THE INCIDENCE OF THE FOUR MAIN BLOOD GROUPS IN RHEUMATIC HEART DISEASE

BY

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The familial incidence of acute rheumatism has long been recognized, but there is as yet no definite evidence as to whether this is due to similar environmental conditions, communicability of infection or to inherited predisposition. Wilson and Schweitzer (1937) concluded from their study that it was the last factor which was most important. Similar conclusions were reached by Roberts and Thomson (1934). Read, Ciocco and Taussig (1938) have also studied this problem and find that not only is rheumatic disease frequent among parents and siblings of rheumatic children, when there is both common inheritance and common environment, but that a similar frequency is observed in more distant relatives such as uncles, aunts and grand-parents who do not belong to the same immediate environment. However, the relatives probably belong to a similar walk of life as the patients and would thus be exposed to a similar if not the same environment. In view of this uncertainty it is obviously desirable to search for some somatic characteristic which might be associated with susceptibility to rheumatic infection. As long ago as 1903, Shruballs suggested that the blonde types exhibited a special predilection for acute rheumatism, but Young (1933) in a careful study of rheumatic children was unable to confirm this. In addition, Young's study of the physical measurements, physical characters and relative bodily proportions revealed no significant differences between rheumatic and normal children.

Although these studies had provided negative results there are obviously other characteristics which might be associated with a predisposition to acute rheumatism. It therefore appeared desirable to determine the incidence of the main blood groups in patients with this disease. A similar study in some other diseases has already been made with doubtful results. Thus Grooten and Kossovitch (1929), Jungeblut and Smith (1932), Shaw, Thelander and Kilgareff (1933) and Hatzky (1933) have all investigated patients with, or convalescent from, acute anterior poliomyelitis with rather varying results. In patients with scarlet fever similar conflicting reports have been made by Minorescu and Stefanov (1926), Nowak (1932), Körwer (1932), Kiss and Teveli (1930) and Brody, Smith and Wolff (1936).

Method

In order to avoid any possible diagnostic errors only those patients were examined who showed undoubted evidence of rheumatic heart disease. Blood was collected in two tubes, one containing isotonic (3·7 per cent.) sodium citrate solution, the blood in the second tube being allowed to clot. Corpuscles from the citrated blood were grouped against standard A and B sera by the Vincet open slide method, the reaction being examined microscopically where necessary. The serum from the clotted blood was also grouped by the same method against known A and B corpuscles.

Results

Two hundred rheumatic patients were examined in this way and their blood groups found to be as follows: Group O: 94; group A: 89; group B: 12; and group AB: 5. Two series are available for comparison. The first is composed of 6,780 observations kindly provided by Drs. R. Race and G. L. Taylor of the Galton Laboratory and the other 4,388 observations kindly provided by Col. L. E. H. Whitby of the Army Blood Transfusion Service. The latter have the advantage of being drawn from the same district (Bristol and the West of England) as the patients with rheumatic heart disease. Both of these have been compared by the X^2 method, with the following results. Taking the figures supplied by Race and Taylor first:

	O	A	B	AB	TOTAL
Rheumatic heart disease sample	94	89	12	5	200
Race-Taylor's series	2941	2976	620	243	6780
Combined series	3035	3065	632	248	6980

Treating both series alike the expected figures are:

$$\begin{array}{cccc} 86\cdot96 & 87\cdot82 & 18\cdot11 & 7\cdot11 \\ 2948\cdot04 & 2977\cdot18 & 613\cdot89 & 240\cdot89 \end{array}$$

and the value of X^2 :

$$\begin{array}{cccc} 0\cdot570 & 0\cdot016 & 2\cdot061 & 0\cdot626 \\ 0\cdot017 & 0 & 0\cdot061 & 0\cdot018 \\ = 3\cdot369 \end{array}$$

Since there are three degrees of freedom Fisher's (1936) table shows that the probability lies between 0·30 and 0·50 and the difference between the two is of no significance.

Treating the controls provided by Whitby in the same manner:

	O	A	B	AB	TOTAL
Rheumatic heart disease sample	94	89	12	5	200
Whitby's series	2137	1818	304	129	4388
Combined series	2231	1907	316	134	4588

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For these the expected figures are:

97.25	83.13	13.78	5.84
2133.75	1823.87	302.22	128.16

and the value of X^2 :

0.109	0.414	0.230	0.121
0.005	0.019	0.010	0.006
= 0.914			

which with three degrees of freedom indicates a probability between 0.80 and 0.90.

There is thus no evidence that a genetic predisposition to rheumatic heart disease is associated with any of the four main blood groups.

Summary

The blood groups of two hundred patients with rheumatic heart disease have been determined. The distribution of these blood groups does not differ from that in the general population.

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