

The effect of acute lymphoblastic Leukemia on liver functions

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Abstract:

Leukemia belong to a broader group of tumors that affect the blood and bone marrow can identified as tumors of the hematopoietic tissues. There are four main types of leukemia: acute lymphoblastic leukemia (ALL), acute myeloid leukemia (AML), chronic lymphocytic leukemia (CLL) and chronic myeloid leukemia (CML)

Aim of the study: To identified the effect of ALL on liver functions by measurement the levels of aspartate aminotransferase (AST), alanine aminotransferase (ALT) and alkaline phosphatase (ALP) .

Methods: This study composed of 30 patients diagnosed with ALL and 30 healthy people as control group . The blood samples were collecting in order to measuring the levels of LT, ALP and AST to identify the liver functions.

Results : The present study indicates that there was a significant differences between control group and patients group in ALT which reached to 14.914 IU/L and 46.084 IU/L respectively , while in ALP test it was 50.63 IU/L and 130.04 IU/L respectively , but there was a slight increase in the level of AST in patients group in contrast with control group which reached 21.383 IU/L and 40.424 IU/L respectively.

Key words:- Leukemia, Acute lymphoblastic anaemia, Liver functions, ALT, ALP, AST.

INTRODUCTION:

Cancer is a group of diseases involving abnormal cell growth with the potential to invade or spread to other parts of the body (1).

Leukemia belong to a larger group of tumors that affect the blood and bone marrow can identified as tumors of the hematopoietic tissues. There are four main types of leukemia: acute lymphoblastic leukemia (ALL), acute myeloid leukemia (AML), chronic lymphocytic leukemia (CLL) and chronic myeloid leukemia (CML) (2). Acute lymphoblastic leukemia (ALL) is a malignant proliferation of lymphoid cells blocked at an initial stage of differentiation and accounts for ¾ of all cases of childhood leukemia (3). It is realized in both children and adults, but its incidence peaks between ages 2 - 5 years. The causation of ALL is considered to be multi-factorial such as: exogenous or endogenous exposures, genetic susceptibility, and chance. So that morphologic, immunologic, cytogenetic, biochemical, and molecular genetic descriptions of acute lymphoblastic leukemia are required to create the diagnosis or to exclude other possible causes of bone marrow failure and, finally, to classify ALL subtypes (3 and 4).

Acute lymphoblastic leukemia may be either asymptomatic or acute with life threatening hemorrhage, infection, or episode of respiratory suffering. While ALL is a disease mainly of the bone marrow and peripheral blood, any organ or tissue may be infiltrated by the abnormal cells (3). The most common signs are lymphadenopathies, hepatosplenomegaly, fever, infection , fatigue, signs of hemorrhage, and bone pain (2 and 5). Biological outcomes include hyperleukocytosis due to circulating lymphoblasts, anemia and thrombocytopenia (3).

patients with ALL originally presented with nausea and vomiting, weight loss, and right upper quadrant abdominal pain with acute hepatocellular liver injury (elevations in

aspartate aminotransferase/alanine aminotransferase) and elevated level of serum creatinine (5) .

All affected on the liver, In several cases that studied in (6) reveal that the liver dysfunction may be the presenting feature of ALL.

METHODS:

The samples were composed of 30 patients diagnosed with acute lymphoblastic leukemia ALL and 30 sample of healthy. The sample was collected from patient before taking the first dose of chemotherapy. The patients' ages varying between 25 to 45 years old.

Blood test: ALT, AST and ALP test: ALT And AST Test Are Also Perform To All Sample (Serum) By Using (Cobas Integra-400-1) .

Statistical analysis:- The result of this study is accessible as mean \pm standard deviation (SD) of the collected data. Statistical analysis of mean value was achieved through ANOVA by using the statistical software package SPSS version 20. A difference was considered to be significant $P < 0.05$ level (7).

RESULTS:

The results of the present study have demonstrated in figures and Tables. The Total number of Acute Lymphoblastic Leukemia ALL patients was 30 and control was 30.

The results of this study found that the level of alanine aminotransferase (ALT) was high in the group of ALL patients compared to the control group where it was concentrated 46.084 IU/L whereas in control 14.914 IU/L as in figure 1.

Figure 2 reveal high concentration of alkaline phosphatase ALP in the patients in compare with healthy which reach to 130.04 IU/L and 50.63 IU/L respectively.

Table 1 reveal the total results of this study in control and ALL patients groups and also reveal the significantly differences between groups.

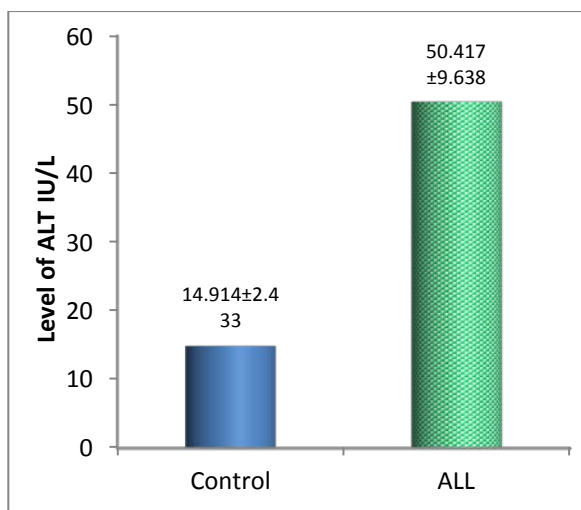


Figure (1): The Level of alanine aminotransferase (Mean±SD) in ALL patients in contrast with healthy groups.

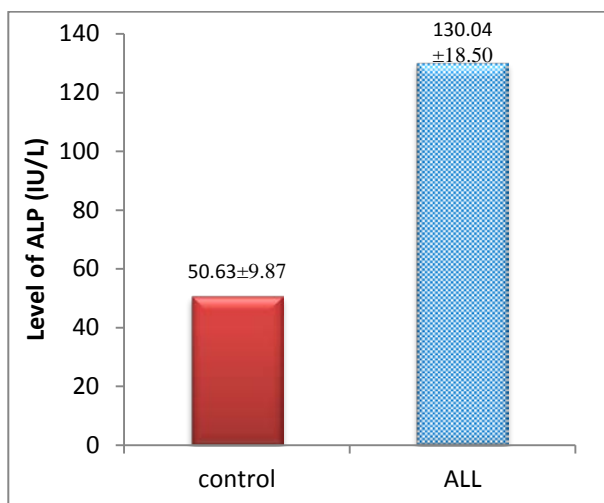


Figure (2): Reveal high level of Alkaline phosphatase ALP (Mean±SD) in ALL compare with healthy groups.

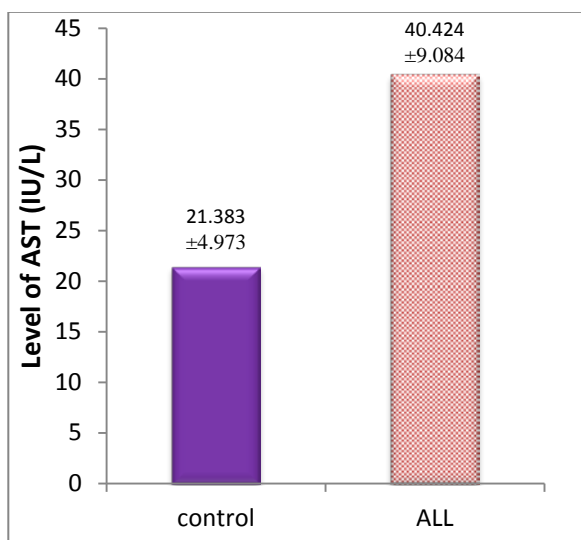


Figure (3): The level of Aspartate Aminotransferase (Mean±SD) in ALL and healthy groups.

Table 1: The concentration of ALL, ALP and AST in control and ALL patients groups.

Parameters of Liver functions	Control group (Mean±SD)	ALL patients (Mean±SD)
ALT	14.914±2.433	46.084±9.638
ALP	50.631±9.87	130.047±18.5
AST	20.383±4.973	40.424±9.084

DISCUSSION:

Acute lymphoblastic leukemia (ALL) is the most common form of cancer in children, with the peak incidence occurring in young children aged 2 to 5 years. Survival rates in children approach 90% (8; 9 and 10). In comparison, ALL is much less common in adults; ALL constitutes less than 20% of all acute leukemias in adults. Survival in adults is much poorer; estimated survival rates are between 20% and 40% (9).

Common presenting signs and symptoms of ALL, although nonspecific, include fever and infection caused by neutropenia, bruising and bleeding secondary to thrombocytopenia, and fatigue and pallor due to anemia. Extramedullary tumor infiltration into the lymph nodes, spleen, testicles, and central nervous system are common (8).

In this study we can denote that the ALL disease is effect on liver function. Figures 1, 2 and 3 reveal that there are increase in the Level of liver enzyme in all patients in contrast with healthy people. Level of Alanine aminotransferase (ALT) in this study was high in the group of ALL patients compared to the control group where it was concentrated 46.084 IU/L whereas in control 14.914 IU/L as in figure 1. Also in this study there are increase in the level of aspartate aminotransferase AST in patients in contrast with healthy group but the is no significantly differences as in Fig 3. So this study agree with (5).

Fig. 3. reveal high concentration of alkaline phosphatase ALP in the patients in compare with healthy which reach to 130.04 IU/L and 50.63 IU/L respectively, this result is agree with (11).

CONCLUSION:

In this study can conclude ALL affected on the liver function whereas the level of AST, ALT and ALP is increase in ALL patients.

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