

# Isohaemagglutinin Anti-A and Anti-B, and Serum Complement Levels in Children with Leukaemia

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The blood group isohaemagglutinins anti-A and anti-B and the serum complement level have been studied in 17 children with acute leukaemia. Low isohaemagglutinin values were more frequent at the exacerbation stage of the disease than during remissions, the difference being significant in the case of isohaemagglutinin anti-B. The complement did not show such a dependence. The variations of the isohaemagglutinin titre in connection with exacerbations and remissions is demonstrated in two selected cases which present an example of individual reactivity.

The level of blood group isohaemagglutinins anti-A and anti-B and the serum complement level have been studied in recent years in children with leukaemia. The object of the study was to establish [1] whether a relation existed between the level of some of the estimated values and the stage of the disease; and [2] whether it would be possible to use these simple tests as a measure of the immunological reactivity at certain stages of the disease.

## MATERIAL and METHODS

Seventeen children with acute non-differentiated leukaemia at different stages of the disease have been studied irrespective of the applied treatment. The diagnosis was made on the basis of clinical and haematological changes with the main stress on the myelogram. Treatment was begun with prednisone, in some cases combined with mercaptopurine or methotrexate.

The children were examined 26 times either at admission, prior to treatment, or during the exacerbation stage, and 40 times at the stage of remission. Eight children were of blood group A, five of O, and four of blood group B. Of the 17 children, 12 died in the course of the study.

For the determination of the isohaemagglutinin titre, the sera were processed either fresh or frozen at  $-20^{\circ}\text{C}$ . Titration was carried out with a 2% suspension of freshly taken blood cells  $A_1$  and B in physiological NaCl solution. Incubation was done for one hour at a constant temperature of  $4^{\circ}\text{C}$ . Reading was carried out by the same person macroscopically after whirling up the sediment by knocking three times at the base of the tube. The values obtained were compared to those of normal children of corresponding age. The serum complement level was determined by the 50% haemolysis method of MAYER *et al.* [4].

## RESULTS

When estimating the titre of isohaemagglutinins irrespective of their specificity, low values were more fre-

quent during the exacerbation stage and the dependence could be proved at the 1% level of significance (Table I).

TABLE I

Isohaemagglutinin anti-A and anti-B	Stage of disease		Total
	exacerbation	re-mission	
Lower than normal	14	5	19
Normal	15	39	54
Total	29	44	
Non-specific agglutination	2	1	

In children with blood groups B and O, i.e. in relation with iso-haemagglutinin anti-A, no connection was found between low titres and the course of the disease. The probability calculated according to FISHER was  $P > 0.05$  (Table II).

TABLE II

Isohaemagglutinin alpha	Stage of disease		Total
	exacerbation	re-mission	
Lower than normal	5	3	8
Normal	8	17	25
Total	13	20	
Non-specific agglutination	0	1	

In children with blood groups A and O, the titre of iso-haemagglutinin anti-B was more frequently low during

exacerbations than during remissions; the dependence was at the 1% level of significance (Table III).

TABLE III

Isohaemagglutinin beta	Stage of disease		Total
	exacerbation	re-mission	
Lower than normal	9	2	11
Normal	7	22	29
Total	16	24	
Non-specific agglutination	2	0	

The complement level did not show any direct relation to the stage of disease (Table IV).

TABLE IV

Complement	Stage of disease		Total
	exacerbation	re-mission	
Lower than normal	10	9	19
Normal	13	24	37
Total	23	33	

In two children (see Fig. 1) a regular dependence of the level of the respective iso-haemagglutinin titre upon the variations of the disease could be observed, although in K. V. the values did not fall below the normal range for the respective age group.

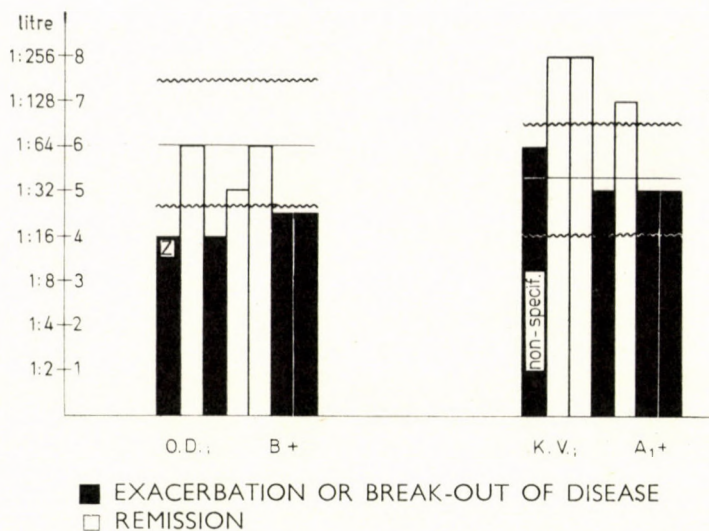


FIG. 1

## DISCUSSION

LIBANSKY and KOUT [3] when studying immunological activity in adults suffering from haemoblastosis, found a more distinct decrease of iso-haemagglutinins in lymphatic leukaemia, without any changes in the complement level. FAIRLEY and AKERS [1], too, drew attention to the low immunological activity in the malignant disorders of the lymphatic system. YOSHIKAWA et al. [5] found in patients with leukaemia a greater variability of the complement level in lymphatic leukaemia than in myelogenous forms of the disease or in healthy controls. JOÓ-SZABADOS et al. [2] examined the immunogram of 26 children with acute leukaemia; they found antibodies at the active stage of the disease as well as immediately before death.

From the present results it may be concluded that in most children with acute leukaemia during the exacerbation stage there occurs a fall of titre below the normal range established for the respective age group. The titre of iso-haemagglutinin anti-B behaved more frequently in this manner than that of iso-haemagglutinin anti-A. The serum complement failed to show such a dependence, although it often displayed quite low values during exacerbations, mainly at the terminal stage. In two cases the remission and exacerbation stages were always accompanied by a change in titre of the respective iso-haemagglutinin. In patient K. V., the titre of iso-haemagglutinin anti-B did not fall below the normal range, but the difference between the values during remission and those during exacerbations amounted to three titration

degrees. In patient, O. D. we could observe a similar dependence, with the difference that the isohaemagglutinin anti-A titre fell below the normal range of the respective age group.

Thus, in leukaemic patients the isohaemagglutinin titre should be followed regularly, as from its fall one can predict an exacerbation of the disease in some children.

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