



Incidence of Breast Cancer and ABO Blood group: A Hospital Based Study

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ABSTRACT

Blood group antigens being the major antigen in humans are present on the surface of red blood cells and various epithelial cells. Since the majority of human cancer cases are derived from epithelial cells, changes in blood group antigens are an important aspect of cancer. Thus the present work is designed to study ABO blood group and incidence of breast cancer in patients of Mahavir Cancer Institute. The study has been carried out on 400 breast cancer patients diagnosed and treated at Mahavir Cancer Institute and Research Centre and control blood samples of 200 healthy people were taken randomly and were classified according to their ABO blood group. The blood group frequencies were compared using Chi- square test. In control group of women 28 percent having blood group A. while 37.5 percent has blood group B. 12.5 percent and 22 percent has blood group AB and O. In breast cancer 21.2 percent has blood group A. While 35.1 percent, 7.3 percent and 36.4 percent has blood group B, AB and O respectively. Thus it is evident from study that blood group O has more chances to develop breast cancer, while blood group B also has increased incidence of breast cancer. More than two third patients of breast cancer belong from these two groups. While blood group AB and A has less incidence of breast cancer comparatively. It is quite clear from study that blood group O people were more prone to develop breast cancer.

Keyword: ABO blood group, Breast cancer, Confidence Interval, Epithelial cells.

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INTRODUCTION

Blood group antigens being the major antigen in humans are present on the surface of red blood cells and various epithelial cells. Since the majority of human cancer cases are derived from epithelial cells, changes in blood group antigens are an important aspect of cancer^{1,4}. The first suggestion of an association between ABO blood group antigens and malignancy was made almost 100 years ago, yet the role of the ABO blood group in cancer risk and prognosis remains controversial⁵. Since the discovery of an association between stomach cancer and blood type A, there have been several studies on possible relationship of blood types to certain diseases⁶. ABO blood groups are a stable feature of a population and they differ among various socioeconomic, geographical and ethnic groups. In Europe, highest frequency is of allele A, increasing to allele B from West to East⁷. There are differences between the percentages of patients with various malignant tumors in our country and those in the western world. Cancer is a disease on which lot of work has been done in comparison to other diseases and yet lot of work has to be done⁸. The ABO blood type, an easily accessible factor in patient's genetic makeup, has been associated with many diseases, though the explanation for the association between ABO blood groups and some disease is still unclear. Since the first report showing an association between blood group A and gastrointestinal cancer⁹, numerous other reports have documented a relation between susceptibility to cancer and blood group. High incidence of blood group A in various cancers, including neurologic tumors, salivary gland, colon, uterus, ovary, pancreas, kidney, bladder and cervix¹⁰, and consistent relation to O blood group in skin and melanoma¹¹ have been reported. In some tumors, alteration of ABO/Lewis-related antigens is associated with malignant transformation^{12,13}. Thus the present work is designed to study ABO blood group and incidence of breast cancer in patients of Mahavir Cancer Institute and Research Centre.

MATERIALS AND METHOD

The study has been carried out on 400 breast cancer patients diagnosed and treated at Mahavir Cancer Institute and Research Centre and were classified according to their ABO blood group. The control blood samples of 200 healthy people were taken randomly and were classified according to their ABO blood group. The study was approved by ethics committee of Mahavir Cancer Institute and Research Centre, Patna, Bihar, India. All the patients and healthy control subjects were involved voluntarily in this study. Control subjects were selected among healthy people with no history of cardiovascular disease, cancer, chronic neurologic disease, hepatitis and alcohol abuse. Blood samples were obtained from each donor's venous circulation into

vacuum tubes containing EDTA. ABO and Rh blood typing were carried out with gel methods. Data were collected and statistically analysis was performed according to statistical package of Graph pad Prism. The blood group frequencies were compared using Chi- square test. Power of study was 80% while confidence Interval (CI) was 95%.

RESULTS AND DISCUSSION

In control group of women 28 percent having blood group A. while 37.5 percent has blood group B. 12.5 percent and 22 percent has blood group AB and O. In breast cancer 21.2 percent has blood group A. While 35.1 percent, 7.3 percent and 36.4 percent has blood group B, AB and O respectively (Figure 1 and Table 1). In the recent times, it has been speculated that a degree of the susceptibility to breast cancer, from a gene perspective, might be a result of a breast cancer-susceptibility locus linked to the ABO locus located on band q34 of chromosome 9¹⁴. Human malignancies such as colon, breast and prostate cancer as the blood group carbohydrates expressed on cell surface of metastasis cancer cells function as cell adhesion molecules. The loss or presence of blood group antigens can increase cellular motility or facilitate the interaction between tumor cells and endothelial cells¹⁵. The blood type antigens are incredibly important components in the process of cell maturation and control; for example the appearance or disappearance of blood type antigens is a hallmark of malignancy in many common cancers^{16,17}. A study of rapidly progressive breast cancer in Tunisian women found a slightly increased risk of a positive diagnosis in blood type A. In breast cancer patients, high frequency of blood group A (35.7%), followed by group O (28.5%), group B (19.0%) and group AB (16.6%) was observed¹⁸. In present study, decreased incidence of breast cancer was observed in blood group AB and blood group A patients. ABO blood group was highly correlation with breast cancer and the majority of patient with A blood group followed by O blood group in AL-Nassyiria governorate Iraq¹⁹. According to a study done in Iran, the association of breast cancer and the blood type has had different degrees in various studies. For example, it has been reported that A-blood group is more frequent in patients with breast cancer in comparison with O-blood group²⁰. The blood group type is one of the genetic factors which affects the risk of different cancers. Studies of associations between tumors outcome and the patients' ABO blood groups have shown increased relative risks for some of blood groups²¹. Many observations has showed that blood type A women have a generalized tendency to worse outcomes and a more rapid progression with this cancer. Various study indicates that blood type A women are over-represented among breast cancer patients, and that this trend occurs even among women thought

to be at low risk for cancer²². Systemic treatment of breast cancer includes cytotoxic, hormonal, and immunotherapeutic agents. The role of genetic factors in the development of cancer is widely accepted. During the last two decades, the role of inheritance in breast tumor genesis has been clearly established. A study showed that group A was significantly associated with breast cancer when compared to control²³. In study of rapidly progressive breast cancer in Tunisian women included 581 cases of the breast cancer patients. A positive risk was reported in blood group A patients²⁴. In Iceland study in 1988 looked at the risk of bilateral breast cancer in 184 familial and 572 sporadic cases with regard to ABO typing. Familial cases of bilateral breast cancer had two fold higher prevalence of type B than did sporadic cases²⁵. The increased rate of Blood type A as compared to controls has been reported by other researchers in breast cancer patients²⁶. In present study we observed that blood group O patient's prevalence of breast cancer was highest followed by blood group B. while in control group highest presence of blood group B was followed by blood group A and blood group O. it was observed that there were 22% control blood group people in periphery while 36.4% breast cancer were reported from this same blood group, this indicates that blood group O people was at highest risk for breast cancer.

Table 1: Showing ABO blood group and Breast Cancer incidence

Blood group	Control no. (%)	Patients no. (%)	P - value	Significance
A	56 (28 %)	85 (21.2 %)	0.203	NS
B	75 (37.5 %)	140 (35.1 %)	0.0012	HS
AB	25 (12.5 %)	29 (7.3)	0.935	NS
O	44 (22 %)	146 (36.4)	0.0005	HS

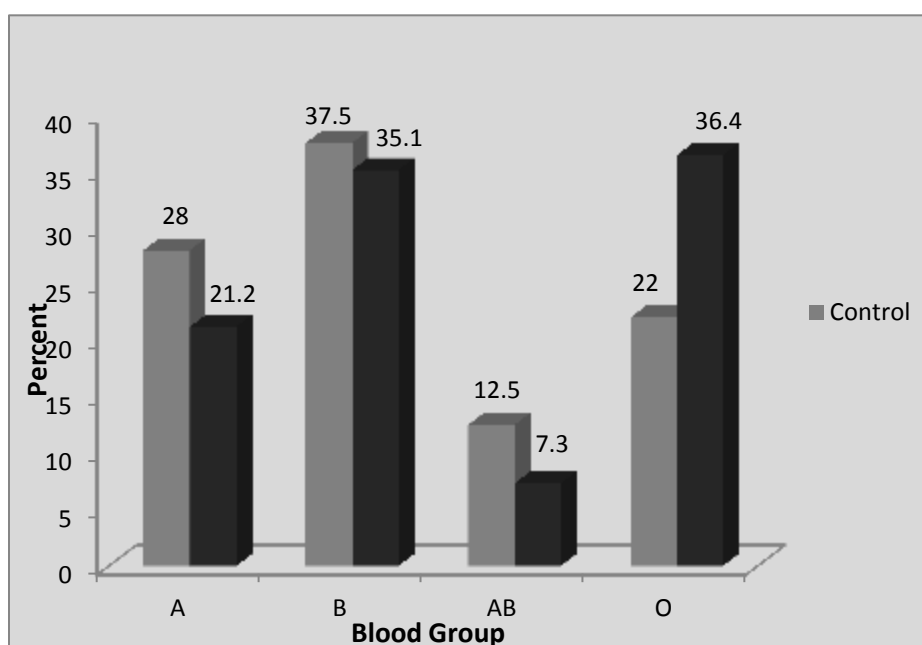


Figure 1: ABO Blood Group and Breast Cancer

CONCLUSION

Thus it is evident from study that blood group O has more chances to develop breast cancer, while blood group B also has increased incidence of breast cancer. More than two third patients of breast cancer belong from these two groups. While blood group AB and A has less incidence of breast cancer comparatively. It is quite clear from study that blood group O people were more prone to develop breast cancer.

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