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Relationship between the ABO blood groups and Breast cancers

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Background: Breast cancer is the most common cancer among women. However, the mortality rates are falling slightly for some subpopulations; it is still a potentially lethal adversary. The relationship between ABO/Rh blood group and breast cancer has been assessed previously, but background information is few and the role of blood group as a prognostic factor remains controversial.
Materials and Methods: In this retrospective study, a self-administered questionnaire was used to collect the information from patients with breast cancer during 2008-2010.
Results: Totally 59 women with breast cancer were enrolled in this study. Mean age was 48.5±11.8 (25-80) years old. The distribution of ABO blood-grouping blood- were as follows: blood group type O: 19; A: 25; B: 8; and AB: 7.56. A number of patients had positive Rh. Lymph node involvement and distant metastasis were found in 26 of them; therefore, there was a positive correlation between regional lymph node metastasis and ABO (p>0.05). The mean of the longest diameter of the tumor was 1.5-6. The distribution of ABO and Rh blood-grouping did differ according to age of patients.
Conclusions: We conclude that the role of blood groups as risk factors for breast cancer should be considered together with other risk factors. However, based on our results, there are significant associations between Rh blood group and the breast cancer and lymph node metastasis.

Keywords: ABO Blood group, Breast cancer, RH blood group

Background

Breast cancer is a major public health problem for women throughout the world and while the mortality rates are falling slightly for some subpopulations of women, it is still a potentially lethal adversary. ABO blood group exerts a significant influence on susceptibility and outcomes (1-4). In 1984, scientists discovered a gene for breast cancer susceptibility linked to ABO susceptibility, located on chromosome 9 at band q34. This discovery of a genetic connection confirms an increasing body of statistical evidence connecting blood group to breast cancer. The role of ABO/Rh blood group as a prognostic factor in breast cancer has been examined in the past; however, existing data are surprisingly few and the prognostic role of blood group remains controversial (5). However, there is evidence that ABO blood groups may have importance, since the antigens of blood groups seems to have a significant biological role in the immunological system, thereby promoting the development of some tumors, including breast cancer (6). The aim of this study was to investigate the presence of a possible association between breast cancer and blood groups ABO and Rh (7, 8).

Materials and Methods

In this retrospective study, a self-administered questionnaire was used to collect the information from patients with breast cancer admitted in the surgical wards of Golestan & Shafa teaching hospitals of Ahvaz Jundishapur University of Medical Sciences during 2008-2010. The required information included the age, type of blood group (ABO and Rh), type of breast cancer, size of tumor, and lymph node metastasis.

Results

Totally 59 women with breast cancer were enrolled in this study: the mean age was 48.5±11.8 (25-80) Y/O. The distribution of ABO and Rh blood-grouping were as follows: blood group type O: 19, A: 25, B: 8 and AB: 7 (table.1). A total of 56 patients were positive Rh. The mean of the longest diameter of the tumor was 1.5-6. Lymph node involvement and distant metastasis were found in 26 women. Therefore, there was a correlation between ABO group and regional lymph node metastasis (p>0.05; CI: 95%). The distribution of ABO and Rh blood-grouping were different according to the age of patients. However, women with a positive Rh had a significantly lesser trend for distant metastasis. Rh+ was along with metastasis in 26 out of 56 patients. The relative risk of metastasis in Rh (-) patient was 4.2 times higher than Rh (+) patients. Among Rh (+) patients the relative risk of metastasis in blood group A was 1.29 times higher than the risk in the other blood groups. Of all blood groups, group A and especially Rh (-) was associated with the worst prognosis (p>0.05).

However, based on our results, there are significant associations between Rh blood group and the breast cancer & lymph node metastasis. Patients with a positive Rh had a significantly lesser trend for distant metastasis.

Table 1. The distribution of blood groups among patients with breast cancer

Blood group	Frequency	Percentage
A	25	42.37
O	19	32.20
B	8	13.5
AB	7	11.8
Total	59	100%

Discussion

The role of genetic factors in the development of cancer is widely accepted. During the last two decades, the role of inheritance in breast tumorigenesis has been clearly established, mainly after the description of BRCA1/2 and other genes. In 1921, Alexander *et al.* reported that patients with blood group B and AB were more vulnerable to develop malignancy, which can be more aggressive than neoplasms occurring in patients with other blood groups (9, 10). According to the result of the study by Aird and Bentall, there is an association between blood group A and gastric cancer (11). This was subsequently confirmed by other investigators, who showed a further association between blood group A and pernicious anemia (12-14). Pandey *et al.* showed an increased frequency of carcinoma of the gallbladder in blood groups A and AB (15). Based on some studies there is a controversy in the role of ABO/Rh blood groups in breast cancer (16). Other groups of investigators have also recognized ABO blood groups as a predisposing or prognostic factor in breast cancer (2, 9, 12, 13). Tamatakos *et al.* showed that a positive family history is more commonly found in Rh (+) patients irrelevant to the ABO blood groups. Rh (+) women with a positive family history are more often presented in blood group A and less often in blood groups AB and B. Ductal type occurs more frequently in Rh (+) patients regardless of the blood group ABO [10]. According to the findings of the study conducted by Aired and bentall *et al.*, in Rh (+) patients, ductal breast cancer is differentially distributed and is commonly observed in patients with blood group A (17). Previous studies have shown that women with the A blood group are generally prone to develop neoplasms with poor prognosis and aggressive biological behavior and these women represent a significant percentage among breast cancer patients, higher than the actual percentage of A blood group among the general feminine population (10, 12, 13). In contrast, women with O blood group may have some "protection" against the development of breast cancer; even when these women have breast cancer, prognosis is usually more favorable (12). Women with AB blood group have similarities with the A blood group. In contrast, women in the B blood group have similarities with women in the O blood group, especially when no family history exists. An interesting observation of some investigators showed that breast cancer patients in the B blood group are at a higher risk of being re-affected by breast malignancy compared with women in other blood groups (15). Based on these data, ABO/Rh blood group could be used as a prognostic factor in breast cancer patients. This use of blood groups is an interesting proposition, given that the determination of blood group requires a simple and cheap examination. However, further studies with a larger number of patients are needed to clearly establish the role of ABO/Rh blood groups as a prognostic factor in breast cancer patients (9).

Conclusions

In conclusion, it appears that A blood groups are most associated with breast cancer. In order to study, the role of blood groups as risk factors for breast cancer should be considered together with other risk factors. However, based on our results, there are significant associations between Rh blood group and the breast cancer & lymph node metastasis. Patients with a positive Rh had a significantly lesser trend for distant metastasis

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