



## Association of ABO blood group and risk of female breast cancer-A retrospective study

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### ABSTRACT

Breast cancer is the second most common cancer among females in rural areas of our country. It constitutes around 20-25% of all female cancers in India. ABO blood group has been observed to be associated with gastric and pancreatic cancer, but its association with breast cancer is unsure. **AIMS & OBJECTIVES:** 1. To find any association between breast cancer and ABO blood group. 2. To know the frequency and risk of each blood group in relation to patients with breast cancer. This study was conducted in the Department of Surgery, Tirunelveli Medical College. Ethical committee approval was obtained. 100 breast cancer cases were taken and 100 healthy women with no reports of breast cancer were taken as controls. Blood grouping was done by Standard Agglutination method. Association of ABO blood groups and breast cancer was found out with Odd Ratios (ORs) with 95% Confidence Interval (CI). ABO blood group distribution among patients with breast cancer was as follows: Group A- 39%, Group O-31%, Group B- 26% and Group AB- 4%. Among 100 healthy controls, ABO blood groups percentage was: Group O- 32%, Group A- 15 %, Group B- 46%, and Group AB- 7%. There is significant association between blood group A and breast Cancer since the p value was <0.05. This study showed that there is strong association between ABO blood group system and female breast cancer and the highest risk for breast cancer was in blood group A and minimum in blood group AB.

**Key words:** Blood groups, ABO group, Female breast cancer, Association, Risk

### INTRODUCTION

Breast cancer is a malignant disease and its number is increasing every year. The breast cancer accounts for about 25% to 32% of all female cancers in India. It is the most common cancer in urban females. There is a large amount of evidence that the ABO blood group system may play a role in disease aetiology also. Initially the association was found between stomach cancer<sup>[1]</sup> and blood group A. It was also proved in pancreatic cancer<sup>[2]</sup>. It leads the way to many researches and production of many reports showing association between blood group system and susceptibility to cancer. This can be due to the influence of blood group antigen over systemic inflammatory response<sup>[3]</sup>. ABO antigen expressed on the surface of the tumour cell is different from the one which is present in normal cells<sup>[4]</sup>. As the cancer cells are different from the normal cells, this different expression may alter the motility of the cells leading to metastasis, can escape from apoptosis and also from immune response<sup>[5]</sup> so the abnormal cancer cells can grow without any interference. Blood group A has been found to be associated with neurologic tumours, salivary gland, colon, uterus, ovary, pancreas, renal, bladder and cervix<sup>[6]</sup> and blood group O in skin and melanoma<sup>[7]</sup> has been reported. But its association with breast cancer is unsure. ABO blood group genes are mapped at 9q34 region in which genetic alteration can lead to cancers<sup>[8]</sup>

### Aims & Objectives

1. To find any association between breast cancer and ABO blood group.
2. To know the frequency of each blood group in relation to patients with breast cancer.

## MATERIALS AND METHODS

This is a retrospective hospital based study. It was conducted in the Department of Surgery, Tirunelveli Medical College. 100 breast cancer cases were taken and 100 women with no reports of breast cancer were taken as controls.

### Inclusion criteria:

Pathologically confirmed cases  
Female breast cancer,  
Available laboratory data for ABO blood group type  
Record of detailed case history.

### Exclusion criteria

Familial cancer history  
Oral contraceptive pill users  
Post menopausal women

Ethical committee approval was obtained. Blood grouping was done by Standard Agglutination method in the central lab. **Standard Agglutination Method:** Red cell suspension is prepared by adding a drop of blood to 2ml of saline solution in a test tube. Then a drop of each antiserum A, antiserum B, anti-D serum is placed on one side of 3 different slides. The slides were labelled. A drop of isotonic saline solution is kept on the other side of all the 3 slides. It serves as a control. Add a drop each of red cell suspension on anti-A, anti-B, anti-D and the saline solution<sup>[9]</sup>. Mix it gently using different tips of the stick. The slide is labelled accordingly. After 10 minutes, examined for the presence of agglutination and confirmed it under the microscope.

## RESULTS

Table: 1.MEAN AGE OF THE GROUPS

| Variable      | Value for           |                         | 'p' value |
|---------------|---------------------|-------------------------|-----------|
|               | Breast cancer group | Non breast cancer group |           |
| Cases studied | n=100               | n=100                   | -         |
| Age (yrs)     | 45.6 ± 11.6         | 43.4 ± 10.3             | 0.1545    |

*p value- not significant*

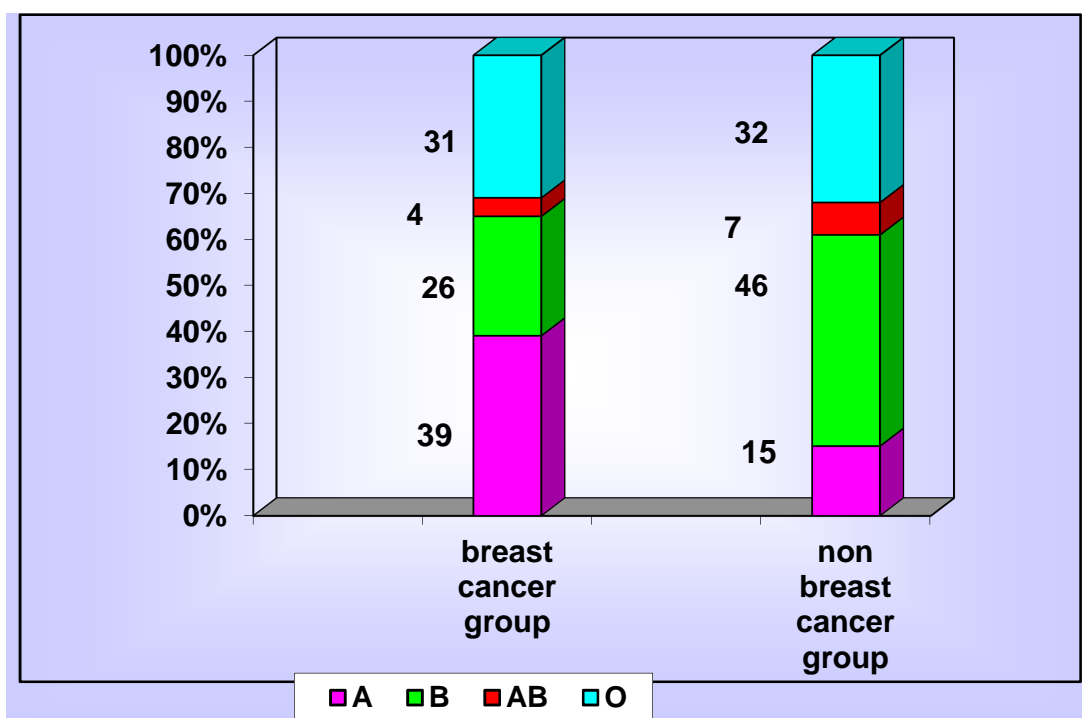


Fig.1: BLOOD GROUP DISTRIBUTION AMONG BREAST CANCER AND NON BREAST CANCER GROUPS

Table 2. PERCENTAGE OF BLOOD GROUPS AMONG BREAST CANCER GROUP &amp; NON BREAST CANCER GROUP

| Variable    | Value for           |     |                         |     | 'p'             | Odds Ratio | Relative Risk |
|-------------|---------------------|-----|-------------------------|-----|-----------------|------------|---------------|
|             | Breast cancer group |     | Non breast cancer group |     |                 |            |               |
| Blood Group | No.                 | %   | No.                     | %   |                 |            |               |
| A           | 39                  | 39  | 15                      | 15  | <b>0.0012 *</b> | 3.11       | 2.36          |
| B           | 26                  | 26  | 46                      | 46  | <b>0.0051 *</b> | 0.41       | 0.57          |
| AB          | 4                   | 4   | 7                       | 7   | 0.535           | 0.55       | 0.59          |
| O           | 31                  | 31  | 32                      | 32  | 1.0             | 0.95       | 0.97          |
| Total       | 100                 | 100 | 100                     | 100 |                 |            |               |

\*significant p value

The above table showed that out of the 100 breast cancer cases Group A- 39%, Group O-31%, Group B- 26% and Group AB- 4%. Higher number of cases were seen among blood group A followed by group O and group B. Blood group A had 3.11 times higher risk for breast cancer when compared to other groups.

## DISCUSSION

In our study high frequency of blood group A had been observed among breast cancer patients. P value is 0.0012 which is statistically significant. Odds ratio is 3.11. This was also proved by previous studies. A study performed by Guleria showed that blood group A was significantly associated with breast cancer<sup>[10]</sup> Amini et al found the significant relationship between the size of tumor, axillary lymph node involvement and ABO blood group system. Some inconsistent studies are also available. Jayant K<sup>[11]</sup> reported no relation between blood group and breast cancer whereas Surekha et al<sup>[12]</sup> have reported a high incidence exist between blood group B individuals and breast cancer. Cancer cells of breast and stomach express a tumour marker called Thomsen-Friedenrich antigen (T) and its precursor (Tn). These are suppressed and masked from the immune system in normal healthy individuals. They become accessible to immune system when a cell becomes malignant. These markers are structurally similar to A antigen because it shares the terminal sugar N-acetylgalactosamine<sup>[13]</sup>. So blood group A persons have the least aggressive antibody response against these cancer cells and is associated with poor outcome.<sup>[14]</sup>

## CONCLUSION

This study concludes that there is strong association between ABO blood group system and breast cancer. It is one of the risk factors newly identified for breast cancer which needs reasonable consideration. Women with blood group A had significant association with breast cancer and they fall in higher risk category followed by O and B, women with blood group AB had minimum risk. Women with blood group A should increase the frequency of mammography screening for early diagnosis of breast cancer as they are more prone when compared with other blood groups. In future, this study has to be conducted in large series to elucidate the relationship between this disease and blood group.

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