

Relationship between the Breast Cancer History and Prostate Cancer in Relatives with Prostate Cancer

M. Jamshidi (MD)¹, A. Aliramaji (MD)², S. Khafri (PhD)³, E. Moudi (MD)^{*4}

1.Student Research Committee, Babol University of Medical Sciences, Babol, I.R.Iran

2.Department of Urology, Babol University of Medical Sciences, Babol, I.R.Iran

3.Fatemeh Zahra Fertility and Infertility Research Center, Health Research Institute, Babol University of Medical Sciences, Babol, I.R.Iran

4.Cancer Research Center, Health Research Institute, Babol University of Medical Sciences, Babol, I.R.Iran

J Babol Univ Med Sci; 19(8); Aug 2017; PP: 7-11

Received: Nov 19th 2016, Revised: Feb 22th 2017, Accepted: Apr 30th 2017.

ABSTRACT

BACKGROUND AND OBJECTIVE: The family history of breast and prostatism cancer is a risk factor for prostate cancer. Considering the common pathogens for prostate and breast cancers, the aim of this study was to determine the relationship between the patient's prostate cancer and their first and second-class relatives with the history of breast cancer.

METHODS: This case-control study was conducted on 300 patients who underwent biopsy in Shahid Beheshti hospital due to prostate enlargement. Patients were divided into two groups based on biopsy: a) prostate cancer in case group and benign prostate enlargement in control group. Additional information of the first and second-class relatives of patients was collected in the checklist and evaluated. The patients (150 control, 150 experimental) were selected using simple sampling method. The experimental and control groups who underwent biopsy suffered from prostate cancer and benign prostate enlargement, respectively. Additional information was collected in the checklist and evaluated for patients in the first and second grade families.

FINDINGS: The mean age of patients was 72.17 ± 9.788 and 70.01 ± 9.921 in case and control group, respectively. The frequency of breast cancer in the family of patients with prostate cancer and healthy persons was 16 (59.3%) and 11 (40.3%), respectively and the frequency of prostate cancer was 26(17.3%) and 2(1.3%), respectively ($p < 0.001$). The frequency of breast cancer was greater in first than second grade familie in both groups. In both groups, the history of breast cancer was higher in patients older than 40 years.

CONCLUSION: The results of the study indicated that the frequency of prostate cancer is probably higher if the first and second-class relatives affect with prostate cancer than breast cancer.

KEY WORDS: Breast Cancer, Prostate Cancer, Family, Relationship, First-Class Relatives, Second-Class Relatives.

Please cite this article as follows:

Jamshidi M, Aliramaji A, Khafri S, Moudi E. Relationship between the breast cancer history and prostate cancer in relatives with prostate cancer. J Babol Univ Med Sci. 2017;19(8):7-11.

* Corresponding author: E. Moudi (MD)

Address: Department of Urology, Shahid Beheshti Hospital, Babol University of Medical Sciences, Babol, I.R.Iran

Tel: +98 11 322556275

E-mail: emadmoudi@gmail.com

Introduction

Among the risk factors for breast cancer, familial history has high value so that according to available data, 10 to 15 percent of breast cancers are hereditary. Risk factors for breast cancer increase the risk of disease slightly, but in some cases such as benign breast disorders, history of previous breast radiation especially at a younger age, family history and specific genes increase this probability 2 to 3 times higher. Family history of breast cancer is considered as a risk factor for prostate cancer, although some studies did not show this relationship (1,2).

There is a common pathogenesis for prostate and breast cancer (3). There is also a strong evidence of the role of steroid hormones in prostate and breast cancer. Estrogen is known to be one of the leading causes of breast cancer and the role of androgen in the development of prostate cancer has been determined. When the axis of the ovary and testicles are removed, the risk of prostate and breast cancer is significantly reduced (4). The incidence of breast cancer in the United States is 1 in 8 (12%) as the most common cancer among women. The risk of death from this cancer is 1 in 35 (3%) (2).

Hereditary Breast and Ovarian Cancer (HBOC) syndrome (due to mutations in the BRCA1 and BRCA2 genes), which is known as dominant autosomal inheritance pattern, has particularly increased the susceptibility to breast and ovarian cancer, early onset of breast cancer and increased prevalence of tumors of other organs, such as fallopian tubes, prostate, men's breast and pancreas (5). The association of prostate and breast cancer was reported in the family in the white population (6). Since some studies have reported the association of prostate and breast cancer in the family, in this study, breast and prostate cancer in their first and second grade families of existing cases of prostate cancer patients were considered in order to determine the association between prostate cancer and family history of breast and prostate cancer.

Methods

This case-control study was performed on 300 patients (150 in the case group and 150 in the control group) underwent biopsy due to prostate enlargement at the Shahid Beheshti Hospital in Babol after registration in ethics committee of Babol University of Medical Sciences. Patients diagnosed with prostate cancer were confirmed by biopsy in the case group and

benign prostatic hypertrophy in the control group. Patients who died or had no precise knowledge of their family history were excluded from the study. Patients' demographic data, including age, sex, diagnosis method and final diagnosis were recorded by referring to patients' profiles. Sampling for all patients was done by a surgeon. The final diagnosis for patients was confirmed by using biopsy.

Diagnostic techniques were transurethral resection of the prostate (TURP) and Open Prostatectomy, which ultimately confirmed the malignant or benign diagnosis of prostate lesions. In this study, the history of breast and prostate cancer in the family, lactation and kinship ratios, smoking and alcohol were also evaluated in people with prostate cancer. The control group was matched according to the age group. To obtain additional information, a checklist was prepared and checklists were completed in person and on the telephone. Since most patients had a high age, the closest person who had complete knowledge of the patient's family was assisted.

Data were analyzed using SPSS V.22, Chi-Square and Fisher's exact test for qualitative variables and T-test for quantitative variables were used in both groups and $p < 0.05$ was considered significant.

Results

The mean age in the case group was 72.17 ± 9.38 years and in the control group was 70.01 ± 9.21 years. This difference was not statistically significant ($p = 0.66$). The number of people with breast cancer in the family of people with prostate cancer and benign prostatic hyperplasia was 16 in the case group and 11 in the control group. 63.3% of the case group and 69.1% of the control group were born in the village. In terms of academic status, in the case group, 42.7% and 52.7% in the control group, this difference was statistically significant (table 1) ($p = 0.02$).

Although the number of breast cancer patients in the case group was greater than the control group, this relationship was not statistically significant. Family history of prostate cancer was associated with the incidence of prostate cancer in the subjects (Table 2) ($p < 0.001$). In the case and control group there was no history of smoking, alcohol and kinship ratios with cancer. All people with breast cancer had a history of breastfeeding. In terms of age, the highest incidence of breast cancer in both the case and control groups was in subjects over 40 years of age. No relationship was found among age, smoking, alcohol and kinship ratios

with cancer. Among those with a history of breast cancer, in the case group, 81.3% of the subjects had a first-degree family relationship and in control group 63.6% had a first-degree family relationship. Out of 16 cases who had a family history of breast cancer, 6 cases (23.1%) had a family history of prostate cancer, while in the control group, none of the family members of the benign prostatic hypertrophy, there was no association between the family history of breast and prostate cancers.

Table 1. Evaluation of basic information in case and control groups (N=150)

Variables	group	Case N(%)	Control N(%)	P-value
Place of birth				
City		55(36.7)	46(30.9)	0.29
Vilage		95(63.3)	1.3(69.1)	
Body mass index (Kg/m²)				
<18.5		3(2)	-	0.01
18.5-24.9		66(44)	84(56)	
25-29.9		59(39.3)	57(38)	
≥30		22(14.7)	9(6)	
Educational status				
illiterate		64(42.7)	79(52.7)	0.021
under diploma		51(34)	47(31.3)	
diploma		20(13.3)	21(14)	
More than diploma		15(10)	3(2)	

Table 2. Diagnostic method and family history of prostate cancer and other cancers (N=150)

Family history	Group	Case N(%)	Control N(%)	P-value
Breast cancer		16(10.7)	11(7.3)	0.313
Prostate cancer		26(17.3)	2(1.3)	<0.001
Benign prostate cancer		18(30)	22(14.7)	0.611
Other cancers		6(4)	3(2)	0.501

Discussion

In this study, patients with prostate cancer were older than 40 years. In a study by Najafi et al., 35% of breast cancer patients were young people aged less than or equal to 40 years old (2). In the study of Shafi et al., the incidence of prostate cancer in individuals with a family history was reported relatively high (7), which is consistent with the present study. The cause of similarity is also probably due to the age group or type of related cancer. There is a genetic relationship between prostate and breast cancers (8). The results of

Lori et al. also showed that there is a genetic relationship between prostate and breast cancers (9). In the study of Lynch et al., 10 to 15 percent of the total population of breast cancer patients was aged less than or equal to 40 (3).

Therefore, it can be concluded that the population with less than or equal to 40 years of age with breast cancer in our country is higher than in Western countries (3). In a study by Najafi et al., a total of 10% of breast cancer patients referred to hospitals were positive family history in the first or second degree relatives (2).

One of the specific strategies to reduce the risk of breast cancer is to provide genetic counseling to find the hereditary groups of the disease. Therefore, it should be noted that family history is one of the most important risk factors for breast cancer (1).

The presence of even a first-degree relative (mother, sister, or girl) increases the risk of breast cancer and doubles the risk of developing breast cancer five times (4). Even when there is a person in a second-degree family (aunt and grandmother) or a third-degree family, the risk is higher, and with increase in the number of relatives involved, the risk of this cancer also increases (5).

Even having a male family member with breast cancer clearly increases the risk of cancer. 5 to 10 percent of all breast cancers are hereditary that can be linked to mutation of genetic genes (5). The most common hereditary breast cancer syndromes are those that are related to the mutation of the BRCA1 and BRCA2 genes, so that 60 to 80% of hereditary cancers in the breast are related to the mutation of these two genes (6).

Najafi et al reported that 5.9% of the total population had a history of non-breast cancer, and the most common type of non-breast cancer in the family of breast cancer patients was colon cancer. The history of ovarian cancer in family members was only 0.6% of patients (2). Some cancers are statistically and genetically distinctly related to breast cancer. Although coexistence of these cancers with prostate and breast cancer in a particular family can be a coincidence, but if necessary, it will require a genetic counseling. Of course, ovarian, colon, prostate, and uterus cancers should be taken into account (10).

In most studies in the West and in Iran, these cancers are mentioned in the family of breast and prostate cancers. Modugno et al. found that in cancer patients, hormone-dependent cancers such as breast,

prostate and endometrial cancers have also shown association (11). It seems that racial and geographical differences in the risk of developing different cancers are effective in concomitant cancer. The most important risk factors for this disease are sex, age, race, benign underlying disease such as DCIS and LCID, and atypical duct hyperplasia, age of menarche, frequency of fertilization, lactation, exposure to diethylstilbestrol, previous radiation of breast, HRT, obesity, alcohol consumption, familial history and the presence of specific genes (3). The results of the study indicated that in the case of first and second-degree

relatives of prostate cancer in comparison with breast cancer, there is a greater probability of prostate cancer.

Acknowledgments

Hereby, we would like to thank the Vice-Chancellor for Research and Technology of Babol University of Medical Sciences for financial support of this research and from the Department of Clinical Research Development of Shahid Beheshti Hospital, especially Ms. Sakineh Kamali, as well as from the participants and cooperation of the elderly.

References

1. Colditz GA, Willett WC, Hunter DJ, Stampfer MJ, Manson JE, Hennekens CH, et al. Family history, age, and risk of breast cancer. prospective data from the nurses' health study. *Jama*. 1993;270(3):338-43.
2. Najafi S, Mehrdad N, Alvi NS, Olfat Bakhsh A. Important of genetic consultation in breast cancer patients. *Iran Quart J Breast Dis*. 2009;2(1):38-42.[In Persian].
3. Lynch HT, Watson P, Conway TA, Lynch JF. Clinical/genetic features in hereditary breast cancer. *Breast Cancer Res Treat*. 1990;15(2):63-71.
4. Jemal A, Siegel R, Ward E, Hao Y, Xu J, Murray T, et al. Cancer statistics, 2008. *CA Cancer J Clin*. 2008;58(2):71-96.
5. Slattery ML, Kerber RA. A comprehensive evaluation of family history and breast cancer risk: the Utah Population Database. *JAMA*. 1993;270(13):1563-8.
6. Foulkes WD. Inherited susceptibility to common cancers. *New Eng J Med*. 2008;359(20):2143-53.
7. Shafi H, Mooudi E, Abolfazli M, Zarghami A, Mohamadpoumr M, Firoozjai AR, et al. Screening of prostate cancer in individuals older than 40 years of age with positive heredity. *J Mazandaran Univ Med Sci*. 2013;22(97):159-64.[In Persian].
8. Lallco F, Evans DG. Familial breast cancer. *Clin Genet*. 2012;82(2):105-14.
9. Lori C, Sakoda Eric, Jorgenson John S, Witte. Forward findings for hormonally mediated cancers. *Nat Gen*. 2013;45:345-8.
10. Risch HA, McLaughlin JR, Cole DE, Rosen B, Bradley L, Fan I, et al. Population BRCA1 and BRCA2 mutation frequencies and cancer penetrances: a kin-cohort study in Ontario, Canada. *J Natl Cancer Inst*. 2006;98(23):1694-706.
11. Modugno F, Zmuda JM, Potter D, Cai C, Ziv E, Cummings SR, et al. Association of estrogen receptor α polymorphisms with breast cancer risk in older Caucasian women. *Inte J Cancer*. 2005;116(6):984-91.