Department of Physiology, Faculty of Medicine, University of Singapore

ABO Blood Groups, G6PD Deficiency and Abnormal Haemoglobins in Syphilis Patients of Three Ethnic Groups

N. Saha, B. Banerjee

SUMMARY

A total of 1,041 syphilis patients of both sexes and different ethnic origin (Chinese, Malay, and Indian) were investigated for the distribution of ABO blood groups and haemoglobin genotypes. There was no significant difference in the incidence of ABO blood groups and abnormal haemoglobins between disease and control series in any of the racial groups.

From the above series, 819 male patients were investigated for the incidence of G6PD deficiency. There was no significant difference in the incidence of this genetic marker in disease and normal series.

Haldane (1949, 1957) suggested that the present-day genetic polymorphic state is the result of interaction between natural selection and some chronic infectious diseases, endemic in certain regions, over some 5,000 years. The more chronic and less fatal a disease, the greater is the chance of it causing a mutation which would be transmitted to the next generation, producing heterozygote state resistant to alleged disease complex. Genetic association of diseases has been explored in the past mainly by observing the association of diseases with ABO blood groups and in some instances Rh group. Very little use has been made of other markers. The results of observations on the association of ABO blood groups and diseases are far from conclusive, except in the case of duodenal ulcer (Roberts, 1959); however, this association in duodenal ulcer is also complicated by ethnic factor, which is evident from different levels of significance amongst different series published.

In our previous studies on genetic association of pulmonary tuberculosis (Saha and Banerjee, 1968; Saha, 1969, 1970) looking for association of ABO-Rh blood group, G6PD deficiency, and abnormal haemoglobins, we observed a low incidence of O group persons amongst Chinese patients, but no such association could be detected in Malay or Indian patients. No association could be detected with G6PD deficiendy and abnormal haemoglobins, excepting that there was a lower prevalence of E haemoglobin in Chinese patients than the normal.

It was therefore thought worthwhile to extend the study of genetic association

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Tab. I. ABO blood groups and syphilis

Blood group	Chinese				Malays				Indians			
	Control [a]		Syphilis		Control [a]		Syphilis		Control [a]		Syphilis	
	N	%	N	%	N	%	N	%	N	%	N	%
O	6,644	43.53	277	40.32	2,098	38.42	96	41.20	1,951	39.02	39	32.23
A	3,967	25.99	175	25.47	1,369	25.07	50	21.46	1,051	21.02	28	23.14
B	3,814	24.99	191	27.80	1,596	29.23	67	28.75	1,680	33.60	48	39.67
AB	837	5.48	44	6.40	398	7.29	20	8.58	318	6.36	6	4.96
Total	15,262		687		5,461		233		5,000		121	

χ^2 (1 df) = O and not-O: Chinese 2.77, Indians 2.30; O and B: Chinese 3.64, Indians 2.71.
[a] Chan, 1962.

Tab. II. G6PD deficiency and syphilis

Ethnic origin	Control				Syphilis			
	N	G6PD normal	G6PD deficiency		N	G6PD normal	G6PD deficiency	
			n	%			n	%
Chinese	577	556	21	3.64	536	520	16	2.99
Malays	232	224	8	3.45	171	163	8	4.68
Indians	362	356	6	1.66	112	111	1	0.89
Total	1,171	1,136	35	2.99	819	794	25	3.05

Tab. III. Abnormal haemoglobins and syphilis

Ethnic origin	Control				Syphilis			
		Incidence of abnormal haemoglobins		Haemoglobin genotype		Incidence of abnormal haemoglobins		Haemoglobin genotype
	N	n	%		N	n	%	
Chinese	1,102	7	0.64	AE	687	1	0.15	AE
Malays	308	17	5.52	AE-16 AH-1	233	10	4.29	AE-9 EE-1
Indians	43	2	4.65	AE-1 AD-1	121	1	0.83	AE
Total	1,453	26	1.79		1,041	12	1.15	

χ^2 (1 df) = Chinese 2.28, Malays 0.42, Indians 2.58.

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using the same genetic markers in another chronic disease, namely syphilis, which is not well documented except the study of Schofield (1966) who investigated ABO-Rh blood groups distribution in patients suffering from venereal diseases.

Materials and Methods

Investigation was done on 1,041 patients of both sexes, including 687 Chinese, 233 Malays and 121 Indians, for distribution of ABO blood groups and prevalence of abnormal haemoglobins. These patients were serologically confirmed cases of syphilis, attending Middle Road Hospital, Singapore. Out of these patients, 819 males were investigated for the presence of G6PD deficiency. The same normal series as for study of pulmonary tuberculosis has been taken as reference control.

The details of methods have been described in earlier publications (Saha and Banerjee, 1968; Saha, 1969, 1970). Deficiency of G6PD was assessed by the method of Motulsky and Campbell-Kraut (1961).

Results and Discussion

Results are presented in Tables I, II, and III.

Tab. I shows the distribution of ABO blood groups in patients of three different ethnic groups suffering from syphilis and of normal control. It is noted that there were fewer Chinese and Indian patients of blood group O compared to normal (χ^2= 2.77 and 2.30 respectively with one degree of freedom). But difference in distribution of O against not-O was not significant. There was also lower frequency of O group compared to B group in syphilis in case of Chinese and Indian patients (χ^2= 3.64 and 2.71 respectively), but the difference was not significant. There was also no difference in ABO blood groups in the case of Malay patients. The present results are in agreement with that of Schofield (1966) who also failed to get any association between ABO and Rh blood groups and syphilis.

Tab. II shows the distribution of G6PD deficiency in syphilitic male patients compared to normal and the results suggest absence of any association of syphilis and this genetic marker. One of the authors failed to get any association of G6PD deficiencies and pulmonary tuberculosis also (Saha, 1969).

Tab. III shows the incidence of abnormal haemoglobins in syphilitics compared to normal. The prevalence of abnormal haemoglobins were less frequent amongst syphilitics than the normal control. But the association was not significant (χ^2=2.28, 0.42, and 2.58 respectively for Chinese, Malay, and Indians).

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RIASSUNTO

Sono stati studiati i gruppi sanguigni ABO e le emoglobine in 1041 pazienti sifilitici di ambedue i sessi e di diversa origine etnica (cinesi, malesi e indiani).

In nessuno dei tre gruppi etnici è stata riscontrata, nei pazienti rispetto ad una serie di controllo, una differenza significativa nelle frequenze dei tipi ABO né in quelle delle emoglobine anormali.

La frequenza della deficienza di G6PD è stata poi studiata in 819 pazienti maschi della stessa serie, senza riscontrare, neanche in questo caso, alcuna differenza significativa.

RÉSUMÉ

Les groupes sanguins ABO et les hémoglobines ont été étudiés chez 1041 sujets des deux sexes et d'origine ethnique différente (chinois, malais et indiens), atteints par la syphilis.

Chez aucun des trois groupes ethniques, les patients ne montraient, vis-à-vis d'une série de contrôle, aucune différence significative dans les fréquences des types ABO et des hémoglobines anormales.

La fréquence de la déficience de G6PD a aussi été étudiée chez 819 patients du même groupe, sans que aucune différence significative ne soit remarquée.

ZUSAMMENFASSUNG

Untersuchung der ABO Blutgruppen und des Hämoglobins bei 1041 Syphilitikern beiderlei Geschlechts und verschiedenen Volksursprungs (Chinesen, Malesen, Inder).

Bei keiner der drei Volksgruppen liess sich eine wesentliche Differenz im Vorkommen der ABO-Typen oder der anormalen Hämoglobine gegenüber einer Kontrollreihe feststellen.

Bei 819 männlichen Patienten der gleichen Versuchsreihe wurde auch der G6PD-Mangel untersucht, doch auch dabei ergaben sich keine wesentliche Unterschiede.

Dr. N. SAHA, Dept. of Physiology, Faculty of Medicine, University of Singapore, Singapore 3, Malaysia.