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Original Article

Epidemiological Study of Prostate Neoplasms in Maragheh City During 2014-2019: Northwestern of Iran

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Abstract

Background and aims: Prostate neoplasms have various geographical distribution in the world as well as in Iran. This study aimed to investigate the epidemiology of prostate neoplasms in Maragheh due to the lack of literature on the subject in this city.

Methods: This study is a descriptive-analytical, cross-sectional study in which the epidemiological status of prostate neoplasms was investigated in Maragheh during 2014-2019. All available records in the form of a census were included in the study. A checklist made by the researcher was used as a special tool for collecting data from prostate neoplasms medical records. The collected data were analyzed by statistical tests of chi-square, unpaired *t* test, Kruskal–Wallis test, and Cohen's kappa coefficient using SPSS 25 software.

Results: By way of explanation, 107 medical records on prostate neoplasms were recorded between 2014 and 2019. The mean and median ages were 71.33 ± 9.37 and 70 years. The highest frequency was observed in the 60-70 age group with a frequency of 41.1% (44 cases). All patients had been undergoing clinical examination (first) and pathological examination (after prostatectomy). For 12.1% of individuals, benign prostatic hyperplasia (BPH) had been diagnosed in the clinical diagnosis, and cancer and prostatitis had been diagnosed in the pathological test. Cohen's kappa coefficient was obtained 20.4%, which was statistically significant ($P \leq 0001$). The results showed a significant relationship between the number of prostate neoplasms and age groups ($P \leq 0001$).

Conclusion: Taking the results of this study into account, it is recommended that more attention be paid to other laboratory and radiological tests such as the PSA test, ultrasound, etc. In addition to clinical examination, it is also suggested that screening programs be particularly developed for the age group ≥50 using a specific prostate antigen against this cancer.

Keywords: Neoplasms, Prostate, Epidemiological

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Introduction

Cancer is one of the most prevalent non-communicable diseases, as well as one of the most significant causes of death and disability worldwide and in Iran.[1-3] In developing countries, cancer is the most critical public health problem among non-communicable diseases, and it is the third leading cause of death after cardiovascular disease and accidents.[4-6] The GLOBOCAN's report in 2012 stated that 14.1 million of new cases of cancer occurred annually in the world and 8.2 million people died per year due to cancer.[3] According to the Iran Ministry of Health and Medical Education report, cancer is the third leading cause of death in the country after cardiovascular diseases and accidents.[7]

Prostate cancer is one of the most common cancers worldwide, and also the second most common cancer among men.[3,8] Moreover, this malignancy is one of the cancers with rising rate and the chief cause of death among Iranian men, as it is the sixth most common cancer occurring among the population, as well as the third most common cancer affecting men in Iran.[9]

Prostate neoplasms have various geographical distribution in the world. It is less prevalent in Asian countries – including Iran, than Western countries.[10,11] The occurrence of prostate neoplasms varies considerably depending on the country and racial population. Some studies have reported up to 90 times more differences between two geographical regions.[12,13] The difference in the occurrence of prostate neoplasms in developed and Asian countries is attributable to repercussions of important differences in the lifestyle.[14] The distribution of prostate neoplasms in Iran is also different. According to data recorded in 2000, the standardized incidence of prostate cancer in Ardabil was 3.5 among 100 thousand people; while in other studies, the prevalence of prostate cancer was 15.6 in 100 thousand individuals.[15,16] These differences are attributable to various factors, such as genetic susceptibility, exposure to unknown environmental risk

factors, differences in health care and cancer registration, and even the sum of some of these factors.[17]

Therefore, the present study aimed to study prostate neoplasms due to the increasing frequency of prostate cancer – especially in developing countries, the lack of academic researches on the changes of time and the epidemiology of the disease in Maragheh, and the importance of providing accurate records of cancer in implementing effective methods for prevention and treatment of the disease.

Materials and Methods

The present study is a descriptive-analytical, cross-sectional study in which the epidemiological status of prostate neoplasms was examined during the period 2014 to 2019 after receiving the approval of Maragheh University of Medical Sciences Vice Chancellor for Research and the code of ethics IR.MARAGHEHPHC.REC.1397.015.

All medical records of the patients referred to Amir Al-Momenin hospital in Maragheh and diagnosed with prostate hyperplasia and underwent prostatectomy between 2014 and 2019 were examined taking a census. Maragheh city, with a population of about 177 079 thousands, is located in southwest of East Azerbaijan province, Iran. As for initiating the investigation, cases with incomplete data as well as medical files on the patients from other regions travelling to Maragheh for treatment were removed from the study. A checklist made by the researcher was used as a special tool for extracting data from prostate neoplasms medical records. The checklist was divided into two sections: section one including biographical information, and section two including clinical information. The information in the medical records was transferred to the checklist, and an attempt was made to maintain complete confidentiality of the patients.

The collected data were analyzed using SPSS 25 statistical software. As for the variables, only age, year of diagnosis, the season of diagnosis, place of residence, clinical diagnosis, and pathology diagnosis were analyzed. Other variables, namely the type of cancer cell, the degree of cancer, and the stage of the cancer were not included in the statistical analysis due to the high number of the lost cases. Indicators such as frequency, mean and standard deviation were used in descriptive statistics, and statistical tests of chi-square, unpaired t-test, Kruskal–Wallis test, and Cohen's kappa coefficient were used in analytical statistics according to existing assumptions. The significance level in this study was set at 0.05.

Results

A total of 154 medical records on prostate neoplasms had been compiled during the period from 2014 to 2019 in Maragheh Amir Al-Momenin hospital. Now, 39 cases (25.3%) out of these 154 records belonged to individuals coming from neighboring counties and their surrounding villages and, therefore, were excluded from the study. Eight patients out of the remaining 115 ones having been diagnosed with prostatitis in pathological examinations were also excluded from statistical analysis (except corresponding Cohen's kappa coefficient used for the results of clinical and pathological studies).

After adopting both diagnostic methods (i.e., clinical and pathological methods) to examine 115 patients, 99 individuals had been diagnosed with benign prostatic hyperplasia (BPH) and 2 individuals had been diagnosed with cancer; however, for 14 persons (12.1% of the total) in the clinical diagnosis, BPH was diagnosed, and with the pathological test, cancer, and prostatitis (Six persons with cancer and eight persons with prostatitis) was diagnosed. Cohen's kappa coefficient was found to be 20.4%, which was statistically significant ($P \leq 0001$).

The patients' ages ranged from 44 to 91 years; and the mean and median ages of the patients were 71.33 ± 9.37 and 70 years, respectively. The highest frequency was observed in the 60-70 age group as being 44.1% (44 cases), and lowest frequency was found in the 40-50 age group as 1.9% (2 cases). The results of the Kruskal–Wallis test showed a significant relationship between the number of prostate neoplasms and age groups ($P \leq 0001$).

According to pathological tests, no case of prostate cancer had been recorded for the ≤ 60 age group, and most cases of cancer had been recorded (4 cases) for the 60-70 age group. Chi-square test results indicated that there was no significant relationship between the type of neoplasm and age groups ($P = 1.000$).

The highest and lowest cases of prostate neoplasms were recorded in 2015 and 2014 with frequencies of 28% (30 cases) and 8.4% (9 cases), respectively. According to pathological tests, most cases of prostate cancer (3 cases) had been reported in 2015; however, no cases of prostate cancer had been recorded in 2017. According to a linear diagram, the number of recoded BPH cases was on upward trend from 2014 to 2015, then it was downward from 2016 to 2017, and finally the trend was on upward slope again from 2017 to 2019.

In terms of the diagnosis season, the highest and lowest cases of prostate neoplasms had been diagnosed in summer with 28% (30 cases) and in spring with 22.4% (24 cases), respectively. The results of Kruskal–Wallis test showed that there was no significant relationship between the number of prostate neoplasms diagnosed based on clinical examination and the diagnosis season ($P = 0.469$).

As for the patients' place of residence, 68.2% of the patients (73 cases) were city dwellers, and 31.8% (34 cases) of them were rural dwellers. The results of unpaired t-test demonstrated that there was no significant association between the number of prostate neoplasms and the place of residence ($P = 0.423$) (Table 1).

Discussion

Analyzing the data from 107 patients with prostate neoplasms in the present study showed that the lowest age of diagnosis was 44 years and the highest age was 91 years, with the mean and median age of 71.33 ± 9.37 and 70 years,

Table 1. Frequency Distribution and Demographic Characteristics of Patients With Prostate Neoplasms

Characteristics		Percentage of prostate neoplasms based on pathological test	Frequency distribution based on clinical diagnosis		Frequency distribution based on pathological test		
			BPH	Cancer	BPH	Cancer	Prostatitis
Age	40-50	1.9	2	0	2	0	0
	50-60	9.3	12	0	10	0	2
	60-70	41.1	43	2	40	4	1
	70-80	27.1	30	0	27	2	1
	+80	20.6	26	0	20	2	4
Place of residence	City	68.2	78	0	69	4	5
	Village	31.8	35	2	30	4	3

respectively. The lowest and highest relative frequencies were observed in the age groups of 40-50 (1.9%) and 60-70 (44.1%), respectively. According to the results from a study by Haghighi et al in Birjand, the highest and lowest incidences of prostate neoplasms were detected in the age groups of 60-70 (40.3%) and ≤ 50 (1.4%), respectively, which were consistent with the findings of this current study.[18]

According to pathology tests, no prostate cancer was reported in the ≤ 60 age group. The highest incidence of registered cancer (4 cases) was seen in the 60-70 age group. The difference was not statistically significant ($P=1$). In a study by Falahatkar et al in Gilan province, the mean age of the patients diagnosed with benign hyperplasia in the pathological test was 76.8 ± 7.8 years, but it was 69.4 ± 8.3 years in patients diagnosed with cancer in the pathology sample, which was not statistically significant. Their study results were in line with the findings of this current study.[19]

In this study, the highest and lowest cases of prostate neoplasm were diagnosed in summer with 28% frequency (30 cases) and in spring with 24.4% frequency (24 cases), respectively. In a study by Almasi et al in Markazi province, the highest number of neoplasms was reported in winter (26.9%), and the lowest number of neoplasms was recorded in summer (20.3%).[20] The difference could be due to the climatic differences affecting study populations in Almasi and colleagues' study and this study.

As for the patients' place of residence, 68.2% of the registered cases were from city and 31.8% of them were from the neighboring villages; this difference was not statistically significant ($P=0.469$). In the study by Almasi et al in Markazi province, 79.1% of patients with neoplasms were city dwellers and 20.9% of them were rural dwellers. Their findings in this regard were consistent with the results of this current study.[20]

Overall, the present study showed that there was a significant decrease in the number of registered neoplasms since 2015. However, Haghighi et al study in Birjand reported an increase in the number of registered prostate neoplasms.[18] Many factors could have been responsible for this discrepancy, among which are the incomplete registration of data in some cases, the lack of full coverage of the population, and the possibly of the referral of some Maragheh dwellers to hospitals in neighboring cities – Tabriz, in particular.

In this study, and from among 113 patients having undergone surgery with the clinical diagnosis of BPH, six patients were diagnosed with cancer and eight patients were diagnosed with prostatitis. The Cohen's kappa coefficient was 20.4% which is a relatively low kappa coefficient between the two methods of clinical diagnosis and pathological diagnosis ($P\leq0001$). In Haghighi et al study in Birjand, a relatively good kappa coefficient (65%) was observed between the clinical examination and the pathology test ($P<0.05$).[18] This could be explained by the fact that grade A prostate cancer is not clinically detectable by rectal examination and it can be detected by pathology.

Conclusion

Due to the low Cohen's kappa coefficient between clinical and pathological diagnosis, it is recommended that other laboratory and radiological tests (e.g., the PSA test, ultrasound, etc.) be paid sufficient attention in clinical diagnosis in addition to clinical examination. Moreover, due to the significant difference in the incidence of prostate cancer between the two age groups of <50 years and ≥ 50 years, it is suggested that screening programs be particularly developed for the age group ≥ 50 years using a specific prostate antigen against this cancer.

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