Acid Phosphatase Positive T-Lymphoblastic Leukaemia (T-ALL) ifl Pakistani Children

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T-Lymphoblastic leukaemia (T-ALL) appears to be associated with factors known to be of bad prognosis in Acute lymphocytic leukaemia (ALL). Acid phosphatase reaction (AP), a specific non-immunological cytochemical marker for T-ALL was performed on peripheral blood and bone marrow slides of fifty children with ALL to assess the frequency of T-ALL in our population. Myeloperoxidase (P) and Alpha-Napthyl Esterase (NASA) were performed to exclude Acute myelocytic and Monoblastic leukaemia. A strong localised AP reaction in more than fifty percent of the blasts was taken as positive for T-ALL. Of the fifty cases studied 32% showed strong AP positivity in majority of the cells. These were negative for both P and NASA and showed varied Periodic Acid Schiff (P.A.S) positivity. This high frequency of T-ALL in our series may explain the poor response to therapy and high relapse rates observed in our population. (JPMA 35: 6, 1985).

Introduction

There are several techniques to demonstrate Acid phosphatase (AP) activity in blood and bone marrow films[1,2]. The 'AP reaction in Acute leukaemia is of most value in Apute lymphocytic leukaemia (ALL) where several workers[3,4,5,6,7] have demonstrated a characteristic strong localised reaction in T-lymphoblastic leukaemia (T-ALL). In a comparative study[8] 90% of the cases of T-ALL were strongly positive for AP in contrast to 2% in common-ALL and 10% in Null-ALL. These Null cells however may in fact be prelymphoid stem cells or many be cells of T-lineage which have an incomplete T-phenotype. In another study[9] of 9 cases of T-ALL which expressed the T antigen (but were Sheep rossette negative)[7] showed a strong paranuclear AP reaction, thus implying that this reaction may be of value in the characterisation of T-lymphoblasts when sheep red blood cells rossettes are negative.
T-ALL in general appears to be associated with factors known to be of bad prognosis in ALL. Meningeal leukaemia presumably related to initial high white cell count is commonly an early event.[10] 'Splenomegaly is a more constant feature in T-ALL than Null-ALL[11]. The remission rate to conventional ALL therapy has been reported to be 40% in T-ALL as compared to 89% in other ALL cases[12]. Comparision of groups of similar white cell counts and organomegaly, similar drug schedules resulted in earlier relapses and shorter survival in T-ALL, thus suggesting an intrinsically more malignant nature of the T-cell neoplasia[12] Relapse rates of 45% in T-ALL as compared to 15% in Null-ALL have been repprted[13]
This study was conducted to evaluate the frequency of T-ALL in our population employing AP reaction as a positive cytochemical marker for 1-ALL. Myeloperoxidase (P) and Alpha-napthyl esterase (NASA) were employeth to exclude, Acute myelocytic and monocytic leukaemias while Periodic acid Schiff (P.A.S) reaction was employed as a positive markers for other ALL.

Material and Methods

Pretreatment samples of bone marrow and or blood from fifty cases of ALL were collected from

various hospitals in Karachi. Slides were used for AP reaction by the method of'. Romanosky stained films were looked at in all cases. P and NASA were performed[14,15] to exclude acute myeloid and monocytic leukaemia and P.A.S stain was performed by the method of[16] ALL cytochemical reactions were performed using Sigma Kits. Cases were scored as AP positive when more than 50% of the blasts showed a characteristic strong reaction usually localised to the area of the cytoplasm corresponding to the Golgi apparatus.

Results

Of the fifty children with ALL which were included in this series, sixteen showed strong localised AP activity in more than 50% of the blasts (Fig. 1 and 2).

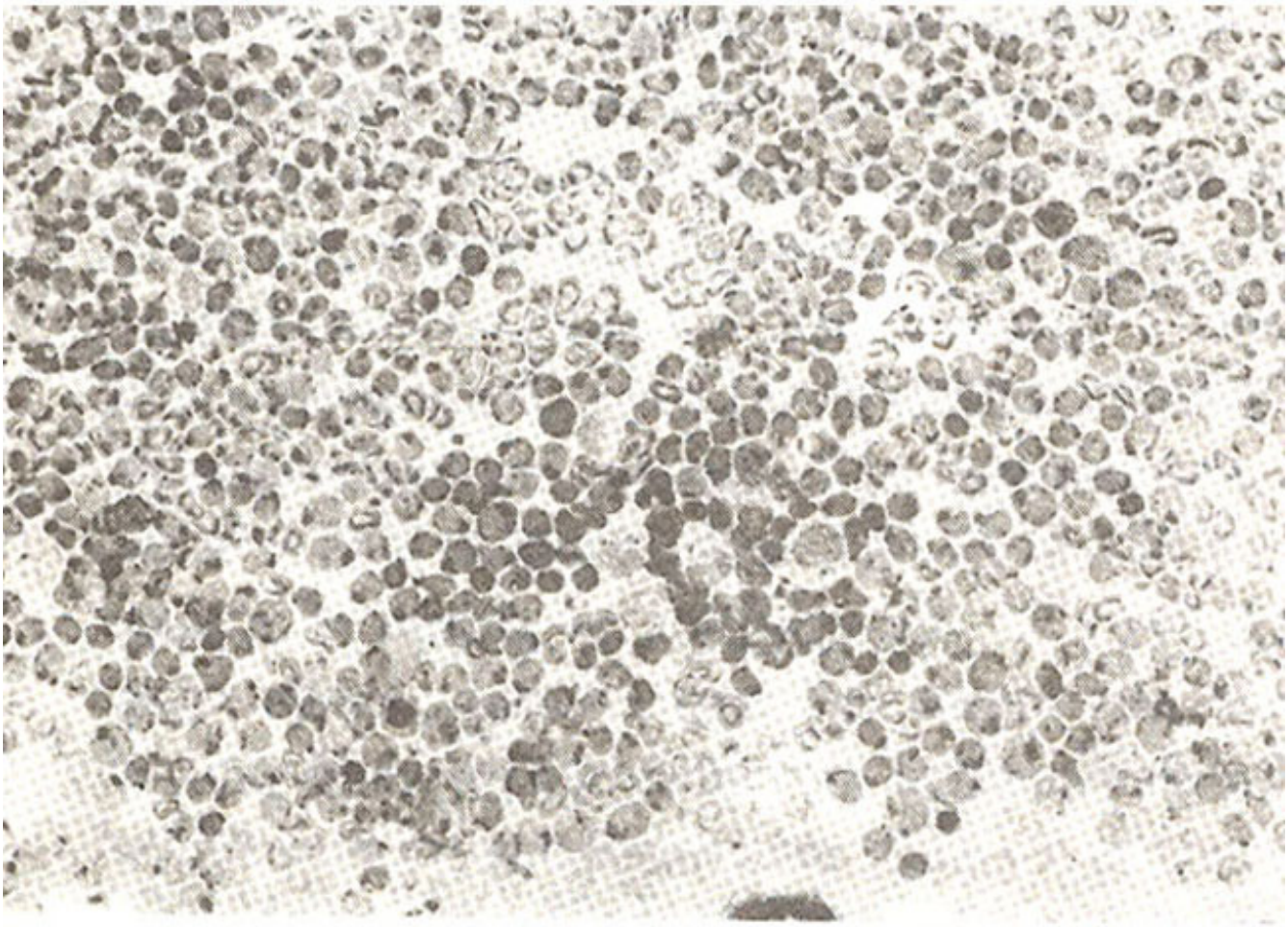

Fig. 1. AP reaction in T–ALL X40 magnification.

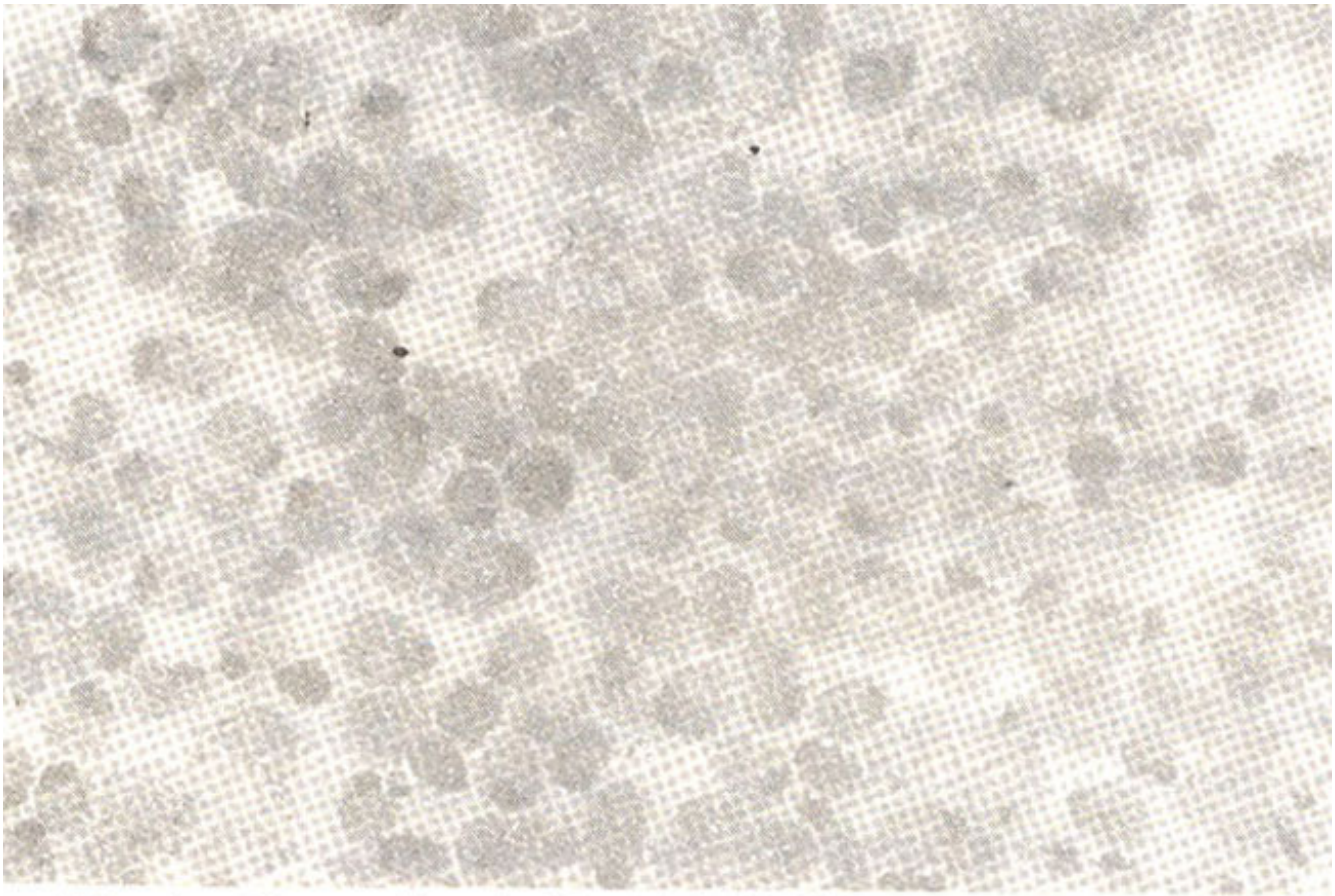

Fig. 2. AP reaction in T–ALL X100 magnification.

All these cases were negative for P (Fig. 3)

Fig. 3. P negativity in T–ALL. All Blasts negative with three positive myeloid cells X 100 magnification.

and reduced activity was observed in NASA and P.A.S (Fig. 4).

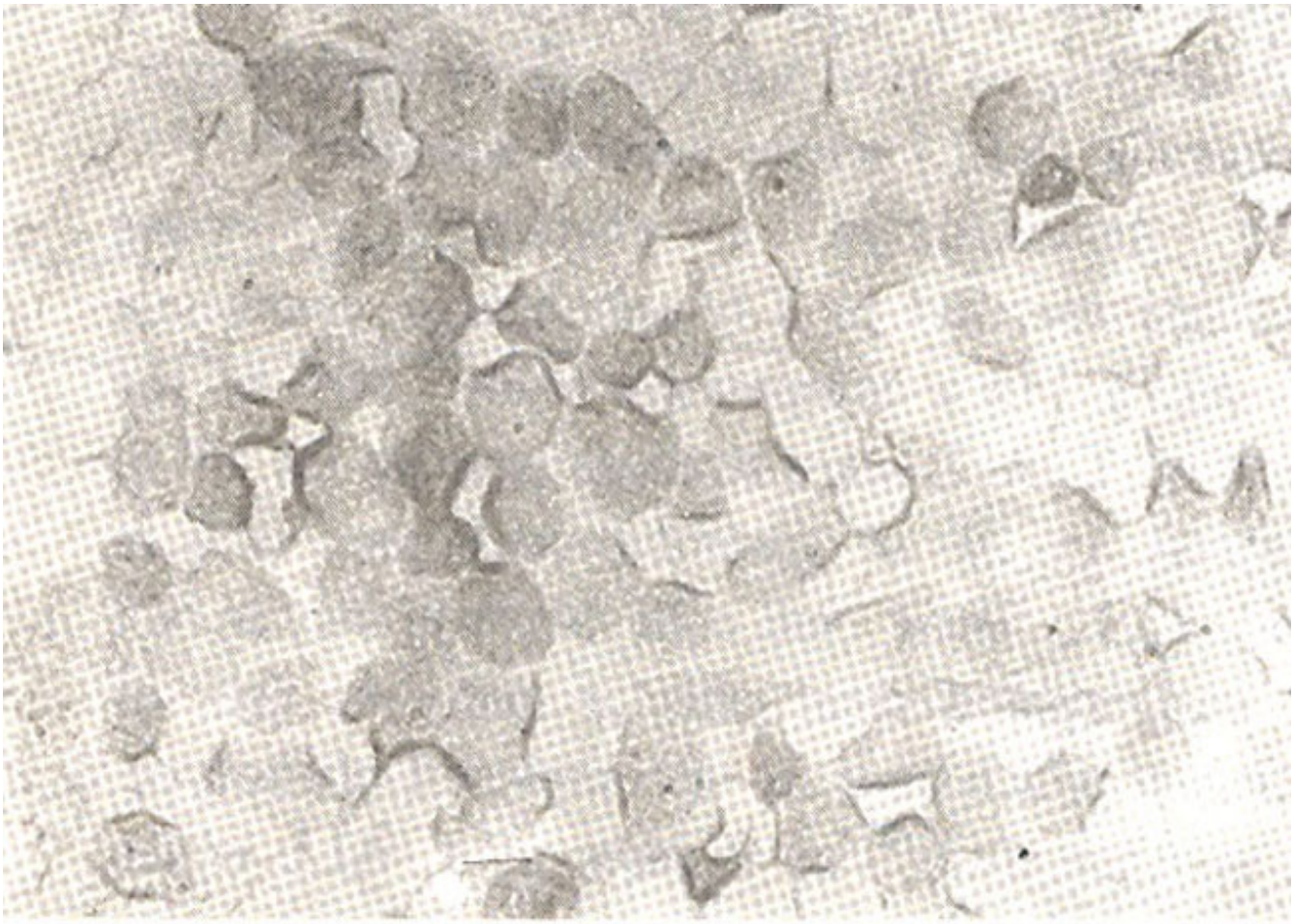

Fig. 4. P.A.S. negativity in T–ALL X100 magnification.

Table Case	Enzyme Activity in % of Blasts.			
	AP	P.A.S.	P	NASA
1	80	Nil	Nil	Nil
2	90	Nil	Nil	Nil
3	95	Nil	Nil	2
4	60	1	Nil	Nil
5	75	Nil	Nil	Nil
6	88	3	Nil	Nil
7	91	Nil	Nil	1
8	98	Nil	Nil	Nil
9	84	10	Nil	5
10	70	Nil	Nil	Nil
11	80	4	Nil	Nil
12	78	Nil	Nil	Nil
13	93	Nil	Nil	Nil
14	91	Nil	Nil	Nil
15	89	Nil	Nil	2
16	87	1	Nil	Nil

Table shows activity in % of blasts of AP, P, NASA and P.A.S.

Discussion

Acid phosphatase reaction was employed in this study as a positive non-immunological cytochemical marker for T-ALL. Since AP is also positive in some cases of acute myelocytic and monocytic leukaemia, myeloperoxidase and Alpha-napthyl esterase were performed and found to be negative or low in all cases positive for AP. Our experience was similar to others[3] where low P.A.S positivity was found in AP positive 1-ALL. In fact within the ALL,P.A.S is mostly positive in Non-T and Null-ALL[3]. This study reports a 32% frequency of T-ALL in Pakistani children with ALL as compared to Western reports where frequencies of 15-20% have been reported[17]. This study suggests firstly a continental variation in types of ALL since T-ALL is a rare disorder in Western countries and secondly that this high frequency of T-ALL in our children may explain the observed low remissions and high relapse rates in Pakistani children.

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