International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 13, No. 12, December 2024 Online ISSN: 2250-3137
Print ISSN: 2977-0122

DOI: 10.69605/ijlbpr_13.12.2024.121

ORIGINAL RESEARCH

Epidemiological assessment of breast cancer patients and their association with ABO blood group: A cross-sectional study

[1]Dr. Krishan Kumar, [2]Dr. Ashok Kumar Gupta

[1]Associate Professor, [2]Assistant Professor, Department of Community Medicine, F.H. Medical College, Etmadpur, U.P., India

Corresponding Author
Dr. Krishan Kumar
Associate Professor, Department of Community Medicine, F.H. Medical College, Etmadpur, U.P., India
Email: guptakrishankumar1987@gmail.com

Received Date: 22 November, 2024 Accepted Date: 21 December, 2024

ABSTRACT

Background: Breast cancer (BC) significantly affects the health of women globally and is recognized as one of the most prevalent forms of cancer. As a readily identifiable component of an individual's genetic profile, ABO blood groups have been statistically linked to various diseases. Hence; the present epidemiological study was conducted for assessing breast cancer patients and their association with ABO blood group.

Materials & methods: A total of 560 breast cancer patients were screened for the present study. Another set of 560 age-matched healthy females were enrolled as control group. Complete demographic and clinical details of all the subjects was obtained. A Performa was made and detailed medical history of all subjects was recoded separately. Finger pricking was done and blood drop was obtained from all the subjects. ABO blood grouping was assessed in all the patients. Correaltion between blood grouping and breast cancer was done. All the results recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software

Results: Mean age of the patients of the cases and controls was 39.2 years and 38.7 years respectively. among cases and controls, majority of the subjects were rural residence. Among cases, 212, 164, 96 and 88 subjects were of A blood group, B blood group, AB blood group and O blood group respectively. Among controls, 231, 151, 102 and 76 subjects were of A blood group, B blood group, AB blood group and O blood group respectively. Among cases and controls, 453 and 475 subjects were Rh+ respectively. Non-significant results were obtained while corralling blood grouping with breast cancer.

Conclusion: ABO blood types represent a polymorphic and antigenic genetic system that is characterized by the presence of specific substances located on the surface of red blood cells (RBCs) as well as in various other cells and tissues. However; we didn't observed any significant correlation of ABO blood grouping with occurrence of breast cancer.

Key words: Breast Cancer, ABD blood group

INTRODUCTION

Breast cancer (BC) significantly affects the health of women globally and is recognized as one of the most prevalent forms of cancer. This disease has profound socio-economic, emotional, and public health consequences.[1] Annually, it is estimated that over one million new cases of BC are identified. While breast cancer statistics are well-documented in developed and Western nations, information from other regions tends to be either fragmented or overlooked. In terms of risk factors, women with a familial history of BC are encouraged to gather comprehensive information about their relatives, including the age at which the cancer was diagnosed and the specific type of cancer.[2, 3] The likelihood of developing breast cancer is heightened by the number of affected family members, the particular lineage involved, and the age at diagnosis.[4, 5]

Stage has been identified as a primary prognostic indicator in breast cancer; however, the disease exhibits significant heterogeneity. Numerous studies have indicated that molecular classification, utilizing comprehensive gene expression profiles or immunohistochemical techniques, can effectively categorize patients into distinct subtypes that differ in

DOI: 10.69605/ijlbpr_13.12.2024.121

biological behavior and prognosis. Furthermore, younger individuals diagnosed with breast cancer tend to present with more advanced disease stages, and they exhibit a higher prevalence of aggressive tumor subtypes compared to their older counterparts. This situation may adversely affect survival rates and treatment costs. Additionally, breast cancer in younger patients carries further critical considerations; these individuals face an elevated risk of developing a new breast cancer in either the residual ipsilateral or contralateral breast due to their longer life expectancy, alongside the social and economic ramifications of treatment during their working and reproductive years.[6-8]

The ABO blood group system, first identified in 1900, categorizes human blood according to the presence or absence of the A and B antigens located on the surface of red blood cells. As a readily identifiable component of an individual's genetic profile, ABO blood groups have been statistically linked to various diseases. Over the past few decades, a multitude of studies have explored the association between ABO blood groups and cancer risk across different anatomical sites; however, the findings have often been inconsistent.[9-12]Hence; the present epidemiological study was conducted for assessing breast cancer patients and their association with ABO blood group.

MATERIALS & METHODS

The present epidemiological study was conducted for assessing breast cancer patients and their association with ABO blood group. A total of 560 breast cancer patients were screened for the present study. Another set of 560 age-matched healthy females were enrolled as control group. Complete demographic and clinical details of all the subjects was obtained. A Performa was made and detailed medical history of all subjects was recoded separately. Finger pricking was done and blood drop was obtained from all the subjects. ABO blood grouping was assessed in all the patients. Correaltion between blood grouping and breast cancer was done. All the results recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software. Univariate analysis was done for evaluation of level of significance.

RESULTS

Mean age of the patients of the cases and controls was 39.2 years and 38.7 years respectively. among cases and controls, majority of the subjects were rural residence. Among cases, 212, 164, 96 and 88 subjects were of A blood group, B blood group, AB blood group and O blood group respectively. Among controls, 231, 151, 102 and 76 subjects were of A blood group, B blood group, AB blood group and O blood group respectively. Among cases and controls, 453 and 475 subjects were Rh+ respectively. Non-significant results were obtained while corralling blood grouping with breast cancer.

Table 1: Demographic data

Demographic data		Cases	Controls
Mean age (years)		39.2	38.7
Residence	Rural	362	351
	Urban	198	209

Table 2: Comparison of blood group

Blood group	Cases	Controls
A	212	231
B	164	151
AB	96	102
O	88	76
Total	560	560
p-value	0.338	

Table 3: Comparison of Rh factor

Blood group	Cases	Controls
Rh +	453	475
Rh -	107	85
Total	560	560
p-value	0.745	

DOI: 10.69605/ijlbpr_13.12.2024.121

DISCUSSION

Breast cancer ranks among the most frequently diagnosed malignancies and is the fifth leading cause of cancer-related mortality, with an estimated 2.3 million new cases globally, as reported by GLOBOCAN 2020 data. The mortality rate associated with breast cancer is significantly higher in transitioning countries, such as those in Melanesia, Western Africa, Micronesia/Polynesia, and the Caribbean, exhibiting an incidence rate approximately 88% greater than that observed in transitioned regions, including Australia/New Zealand, Western Europe, Northern America, and Northern Europe. The adoption of preventive measures and the establishment of screening programs are essential for reducing the incidence of breast cancer and facilitating early intervention.[8, 9]

Mean age of the patients of the cases and controls was 39.2 years and 38.7 years respectively. among cases and controls, majority of the subjects were rural residence. Among cases, 212, 164, 96 and 88 subjects were of A blood group, B blood group, AB blood group and O blood group respectively. Among controls, 231, 151, 102 and 76 subjects were of A blood group, B blood group, AB blood group and O blood group respectively. Among cases and controls, 453 and 475 subjects were Rh+ respectively. Non-significant results were obtained while corralling blood grouping with breast cancer. The direct mechanisms by which the ABO blood group system influences cancer development remain unclear. Nevertheless, various biological evidences may elucidate the observed associations. The ABO gene is responsible for encoding a glycosyltransferase that exists in three primary variant alleles: A, B, and O, each exhibiting distinct substrate specificities (Reid et al., 2004). Specifically, the A, B, and O glycosyltransferases are involved in the transfer of N-acetylgalactosamine, D-galactose, or the absence of any sugar residue, respectively, to a protein backbone known as the H antigen (Yazer et al., 2005). Blood group antigens are present on the surfaces of red blood cells as well as various other tissues throughout the organism. Research has indicated that the blood group antigens found on malignant cells differ from those on normal cells across multiple tumor types (Hakomori et al., 1999). Alterations in the expression of blood group antigens on cancer cell surfaces may impact cell motility, apoptosis sensitivity, and immune evasion, thereby affecting both the initiation and progression of cancer (Le Pendu et al., 2001).[13- 16]Gates MA et al. investigated the relationship between serologic blood type and the occurrence of breast cancer in a cohort of 67,697 women, which included 3,107 diagnosed cases. Additionally, they conducted a nested case-control study involving 1,138 cases of invasive breast cancer and 1,090 matched controls to explore the association with ABO genotype. Furthermore, the study assessed the link between serologic blood type and survival outcomes in 2,036 breast cancer patients. The findings revealed no significant correlation between serologic blood type or ABO genotype and the risk of total breast cancer, invasive breast cancer, or its subtypes. When comparing women with blood type O, the age-adjusted incidence rate ratios for total breast cancer were found to be 1.06 for type A, 1.06 for type AB, and 1.08 for type B. Moreover, no notable association was observed between blood type and either overall mortality or breast cancer-specific mortality.[17]

CONCLUSION

ABO blood types represent a polymorphic and antigenic genetic system that is characterized by the presence of specific substances located on the surface of red blood cells (RBCs) as well as in various other cells and tissues. However; we didn't observed any significant correlation of ABO blood grouping with occurrence of breast cancer.

REFERENCES

1. Cohen M, Azaiza F. Increasing breast examinations among arab women using a tailored culture-based intervention. Behav Med. 2010;36:92–99.
2. Kawar LN. Jordanian and Palestinian immigrant women's knowledge, affect, cultural attitudes, health habits, and participation in breast cancer screening. Health Care Women Int. 2009;30:768–782
3. Othman A, Ahram M, Al-Tarawneh MR, Shahrouri M. Knowledge, attitudes and practices of breast cancer screening among women in Jordan. Health Care Women Int. 2015;36:578–592.
4. Miller AB. Screening for breast cancer in the Eastern Mediterranean Region. East Mediterr Health J. 2010;16:1022–1024.
5. Baron-Epel O, Friedman N, Lernau O. Reducing disparities in mammography-use in a multicultural population in Israel. Int J Equity Health. 2009;8:19.
6. Porter P. Westernizing Women's Risks? Breast Cancer in Lower-Income Countries. N. Engl. J. Med. 2008;358:213–216
7. Key T.J., Appleby P.N., Reeves G.K., Travis R.C., Alberg A.J., Barricarte A., Berrino F., Krogh V., Sieri S., Brinton L.A., et al. Sex hormones and risk of breast cancer in premenopausal women: A collaborative reanalysis of individual participant data from seven prospective studies. Lancet Oncol. 2013;14:1009–1019.
8. Sung H., Ferlay J., Siegel R.L., Laversanne M., Soerjomataram I., Jemal A., Bray F. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. CA Cancer J. Clin. 2021;71:209–249
9. Duggan C., Dvaladze A., Rositch A.F., Ginsburg O., Yip C., Horton S., Rodriguez R.C., Eniu A., Mutebi M., Bourque J., et al. The Breast Health Global Initiative 2018 Global Summit on Improving Breast Healthcare Through Resource-Stratified Phased Implementation: Methods and overview. Cancer. 2020;126:2339–2352.

DOI: 10.69605/ijlbpr_13.12.2024.121

10. Levitan R, Razis DV, Diamond HD, Craver LF (1959). ABO blood groups in Hodgkin's disease. Acta Haematol, 22, 12-9.
11. Lewis JG, Woods AC (1961). The ABO and Rhesus blood groups in patients with respiratory disease. Tubercle, 42, 362-5.
12. Strang RR (1965). ABO blood-groups in Parkinson's disease. Acta Pathol Microbiol Scand, 65, 653.
13. Reid ME, Mohandas N (2004). Red blood cell blood group antigens: structure and function. Semin Hematol, 41, 93-117
14. Yazer MH (2005). What a difference 2 nucleotides make: a short review of ABO genetics. Transfus Med Rev, 19, 200-9.
15. Hakomori S (1999). Antigen structure and genetic basis of histoblood groups A, B and O: their changes associated with human cancer. Biochim Biophys Acta, 1473, 247-66
16. Le Pendu J, Marionneau S, Cailleau-Thomas A, et al (2001). ABH and Lewis histo-blood group antigens in cancer. Apmis, 109, 9-31
17. Gates MA, Xu M, Chen WY, Kraft P, Hankinson SE, Wolpin BM. ABO blood group and breast cancer incidence and survival. Int J Cancer. 2012 May 1;130(9):2129-37.