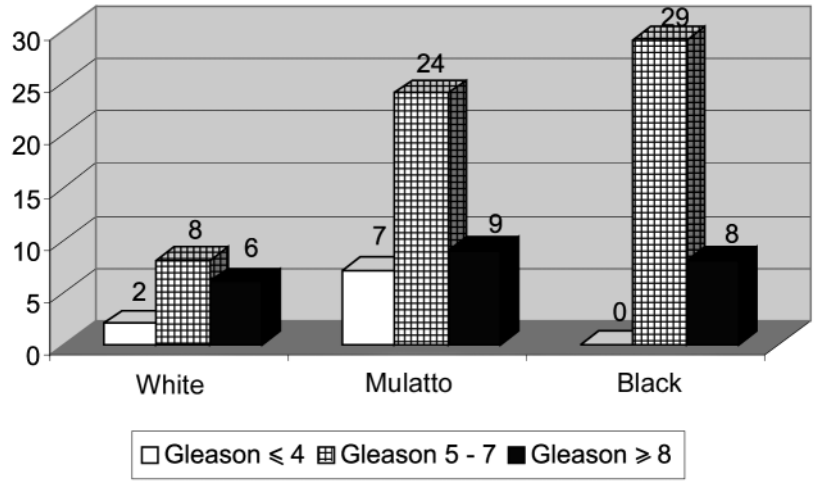

Figure 1 – *Gleason score in 93 patients with prostate cancer.*

Assessing only the group of 162 patients biopsied (Table-6), we did not find statistically significant differences as well: we found prostate adenocarcinoma in 16 of the 30 Whites (53.3%), 77 of the 132 Mulattos and Blacks (58.3%). Among patients aged between 40 and 60 years, 2 of the 4 were White (50%) and 19 of the 27 were Mulatto and Black (70.4%). In patients over 60 years old we found prostate adenocarcinoma in 14 of the 26 White (53.8%) and 58 of the 105 Mulatto and Black patients (55.2%).

DISCUSSION

In the present study, of the 162 patients (27.9%) who underwent transrectal prostatic biopsy, the pathological study revealed prostate adenocarcinoma in 93 of them, representing 16.6% of men followed in the general urology outpatient service, excluding those who refused the biopsy, which was not surprising because it was a group of high risk patients for prostate adenocarcinoma.

Table 5 – *Association between race and diagnosis of prostate adenocarcinoma according to age.*

Age Range	White	Mulatto / Black	PR (CI 95%)	p value
Total group	16/112 (14.3%)	77/448 (17.2%)	1.2 (0.73 - 1.98)	0.46
40 to 60 years	2/51 (3.9%)	19/217 (8.7%)	2.2 (0.54 - 9.28)	0.25
> 60 years	14/61 (22.9%)	58/231 (25.1%)	1.1 (0.66 - 1.82)	0.73

PR = prevalence ratio; CI = confidence interval.

Table 6 – *Association between race and diagnosis of prostate adenocarcinoma according to age (biopsied).*

Age Range	White %	Mulatto / Black %	PR (CI 95%)	p value
Biopsied	16/30 (53.3%)	77/132 (58.3%)	1.1 (0.76 - 1.57)	0.6
40 to 60 years	2/4 (50.0%)	19/27 (70.4%)	1.4 (0.51 - 3.8)	0.58
> 60 years	14/26 (53.8%)	58/105 (55.2%)	1.0 (0.7 - 1.52)	0.9

RP = razão de prevalência; IC = intervalo de confiança.

Additionally, in the analyzed material, no significant difference was found between the 3 racial groups concerning age, presence of urinary symptoms and prostate volume. As for the serum level of PSA, no significant difference was found between the 3 groups as well, differing from Henderson et al. (9) who, in a retrospective study, found higher serum levels of PSA in Black men, when compared to White man of a similar age group, though it did not involve men with evidence of prostate adenocarcinoma. The reasons for this discrepancy are not apparent and were not a matter of this study.

Literature has called the attention to several risks for developing prostate cancer, with race being one of them (10,11). Studies conducted in North-American population showed a high incidence of prostate cancer in Blacks, with a low incidence in Whites (12-14).

Though the number of White men with diagnosis of prostate adenocarcinoma was lower than that of Mulatto and Black men, there was no difference relative to the proportion of patients with prostate adenocarcinoma in each racial group, in our population. Even when Mulattos and Blacks were jointly considered, no association was found between race and diagnosis of prostate adenocarcinoma neither in the group of all patients assessed nor in those who underwent prostatic biopsy. When stratified by age, the lack of association remained both for the total group (prevalence ratio - PR = 1.1) and among the biopsied patients (PR = 1.0) aged above 60 years old. Among those aged under 60 years, as well, there was no association between the analyzed groups. However, it is important to observe that in the total group the frequency of prostate adenocarcinoma was 2 times higher among Mulattos and Blacks than among Whites. Studies with larger groups of participants could determine if such result is incidental or if, really, Mulatto and Black men have a higher risk of prostate adenocarcinoma in lower age ranges.

Our data are in accordance to others in the literature. Antonopoulos et al. (7) and Cotter et al. (5) did not find a significant difference in the prevalence of prostate adenocarcinoma between Whites and Blacks as well. However, Cotter et al. (5) demonstrated that American Black men have a familial history of prostate cancer more often and are younger at the time of diagnosis than White men. In a subsequent publication, however, Antonopoulos et al. (15) reported a higher prevalence of neoplasia in Negroid than in White patients. The reasons for the difference between the 2 series were nor assessed, but it is known that genetic, environmental, dietetic, educational, and socio-economic factors, related to the diagnosis of prostate adenocarcinoma, also vary in different Brazilian regions.

We must call to attention that racial distribution in the studied population is similar to that in the metropolitan region of Salvador - Bahia, according to the demographic census conducted by the Brazilian Institute of Geography and Statistics (IBGE) in the year of 2000 (16), which suggests that, in a certain way, it represents the prevalence behavior of prostate pathology in the population.

We must pay attention to the fact that Brazilian population and, mainly the one from Bahia, has a high miscegenation index. It is important to stress that the classification of race using skin color as a parameter is inaccurate, especially in countries like ours, and it was discussed by Azevedo (17). However, the importance of phenotypic characteristics in biomedical studies and even in clinical practice is acknowledged, as evaluated by Burchard et al. (18). A better investigation of genetic and environmental differences between Black and White men can be helpful for clarifying the mechanisms of prostate carcinogenesis (19).

CONCLUSION

Prostate adenocarcinoma was found in 16.6% of patients aged between 40 and 79 years. We found no influence of race in our population with prostate adenocarcinoma though the punctual estimate had indicated a frequency 2 times higher among Mulattos and Blacks (PR = 2.2) than in Whites in the age range between 40 and 60 years, even if it was not statistically significant.

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Correspondence address:
Dr. Milton da Silva Barros
Rua do Benjoim, 940 / 202
Salvador, BA, 41810-400, Brazil
Fax: + 55 71 235-8854

EDITORIAL COMMENT

This paper addresses a controversial and much discussed subject in international literature – the association of racial factors with the prevalence of prostate cancer in the population submitted to screening for early detection of this pathology. Studies on detection of prostate cancer coordinated by Catalona observed that black race men present an increased risk for this disease, which can also appear earlier in these individuals (1,2). Such data have generated much discussion, since they imply in differentiated politics for health programs based on race, which is often seen as a discriminatory factor by some people. In the Brazilian population, little is known about racial differences concerning the diagnosis of prostate cancer. In this aspect, the present work brings relevant information, and stresses that there was no statistically significant difference between the racial groups under study, despite the prevalence ratio was 2.2 times higher among younger Black men, in the age range between 40 and 60 years. Maybe, with a larger number of patients, this difference could reach a significance, which would corroborate North-American data. In Brazil, though, racial differentiation is not an easy task to be done due to the strong miscegenation that occurred since colonial times between European, Indian and African populations (and the latter one with different origins as well). It is also interesting to note the high positive predictive value of prostate biopsy in the population studied in this paper, higher than the one internationally reported. Could it be that our patients are being diagnosed with neoplasias in more advanced stages or that biopsy techniques have evolved?

Racial implications in prostate cancer gain importance because they go beyond a mere diagnosis. Black race has also been questioned as a factor associated to adverse pathology or inferior responses to treatments such as radical surgery or external radiotherapy (1-3). More recently, however, these results have been doubted, stressing that in populations with identical access to health, racial factor cannot be an independent factor of pathology or of therapeutic outcome (4,5). Moreover, it can be stressed that co-factors indirectly related to race, and not always studied, e.g., a higher tendency to obesity, have been suggested as the actual responsible for the racial differences in the behavior of prostate neoplasia (6).

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Dr. Gustavo Franco Carvalhal
Section of Urology
School of Medicine, Catholic University
Porto Alegre, Rio Grande do Sul, Brazil