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Case Report

Case Presentation: The Diagnosis and Clinical Features of a Pediatric Patient with Acute B Cell Lymphoblastic Leukemia

Dr Venugopal Reddy. I[1*], Dr. Shanti Reddy .M[2]

1. Medical Director and Consultant Pediatrician, Ovum Hospital, Bangalore.

2. Consultant Pediatrician, Ovum Hospital, Bangalore.

[*]**Correspondence to:** Dr Venugopal Reddy. I, Medical Director and Consultant Pediatrician, Ovum Hospital, Bangalore.

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Abstract

B-Cell lymphoblastic leukaemia of blood cancer that influences B-Lymphocytes, which are white blood cells that create within the delicate marrow of your bones (marrow).When healthy blood cells start to alter and expand out of control, this is called leukaemia. ALL is a tumour of immature lymphocytes. Lymphocytes are white blood cells that help the immune system function. Acute lymphoid leukaemia (ALL) is also known as acute lymphoblastic leukaemia. ALL is most visits in youthful children and people over the age of 50, but it can influence anybody at any age.

B-cell acute lymphoblastic leukemia is one of the most common types of leukemia in children but is rare in adults. My patient was admitted to medicine ward no-30, AVBRH with diagnosed of Acute Lymphatic Leukaemia and he had complaint of fever and abdominal discomfort. After getting appropriate treatment his condition was improved.

Introduction

Acute lymphoblastic leukemia (ALL) is the most common type of cancer in children, affecting B cells and T cells in the immune system. It can be treated by abnormal growth of lymphocyte precursors or lymphoblasts, which can lead to leukemia cells that survive longer and reproduce more rapidly than normal cells. These leukaemia cells can spread to other organs in the body. Although it cannot be cured in most cases, treatment can help individuals live longer and better. (1)

In individuals with ALL, abnormal cells in the bone marrow drive out other types of cells, preventing the era of red blood cells, various white blood cells, and platelets. This can lead to issues related to having a limited number of solid blood cells, such as weakness due to a need for red blood cells, contaminations due to a need for neutrophils, and increased chances of bruises due to platelets. Lymphoblasts can also accumulate in the lymphatic framework, causing swelling in the lymphatic system.

The spread of ALL to other regions of the body does not indicate that the malignancy has progressed. When acute leukaemia is discovered, it is typically through the body and can still be healed. Current treatments

can treat over 80% of children but less than 50% of adults. Risk-directed therapy aims to improve not only cure rates but also patient quality of life, as assessed by reduced acute morbidity and long-term scarring.(2)

As we learn more about leukemic cell transformation, drug resistance development, and the impact of personal genetics on chemotherapy response, we are moving closer to an era of individualized ALL therapy, where treatments based on individual patients' unique molecular targets and pharmacodynamics will improve existing procedures for large groups of patients. (3)

Patient Identification: A male age old 7 years, whom presented with suspected leukaemia to us for further management.

Blood test: 14.5.23 had shown 10.1 g/dl, total WBC 19600/mm3, absolute neutrophils 2800 /mm3 and platelets 2,84,000/mm3. He had 10% blasts on the peripheral smear.

Treatment: Child was started on hyperhydration and allopurinol. Diagnosis was confirmed by bone marrow studies which showed 83% blasts and by marrow flow cytometry as Acute B cell lymphoblastic leukemia and there were no CNS involvement, and he was started on Induction treatment as per UK ALL regimen A (low risk ALL). Unfortunately, within one week of treatment his cytogenetic and molecular genetics reports confirmed he is positive of 9;22 translocation (Philadelphia positive ALL). Hence is treatment was escalated to high risk ESPHALL protocol and he was started on Imatinib.

He has completed the induction treatment and am pleased to report that he is MRD (measurable residual disease) negative at the end of induction and he doing well. He is waiting for count recovery to start the next course of chemotherapy. With the modern chemotherapy protocols and good supportive care long term complete cure is expected to be in the range of 80%.

Discussion

A 7-year-old male adult with acute lymphoblast's leukaemia (ALL) was diagnosed and treated at the hospital. B-cell acute lymphoblastic leukaemia is the most common type of ALL in both children and adults, accounting for 75% of ALL cases. Risk factors for developing B-cell acute lymphoblastic leukaemia include Down syndrome, genetic disorders, and radiation exposure. Smoking has been linked to an increased risk of various cancers, including B-cell acute lymphoblastic leukaemia.(4)

A study was conducted to determine the clinical presentation and management of acute lymphocytic leukaemia. Patient case sheets were collected in 2017 and analyzed in a specially designed Performa. Results showed that ALL is the most common intense leukemia in adults, with over 6500 cases analyzed each year in the US alone. B-cell precursors account for 75% of cases, with dangerous T-cell antecedents for 25%. (5)

Case stratification has traditionally been based on clinical criteria such as age, white blood cell number, and chemotherapy reaction. However, the disclosure of repetitive hereditary changes has made a difference in person analysis and direct care. Despite advancements in treatment, multi-agent chemotherapy with vincristine, corticosteroids, and anthracycline, combined with allogeneic stem cell transplantation, remains the gold standard of treatment. (6-8)

Patients who are elderly are more likely to be unable to handle such regimens and have a difficult guess. Recent improvements in treatment of ALL include the ability to accurately evaluate forecasts, which can help doctors decide the most suitable starting treatment regimen and when allogeneic stem cell transplantation should be considered. Ph.-negative leukemia (B-ALL) is a rare and aggressive cancer that has a high prognosis based on age and white blood cell count. The MRC UKALL XII/ECOG E2993 considers a significant difference in disease-free (DFS) and overall survival (OS) based on age, with a cut-off of 35 for optimal treatment. A tall white blood cell number at diagnosis is also considered a free prognostic factor for DFS and OS. (9)

Ph.-negative infections can be classified as moo chance, middle chance, or tall chance based on these factors. Genetic profiling has been extensively investigated on ALL, with MLLr and TP53 mutations being powerful predictors of adverse outcomes in pediatric B-ALL and ALL. Genetic profiling can improve prognostication and management in ALL patients. (10)

Treatments include chemotherapy, radiation, targeted therapy, stem cell transplants, immunotherapy, and therapy with chimeric antigen receptor (CAR)-T cells. Adjuvant chemotherapy is superior to neoadjuvant chemotherapy, as it has a lower risk of distant metastasis/recurrence after one year of treatment. (11,12)

Conclusion

Acute lymphoblastic leukaemia is a common childhood cancer, requiring early diagnosis and preventive measures like antenatal screening and genetic counseling. Treatment has shown significant improvement,

and the patient's condition continues to progress until their last care date. Preventive measures, such as genetic counseling, are crucial to prevent complications and ensure the best possible prognosis.

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