ORIGINAL ARTICLE

Acute Lymphoblastic Leukemia in the Department of Child Health, School of Medicine, University of North Sumatera/ Dr. Pirngadi Hospital Medan (1980 - 1988)

by

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Abstract

A retrospective study on acute lymphoblastic leukemia (ALL) was conducted to assess the pattern of childhood ALL at the Subdivision of Pediatric of Hematology, School of Medicine, University of North Sumatera/Dr. Pirngadi Hospital, Medan, in a period of 8 years (1980 - 1988).

There were 120 cases, consisting of 63 (52.5%) males and 57 (47.5%) females. By the FAB classification (Bennett, 1976) 93 (77.5%) were found as FAB L 1, 25 (20.8%) as FAB L 2, and 2 (1.7%) as FAB L 3. The youngest was 4 months old.

The majority of signs and symptoms appeared in the forms of pallor 102 (85%), fever 84 (70%), hemorrhage 52 (43.3%), hepatomegaly 64 (53.3%), splenomegaly 54 (45%) and lymphadenopathy 18 (15%).

On first admission, 76 (63.33%) cases were with a leukocyte count of less than 20,000/ul, and 72 (60%) with Hb content of less than 5 g/dl. Twenty one cases died in the first year. The received cytostatic protocol; 11 (52.38%) were treated regularly and first remission were found in 8 (72.73%) cases.

The average of admissions per year for the age group of 2-8 years was higher than the age groups of 0-2 years and 8-16 years ($p < 0.05$).

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Introduction

Acute leukemia is a primary malignant disease of the blood forming organs in the presence of progressive infiltration and the exchanges of normal bone marrow as well as lymphatic tissues into the immature cells forming lymphoid and myeloid (Henderson, 1977).

Acute leukemia is a malignant type of leukemia and it is more commonly found in children. Acute lymphoblastic leukemia (ALL) is the most common in children (± 76%) and the peak incidence usually is at the age of 4 years (Leventhal, 1987).

ALL may be classified by the criteria of morphology and immunology. FAB classification (Bennet et al., 1976) is based on the morphological appearances of bone marrow cells at the time of diagnosis, consisting of three subtypes : L1, L2 and L3 (Champlin and Gale, 1989).

ALL is found a little more frequently in males than in females, and the clinical manifestations of ALL are generally similar (Sallan and Weinstein, 1983).

Most children with ALL have clinical symptoms such as fever, pallor, hemorrhage, hepatomegaly, splenomegaly, adenopathy and arthralgia (Miller, 1980).

On first laboratory examination, most of patients with ALL show signs of anemia, decreased leukocytes, thrombocytopenia; blast cells are predominant in the bone marrow (Leventhal, 1987; Sallan and Weinstein, 1983).

Poor prognosis is found in patients with ALL who are younger than 2 years or older than 10 years, with leukocyte count more than 20,000 or 50,000/ul, or in the presence of a mediastinal mass (Champlin and Gale, 1989; Leventhal, 1987).

The purpose of this study is to assess the clinical and laboratory patterns of ALL in the Department of Child Health, School of Medicine, University of North Sumatera/ Dr. Pirngadi Hospital, Medan, in a period of 1980-1988.

Materials and methods

This study was done retrospectively in children with ALL admitted to the Subdivision of Pediatric Hematology, Department of Child Health, School of Medicine, University of North Sumatera/Dr. Pirngadi Hospital, Medan, 1980-1988. The diagnosis of ALL was based on the clinical symptoms, routine blood examinations and bone marrow as well. Reported data included several aspects of age, sex, FAB classification; time, symptoms, and laboratory examination on first admission as well as conditions of patients who died.

The statistical analysis used in this study for quantitative data with three variables was analysis of variance, with $p < 0.05$.

Results

During 1980-1988, there were 120 children with ALL, it was found that males were more common than females. According to the FAB classification (Bennett, et al., 1976), most of patients were found having the subtype of FAB L 1 (Table 1). The youngest was 4 months old.

Table 1 : *Distribution of patients according to subtype of ALL and sex*

Subtype	Sex				Number	%
	Male		Female			
	No.	%	No.	%		
FAB L 1	49	40.8	44	36.7	93	77.5
FAB L 2	13	10.8	12	10.00	25	20.8
FAB L 3	1	0.8	1	0.8	2	1.7
Total	63	52.5	57	47.5	120	100

Table 2 : *Distribution of disease by age by subtype of FAB*

Age (year)	FAB L 1	FAB L 2	FAB L 3	Number	%
0	9	4	-	13	10.8
2	19	5	1	25	20.8
4	18	-	-	18	15.0
6	18	3	-	21	17.5
8	7	3	1	11	9.2
10	10	6	-	16	13.3
12	6	4	-	10	8.3
14 - 16	6	-	-	6	5.0
Total	93	25	2	120	100.0

At the time of diagnosis, most of the cases were found in the age group of 2-8 years (53.3%) (Table 2). The average of admissions per year for this age group was higher than the age groups of 0-2 years and 8-16 years (see Fig. 1). This difference was statistically significant ($p < 0.05$).

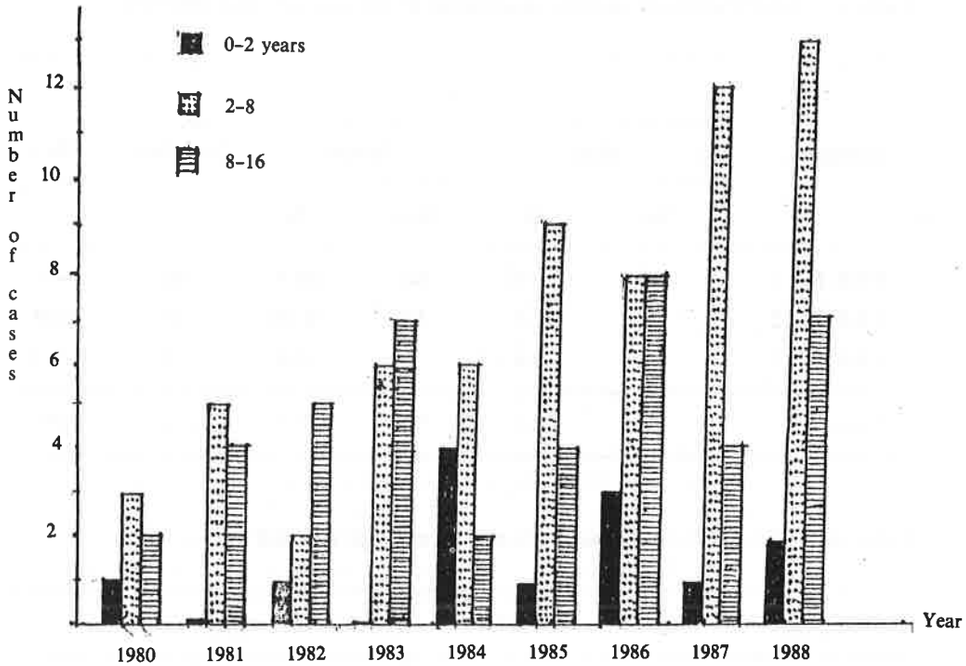

Figure 1 : *Number of admission per year ny age group*

Table 3 : *Distribution of leukocyte count by FAB subtype*

Leuc. count × 1000/ul	FAB L 1	FAB L 2	FAB L 3	Number	%
20	62	13	1	76	63.3
20 - 50	11	6	-	17	14.2
50 - 100	7	1	1	9	7.5
100	13	5	-	18	15.0
Total	93	25	2	120	100.0

Six clinical signs/symptoms frequently found in the first admissions were pallor in 102 (85%), fever in 84 (70%), hemorrhage in 52 (43.3%), hepatomegaly in 64 (53.3%), splenomegaly in 54 (45%), and lymphadenopathy in 18 (15%) of cases. Other signs/symptoms were headache, arthralgia, vomiting, anorexia, and exophthalmus.

On examination, the leukocytes count in the presence of diseases was, in most patients less than 20,000/ul (Table 3).

Table 4 : *Distribution of Hb level by FAB subtype*

Hb levels (g/dl)	FAB L 1	FAB L 2	FAB L 3	Number	%
5	54	17	1	72	60.0
5 - 10	37	8	1	46	38.3
10	2	-	-	2	1.7
Total	93	25	2	120	100.0

From 30 patients who died, 24 (80%) had got cytostatic therapy; and of them there were 21 (87.5%) who died in the first year. From those who died in the first year, 11 (52.4%) had got regular treatments, and of them there were 8 (72.7%) who had remissions.

Discussions

One hundred twenty patients with ALL, 52.5% males and 47.5% females, were studied. ALL subtypes were mostly FAB L1 (77.5%), followed by FAB L2 (20.80%), and FAB L 3(1.67%). Leventhal(1987) also found a small preponderance in males compared with females. Miller (1980) reported the nearly same percentages : 84%, 15%, and 1% for FAB L1, FAB L2 and FAB L 3, respectively.

The peak incidence of ALL in the patients studied, was in the age group of 2-8 years, i.e. 64 cases (53.33%). The admissions for the age group of 2-8 years, every year, was higher than in the age group of 0-2 years and 8-16 years ($p < 0.05$). Henderson (1977) reported that the age group of 2-10 years was predominant; Leventhal (1987) stated that the peak incidence of ALL was found in the patients with the age of arround four years.

Clinical signs and symptoms occurring at the time of diagnosis seemed to be nearly similar to those found in the earlier studies, except that we found hepatomegaly more prominently than lymphadenopathy. Leventhal (1977) reported hepatomegaly as less common while Miller (1980) found splenomegaly in 50% of patients.

On admission, the leukocytes count was less than 20,000/ul in 63.33% of patients; and Sallan (1983) reported a leukocytes count of less than 25,000/ul in 73% of cases.

In the presence of disease, Hb level of lower than 5 g/dl was found in 60% of patients. Miller (1980) reported a Hb level of lower than 7 g/dl in 43% of patients.

From 30 patients who died, 80% had had cytostatic therapy. Other patients were out of follow up. From those who had got cytostatic treatment, 87.5% died in the first year, and 52,4% of them had had regular treatment. From those who had had regular treatment, 72.7% had remissions. The most frequent side effect/complication were CNS leukemia in 5 (20.8%) and cytostatic toxicity in 4 (16.7%) cases. Although they had regular therapy and remissions, mortality in the first year was still high.

Conclusions

1. In this study, we found the patients with ALL mostly in the age group of 2-8 years.
2. Six main symptoms frequently found in the first admissions were pallor, fever, hepatomegaly, splenomegaly, hemorrhage, and lymphadenopathy.
3. Most of the patients had leukocytes counts of less than 20.000/ul.
4. Mortality in the first year was high.

REFERENCES

1. BENNET, J.M.; CATOVSKY, D.; DANIEL, M.T.; FLANDRIN, G.; GALTON, D.A.G.; GRALNICL, H.R.; SULTAN, C. (F.A.B. Co-operative Group). Proposals for the classification of the acute leukemias. Br. J. Haemat. 33 : 451 (1976).
2. CHAMPLIN, R.; GALE, R.P.: Acute Lymphoblastic Leukemia: Recent Advances in Biology and Therapy. Blood 73 : 2051-2066 (1989).
3. HENDERSON, E.S. : Acute Leukemia : General Consideration; in William, Haematology, 2nd ed, pp. 809-827 (Mc-Graw-Hill, New York 1977).
4. LEVENTHAL, B.G.: Acute Lymphocytic Leukemia; in Behrman, Nelson Textbook of Pediatrics; 13th ed. pp. 1085-1087 Saunders, Philadelphia-Tokyo 1987).
5. MILLER, D.R.: Acute Lymphoblastic Leukemia; in Bachner, The Pediatric Clinics of North America, symposium on Pediatric Hematology; Vol. 27 No. 2 pp. 269-291 (Saunders, Philadelphia 1980).
6. SALLAN, S.E.; WEINSTEIN, H.J. : Childhood Leukemia; in Nathan, Oski, Hematology of Infancy and Childhood; 2nd ed; Vol. II pp. 979-1013 (Saunders, Philadelphia/Tokyo 1983). 1983).