

Biochemical Changes in Leukaemia

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Table 1

Changes in concentration of Uric acid, Calcium and Amino acid Nitrogen in Serum and Urine.

	Uric acid		Calcium		Amino acid Nitrogen	
	Serum	Urine mg% 24hr. urine	Serum mg%	Urine mg% 24hr. urine	Serum mg%	Urine mg% 24hr. urine
Leukaemic Children (n=35)	10.38 ± 0.27 (7.3—14.2)	451 ± 29.57 (275—710)	11.4 ± 0.48 (9—16)	84.75 ± 2.54 (56—124)	5.86 ± 0.17 (4.2—8.7)	301 ± 5.78 (246—356)
Control (n=15)	4.48 ± 0.24 (2.6—5.7)	266 ± 12.81 (217—314)	10.3 ± 0.30 (8.4—12.2)	114.2 ± 1.72 (88—160)	4.76 ± 0.16 (3.8—5.7)	221 ± 15.25 (183—274)

All values are Mean ± S. E. The range is given in parathesis.

The uric acid concentration in the serum and urine of the patients were significantly lower than that of the normal controls (P less than 0.001). Eventhough the mean value of serum calcium and the mean value of serum and urine amino acid nitrogen were slightly higher than that of normal control subjects the difference was not significant. The mean value of 24 hour urinary excretion of calcium of the patient was lower than that of the normal controls. But difference was negligible. The serum proteins and serum alkaline phosphatase value of the patients and that of the normal control subjects are given in Table II.

Table 2

Changes in concentration of Serum proteins and Alkaline Phosphatase.

	Serum proteins in gram %			Alkaline phosphatase in K. A. Units/100ml.
	Total	Albumin	Globulin	
Leukaemic Children (n=35)	6.72 ± 0.16 (6.5—7.46)	3.65 ± 0.20 (3.0—4.2)	3.05 ± 0.01 (2.5—3.3)	11.09 ± 0.27 9.0—14.0
Control (n=15)	6.72 ± 0.10 (6.0—7.5)	3.82 ± 0.11 (3.2—4.4)	2.9 ± 0.09 (2.3—3.5)	12.92 ± 0.49 (8.7—16.0)

All values are Mean ± S. E. The range is given in parathesis.

None of the values of the patients showed any difference from that of the normal subjects.

Discussion

The incidence of hyperuricemia in proliferative disease is very common.²² The antileukaemic drugs causes lysis of leukaemic cells presenting overwhelming load of uric acid to the kidney.²³ Uric acid production is directly proportional to the nucleic acid turnover in

various haematological disorders. Sandberg *et al*²⁴ observed in increased serum uric acid levels in leukaemia.

Hypoalbuminemia and or an increase in the different globulin fractions are relatively common in leukaemia.^{25, 26, 27, 28} But in the present study no significant abnormalities in the serum protein concentration were observed.

Kronfeld and Reynold²⁹ have suggested that hypercalcemia in leukaemia is a manifestation of bone destruction. Jordan and Richard³⁰ have reported hypercalcemia in acute leukaemic children. In the present study contrary to the previous findings there was no significant in the serum and urinary calcium levels.

Lebinaco and Sala³¹ have also reported that the concentration of amino acid nitrogen in both the serum and urine of leukaemic children is high and therapy has no influence on either the blood or urinary amino acid nitrogen. In the present study also it is observed that there is a slight elevation in the concentration of serum and urine amino acid nitrogen. The serum alkaline phosphatase activity in leukaemia was found to be within the normal limit in the present study.

From this study it can be concluded that except uric acid no other biochemical constituents showed any statistical change which can be of any use in the diagnosis or prognosis of the disease.

Summary

Biochemical changes in childhood leukaemia was studied to find out a biochemical marker which can be used for the diagnosis and prognosis of the disease. The following investigations were undertaken. Serum and urine uric acid, Serum and urine calcium, serum and urine amino acid nitrogen, serum proteins and serum alkaline phosphatase in 35 leukaemic children. For comparison 15 normal control children of the same age group were also investigated. The concentration of

serum and urine uric acid was found to be significantly increased in the leukaemic children compared to that of the normal controls. No significant change was observed in any of the other biochemical parameters investigated. Hence the biochemical parameters investigated are not of much help in the diagnosis of leukaemia, as the variation in these biochemical constituents are not statistically significant.

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