

Frequency of ABO and Rh-D blood groups in cervical cancer

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Article Info

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Abstract

There is much evidence that the ABO blood group system may play a role in the pathogenesis of the disease. The relationship between ABO and Rhesus blood groups and cancer risk has been demonstrated in many research works. However, concerning gynaecological malignancies, these findings are inconsistent. This study aimed to evaluate the frequency of ABO and Rh-D blood groups in patients with carcinoma cervix. This cross-sectional study was conducted in the Department of Transfusion Medicine, Department of Gynaecological Oncology and Department of Pathology of Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka. A total of 110 clinically suspected cervical cancer patients were included in this study. Pap smear tests were done in all cases and the patients were divided into case (Pap test positive) and control group (Pap test negative). A total of 55 patients were included in each group. Blood groups (ABO & Rh-D) of all the patients were recorded. A higher number of the patients in the cervical cancer group were multiparous than in the control group. Almost in two-thirds of the population, the age of marriage was <18 years in the cervical cancer group compared to 34.5% in the control group. More than one-third population had "O" blood group in the case group, while it was 31% in the control group. The almost equal number had Rh D+ve in the case and control (92.7% vs. 94.5%). The differences between the blood group and Rh D were not statistically significant between the two groups. Nearly half (40.0%) of the participants had used a hormonal contraceptive in the case and 61.8% in control. The differences in hormonal contraceptives use were statistically significant within the two groups. The distribution of "O" blood group and Rh D +ve cases was found to be higher in patients with cervical cancer than in non-cancer patients although the difference was not statistically significant.

Introduction Discussion

In this present study it was observed that 36.4% patients belonged to age was 41-50 years in case and 34.5% in control. The mean age was 47.2 ± 10.5 years in case and 43.3 ± 10.8 years in control. The differences were statistically not significant ($p > 0.05$) between two groups. Study found that the median In 1900, Karl Landsteiner first described the ABO blood group system based on agglutination patterns of red blood cells when blood types from different donors were mixed. The ABO blood group system is based on the expression of two antigens, A and or B, on the surface of the red blood cell. Patients may have A, B or AB expression patterns. Deficient expression of either antigen results in 'O' phenotype.¹

Blood group frequencies vary globally, with type 'O', whose frequency approaches 100% among the indigenous populations of Central

and South America, followed by type A, which is common in central and eastern Europe, B group is common in China and India, and AB is more frequent in Japan, China and Korea.² The most common ABO blood group in the Bangladeshi population was B (34.4%) followed by group O (30.4%).³ The ABO blood group has been associated with several diseases or hemostatic complications.⁴

Gynaecological cancer affects female reproductive organs, mostly ovaries, fallopian tubes, uterus, cervix and vagina. Cervical cancer is one of the most common cancers among women worldwide. In developing countries, cervical carcinoma ranks second, whereas, in developed countries, it ranks fifth.^{5,6} It is estimated that about 132,082 women die yearly from cervical cancer.⁵ According to Cancer Registry Report, carcinoma cervix is the second most common cancer among Bangladeshi females (21.5%).⁷

Studies have shown that carcinoma of the cervix is highly prevalent among individuals of blood group A along with a weak association with blood group B.⁸ In a cohort of women, the A blood group was over-represented in patients with carcinoma of cervix; such relationship was also seen in patients from Delhi, India.^{4,9} No relationship was found between blood group types and cervical cancer risk in patients from southeast Siberia or Nigeria.⁹⁻¹¹

Cancer is a multifactorial disease that may be affected by germ line variation and environmental exposures. The frequency of the ABO blood group varies globally. In evaluating the role of ABO in diseases, differences in allele frequency of the ABO blood group must be considered. So, this study was conducted to determine the frequency of ABO and Rh-D blood groups in cervical cancer patients.

Methods

This cross-sectional study was carried out involving patients who were clinically suspected as cervical cancer. After obtaining permission from the Institutional Review Board (IRB) of BSMMU, 110 patients were examined in the Department of Transfusion Medicine, Department of Gynaecological Oncology and Department of Pathology of Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka during March 2019 to August 2021.

Pap smear tests was done in all cases and the patients were divided into two groups (case and control group) based on the results of Pap tests. A total of 55 patients were included in each group. The patients in case group included those who had Pap test positive with histopathological confirmation and the control group had Pap test negative patients. Blood groups (ABO & Rh-D) of all patients were determined. Women who had hysterectomy, oophorectomy, menopause due to pelvic irradiation, critically ill women, and women diagnosed as cancer other than cervical cancer were excluded from the study.

A structured questionnaire was designed according to the objective of the study. The purposive sampling technique was applied to collect the sample from the study population.

Results

The mean age was 47.2±10.5 years in case and 43.3±10.8 years in control. Majority 52 (94.5%) patients were housewife in case and that was 51 (92.7%) in control. Majority 46 (83.6%) patients came from rural area in case, while 42 (76.4%) patients came from urban area in control. The differences of residence were statistically significant ($p < 0.05$) between two groups (Table-I).

Majority of the patients (51, 92.7%) had multipara in case and 41(74.5%) in control group. In 34 (61.8%) patients, the age of marriage was <18 years in case group and this was 19 (34.5%)

Table-I

Distribution of the study population by demographic profile (n=110)					
Demographic Profile	Case (n=55)		Control (n=55)		p value
	N	%	N	%	
Age in years					
≤30	4	7.3	7	12.7	
31-40	12	21.8	18	32.7	
41-50	20	36.4	19	34.5	
51-60	14	25.5	7	12.7	
>60	5	9.1	4	7.3	
Mean±SD	47.2±10.5		43.3±10.8		
Range(min,max)	28,66		20,65		
Occupation					
House wife	52	94.5	51	92.7	b0.696 ^{ns}
Service	3	5.5	4	7.3	
Residence					
Rural	46	83.6	13	23.6	b0.001 ^s
Urban	9	16.4	42	76.4	

s= significant, ns= not significant, ^ap value reached from Unpaired t-test, ^bp value reached from Chi-square test

Table-II

Distribution of the study population by obstetric information (n=110)					
Obstetric Information	Case (n=55)		Control (n=55)		p value
	N	%	N	%	
Parity					
Nullipara	1	1.8	3	5.5	0.035 ^s
Primipara	3	5.5	11	20.0	
Multipara	51	92.7	41	74.5	
Age of marriage (Year)					
<18	34	61.8	19	34.5	0.004 ^s
≥18	21	38.2	36	65.5	
Married for (Year)					
<10	0	0.0	6	10.9	0.009 ^s
10-20	12	21.8	24	43.6	
21-30	21	38.2	14	25.5	
31-40	13	23.6	6	10.9	
41-50	8	14.5	4	7.3	
>50	1	1.8	1	1.8	
Exposure history					
No	55	100.0	55	100.0	

-s= significant

p value reached from Chi-square test

in control group. In more than one third (21, 38.2%) patients, duration of married ranged 21-30 years in case group and 14 (25.5%) in control group. The differences in parity, age of getting married and years of marriage were statistically significant ($p < 0.05$) between the two groups (Table-II).

More than one third 19 (34.5%) patients' blood group were O in case and 17 (30.0%) in control. Majority 51 (92.7%) patients had +ve Rh D in case and 52 (94.5%) in control. The differences of blood group and Rh D were not statistically significant ($p > 0.05$) between the two groups. There was no exposure history between two groups (Table - III).

Table-III					
Distribution of the study population by blood group (n=110)					
Investigation	Case (n=55)		Control (n=55)		p value
	N	%	N	%	
Blood group					
O	19	34.5	17	30.9	0.867ns
A	15	27.3	14	25.5	
B	16	29.1	17	30.9	
AB	5	9.1	6	10.9	
Bombay	0	0.0	1	1.8	
Rh D					
+ve	51	92.7	52	94.5	0.696ns
-ve	4	7.3	3	5.5	

ns= not significant, p value reached from Chi-square test

More than half 29 (52.7%) patients had post-menopausal history in case and this was 11 (20.0%) in control. The differences of menstrual history were statistically significant ($p < 0.05$) between the two groups. Post-menopausal had 4.46 times significantly increase risk to have developed cervical cancer with (95% CI 1.77 to 11.41) (Table - IV).

Table-IV					
Distribution of the study population by menstrual history (n=110)					
Menstrual history	Case (n=55)		Control (n=55)		p value
	N	%	N	%	
Regular	6	10.9	20	36.4	0.001s
Irregular	11	20.0	17	30.9	
Menorrhagia	8	14.5	7	12.7	
Post Menopausal	29	52.7	11	20.0	
Dysmenorrhoea	1	1.8	0	0.0	

s= significant, p value reached from Chi-square test

About half 22 (40.0%) patients had hormonal contraceptive in case group and 34 (61.8%) in control group. Use of hormonal contraceptive was statistically significant ($p < 0.05$) in control group (Table - V).

Table-V					
Distribution of the study population by hormonal contraceptive (n=110)					
Hormonal Contraceptive	Case (n=55)		Control (n=55)		p value
	N	%	N	%	
Yes	22	40.0	34	61.8	0.022s
No	33	60.0	21	38.2	

s= significant

p value reached from Chi-square test

Discussion

In this study, it was observed that 36.4% of patients in case and 34.5% in control belonged to the age range 41-50 years. The mean age was 47.2 ± 10.5 years in case and 43.3 ± 10.8 years in control ($p > 0.05$).

In the current study, it was observed that 83.6% of patients came from rural area in the case and 76.4% of control patients came from urban area ($p < 0.05$). Studies done by other authors observed that in case of cancer patients, 75.0% came from rural and 25.0% from urban areas. For controls, 66.0% came from rural area and 34.0% from urban. The difference did not show any statistically significant association. However, a study showed that those from the rural region had a 1.5 times higher carcinoma occurrence.¹²

In this study, it was observed that 92.7% patients had multipara in case and 74.5% in control. Multipara was significantly ($p < 0.05$) higher in case group. Study observed that women with more number of children (multipara) have a relatively higher odds ratio than that of unipara. Multipara women has a 4 times higher chance of developing carcinoma cervix.¹² Study showed that women with 3 or more births showed 1.51 increased odds ratio to carcinoma cervix.¹³ The findings of these studies are similar to the findings of our study.

Regarding age of marriage, women married between the age of 11 and 20 years were found to have a significant relation with the distribution of carcinoma cervix.¹² In this current study it was observed that 61.8% patients were married under 18 years of age in case and this percentage was 34.5% in control. More than one third 38.2% patients' marital age ranged from 21 to 30 years in case and this range was observed among 25.5% control. The differences were statistically significant ($p < 0.05$) between the two groups.

Study showed the association between age of getting marriage and the distribution of cases was statistically significant ($p < 0.05$).¹²

Age of marriage generally reflect the age of first intercourse. Study showed that those having intercourse before age of 17 years have an odds ratio of 1.41, while those having intercourse between age of 17-20 years have an odds ratio of 1.12 compared to that of age 21 or more.¹³

In this present study it was observed that 34.5% patients' blood group were O in case and 30.9% in control. Blood group A was found 27.3% and 25.5% in case and control group, respectively. Blood group B was found 29.1% in case group and 30.9% in control group. Blood group AB was found 9.1% in case group and 10.9% in control group. Bombay blood group was not found in case group and 1.8% found in control group. The differences were not statistically significant ($p > 0.05$) between two groups.

A study reported that overall distribution of ABO blood groups showed that O group (37.7%) was most common, followed by B (31.4%) and A (22.0%), while the least common was AB (8.9%) group amongst cases. In controls, O group was 39.5% followed by B (31.9%), A (22.0%) and least common was AB blood group (6.6%).¹⁴

In a study at Jamaica, cervical dysplasia/carcinoma was highly associated with blood group O compared to blood groups A, B or AB.¹⁵ In a study, cervix cancer showed almost similar frequency of blood group B and O followed by A. Study found a statistically significant higher incidence of carcinoma cervix among blood group B patients. Blood group A showed relatively low incidence, even lower than that of blood group O. There may be some association between cervical carcinoma and blood group, but there is no clear explanation about it.¹²

In the current study, it was observed that 92.7% patients had +ve Rh D in case and 94.5% in control. The differences were not statistically significant ($p > 0.05$) between the two groups. A study has demonstrated that the absence of the Rh factor (Rh-) was positively associated with a 50% increased breast cancer risk.¹⁶ Likewise, it has been revealed that the relative risk of metastasis in Rh- patients with breast cancer was 4.2 times higher than that in Rh+ patients.¹⁷ Interestingly, the relative risk of metastasis was 1.29 times higher in subjects who simultaneously possessed Rh+ and A blood group.

In this present study, it was observed that 52.7% patients had post-menopausal history in case and 20.0% in control. Post-menopausal history was significantly ($p < 0.05$) higher in case group. A study demonstrated that post-menopausal bleeding is associated with significant anxiety due to risk of malignancy in 5-25% of cases.¹⁸

In the current study it was observed that 40.0% patients received hormonal contraceptive in case and 61.8% in control.

Hormonal contraceptive was significantly ($p < 0.05$) higher in control group. Study reported that use of hormonal contraceptive was significantly associated both with the disease and the severity of the disease.¹⁵

Conclusion

Most of the patients age belonged to 5th and above decade and housewife in both group. Rural area, multipara, age of marriage under 18 years, married for 20 years and above, postmenopausal history and no history of hormonal contraceptive were significantly more common in case group. ABO blood group and Rh D status were statistically not significant between two groups but the majority population found O and Rh D +ve blood group in case group.

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