Case Report on Acute Lymphoblastic Leukemia
B-Cell

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Authors’ contributions
This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: B-Cell lymphoblastic leukemia of blood cancer that influences B- Lymphocytes, which are white blood cells that create within the delicate marrow of your bones (marrow) [1]. 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 [2].
Aim: To acquire the knowledge regarding a case of B-cell acute lymphoblastic leukaemia.
Clinical findings: Abdominal discomfort, fever high grade, chills, weakness.
Diagnostic Evaluation: Blood Test: Hb-5.5%, Total RBC count-2.21 million/cumm, Total WBC count- 27400/cumm, RDW- 14.8%, HCT-17.7%, Monocytes-02%, Granulocytes-28%, Lymphocytes-68%, AST(SGOT)-110U/L.
Peripheral Smear: RBC: Total RBC Count- Decreased on smear, Haemoglobin- Decreased Predominantly normocytic with few micro showing moderate lymphomia, Platelets- Decreased on smear No hemoparacites are seen, Peripheral smear is suspicious of severe viral infection.
Ultrasoundography: Splenomegaly. Bone marrow aspiration and biopsy. B-cell lymphoblasts (immature white blood cells) are found in the bone marrow
Therapeutic intervention: Blood Transfusion-30 times, Inj Levofloxacin, Inj. Piptaz, Inj. Pan, Inj. Emset, Inj. Doxy, Inj. Hydrocort, Inj. Avil, Tab prednisolone, Tab Dolo.
Outcome: After Treatment, The patient shows improvement. His fever and abdominal discomfort were relived and his Hb% increased from 5.5% to 6% after blood transfusion.
Conclusion: B-cell acute lymphoblastic leukaemia is one of the most common types of leukaemia 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.

Keywords: Acute lymphatic leukaemia; hemoparacites; normocytic; splenomegaly.

1. INTRODUCTION

Acute lymphoblastic leukaemia (ALL) is the most common type of cancer in children. It affects certain cells in the immune system, called B cells and T cells. ALL usually affects B cells in children. Acute lymphocytic leukaemia (ALL), also known as acute lymphoblastic leukaemia, refers to an abnormal growth of lymphocyte precursors or lymphoblasts. B- Cell intense lymphoblastic leukaemia could be a cancer that influences the white blood cells called B- Lymphocytes that shape within the delicate middle of your bones, named marrow. B Lymphocytes are cells that are meant to assist you fight infections. However, with this disease, they transform into "leukaemia" cells, which survive longer and reproduce more swiftly than normal cells. They can then spread to other organs in the body. Although it cannot be cured in the vast majority of cases, treatment can help you live longer and better. Researchers are also exploring for new measures to fight the sickness [1].

In individuals with ALL, bizarre cells inside the bone marrow drive out other sorts of cells. This stops the era of red blood cells, which carry oxygen, as well as diverse sorts of white blood cells and platelets, which are blood components that affect the blood clot. This implies that individuals with ALL may involvement issues related to having as well few solid blood cells, such as weakness due to a need of red blood cells, contaminations due to a need of the sort of white blood cells known as neutrophils, which battle microbes, and an expanded chance of bruises due to a need of platelets [2].

Lymphoblast’s can too collect in a person's lymphatic framework, causing lymph hub swelling. A few items have the capacity to attack other organs, such as the brain, liver, spleen, thymus, or balls in men. Be The spread of ALL to other regions of the body, unlike other types of cancer, does not indicate that the malignancy has progressed. When acute leukaemia is discovered, it is typically through the body, and it can still be healed [2].

Acute lymphoblastic leukaemia (ALL) can be treated in more than 80% of children, but less than 50% of adults, as according current treatments. Current risk-directed therapy aims to improve not just cure rates in ALL, but also patient quality of life, as assessed by reduced acute morbidity and long-term squeal. As we learn more about the processes of leukemic cell transformation and drug resistance development, as well as the effect of personal genetics on a patient's chemotherapy response, The closer we come to an era of individualized ALL therapy, in which treatments based on individual patients' unique molecular targets and pharmacodynamics will improve existing procedures for huge groups of patients [3].

1.1 Patient Identification

A male age old 18 years from Bhiwapur, Wardha admitted to medicine ward 30, AVBRH on 24th May 2021 with a diagnosed of acute
lymphoblast’s leukaemia. He is 34 kg and his height is 154 cm.

1.2 Present Medical History

A male age of 18 years old was brought to AVBRH on 24th May 2021 by his parents with complaints of fever and chills, and abdominal discomfort and he was admitted to medicine ward no. 30. He is diagnosed of acute lymphoblast’s leukaemia and his haemoglobin level at the time of admission was 5.5%. The patient is weak and inactive on admission.

1.3 Past Medical History

My patient was not any past medical history.

1.4 Family History

There are four family members in the family. My patient was diagnosed acute lymphoblast’s leukaemia. Type of marriage of the parents is non-consanguineous marriage. All other members of the family were not having complaints in their health except for my patients who was being admitted in the hospital.

1.5 Clinical Findings

Abdominal discomfort, fever high grade (Temperature-101°F), chills, Weakness.

2. ETHOLOGY

A change in the DNA of a bone marrow cell causes B-cell acute lymphocytic leukaemia. This process is hampered by the DNA gene that causes B-cell acute lymphocytic leukaemia. The bone marrow cells grow and divide as a result of this. The growth in bone marrow cells releases the immature white blood cell. The cells then turn into leukaemia white blood cell, known as lymphoblasts. In B-cell acute lymphoblastic leukaemia, he affected white blood cell re B-cell. T-cell directly destroys cells that carry the infection. Body needs both T-cell and B-cell to fight infections [4].

2.1 Physical Examination

There is not much abnormally found in head to toe examination, the adults is lean and thin and having dull look. He is weak and so cooperative. Though it is found that the adult is having splenomegaly from ultrasonography, it is not palpable.

2.2 Diagnostic Assessment

2.2.1 Blood test

Hb-5.5%, Total RBC count-2.21million/cu.mm, Total WBC count- 27400/cumm, RDW- 14.8%, HCT-17.7%, Monocytes-02%, Granulocytes-28%, Lymphocytes-68%, AST(SGOT)-110U/L.

2.2.2 Peripheral smear

RBC: Total RBC Count- Decreased on smear, Haemoglobin- Decreased Predominantly normocytic with few micro showing moderate lymphoma, Platelets- Decreased on smear No hemoparacites are seen, Peripheral smear is suspicious of severe viral infection.

2.2.3 Ultrasonography

Splenomegaly. Bone marrow aspiration and biopsy. B-cell lymphoblasts (immature white blood cells) are found in the bone marrow.

2.2.4 Medical management

Blood Transfusion-30 times, Inj Levofoxacin, Inj. Piptaz, Inj. Pan, Inj. Emset, Inj. Doxy, Inj. Hydrocort, Inj. Avil, Tab prednisolone, Tab Dolo.

2.2.5 Nursing management

Table 1. Acute pain and discomfort related to mucositis, leukocyte infiltration of systemic tissues, fever, and infection

| Nursing Interventions                                                                 | Rationale                                                                 |
|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------|
| Assess the level of pain then record and report it to doctor.                         | To know the level of pain and frame further interventions.                |
| Consult and co-ordinate with health care team members of various department included  | 2. To confirm the final diagnosis with staging and prepare nursing diagnosis to provide effective care. |
| Administer the analgesics as per doctor order.                                         | 3. To provide symptomatic pain relief.                                     |
Table 2. Imbalance nutritional pattern less than body requirement related to related to hypermetabolic state, anorexia, mucositis, pain, and nausea

| Nursing Intervention                                                                 | Rationale                                                                                   |
|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| 1. Monitor the weight of the patient daily.                                           | To collect the baseline data about weight loss with the pain perception.                    |
| 2. Check the physician’s order and administer antiemetic and supplementary medicines. | 2. To avoid regurgitation and enhance the health of the patient.                             |
| 3. Consult the dietician and provide a diet pattern to the patient’s family to follow. | 3. To provide the patient with a healthy diet in order to cope up with daily activities.    |

Table 3. Fear and anxiety related to hospitalization secondary related to the regimen treatment

| Nursing Intervention                                                                 | Rationale                                                                                   |
|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| 1. Maintain rapport with the patient and her family.                                 | 1. To induce comfort so that they can share about the queries and problems.                  |
| 2. Provide information regarding disease condition and treatment modalities.         | 2. To increase knowledge regrading disease condition and treatment modalities of the patient and family. |
| 3. Counsel the patient regarding the mentioned fears and anxiety.                    | 3. To prepare the patient for the blood transfusion chemotherapy.                            |

3. DISCUSSION

A male adult of 18 years old from Bhiwapur was admitted to medicine ward no 30, AVBRH On 24\textsuperscript{th} May 2021 with complaint of abdominal discomfort, Fever with chills, weakness and Hb% less than normal limit. He is diagnosed acute lymphoblast’s leukaemia after two days of admitted. As soon as he was admitted to hospital investigations were done and appropriate treatment were started. After getting treatment, he shown great improvement and the treatment was still going on till my last date of care.

ALL (acute lymphocytic leukaemia) is a malignancy that affects the blood and bone marrow. The most frequent kind of ALL in both children and adults is B-cell acute lymphoblastic leukaemia. B-cell acute lymphoblastic leukaemia is a serious disease, but it can be treated and cured. B-cell acute lymphoblastic leukaemia (B-cell ALL) is a kind of ALL that causes you to have a lot of immature white blood cells called B-cell lymphoblasts in your bloodstream and bone marrow. The most prevalent subtype of ALL is B-cell acute lymphoblastic leukaemia, which accounts for 75 percent of ALL cases. The afflicted white blood cells in B-cell acute lymphoblastic leukaemia are B-cells. Risk factors may include: Down syndrome and other genetic disorders. A higher chance of developing B-cell acute lymphoblastic leukaemia can be caused by the chromosomal variations that underlie disorders like Down syndrome. Chemotherapy and other cancer treatments: People who are undergoing chemotherapy or radiation therapy for cancer are more likely to develop B-cell acute lymphoblastic leukaemia. High amounts of radiation: persons exposed to nuclear reactor accidents or other high levels of radiation are more likely to develop B-cell acute lymphoblastic leukaemia. Smoking has been related to an increased risk of numerous cancers, including B-cell acute lymphoblastic leukaemia. Some of these symptoms include: fever, shortness of breath dizziness, feeling paler than usual or clammy. night sweats, nosebleeds that are severe or occur often, cuts that are slow to stop bleeding and heal, loss of energy, weakness, bone pain or discomfort. Joint pain. Bleeding gums. infections that do not heal, swollen lymph nodes you can feel as lumps under your skin around your neck, stomach, pelvis, or armpits, bruising, menstrual irregularities, pin-sized red dots on your skin, unexplained weight loss. To destroy leukemic cells and promote remission, systemic chemotherapy is used (less than 5 percent of blast cells in the marrow and peripheral blood are normal). Testicular infiltrations are treated with radiation therapy. To avoid bleeding,
platelet transfusion is used, and RBC transfusion is used to prevent anaemia [5].

“Acute lymphoblastic leukemia: a total audit and 2017 update,” concurring to a inquire about. It was carried out to determine the clinical presentation and management of acute lymphocytic leukaemia. For the study, patient case sheets were collected in 2017. These case sheets were examined and recorded in a specially made Performa for the study. The result of the study were - Intense lymphoblastic leukemia (ALL) is the moment most common intense leukemia in grown-ups, with over 6500 cases analyzed each year within the US alone. In grown-ups, B-cell forerunners account for 75% of cases, with dangerous T-cell antecedents capable for the other 25% of cases.Chance stratification has customarily been based on clinical criteria such as age, white blood cell number, and chemotherapy reaction; in any case, the disclosure of repetitive hereditary changes has made a difference move forward person analyze and direct care. Despite progresses in administration, multi-agent chemotherapy with vincristine, corticosteroids, and an anthracycline, combined with allogeneic stem cell transplantation for appropriate people, remains the gold standard of treatment.Patients who are elderly are more often than not incapable to handle such regimens and have a destitute guess. Here, we take a see at a few of the foremost important most recent improvements within the treatment of ALL. The ability to precisely evaluate forecast is basic within the treatment of ALL. The doctor can utilize hazard stratification to decide the foremost suitable starting treatment regimen as well as when allogeneic stem cell transplantation ought to be considered. Patients have customarily been chance stratified based on their age and white blood cell check at the time of conclusion. As you get more seasoned, your guess will decline.In Ph.-negative ailment, the MRC UKALL XII/ECOG E2993 consider appears a significant distinction in disease-free (DFS) and generally survival (OS) based on age employing a cut-off of 35 within the biggest planned think about to decide ideal treatment.23 A tall white blood cell number at determination, characterized as >30 109 for B-ALL and >100 109 for T-ALL, was too found to be an free prognostic calculate for DFS and OS. Ph.-negative infection can be classified as moo chance (no hazard variables based on age or WBC number), middle chance (age >35 or hoisted WBC tally), or tall chance (age >35 and raised WBC check) based on these comes about. The 5-year OS rates were 55, 34, and 5%, individually, based on these chance categorie [6].

Recently, genetic profiling has been fully investigated on ALL; MLLr and TP53 mutations are powerful predictors for adverse outcome in paediatric B-ALL and ALL. MLLr were independently associated with adverse outcome in B-cell ALL (B-ALL). Genetic profiling can contribute to the improvement of prognostication and management in ALL patients [7].

Treatments receive throughout phases include: Chemotherapy: This therapy is given during the first phase of treatment to kill cancer cells, as well as throughout the post-remission and maintenance therapy phases. Radiation: This therapy uses X-ray-like beams to eliminate cancer cells, and it is required if the cancer has spread. Targeted therapy: Medication that is prescribed to target the "errors" in cancer cells. This may result in their extinction. In the first phase of treatment, targeted therapy is usually combined with chemotherapy. Stem cell transplants: This procedure replaces the cancer-affected bone marrow with new, healthy bone marrow. It's commonly used to treat relapses. Immunotherapy: This treatment works by boosting your body's natural immune system to help fight cancer. You can also get it if you experience a relapse. Therapy with chimeric antigen receptor (CAR)-T cells: CAR-T cell therapy is a treatment that enlists the help of your body's T cells to kill cancer cells. Children and young adults are the most often recipients of this treatment. For B-cell acute lymphoblastic leukaemia, there are various experimental treatments and clinical trials available [8]. Adjuvant chemotherapy is superior than neoadjuvant chemotherapy. Superior in terms of lesser distant metastasis/recurrence when we followed up the patient for 1 year after the completion of treatment [9].

4. CONCLUSION

Acute lymphoblastic leukaemia is one of the most common cases found among children, it is very important to diagnosis in early stage so that the child and adult will not develop complications from the disease. It is also very important to take preventive measures like antenatal screening and giving genetic
counselling are very important. My patient show great improvement after getting treatment and the treatment was still going on till my last date of care.

CONSENT

As per international standard or university standard, patient’s written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

Ethical approval acquired from the morals committee of the institution.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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