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Leprosy and A.B.O. Blood Groups

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Alexander (1921) was one of the first who attempted to find a relationship between ABO blood group and disease. He found that group B and AB were peculiarly susceptible to various forms of neoplasms. Buchnan and Higley (1921) reported in the same year that there was no relationship between the blood groups and a disease. Johannsen (1925) stated that A and AB individuals were more susceptible to external influences provoking carcinoma of uterus while those of O and B were resistant. Mitra (1933) did not find any relation between blood groups and diseases except in helminthesis and malignancy where one AB blood group was predominant.

Since then there have been various reports of widely different conclusions on many diseases in relation to blood groups (Goldfeder and Fershing, 1937; Tinney and Watkins, 1941; Roberts, 1953; Aird *et al.*, 1953; Macafee, 1960; Beasley, 1960; Stirling, 1960, etc).

With the increasing interest in the rôle of genetic factors in the development of diseases renewed efforts are being directed towards determining the relationship of blood groups to diseases. Recently Hsuen *et al.* (1963) from South India have reported that there is an association between the incidence of leprosy and the ABO blood groups and the incidence of leprosy is nearly twice as high in O group as compared to the B group.

As there has been diversity of the results about association between ABO blood groups and various diseases, it was thought that studies undertaken on similar lines, in different parts of India, would be worthwhile.

Such a study was conducted in Baroda, a city in Gujarat State, in the Western part of India.

MATERIAL AND METHOD

The Blood group frequencies of 594 patients suffering from leprosy was determined. All the patients taken in this study belonged to Baroda district. They were either attending the Medical College Hospital, Baroda or one of the leprosy clinics in the district.

In the control series 1000 first time blood donors at Medical College Hospital were taken for the blood group frequency examination. Only those donors who belonged to Baroda district were included in this study. None of these donors has shown any clinical evidence of leprosy.

Blood was obtained by the finger prick method in all these cases, and was examined within a period of 6 hours. The diagnosis of leprosy and its type was determined by a thorough physical examination and bacterial index. Where a difficulty in the diagnosis arose, histopathological examination was performed. International classification was used for classifying the cases under study.

RESULTS AND DISCUSSION

Table I shows the frequency distribution of different types of leprosy among the 594 patients.

TABLE I

Frequency distribution of different types leprosy among the 594 patients

Type of disease	*No. of cases*
Lepromatous	288
Non-lepromatous	306
(1) Tuberculoid	151
(2) Borderline	66
(3) Indeterminate	87
(4) Neural	2

Table II gives the frequency distribution of blood groups for the control series, study series (Lepromatous) and study series (Non-lepromatous).

TABLE II

Blood group distribution of 1000 first time blood donors, 288 Lepromatous leprosy and 306 Non-lepromatous leprosy patients

Blood group	*Control series*		*Lepromatous*		*Non-lepromatous*		*Combined series*	
	No. of cases	%	*No. of cases*	%	*No. of cases*	%	*No. of cases*	%
A	242	24.2	74	25.7	82	26.8	156	38.9
B	347	34.7	111	38.5	120	39.2	231	26.3
O	355	33.5	92	31.9	85	27.8	177	29.8
AB	76	7.6	11	3.8	19	6.2	30	5.0
Total	1000	100%	288	100%	306	100%	594	100%

The value of $X^2 = 9.84$, for d.f. $= 6$ gives probability $p = 0.11$ as shown in Table II. The distribution of the blood groups between the three series do not differ significantly. This suggests that there is no association between the blood groups and the incidence of leprosy.

If we combine the two series (of Table II), namely, that of lepromatous patients and non-lepromatous patients and compare it with the control series, then the value of $X^2 = 7.86$, $p = 0.0496$, d.f. $= 3$ is arrived at showing that the difference is just significant. The probability being just 0.05, there is only a weak evidence that the blood group distribution among the two series (control and combined) differs. In view of the further analysis which follows in Table III this evidence becomes much weaker and we cannot accept the hypothesis that the distribution of blood groups in the two series differs significantly.

TABLE III

	d.f.	X^2
Sum of two X^2 from Table 2 (Cols. 3 and 4)	6	$6.09 + 5.03 = 11.12$
X^2 from Table 2 (Cols. 2 and 5)	3	7.86
Heterogeneity X^2 (difference)	3	3.26

Heterogeneity X^2 is 3.26 for d.f. $= 3$ gives $p = 0.20$, showing that the two lepromatous and non-lepromatous series do not differ significantly, as already shown in the analysis of Table II. Hence the conclusion from the addition of two X^2, namely 11.12, $p = 0.096$ for d.f. $= 6$ is more reliable than the result from the pooled data which gives $X^2 = 7.86$ for d.f. $= 3$. As mentioned earlier, this supports the hypothesis that the blood group distribution of the control series and that in the leprosy patients series do not differ significantly.

This work is almost similar to Hsuen *et al.*, study in its design and methodology. On statistical analysis of our results we are unable to confirm Hsuen's conclusion that there was an association between leprosy and ABO blood groups. Our results indicate that there is no difference in the incidence of leprosy between the ABO blood groups.

CONCLUSION

The blood group distribution of leprosy patients does not differ significantly from that of the general population. The data given here does not support the hypothesis that there is any difference in the incidence of leprosy between the ABO blood groups.

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