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Studies Showing the Relationship between ABO Blood Groups and Major Types of Cancers

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Abstract : After the discovery of an association between stomach cancer and blood type A by Arid and Bentall in 1953, there have been several studies on possible relationship of blood types to certain diseases. Since it is estimated that cancer generally affect people of developing countries hence this study encompasses, the distribution of ABO blood groups in two major cancers viz, oral and lungs in males, and cervix and breast in females occurring in men and women of Bhopal city and comparison of pattern of cancer incidence with previous available data. Present study is an attempt of blood samples of cancer patients vis-a-vis their blood grouping. In breast cancer no clear relationship was found and in other cancers highest frequency occurned in blood group B. Moreover a change has been noticedin the pattern of cancer incidences from the data of past few years.

Keywords : Blood groups, Cancers, Cervix.

Introduction :

Since the discovery of an association between stomach cancer and blood type A by Arid and Bentall in 1953, there have been several studies on possible relationship of blood types to certain diseases. Enough has been presented in support and denial of the hypothesis that certain chronic diseases are associated preferentially with selected ABO and other blood groups. ABO blood groups are a stable feature of a population and they differ among various socio-economic, geographical and ethnic groups. In Europe highest frequency is of allele A, increasing to allele B from West to East (Bhasin and Chahal 1996).

Similarly, there are differences between the percentages of patients with various malignant tumors in our country and those in the Western world. In Indian perspective not much work has been done in this field. Cancer is a disease on which lot of work has been done in comparison to other diseases. In India cancer has become one of the leading death causes. It is estimated that there are nearly 1.5 to 2 million cancer cases at any given point of time. Data from population-based registries under National Cancer Registry Programme of Bhopal city indicate that the leading sites of cancer are oral cavity, lungs, oesophagus and stomach amongst men and cervix, breast and oral cavity amongst women. Cancers namely those of oral and lungs in males, and cervix and breast in females account for over 50% of all cancer deaths in India. Hence, besides

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studying the association of blood group and disease, the aim of this study is to understand the trends in cancer occurrence. Their variation according to demographic or life style characteristics of the population, and also in relation to diagnostic facilities available in the specific region, helps in generation of hypothesis in aetiology of various cancers. Taking this into account, this study encompasses the distribution of ABO blood groups in two major cancer occurring in men and women viz, cancer of lung and buccal mucosa in men and cervix and breast in females in Bhopal and their comparison with previous available data.

Materials and Method :

The present study comprises of blood samples collection in cancer cases viz, lung, buccal mucosa, cervix and breast from Jawaharlal Nehru cancer Hospital, Bhopal. Total 368 blood samples of cancer patients were collected by finger prick method, and blood typing done by tube method. The comparison for the blood group frequencies was done using Chi square test.

Results and Discussion :

The frequency of ABO blood groups of 368 cancer patients is shown in Table 1. In breast cancer high frequency is of blood group O (34.92%), followed by B (28.57%), A (24.60%)and AB (11.91%). In case of cervix cancer blood group B and O show almost similar frequency *i.e.* (36.11%) and (35.19%) followed by A (19.44%) and AB (9.26%). Whereas in cancer of lung and buccal mucosa, blood group B shows high frequency *i.e.* 36.54% and 34.15%, respectively. Blood group frequencies after statistical analysis are shown in Table 2.

In the literature breast cancer and blood type has shown variable results. Anderson and Haas (1984) found sister pedigrees with breast cancer to have an increased rate of type A compared to type O. A 1988 Iceland study looked at the risk of bilateral breast cancer in familial and sporadic cases with regard to ABO typing. Familial cases of bilateral breast cancer had a two fold higher prevalence of type B than did sporadic cases (Tryggvadottir et al 1988). A study of rapidly progressive breast cancer in Tunisian women found a slightly increased risk of a positive diagnosis in blood type A (Mourali *et al*., 1980).

In a 1988, Roberts *et. al*. studied 86 patients who had resection of lung cancers between 1978 and 1983. Those patients who were blood type B or AB had a significantly shorter survival than those with other blood types ($p < 0.0017$). Beolchini *et al*. (1957) reported an excess of blood group A in patients with cancer of uterine cervix in 1957. One such study revealed a lack of association between ABO blood groups and patients with cancer of the cervix, cancer of other genital organ and cancer of the breast (Mitra and Mondal, 1962).

When the trend of cancer occurrence in past few years was analysed, it was found that among 368 cancer patients studied, in case of cancer occurring in women, high percentage frequency is of breast cancer (34.2%) followed by cancer of cervix (29.35%) and in case of males cancer of buccal mucosa (22.28%)and then lung cancer (14.13%). Whereas,

Table 1 : The distribution of ABO blood groups in different four cancer types

Blood groups	***Types of Cancer***			
	Breast	***Cervix***	***Lung***	***Buccal Mucosa***
O	44(34.92%)	38(35.19%)	15(28.85%)	23(28.04%)
A	31(24.60%)	21(19.44%)	11(21.15%)	25(30.49%)
B	36(28.57%)	39(36.11%)	19(36.54%)	28(34.15%)
AB	15(11.91%)	10(9.26%)	7(11.54%)	6(7.32%)
Total (368)	**126(34.2%)**	**108(29.35%)**	**52(14.13%)**	**82(22.28%)**

(Figures in parentheses represent frequency of blood groups)

Table 2 : Comparison of Chi square values of ABO blood groups in four major cancers

Blood groups	***Breast Cancer***	x^2	***Cervix Cancer***	x^2	***Buccal Mucosa***	x^2	***Lung***	x^2
O	44	0.1796	38	0.0264	23	0.4999	15	0.0613
A	31	0.2943	21	0.0597	25	0.0255	11	0.1074
B	36	0.2322	39	0.0326	28	0.8750	19	0.0536
AB	15	1.0982	10	0.1996	6	0.3190	7	0.2890
Total	126	1.8043	108	0.3183	82	1.7194	52	0.5113

(The x^2 values correspond to a probability of $p > 0.05$, which is not statistically significant.)

according to Population Based Cancer Registries – Consolidated Report (1990-96) covering a rural and five urban cities including Bhopal, shows high incidence of cervix cancer followed by breast cancer in females and cancer of lung followed by tongue and buccal mucosa in case of males. The present study shows relevance with First All India Report: 2001-2002, of National Cancer Registry Program, according to which, relative proportion of breast cancer is 23.8 and that of cervix is 22.2 and that of buccal mucosa and lung cancer is 8.9 and 12, respectively. Since cancer of lung and oral cavity are caused by habits like smoking and tobacco chewing, which are found not only in men but also in women, but with a low frequency, therefore it is quite possible that men are at a greater risk of getting affected by these cancer types.

This study concludes that, in case of breast cancer, high frequency is of blood group O followed by B. Since this frequency is found in normal population also, hence no clear relationship is

established between blood group and disease. Whereas in other three cancers, since high frequency is of blood group B, so there may be some association with blood group, but there is no clear explanation about it. Further studies on blood groups in large series are needed to elucidate the relationship between blood group and disease. However, in comparison to trends of cancer occurrence from past few year reports, there has been a noticeable change in the pattern of cancer in this study. In case of cancer occurring in men and women, the pattern of two major cancers has been, breast and cervix cancer in women and buccal mucosa and lung cancer in men. From this study some clues can be drawn for understanding the trends in cancer occurrence.

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References :

Anderson D.E. and Haas C. (1984) : Blood Type A and Familial Breast Cancer. *Cancer.* **54**, 1845-1849.

Arid I., Bentall H.H. and Roberts J.A. (1953) : A relationship between cancer of the stomach and ABO blood group. *Br. Med. J,* **1,** 799-801.

Beolchini P. E., Cresseri A., De Maria B., Morganti G., Peruzzotti R., and Serra A. (1957) : Rapportitra neoplasie del collo dell'utero e gruppi sanguigni del sistema ABO (dati preliminari). *Monogr. Analecta Genet.* **6,** 109-111.

Bhasin M.K. and Chahal S.M.S. (1996) : *A Laboratory Manual for Human Blood Analysis*. Kamla-Raj Enterprises, Delhi.

Mitra S. and Mondal S. (1962) : Study of ABO blood groups in cancer of the female genital organs and cancer of the breast. *Cancer.* **15,** 39-41.

Mourali N., Muenz L.R., Tabbane F., Belhassen S., Bahi J. and Levine P.H. (1980) : Epidemiologic Features of Rapidly Progressing Breast Cancer in Tunisia. *Cancer*. **46,** 2741-2746.

Roberts T.E., Hasleton P., Swindell R., and Lawson R. (1988) : Blood groups and lung cancer. *Br. J Cancer.* **58,** 278.

Tryggvadottir L., Tulinius H. and Roberts J.M. (1988) : Familial and Sporadic Breast Cancer Cases in Iceland: A comparison related to ABO Blood groups and Risk of Bilateral breast Cancer. *Int. J. Cancer.* **42,** 499-501.