

Research Journal of Pharmaceutical, Biological and Chemical Sciences

Association of ABO Blood Group and Rhesus factor with Incidence of Breast Cancer.

Shruti Pandey¹, Nirupama M^{2*}, Nandan P³, Nayanatara AK⁴, Debarshi Saha⁵,
Deepa Adiga⁶, and Jessica Minal⁷.

¹Junior Resident. Kasturba Medical College, Mangalore, Affiliated to Manipal University, Mangalore, Karnataka, India.

²Department of Pathology, Kasturba Medical College, Mangalore, Affiliated to Manipal University, Mangalore, Karnataka, India.

³Junior resident, Department of Pathology, Kasturba Medical College, Mangalore, Affiliated to Manipal University, Mangalore, Karnataka, India.

⁴Department of P hysiology, Kasturba Medical College, Mangalore, Affiliated to Manipal University, Mangalore, Karnataka, India.

⁵Department of Pathology, Kasturba Medical College, Mangalore, Affiliated to Manipal University, Mangalore, Karnataka, India.

⁶Department of Pathology, Kasturba Medical College, Mangalore, Affiliated to Manipal University, Mangalore, Karnataka, India.

⁷Department of Pathology, Kasturba Medical College, Mangalore, Affiliated to Manipal University, Mangalore, Karnataka, India.

ABSTRACT

Breast cancer is one of the leading cause of death. Multifactorial causes play a role in the development of cancer breast which includes endogenous hormonal alteration to familial association and genetic mutations. Association of various blood group antigen is known in gastric, pancreatic, prostate and other cancers. However, in relation to breast cancer, these findings are inconsistent. To study the association of ABO and Rh blood group with incidence of breast carcinoma. Retrospective cases of diagnosed breast cancers over a period of two years, excluding those with familial association and history of oral contraceptive use, were included in the study. Blood group of these patients were retrieved from the hospital data. Control group included healthy female donors of same age group. Data analysis was done using SPSS. Blood group A followed by AB and Rh negative group showed significant association in the study group in the given population.

Keywords: breast carcinoma, tumour, antigen, carcinoma

**Corresponding author*

INTRODUCTION

Blood group antigens are commonly associated with RBCs and epithelial cells. Tumours derived from these will lead to changes in antigenic expression.^{1,2}

ABO blood genes are mapped to 9q34.2 region in which genetic alteration is seen. ABO blood group type has been associated with many tumours like those of the gastrointestinal tract, female genital tract, skin tumours and neurological tumours.^{3,4,5}

Genetic alterations in the tumour lead to changes in blood group antigen expression. Expression of blood group antigens on cancer cells has an end product of tumour progression which can be used as a diagnostic and prognostic marker.^{6,7,8}

The aim of this study is to correlate the blood group type with the incidence of breast cancer along with its histological subtype in an attempt to find whether or not a significant relation exists between the two.

Aims & objectives

- To study the association of ABO blood type with the incidence of breast carcinoma.
- To study the occurrence of breast carcinomas in different age groups.

MATERIALS AND METHODS

Study design

Retrospective study of a period of two years was conducted in a tertiary care centre. Study included all biopsy proved cases of breast cancer and excluded cases where blood group was not determined. The control group was chosen among women who donated blood at the tertiary care centre during the same time.

Data collection methodology

Institutional Ethics Committee approval taken and all patients diagnosed positive for breast cancer by biopsy was taken into consideration. ABO blood group of all such patients was categorized into A, B, AB or O. Histological subtype of breast cancer and age of the patient was then associated with the blood group type.

Data analysis

The collected data was entered in Microsoft excel and analyzed using SPSS version 11.5. ($p < 0.05$ was taken as statistically significant.)

RESULTS AND ANALYSIS

All the 271 cases of breast cancer cases in our study were invariably reported in females. Majority of the cases were reported in the age group 26-50 and 51-75. [Table I]

Most common blood group among cases was A and Rh +ve. Significant risk is associated with blood groups A and AB with incidence of breast cancer. Blood groups B and O have significantly lower risk of breast cancer. Rh group negative is also associated with significantly higher risk of breast cancer. Distribution of breast cancer patients across various blood groups is given in tables II and III.

Right sided breast cancer was slightly less prevalent than left sided. A marginal 1.1% of the cases had unilateral incidence. [Table IV]

Occurrence of breast cancer histological types in different age groups is depicted in table V. Infiltrating ductal carcinoma was found to be the commonest histological subtype diagnosed across all age groups.

Table I: Occurrence of breast cancer in different age groups (n=271)

S. No.	Age group (in years)	Number of cases
1.	<26	4 (1.5%)
2.	26-50	141 (52%)
3.	51-75	115 (42.4%)
4.	>75	11 (4.1%)

Table II: Distribution of breast cancer patients across various blood groups (n=271)

SI No.	ABO group	Case	Control	P value	Risk
1.	A	112 (41.3%)	136(23.85%)	< 0.00001	1.6843
2.	B	56 (20.7%)	171(30.0%)	0.004378	0.7045
3.	AB	31 (11.4%)	36(6.31%)	0.010313	1.4922
4.	O	72 (26.6%)	227(39.82%)	0.000174	0.6559
Total		271	570		

Table III: Distribution of breast cancer patients according to their Rh status (n=271)

S no.	Rh status	Number of cases	Number of control	P value	Risk
1.	Positive	245 (90.4%)	537(94.21%)	0.043394	0.7109
2.	Negative	26 (9.6%)	33(5.79%)		1.4066
Total		271	570		

Table IV: Number of cases with laterality of breast cancer (n=271)

S no.	Side	Number of patients
1.	Right	126 (46.5%)
2.	Left	142 (52.4%)
3.	Bilateral	3 (1.1%)

Table V: Occurrence of breast cancer histological types in different age groups (n=271)

SI no.	Age group (in years)	Carcinoma in situ	Infiltrating ductal carcinoma	Infiltrating lobular carcinoma	Others	Total
1.	<25	1 (25%)	3 (75%)	0 (0.0%)	0 (0.0%)	4
2.	26-50	6 (4.25%)	119 (84.39%)	7 (4.96%)	9 (6.38%)	141
3.	51-75	7 (6.08%)	101 (87.82%)	4 (3.47%)	3 (2.60%)	115
4.	>75	1 (9.09%)	8 (72.72%)	2 (18.18%)	0 (0.0%)	11

DISCUSSION

The age trend of breast cancer according to our study shows that a majority (53.5%) of cases during 2012-2014 occurred in women less than 50 years of age. In another study carried out in Madhya Pradesh 60% breast cancer cases were diagnosed in women less than 50 years of age⁹. Our results were thus concordant with this study.

However, the fact remains that the incidence of breast cancer rises with increasing age, as mentioned in the statistics provided by CDC, Centres for Disease Control and Prevention.

The median age at diagnosis as per our study is 50 years. However, the median age at diagnosis is 61 years as per the information given by the US surveillance statistics of 2008-2012.¹⁰

Our study revealed positive association of breast cancer with blood group type A and AB; and negative association with blood group B, O and Rh +ve. On the other hand, a study conducted by Saxena S et al¹¹ showed positive association of blood group type A but negative association of blood group AB with breast cancer. Various studies conducted^{12,13,14} failed to demonstrate an association between ABO blood type/Rh factor and breast cancer.

A study by Tulinius H et al¹⁵ states that unilateral breast cancer is more common on the left than the right side. Our results are concordant with this study.

CONCLUSION AND SUMMARY

Multifactorial interactions play role in the development of breast cancer. From genetic to social and economic factors all play their own part. Breast cancer affects females more than males, at all ages.

Middle aged females are more commonly affected, though the incidence is rising among younger age groups. The highest incidence is seen among 25-50 years as per our study.

Blood group A and AB and Rh –ve is positively associated with breast cancer.

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