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RESEARCH ARTICLE

OVARIAN MALIGNANCIES IN RELATION TO ABO BLOOD GROUPS AND RH FACTOR.

Dr. Upma, Dr. Roopali Fotra.

Lecturer, Institute of Human Genetics, University of Jammu, J & K.

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***Corresponding Author**

Dr. Upma.

Abstract

Background & Objectives: To investigate correlation between the ABO blood groups and ovarian malignancies in females and also to correlate the frequency of ovarian malignancies with Rh factor.

Methods: Data were collected on the blood groups of 1,870 females diagnosed with ovarian malignancies and the same was compared with blood groups of 2,540 females taken as controls that were operated with reasons other than ovarian malignancies. For assessing the relationship between blood groups and ovarian malignancies, odds ratio (OR) with 95% CI (confidence interval) was calculated.

Results: A strong correlation was observed between females without 'A' or 'B' antigens i.e. O blood group females and increased risk of ovarian cancer (OR= 1.3281, CI= 1.1457-1.5396, p-value= 0.0002). The strongest magnitude of correlation was observed in patients without 'Rh' factor i.e. Rh- blood group.

Interpretation & Conclusions: There is a strong correlation between ABO and Rh blood groups and tendency of a female to develop ovarian malignancy.

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Introduction:-

Of the gynaecological cancers, ovarian malignancies represent the greatest clinical challenge^[1]. Ovarian tumor is the sixth most common female malignancy worldwide and second most common malignancy of the female reproductive system. In totality, it accounts for 4% of cancer and 5% of cancer deaths in the females^[1]. Annual incidence rates vary from less than 5 per 100,000 females in less developed countries like India, Brazil etc. to greater than 13 per 100,000 females in developed countries like United States, Germany etc^[2].

ABO blood groups are defined by carbohydrate moieties on the extracellular surface of the red blood cell membranes. Red blood cell antigens have various functions, including membrane structural integrity, transportation of molecules through membranes, and adhesion^[3]. Along with their expression on red blood cells, ABO antigens are also highly expressed on the surface of epithelial cells. Previous studies suggest a possible association between ABO blood groups and the risk of some epithelial malignancies, including pancreatic cancer^[4] and gastric cancer^[5]. It was in the year 1953 when the correlation between blood group A and gastric cancer was pointed out^[6]. Since 1953, the relationship of ABO blood groups with incidence, clinicopathologic characteristics, and prognosis of many diseases has been established^[7]. Some recent studies have shown the association of ABO blood groups with cancer of the cervix^[8], oral premalignancies^[9], cancer mortality^[10] and breast cancer^[11]. Several plausible mechanisms, including inflammation, immune-surveillance for malignant cells, intercellular adhesion, and membrane signalling have been proposed to explain the observed association between ABO blood groups and cancer risk^[4]. Previous

studies have drawn the association between ABO blood groups with the risk of certain malignancies; however, very few prospective studies of the association with ovarian malignancies are available^[12].

The present study was conducted with an objective of finding out the association of the distribution of ABO blood groups with ovarian malignancies and also to correlate the frequency of ovarian malignancies with Rh factor.

Materials and Methods:-

Present study is a hospital based study. Data was collected about the blood groups of 1,870 females diagnosed with ovarian cancer after their informed consent from the Department of Gynaecology and Obstetrics, Govt. Medical College, Jammu. Besides this, 2,540 females were taken as control group to rule out the association of the commonest occurring blood group type in both the diagnosed and control group.

Statistical analysis was done by using MedCalc software (MedCalc, Inc). Odds ratio with 95% confidence intervals was generated. The blood group B was taken as reference group as it has the highest frequency in the population of Jammu.

Results:-

The frequency of blood groups ABO and Rh factor among the 1,870 females with ovarian malignancies and the control group has been shown in Table 1 and Table 2 respectively.

Table 1: Distribution of ABO blood groups between cases and controls.

Blood group	Cases	Controls	Odd ratio (95% CI)	P-value
O	560	660	1.3281(1.1457-1.5396)	0.0002
A	420	550	1.1953(1.0196-1.4011)	0.0278
B	690	1080	1.0 (ref)	
AB	200	250	1.25(1.0160-1.5433)	0.0350
A+AB	620	800	1.2130(1.0526-1.3979)	0.076
B+AB	890	1330	1.04(0.9218-1.1902)	0.4775

Table 2: Distribution of Rh antigen between cases and controls.

Blood group	Cases	Controls	Odd Ratio (95% CI)	P-value
Rh+	1760	2460	1 (ref)	
Rh-	110	80	1.9219(1.4317-2.5798)	<0.0001

A correlation was observed between individuals without A or B antigens (i.e. O blood group females) and increased risk of ovarian cancer (OR= 1.3281, CI= 1.1457-1.5396, p-value= 0.0002). Also, the strongest magnitude of correlation was observed in patients without Rh antigen (OR= 1.9219, CI= 1.4317-2.5798, p-value<0.0001).

Discussion:

Study on the association between blood groups and several diseases has been carried out by various workers^[6-14]. There are only a few studies available regarding the relationship of ABO blood groups and risk of developing ovarian malignancies and these studies have stated contradictory results^[12, 19-21].

According to one study, females with blood group AB or B had a non-significant 38% increase in ovarian cancer incidence (95% CI=0.88-2.16 for blood group AB and 96-1.99 for blood group B) compared to females with blood group O, while blood group A and presence of Rh factor were not associated with the risk^[12]. Some other workers found^[19] ovarian cancer to be more common in women with blood group A than in others (RI= 1.17). Contradictory results were found by Bjorkholm (1984) who found a predominance of blood group A at the expense of blood group O when females with ovarian cancer were compared with the healthy controls^[20].

An increased probability of incidence of the majority of ovarian tumor types among AB blood group females compared to other groups (O, A and B) was observed by some workers. Also, there was noticed a considerably increased relative ovarian tumor and cyst morbidity among Rh+ females compared to Rh- ones^[21].

In the present study, it was found that O blood group has strongest association with ovarian cancer. A predominance of blood group O was seen over blood group A in females with ovarian cancer when compared with controls which contradicts the findings of some earlier workers^[12, 19-21]. Also, a higher probability of ovarian cancer was seen in Rh-females which is similar to the earlier findings^[12]. Recently the association between absence of Rh factor and presence of breast cancer has also been reported which further supports our findings^[22].

This study indicates that presence of blood antigens A and B provide some resistance against the tendency to develop ovarian cancer. This might be the reason that O blood group females have the highest tendency of developing the ovarian cancer. The presence of Rh antigen also is playing a sort of protective role against ovarian cancer for reasons still to be explored.

The explanation for the association between ABO blood groups and some special diseases was still unclear. Many reports have shown that blood group antigen expression in tumor is associated with metastasis^[23] and prognosis^[24, 25]. The loss or presence of blood group antigens can change cellular motility or facilitate the interaction between tumor cells and the endothelium of distant organs^[26]. ABO (H) blood group genes are map at 9q in which the genetic alteration is common in many tumors^[27-29]. Thus, ABO (H) blood group antigen expression may be affected by the genetic change of tumors. On the other hand, it is possible that the observed associations are not due to the blood group antigens themselves, but to the effects of genes closely associated with them^[30].

Conclusions:-

The present study indicates that there is a strong association between blood groups and tendency of a female to develop ovarian cancer. Also, the blood group O and absence of Rhesus factor are a risk factor for ovarian cancer. Further, detailed studies are needed to explore the mechanisms through which blood group may influence ovarian cancer risk.

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