

Clinical profile, complications and outcome of Leukemia in Pediatric age group

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Abstract

Introduction: Aim of the study was to study clinical profile, complications & outcome of Leukemia in pediatric patients.

Materials and Methods: Patients of both sexes aged 0-12 years having Leukemia were included in the study. After admission, detailed history, physical examination and necessary investigations were done. During hospital stay, any complications occurring were recorded. Outcome was recorded as discharge or death.

Results: Total 50 patients were enrolled. 26(52%) were male while 24(48%) were female. 36(72%) patients were in age group 5-12 years. ALL [44 patients (88%)] was most common type of Leukemia. Fever [32 patients (64%)] was most common symptom and hepatomegaly [38 patients (76%)] as most common sign. Thrombocytopenia (32%) was most common complication seen. 43(86%) patients were discharged.

Conclusion: In present study, males were affected more commonly (male: female 1.08:1). Leukemia was most commonly seen in 5-12-year age group. ALL was the commonest type of Leukemia seen. Fever was most common symptom and hepatomegaly as most common sign. Most common complication seen was thrombocytopenia. Majority patients survived during study period (86%).

Keywords: Leukemia, ALL, AML, CML.

Introduction

Leukemia is a malignant neoplasm from the clonal proliferation of abnormal hematopoietic stem cells. It is characterized by diffuse replacement of the bone marrow by neoplastic cells leading to Bone marrow failure. Leukemia is the most common malignancy in children of which lymphoblastic Leukemia accounts for majority of the cases.¹

In most cases aetiology is not obvious. Over past 50 years, progressive advances in treatment of Leukemia have converted an incurable disease to one in which complete remission can be obtained in up to 95% of selected patient treated with curative intent.²

There are two main subtypes, the commoner acute lymphoblastic leukemia (ALL) and acute myeloid leukemia (AML). A small proportion may have chronic myeloid leukemia (CML) and juvenile myelomonocytic leukemia (JMML). Studies from

India have reported that ALL accounted for 60 to 85% of all childhood Leukemias.³

So, it is important to identify the pattern and clinical presentation of Leukemia in children, risk factor for prognosis and management lacunae in Indian scenario for better risk stratification and treatments.

So present study was aimed at studying clinical profile, complications and outcome of children who presented with Leukemia.

Materials and Methods

Present study was conducted in department of Pediatric oncology of a Government Cancer Hospital, Aurangabad in central Maharashtra region. It was a prospective observational study and study period was from Nov 2017 to Nov 2018. After approval of institutional ethical committee and written informed consent from parents or guardians, all patients of

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Leukemia admitted in Pediatric ward were enrolled in the study. We excluded patients more than 12 year of age and patients with diagnosis of lymphoma, aplastic anaemia or myelodysplasia.

After admission, detailed history and clinical examination was done. Investigations like CBC with PS, LFT, KFT, USG, CXR, Bone marrow aspiration & biopsy with flowcytometry and cytogenetics were done. Patients were treated with chemotherapy, cranial radiotherapy, G CSF, IV antibiotics, blood & blood component therapy and other supportive therapies as required.

Patients of ALL were treated according to BFM 90 protocol after risk stratification. High risk protocol was given only if good follow up was possible and parents were willing. AML excluding APL was treated with 7+3 regimen and CML was treated with Arsenic or imatinib mesylate. Regular examinations

were done during hospital stay & any complications were recorded & treated. Study outcome was noted as discharge or death.

Leukemia was defined by presence of >25% blast in bone marrow in ALL and >20% in AML.⁴

Results

During the study period, a total of 50 patients were enrolled as shown in table 1. There were 39 patients of B ALL, 05 patients of T ALL, 02 patients of AML & 04 patients of CML.

Males were affected more commonly than females. Males were 26 and females were 24 with male to female ratio was 1.08:1 as shown in Table 1.

Age group of 5-12 year (34 patients) was more commonly affected than age group of 1-5 year (16 patients) as shown in Table 1.

Table 1: Distribution of immunophenotype of Leukemia with respect to age & sex

| Immunophenotype of leukemia | Male | | Female | | Total |
|-----------------------------|----------|-----------|----------|-----------|-------|
| | 1-5 year | 5-12 year | 1-5 year | 5-12 year | |
| B cell ALL | 05 | 14 | 08 | 12 | 39 |
| T ALL | 00 | 04 | 00 | 01 | 05 |
| AML | 00 | 00 | 02 | 00 | 02 |
| CML | 01 | 02 | 00 | 01 | 04 |
| Total | 06 | 20 | 10 | 14 | 50 |

Figure 1 shows cytogenetics finding done in ALL & CML patients. Majority of patients had normal karyotype (19 patients) or hyperdiploidy (18 patients). All patients of CML had Philadelphia translocation (4 patients). 2 patients had del 5q while 4 patients had del 9q. Single patient of ALL had Philadelphia translocation.

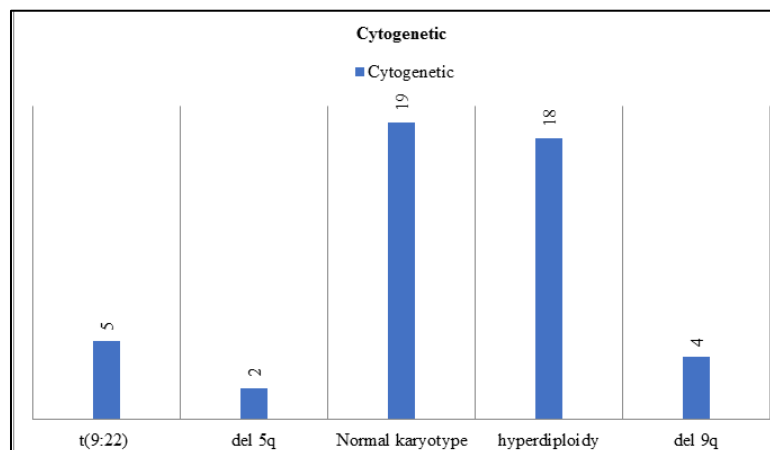


Fig. 1: Cytogenetic findings in patients of Leukemia

Table 2: Presenting symptoms & signs in patients of Leukemia

| Finding | No of patients | Percentage (%) |
|--------------------------|----------------|----------------|
| Symptomatology | | |
| Fever | 32 | 64 |
| Abdominal pain | 24 | 48 |
| Abdominal distention | 18 | 36 |
| Lymphadenopathy | 18 | 36 |
| Easy fatigability | 16 | 32 |
| Cough | 12 | 24 |
| Bony pain | 10 | 20 |
| Loss of appetite | 08 | 16 |
| Anorexia | 08 | 16 |
| Bleeding spot | 08 | 16 |
| Clinical findings | | |
| Sign | No of patients | Percentage (%) |
| Hepatomegaly | 38 | 76 |
| Splenomegaly | 32 | 64 |
| Pallor | 30 | 60 |
| Lymphadenopathy | 18 | 36 |
| Bleeding spots | 07 | 14 |
| Bone tenderness | 07 | 14 |
| Parotid enlargement | 04 | 08 |
| CNS manifestation | 03 | 06 |

Table 2 shows presenting symptoms & signs of patients of Leukemia. Fever was most common presenting symptom (64% patients) followed by abdominal pain (48% patients).

Hepatomegaly was found to be the most common sign (76% patients) followed by splenomegaly (64% patients).

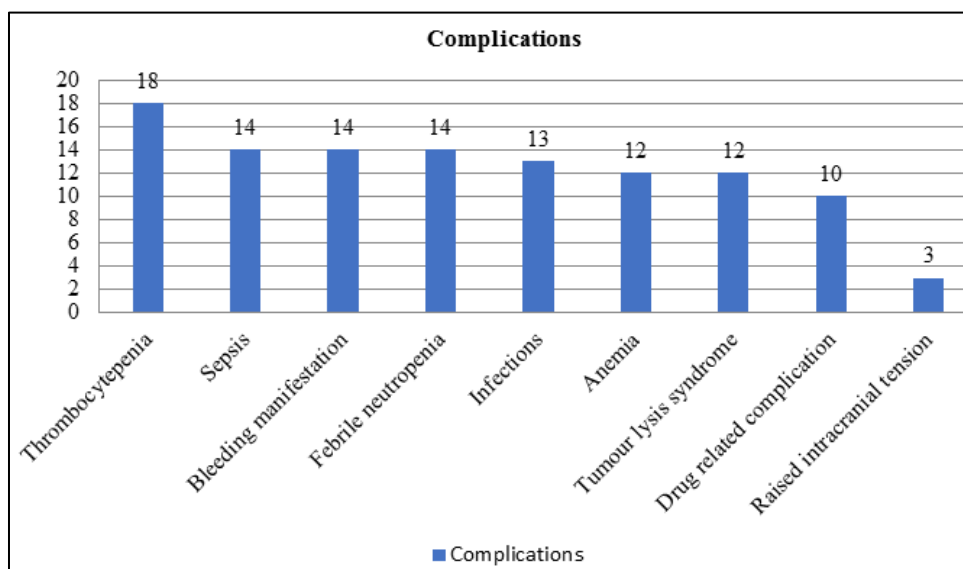
**Fig. 2:** Complications in Leukemic patients

Figure 2 shows complications seen in leukemic patients. Thrombocytopenia was the most common complication (36% patients) followed by Sepsis (28% patients) in Leukemic patients. Raised intracranial tension was least common complication seen (06% patients) as shown in Figure 2.

Table 3: Duration of hospital stay in Leukemia patients

| Days | No of patients | Percentage (%) |
|-----------|----------------|----------------|
| 1-4 weeks | 32 | 64 |
| 4-6 weeks | 10 | 20 |
| >6 weeks | 08 | 16 |
| Total | 50 | 100 |

As shown in table 3, in majority of Leukemia patients, hospital stay was between 1-4 weeks (64% patients). Few patients required longer than 6 weeks hospital stay (16% patients).

In ALL patients, based upon age, type, cytogenetics, prednisolone response and other factors, patients were started with high, intermediate and standard risk chemotherapy according to BFM 90 protocol. 15 patients received intermediate risk protocol while 29 patients received standard risk protocol. None of the patients received high risk protocol.

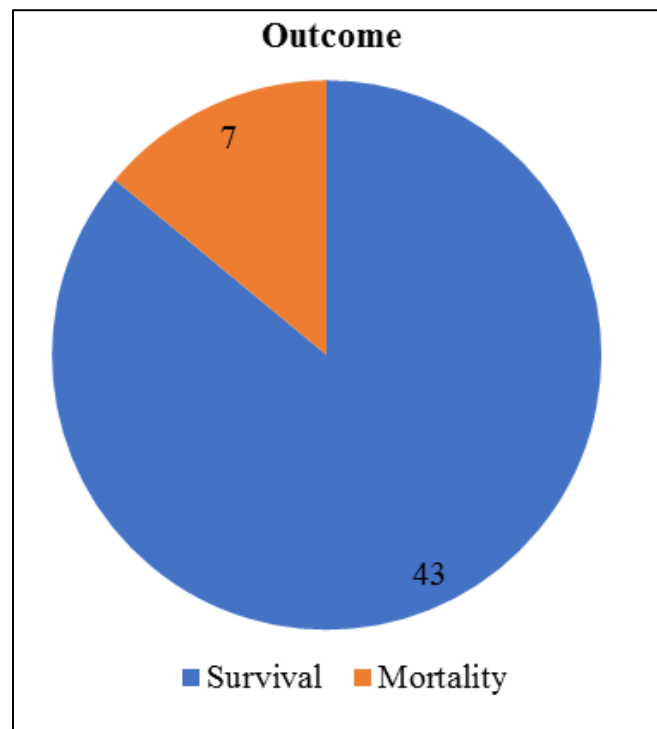


Fig. 3: Outcome in leukemia patients

Figure 3 shows outcome in Leukemia patients. During study period, 43 patients (86%) survived while 7 patients (14%) expired (4 patients of ALL intermediate risk therapy, 1 ALL on standard risk therapy, 1 patients each of AML & CML).

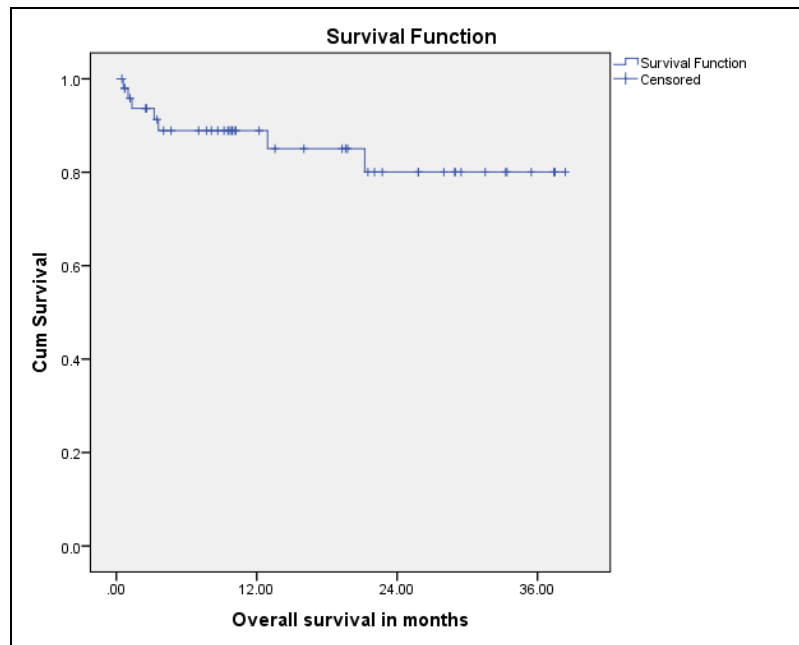


Fig. 4: Kaplan Meier curve showing survival in Leukemia patients

Figure 4 shows Kaplan Meier curve showing overall survival of 32.49 months (28.51 to 36.47 months) in Leukemia patients

Discussion

Though Leukemia has been observed in all age groups, in present study, most common affected age group was between 5-12 years (68%). Similar finding was reported by study done by Pandian et al⁵ & Khalid H et al⁶. But Siddaiahgari et al⁷ found that most common affected age group of patients was between 1-5 years (79.61%). In Present study, there was a male preponderance. Similar finding was reported by Osmari et al⁸ & Bembeck B et al.⁹

In present study, fever was the most common presentation in 32(64%) patients, followed by abdominal pain in 24(48%) patients. Bone pain was least common presenting symptom in 10(20%) patients. Pandian G et al⁵ similarly observed fever as the most common symptom in 24(85.71%) patients followed by abdominal distension in 18(64.28%) patients. Siddaiahgari et al⁷ similarly observed fever was the most common symptom in (92.23%) patients followed by pallor in (87.38%) patients. Bembeck B et al⁹ and Zulfikar A et al¹⁰ observed paleness as most common presenting symptom (74% & 84% respectively). This difference might be due to difference in the study populations.

Hepatomegaly was found to be the most common sign seen in 38(76%) patients, followed by splenomegaly in 32 (64%) patients in present study. CNS manifestation were least common [3(6%) patients]. Similarly, Manisha B et al¹¹ & Advani et al¹² observed most common sign was hepatomegaly followed by splenomegaly. In contrast, Mishra et al¹³ observed that most common sign was splenomegaly f/b hepatomegaly, purpura & sternal tenderness. This difference could be due to large number of patients included in the study and mostly they were adult.

In present study, 44(88%) patients were of ALL [B-ALL 39(78%), T ALL 5(10%)]. 4(8%) patients were of CML & 2(4%) patients were diagnosed as AML. Similar observation was made by Pandian G et al⁵. They observed 24(85.7%) patients were of B-cell ALL and 4(14.3%) patients were of T cell ALL. In contrast to present study Mukhopadhyay A et al¹⁴ observed T-cell ALL in 50.4% patients followed by B-cell ALL in 47.3% patients. This could be difference in study population, as both pediatric and adulthood patients were included in the study.

In the present study thrombocytopenia was the most common complication of Leukemia and was seen in 18(16.36%) patients, followed by sepsis in 14(12.72%) patients. Siddaiahgari et al⁷ also observed thrombocytopenia to be the commonest complication seen in 75% patients followed by febrile neutropenia in 47(48.41%) patients. In contrast to our study Khalid et al⁶ observed treatment related toxicities as the most common complication. This difference may be due to large duration of study done by Khalid et al⁶ for nearly 17 yrs.

In present study, out of 50 cases of Leukemia, 7(14%) patients died and 43(86%) patients survived. This observation is parallel to study reported by Siddaiahgari et al⁷ in which the majority of patients survived i.e.97.07% and 1 patient (2.93%) died. In contrast to present study, study by Pandian G et al⁵ showed only 57.7% patients survived and poor outcome noted in 42.3% patients even before completion of treatment. This could be due to less no of patients in this study.

In present study, in majority of the cases i.e. 32(64%) patients, hospital stay was 1-4 weeks followed by 4-6weeks stay in 10(20%) patients. This observation is parallel to study done by Khalid et al⁶ in which majority of the (97.8%) cases had hospital stay for less than 4weeks and 2.2% cases has hospital stay of more than 2 weeks. In contrast to present study Iwamatos et al¹⁵ found majority of the 98 (53.26%) cases had hospital stay for more than (1- 4) weeks. This difference might be due to inclusion of all types of leukemia with presence of co-morbidities in their study.

Conclusion

Most common age group affected in Leukemia was 5–12 years (72%). Boys 26 (52%) were more affected than girls 24 (48%) with male to female ratio 1.08:1.

Fever (64%) was the most common symptom while Hepatomegaly (76%) was most common sign found in Leukemia patients. Most common type of Leukemia was ALL (88%) in pediatric age group. Thrombocytopenia (36%) was most common complication found in Leukemia patients.

In majority of patients (64%) the hospital stay was 1-4 weeks. In present study, majority patients survived [43 (86%)] and 7(14%) patients died.

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Conflict of Interest

None.

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