

Original Article



Susceptibility of O Positive Blood Group for Different Types of Malignancy

Ayesha Yasmin¹, Md. Nazmul Alam², Md Ershadul Haque³, Kamrunnahar Alo⁴,
Badar Uddin⁵, Taslima Akber⁶.

Abstract

Background: Blood group is one of the major genetic risk factors for developing different types of malignancy throughout the world. **Objectives:** To find out the susceptible blood group in ABO and Rhesus systems in patients with malignancy. **Methods and Materials:** This study was one at KYAMCH cancer center, Enayetpur, Sirajganj, from October 2018 to February 2019. Total 150 cancer patients attending OPD were included irrespective of age, sex, socioeconomic status. ABO and Rhesus blood groups were determined in laboratory by standard methods. **Results:** Among 150 patients, 55% were female and 45% were male. Malignancy was predominant in the age group of 41-50 years (25.3%) and 33.33% patients were found to have O blood group. Out of the patients, 98.7% had Rh positive of all blood groups of which 32% was belonged to blood group O. Metastasis was found among 34.66% patients and out of this 14.67% were having O blood group. Among 22 metastatic O blood group patients, 90.9% was Rh positive and 9.09% was Rh negative. **Conclusion:** Various types of malignancy are common among O positive blood group.

Keywords: ABO blood group, Malignancy, Metastasis.

Date of received: 08.10.2018.

Date of acceptance: 12.05.2019.

KYAMC Journal.2019;10(3):133-136 .

DOI: <https://doi.org/10.3329/kyamcj.v10i3.44415>

Introduction

Any type of malignancy is fatal irrespective of age, sex, site of origin or risk factors provoking it. Many factors such as genetic, environmental, chemical, illiteracy, hygiene or personal habit can lead to malignancy. There are over 200 different known cancers affecting humans.¹ Approximately 5 to 10% of cases are entirely hereditary.² The blood group is one of the genetic factors which affect the risk of different type cancers.³ Several studies show the risks of common blood group system and risks of malignancy.¹⁻³ At present, 33 blood group systems representing more than 300 blood types, but they all fall into one of key groups A, B, AB or O.⁴ The first report on the relation between the ABO blood group and cancer was published by England and Scotland researchers.⁵ A number of studies have found evidence of an association between ABO blood group antigens and various types of cancers.⁵⁻⁷ Several

studies revealed that, GIT cancer has increased incidence among blood group A and O individuals.⁸⁻¹³ The association of blood group B with Hodgkin's Lymphoma and consistent relation to blood group O with acute lymphoblastic leukemia, lymphoma and melanoma was seen in some studies.¹⁴⁻¹⁶ Along with that, several studies has also implicated, breast cancer was more profound among blood group A.^{3,17,18} Various reports afterward have been found by many investigations, representing the relationship between ABO blood group and carcinogenesis or development of human tumors including breast, pancreatic, skin cancer and other malignancies.¹⁹ The ABO system occurs as a result of polymorphism of complex carbohydrate structure of glycoprotein and glycolipid expressed at the surface of erythrocytes or other cells or present in secretions, as glycan units of mucin

1. Associate Professor, Department of Physiology, Khwaja Yunus Ali Medical College, Enayetpur, Sirajganj, Bangladesh.
2. Assistant Professor, Department of Oncology, Khwaja Yunus Ali Medical College and Hospital Cancer Center, Enayetpur, Sirajganj, Bangladesh.
3. Phase B resident MD (Oncology), Department of Oncology, Khwaja Yunus Ali Medical College and Hospital Cancer Center, Enayetpur, Sirajganj, Bangladesh.
4. Assistant Professor, Department of Physiology, Khwaja Yunus Ali Medical College, Enayetpur, Sirajganj, Bangladesh.
5. Professor, Department of Physiology, Khwaja Yunus Ali Medical College, Enayetpur, Sirajganj, Bangladesh.
6. Associate Professor, Department of Community Medicine, Khwaja Yunus Ali Medical College, Enayetpur, Sirajganj, Bangladesh.

Correspondent: Dr. Ayesha Yasmin, Associate Professor, Department of Physiology, Khwaja Yunus Ali Medical College, Enayetpur, Sirajganj, Bangladesh. Mob: +8801811914969, E-mail: ayasha595120@gmail.com

glycoproteins.¹⁹⁻²⁰ ABO blood group genes are mapped at chromosome 9q, in which the genetic alteration is common in many cancers.²⁰ Alteration in the host inflammatory state due to ABO blood antigens provides a further potential mechanism by which blood type may influence the progression and spread of malignancy.²¹

After ABO, the Rh (Rhesus) blood group system has the principal importance in transfusion medicine.²² Among different types of Rh antigens, six antigens are important- C, D, E, c, d, e and depending upon the presence or absence of antigen D on the surface of RBC refers to Rh positive or Rh negative blood group.²³

Many researches observed relationship of malignancy with common blood groups. Current study was performed in an attempt to find the susceptible blood group among the cancer patients visiting KYAMCH Cancer Center.

Materials and Methods

This descriptive observational study was conducted in the Cancer Center of Khwaja Yunus Ali Medical College and Hospital (KYAMCH) during the period of October 2018 to February 2019. After proper and ethical consideration random 150 patients were included. These patients had different age, sex, socioeconomic status. Their data were collected from cancer unit to find out the majority of specific blood group system among the cancer patients. Presence of metastasis in common blood groups were also investigated. Both ABO and Rh blood group tests were done by standard method in the hospital laboratory.

Table I: Distribution of cancer patients by age groups (n=150)

Age group (years)	No. of patients	Percentage (%)
0-10	03	2
11-20	10	6.7
21-30	13	8.7
31-40	24	16
41-50	38	25.3
51-60	26	17.3
61-70	25	16.6
71-80	10	6.6
81-90	01	0.7
Total	150	99.9

Figure I: Male Female percentage (male= 45%, female=55%)

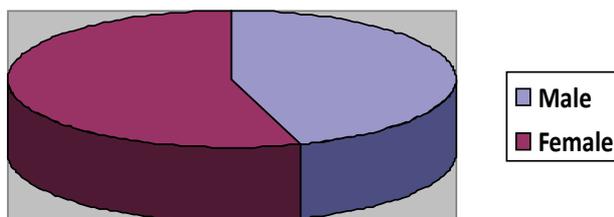


Table II: ABO blood group and their distribution in different types of malignancy n=150

Different types of malignancy	Blood groups and percentage (%)			
	A=42	B=40	AB=18	O=50
Ca Gastrointestinal tract (GIT)	18 (12.0)	16 (10.67)	01 (0.67)	13 (8.67)
Ca Breast	07 (4.67)	03 (2.0)	04 (2.67)	05 (3.34)
Ca Female Reproductive system	04 (2.67)	04 (2.67)	01 (0.67)	05 (3.34)
Ca Oral Cavity	02 (1.34)	02 (1.34)	02 (1.34)	10 (6.7)
Ca Respiratory system	06 (4.0)	04 (2.67)	02 (1.34)	04 (2.67)
Ca Urinary bladder	Nil	01(0.67)	Nil	Nil
Ca Prostate	02 (1.34)	04 (2.67)	Nil	01(0.67)
Renal Cell Carcinoma	Nil	01 (0.67)	Nil	02 (1.34)
Other Carcinoma	03 (0.01)	05 (3.34)	08 (5.34)	10 (6.67)
Total	42 (28%)	40 (26.67%)	18 (12%)	50 (33.33%)

Table III: Distribution of cancer patients by Rh system (n=150)

Blood group	Rhesus positive	Rhesus negative
A	42 (28%)	Nil
B	40 (26.7%)	nil
AB	18 (12%)	Nil
O	48 (32%)	02 (1.33%)
Total	148 (98.66%)	02 (1.33%)

Table IV: Distribution of presence or absence of metastasis in patients by Rh types (n=150)

Blood groups	Metastasis	
	Present	absent
A+ve	14 (09.34%)	28 (18.67%)
A-ve	Nil	Nil
B+ve	11 (07.34%)	29 (19.34%)
B-ve	Nil	Nil
AB+ve	05 (03.33%)	13 (08.67%)
AB-ve	Nil	Nil
O+ve	20 (13.33%)	28 (18.67%)
O-ve	2 (1.33%)	Nil
Total	52 (34.66%)	98 (65.33%)

Table V: Distribution of metastasis among O positive blood group patients (n=22)

Blood groups	Metastasis	
	Rh positive	Rh negative
O	20 (90.9%)	02 (9.09%)

In present study, the data were taken from 150 cancer patients attending in OPD at KYAMCH Cancer Center. Among them 69 (45%) were males and 81 (55%) were female malignant patients (Figure I), of different blood group types and the age group was ranging from 3-90 years. Predominant (25.3%) age group was 41 to 50 years (Table I). According to ABO and Rh systems, among 150 patients, 33.33% were belonged to blood group O (Table II) and 98.7% patients were of Rh positive (Table III). It was also found that; metastasis was present in 34.66% patients (Table IV) of which 13.33% were of O positive and 1.3% was of O negative blood group (Table IV). Again, among 22 metastatic O blood group patients 90.9% was Rh positive and 9.09% was of Rh negative blood group (Table V).

Discussion

The ABO blood group system is one of the important genetic factors in developing malignancy. Present study was attempted to find out the specific blood group common within ABO and Rh systems in different types of malignant patients those are coming for the treatment in KYAMCH Cancer Center. In Present study, predominant age group was 41 to 50 years (Table I). Among 150 patients, irrespective of sex 33.33% patients were from O blood group. These findings were in consistent with several research works.^{14,15} However; it was opposed by a number of studies.^{3,15-18}

In this study, among females 12.9% presented with carcinoma breast and 9.35% had carcinoma reproductive organ. It was also found that breast cancer was more (4.67%) among blood group A. These findings were in consistent with a number of studies.^{3,18,19} Whereas, a study done among Indian women, showed breast carcinoma was common in blood group O.²⁴ Again, it was found that carcinoma female reproductive organ was common in blood group O. This finding was supported by a number of researchers.²⁵ Present study showed that, 6.67% patients of O blood groups were having malignancies like-osteosarcoma, Hodgkin's and Non Hodgkin's lymphoma, carcinoma pyriform fossa, cancer glans penis, adenocarcinoma, soft tissue sarcoma, medulloblastoma, fibrosarcoma etc. These findings were also reported by several studies.^{26,27} Oral cancer affecting tongue, buccal mucosa, and soft palate was found in 6.67% of O blood group patients. However, several studies found higher frequency of oral carcinoma was presented among blood group A patients.^{28,29} Renal cell carcinoma was found among 1.34% patients with blood group O. However, this funding was opposed by a number of authors.³⁰

Present study showed that, 98.7% cancer patients were of rhesus positive blood group (Table III). It was supported by many researchers.³¹ Metastasis was found in 22 (14.66%) blood group O patients (Table IV). Among 22 blood group O metastatic patients, 90.9% patients were Rh positive and 9.09% was Rh negative (Table V). This finding was also seen in several research works.^{32,33} However, this was not supported by some researchers.³⁴

Conclusion

Regarding this study, most of the malignant patients were belonging to blood group O positive group. Metastasis was also common among O positive blood group patients. The current findings suggest that, patients with O positive blood groups should be carefully monitored. However, further studies with large numbers of patients are required to clarify the specific blood group with different types of malignancy in our country.

Acknowledgement

The authors are grateful to Cancer Institute of KYAMCH for helping the collection of data. AI so thanks to and also colleagues who red helped with dedication and generosity.

Reference

1. How many different types of cancer are there? Cancer Research UK: CancerHelp UK. Retrived 2012.
2. Jaleel BF, Nagarajappa R. Relationship between ABO blood groups and oral cancer. Indian Journal of Dental Research 2012; 23:7-10.
3. Khan GM, Rahmatullah M, Mustafa I. Relationship of blood groups (ABO & Rhesus) and breast cancer in Bangladesh. J Enam Med Col 2014; 4:106-109.
4. Mitra R, Mishra N, Rath PR. Blood group systems. Indian J Anaesth 2014; 58 (5):524-528.
5. Liumbruno GM, Franchini M. Hemostasis, Cancer and ABO blood group: the most recent evidence of association. J Thromb Thrombolysis 2014; 38: 160-166.
6. Iodice S, Maisonneuve P, Botteri E, Sandri MT, Lowenfels AB. ABO blood group and cancer. Eur J Cancer 2010; 46: 3345-3350.
7. Franchini M, Lippi G. The intriguing relationship between ABO blood group, cardiovascular disease and cancer. BMC Med 2015; 13:7-10.
8. Hosen SMZ, Yousuff SM, Barua S, Choudhury A, Arifuzzaman M. ABO blood type and threat of GIT cancer and Liver cancer in Bangladesh population. J Med App Sci 2018; 6: 36-39.
9. White C, Eisenberg H. ABO blood groups and cancer of the stomach. Yale J Bio Med 1959; 32:58-61.
10. Aird I, Bentall HH, Roberts JF. Relationship between cancer of stomach and the ABO blood groups. Br Med J 1953; 11:799-801.
11. Xu YQ, Jiang TW, Cui YH, Zhao YL, Qiu LQ Prognostic value of ABO blood group in patients with Gastric cancer. J Surg Res 2016; 201:188-195.
12. Vasan SK, Hwang J, Rostagarard K. Blood group and risk of cancer; A registered based cohort study of 1.6 million blood donors. Cancer Epidemiol 2016; 44: 40-43.

13. Rasmi Y, Sadreddini M, Peirovi T, Jamali M, Khosravifar F et al. Frequency of ABO blood group in peptic ulcer disease in Iranian subjects. *Pak J Biol Sci* 2009; 12: 991-993.
14. Vadivelu MK, Dadaran S, Solomon J, Rajeeseharan A. Distribution of ABO blood groups in acute leukaemias and lymphomas. *Ann Hematol* 2004; 83: 584-587.
15. Karakousis CP, Evlogimenos E, Suh O: Blood groups and malignant melanoma. *J Surg Oncol* 1986; 33(1): 24-26.
16. Xie J, Quereshi AA, Li Y, Han J. ABO blood group and skin cancer. *PLoS One*. 2010;8: e11972-e11977.
17. Meo SA, Suraya F, Jamil B et al. Association of ABO and Rh blood groups with breast cancer. *Saudi J of Bio Sci* 2017; 24: 1609-1613.
18. Meo SA, Suraya F, Jamil B et al. Association of ABO and Rh blood groups with breast cancer. *Saudi J of Bio Sci* 2017; 24: 1609-1613.
19. Watkins WM. The ABO blood group system: historical background. *Trans Med* 2001;4:243-265.
20. Watkins WM. The ABO blood group system: historical background. *Trans Med* 2001;4: 243-265.
21. Jesch U, Endlar PC, Wulkersdorfer B, Spranger H. ABO blood group. Related investigations and their association with different pathologies. *Sci Wor J* 2007; 7:1151-1154.
22. Siransy LK, Nanga ZY, Zaba FS et al. ABO/Rh blood groups and risk of HIV infections and hepatitis B among blood donors among blood donors of Abidjan. *Cote D'ivoire. Eur J Microbiol Immunol* 2015; 18: 205-209.
23. Keele CA, Neil E and Joels N. *Samson Wright's Applied Physiology*. 13th ed. 2000. Oxford University Press, New York.
24. Majupuria KC, Gupta SR, Gupta LC. The study of ABO blood groups and relationship with breast cancer. *Indian J Cancer* 1966; 3: 182-183.
25. Henderson J, Seagroatt V, Goldacre M. Ovarian cancer and ABO blood groups. *Epidemiology Community Health* 1993; 47:287-289.
26. Akther K, Mehedi G, Sherwani R, Sofi L. Relationship between various cancers and ABO blood groups- A northern India experience. *Int J of Path* 2010; 13:101-105.
27. Levitan R, Razis DV, Diamond HD, Craver LF, ABO blood groups in Hodgkin's disease. *Acta Hematol* 1959; 22:12-19.
28. Ramesh G, Pathak S, Gupta B, Raj A, Pathak R. Blood group and oral cancer. *Rama Univ J Dent Sci* 2015;2:17-22.
29. Raghavan VMR, Bailnoor DN, Jhansi RP. Incidence of ABO blood groups and oral cancer in South Kanara district. *J Indian Dent Assoc* 1986;58: 443-444.
30. Ko K, Park YH, Jeong CW, Cu JH, Kim NH, Kwak C. Prognostic significance of blood type A in patients with renal cell carcinoma. *Urol J* 2016; 4: 2765-2772.
31. Farhad FM, Tareq SM, Faisal TM, Islam MN, Islam SMA. A study on incidence of GIT cancer in relation to age, ABO blood group and Rh factor in Bangladesh. *Int J Sci Ing* 2013;4 (11): 102-106.
32. Wang GN, Zhou S, Chen C, Chang H et al. O blood type is associated with unfavorable distant metastasis- free survival in female patients with nasopharyngeal carcinoma : A retrospective study of 2439 patients from epidemic area. *J cancer* 2019; 10 (5):1297-1306.
33. Weisbrod AB, Nilubol N, Weinstein LS et al. association of type-O blood with neuroendocrine tumors in multiple endocrine neoplasia type 1. *J Cli Endo Met* 2013; 98 (1): E109-E114.
34. Franchini M, Giancarlo M, Liunbruno, Lippi G. The prognostic value of ABO blood group in cancer patients. *Blood Transf* 2016; 14 (5):434-440.