Results

The present study included 25 pediatric patients with acute leukemia (20 ALL patients& 5 AML patients) admitted to National Cancer Institute in Cairo. Ten children of matched age and sex were included as a reference group.

Clinical results:

Our patients age ranged from1.3-15 years with a mean value of (5.1 ± 4.2), 3 patients (12%) aged below 2 years while 6 patients (24%) aged more than 10 years and the majority (16) of patients (64%) aged between 2-10 years .figure (1).

As regard the sex there was male predominance ,14 (56%) cases were males and 11 (44%) cases were females with male to female ratio 1.2:1figure (2).

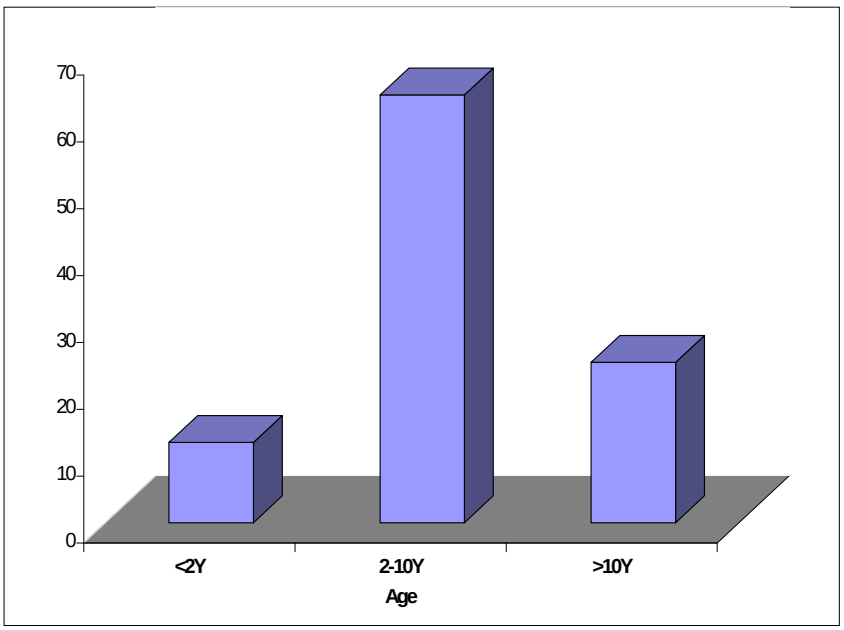


Fig. (1): Age distribution among children with acute leukemia

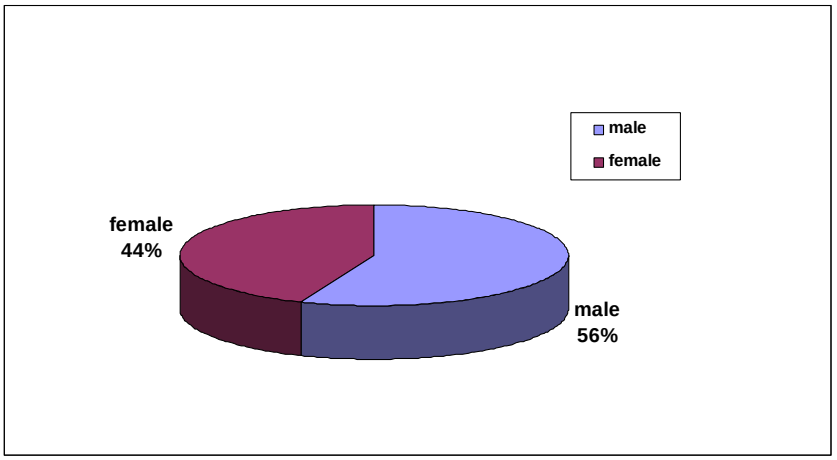


Fig. (2): Sex distribution among children with acute leukemia

Clinical Findings in Leukemic Patients

Fever was detected in 19 patients (76%), pallor (anemia) was present in 18cases (72%), bleeding (thrombocytopenia) and purpura in 15 cases (60%). Hepatosplenomegaly and generalized Lymphadenopathy in 17 cases (68%) while bone ache was present in 9 patients (36 %) (table 2& figure 3).

Table (1): Clinical Findings in Leukemic Patients

Cases	25 (100)%
Fever	19 (76)%
Pallor	18 (72)%
Bleedding and pupura	15 (60)%
Hepatosplenomegaly	17(68)%
Lymphoadenopathy	17(68)%
Boneache	9 (36)%

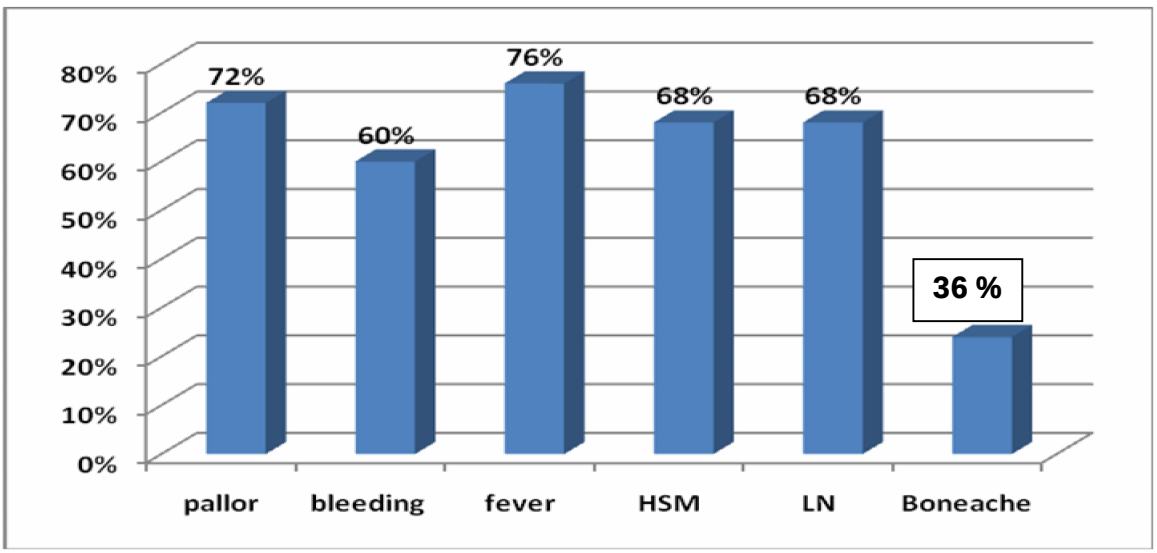


Fig (3): Clinical Findings In Leukemic Patients

Laboratory Findings Of Leukemic Patients

Leukocyte count below 100,000/mm3 was present in 19 cases (76%) while count above 100,000/mm3 was found in 6 cases (24%) .Hb≤10gm/dl was present in 18 cases (72%) while above 10gm/dl was present in 7cases (28%). Platelet count**<50000/cmm was present in16 cases (64%)**while above 50000/cmm was present in(36%).figure (4).

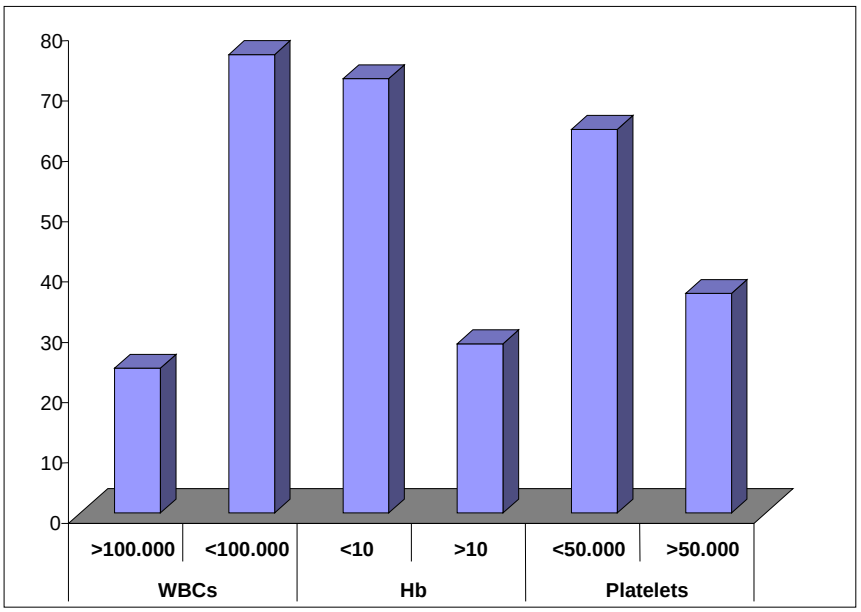


Fig (4): Laboratory Findings Of Leukemic Patients

FAB classification of the patients

As regard the FAB subtypes of the ALL patients(20 cases), L2 was the most common FAB subtype as it was detected in eleven patients (55%), while eight patients (40%) were diagnosed as L1and one case (5%) were diagnosed as L3 figure (5).

As regards the FAB subtypes of the AML patients (5 cases), two patients (40 %) were diagnosed as M2, two cases (40 %) were diagnosed as M3 while on case was M6 (20 %) figure (6).

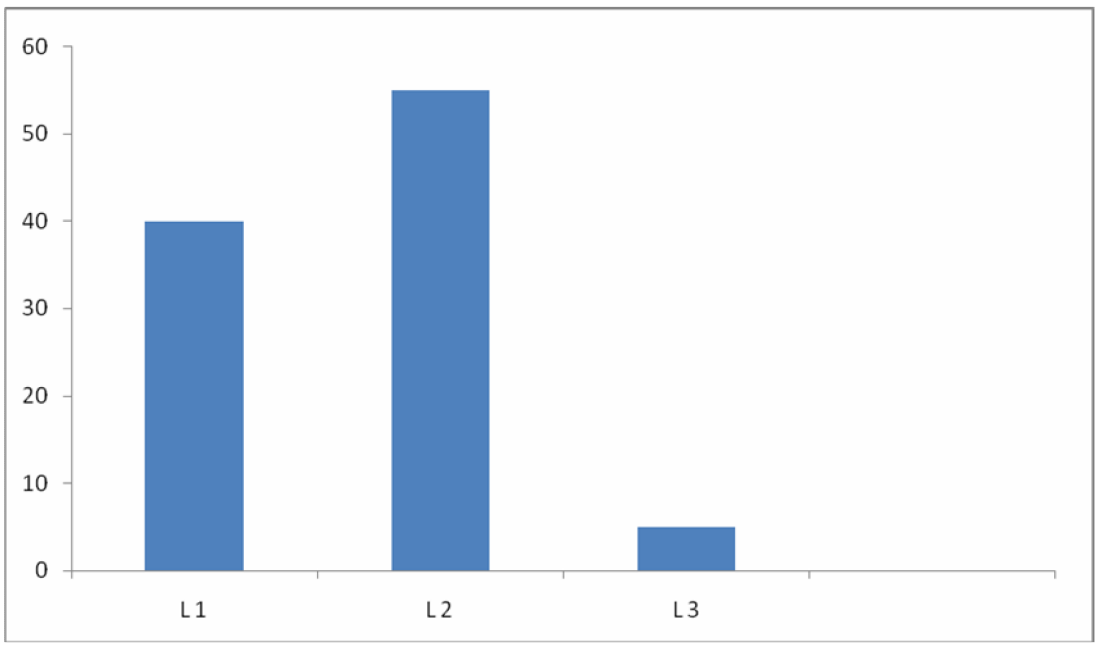


Fig.(5)FAB classification of ALL patients.

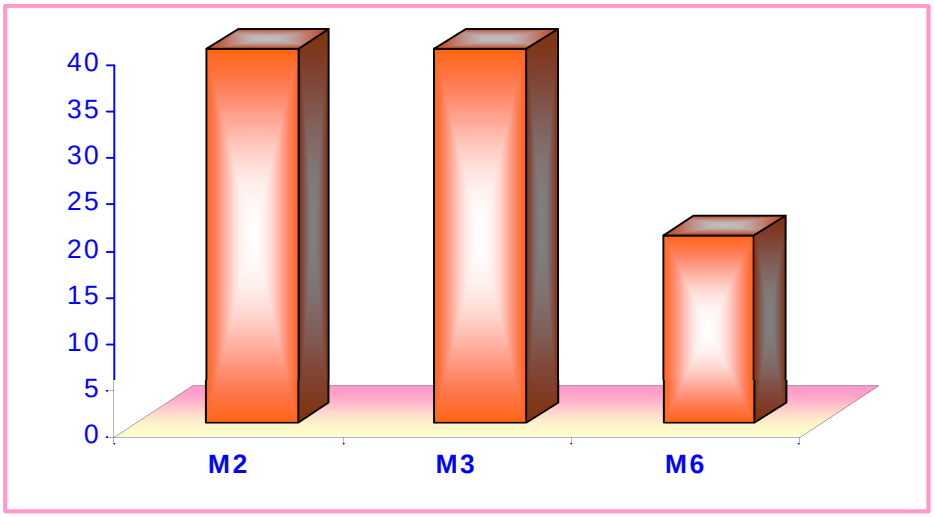


Fig.(6): FAB classification of AML patients.

Immuunophenotyping of the ALL patients:

B cell type was present in 15 /20 cases (75%), while T cell in 5/20cases (25%). Among B cells, the early pre-B subtype was the most common as it was detected in 9 /20cases (45%), while the pre-B was detected in 5 /20 cases (25%) and the mature B was present in 1/20 (5%) figure (7).

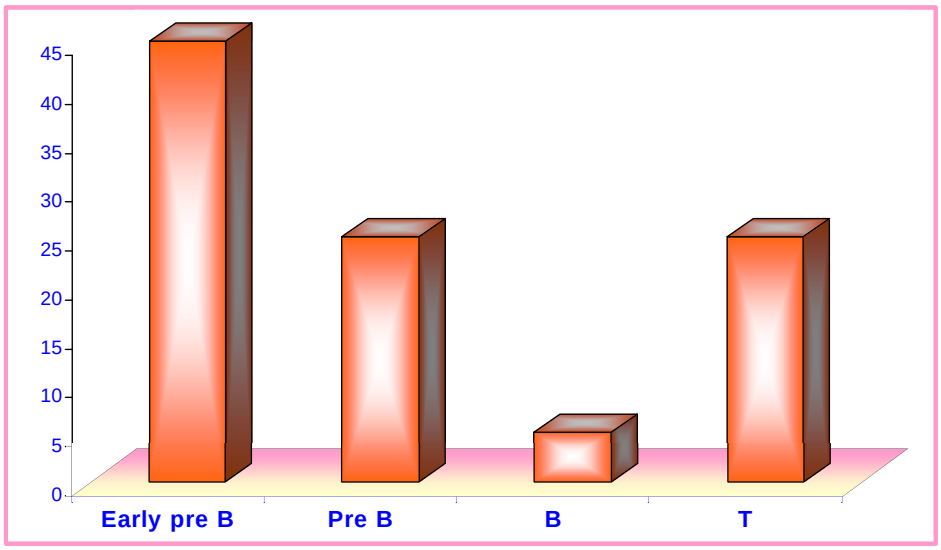


Fig. (7): Immunophenotyping of ALL patients.

Hepcidin Results

Serum hepcidin in ALL patients ranged from (200 -670 ng/dl) with a mean value of (434±95) while Serum hepcidin in AML patients ranged from(200-440 ng/dl)) with a mean of (370+ 83).table (3).

Table (2): Comparison between serum hepcidin level(ng/dl) inALL&AMLpatients

Serum hepcidin ng/dl	ALL	AML
Min	**200**	**200**
Max	**670**	**440**
Mean	**434**	**370**
SD	**95**	**83**
t	**3.1**	
p	**<0.05***	

- This table shows that there is statistically significant increase in serum hepcidin level in ALL compared to AML patients.

Comparisons between patient and control groups regarding age, serum hepcidin, complete blood count and different laboratory findings.

Table(3): Comparison between cases and control regarding age/ys

Age (years)	Cases (n=25)	Control (n=10)
Min	**1.3**	**2.5**
Max	**15**	**15**
Mean	**5.1**	**7.6**
SD	**4.2**	**4.03**
T	**0.65**	
P	**>0.05**	

This table shows that no statistical significant difference between cases & control regarding the age.

Table(4): Comparison between cases and control regarding serum hepcidin level (ng/dl)

Hepcidin/ (ng/dl)	Cases (n=25)	Control (n=10)
Min	200	8
Max	680	25.3
Mean	415.9	15.06
SD	154.6	5.9
T	8.5	
P	<0.001**	

This table shows that there is highly statistically significant difference between cases & control groups regarding serum hepcidin level.

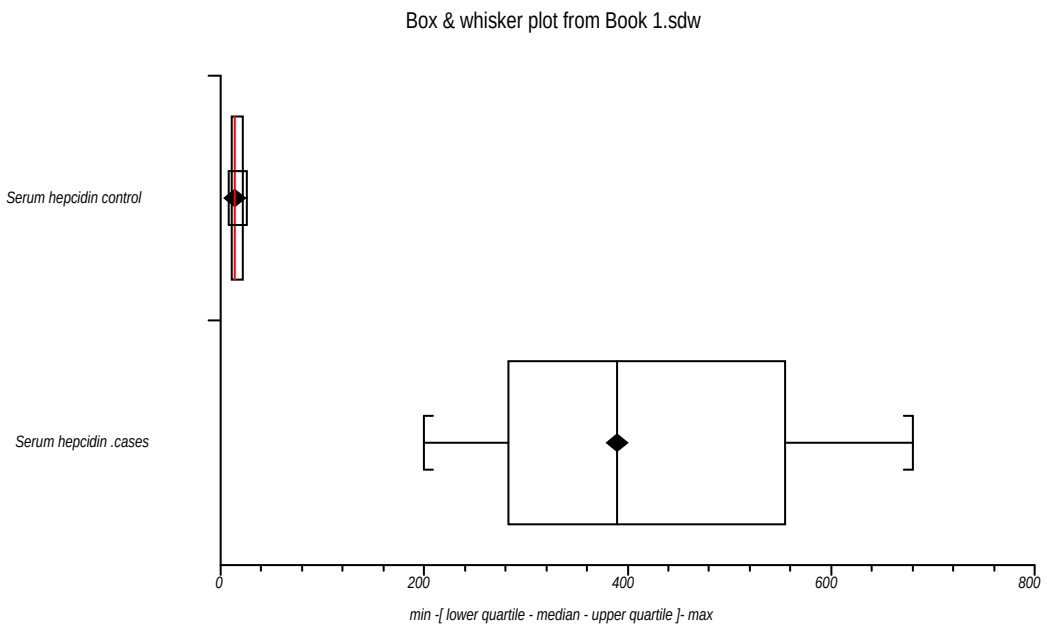


Fig (8): Comparison between cases and control groups regarding serum hepcidin level(ng/dl).

Table (5) Comparison between patient and control groups regarding complete blood count.

	patients(N= 25)		Control (N=10)		P-Value
	Range	Mean ±SD	Range	Mean ±SD	
HB/ gm%	4-12.9	8.3±2.5	10.2-13	11.2±0.88	<0.01**
WBCs x1000/cmm	1.6-350.0	67.8±90.8	2.1-8.5	5.7± 2.5	<0.05*
Lympho. x1000/cmm	0.32-135.5	28.6±38.1	1.5-3.2	2.03±0.65	<0.05*
Neutro x100/cmm	0.3-420	36.7±87.3	3.2-8.1	5.01±1.66	<0.05*
Plat x1000/cmm	16.0-670	74.1±124.3	157-355	231.7±63.9	<0.01**

*significant **high significant

This table shows that there is

- Statistically significant increase in total WBCs count,total lymphocytic count and total neutrophils count in cases compared to control groups.
- Highly statistically significant decrease in haemoglobin concentration and platelet count in cases compared to control groups.

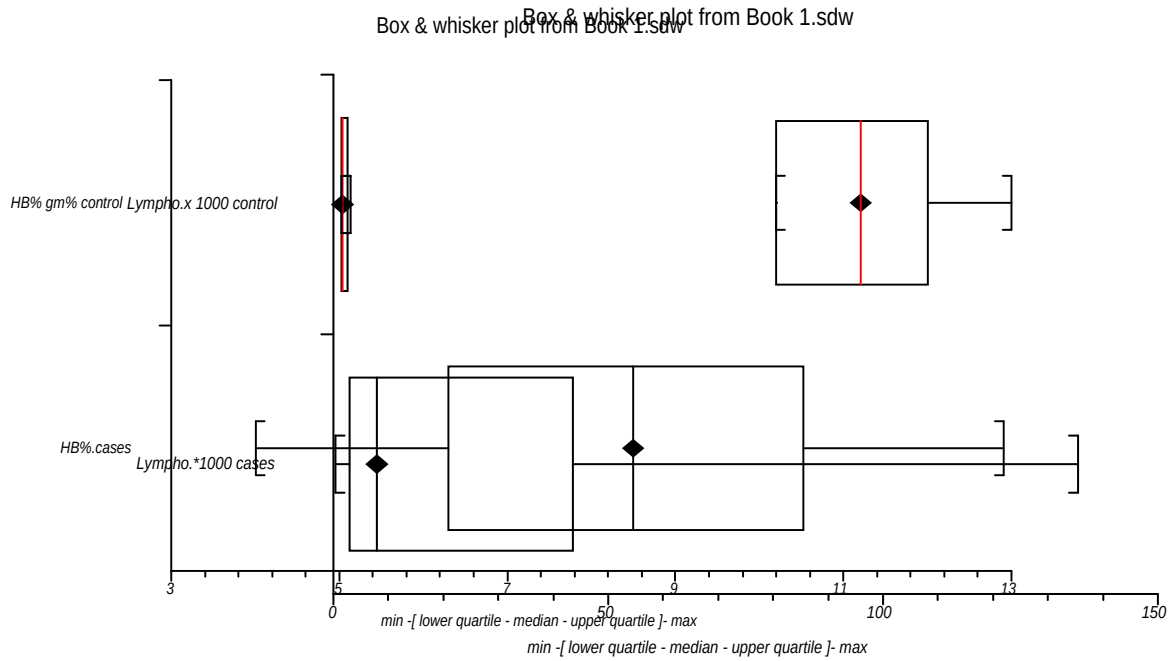
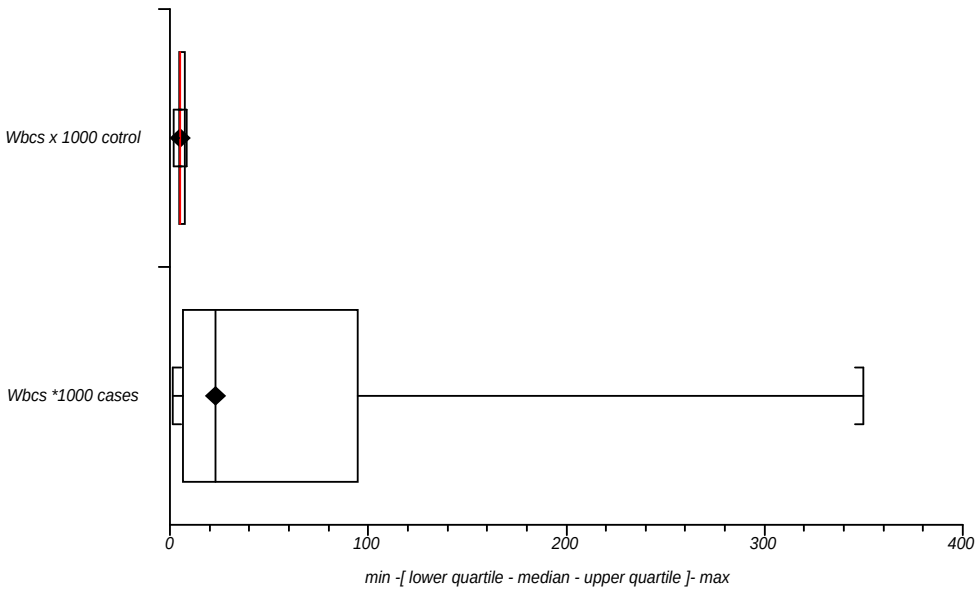


Fig (9): Comparison between cases and control regarding haemoglobin concentration(gm%)



Fig(10): Comparison between cases and control groups regarding total WBCs count

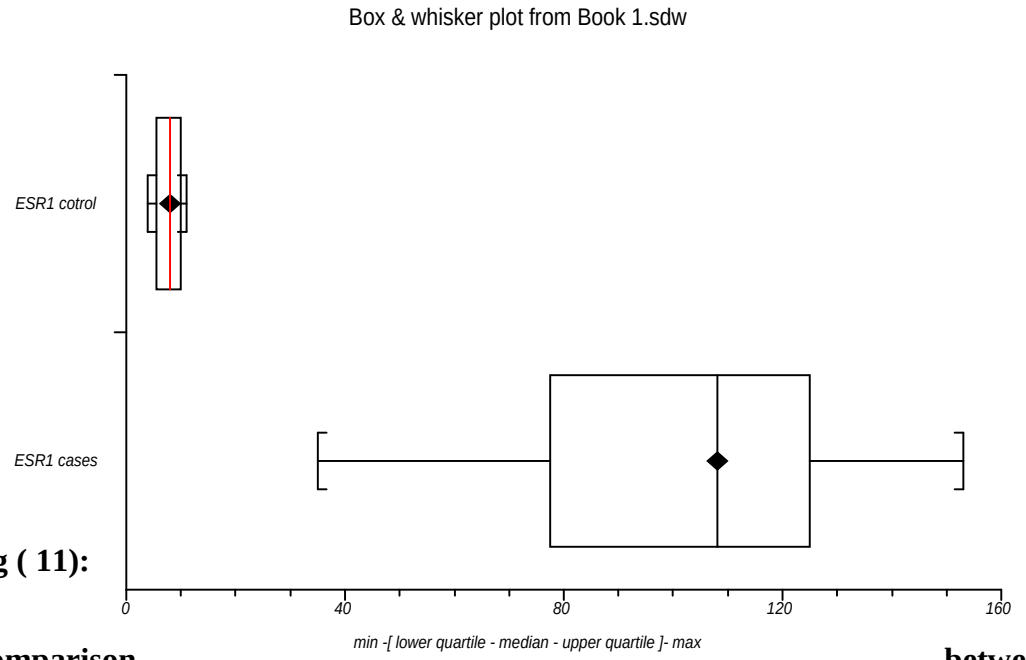


Fig (11): Comparison between cases and control regarding total lymphocytic count(x1000/cmm)

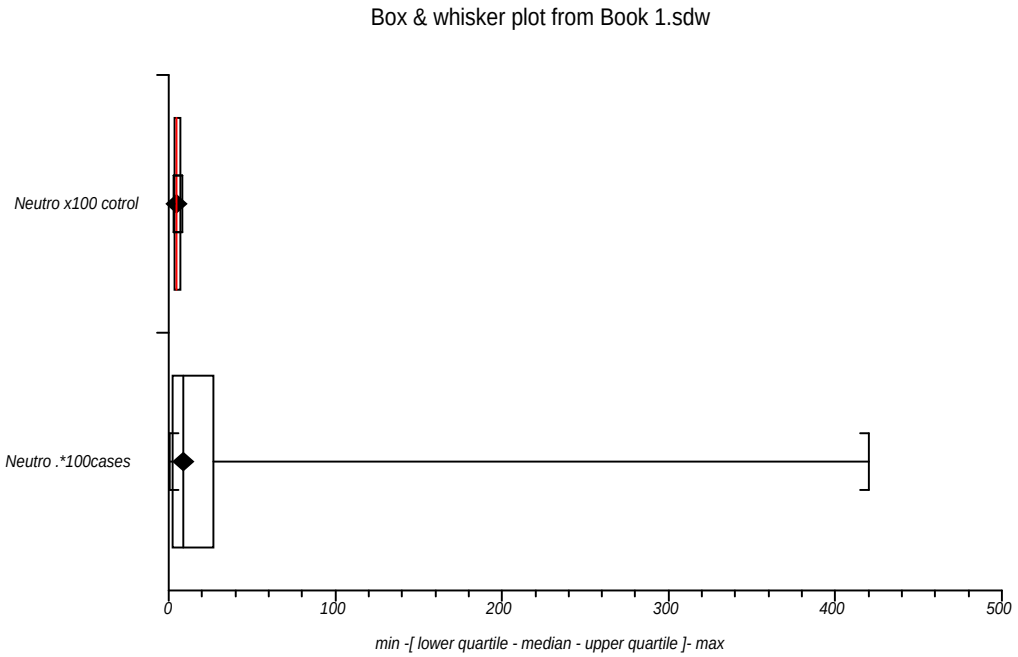


Fig (12): Ccomparison between cases and control groups regarding total neutrophils count (x100/cmm)

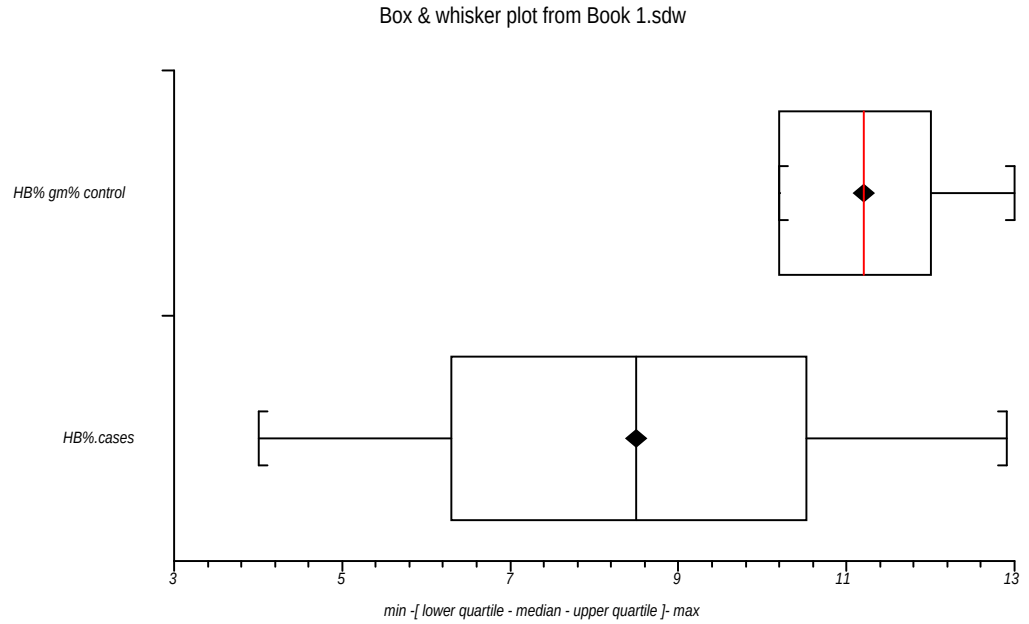


Fig (13): Ccomparison between cases and control regarding platelets (x1000/cmm)

Table (6) Comparison between patient and control groups regarding laboratory findings.

	patients(N= 25)		Control (N=10)		P-Value
	Range	Mean ±SD	Range	Mean ±SD	
1st hourESR mm	35-153	99.1±33.3	10-18	11.2±6.5	<0.01**
2nd hourESR mm	52-160	124.9±29.8	11-25	14.6±6.8	<0.01**
LDH U/L	100.0-4450	1402.6±1219.9	90-320	174.5±95.9	<0.01**

This table shows that there is highly statistically significant increase in ESR and serum LDH. in cases compared to control groups.

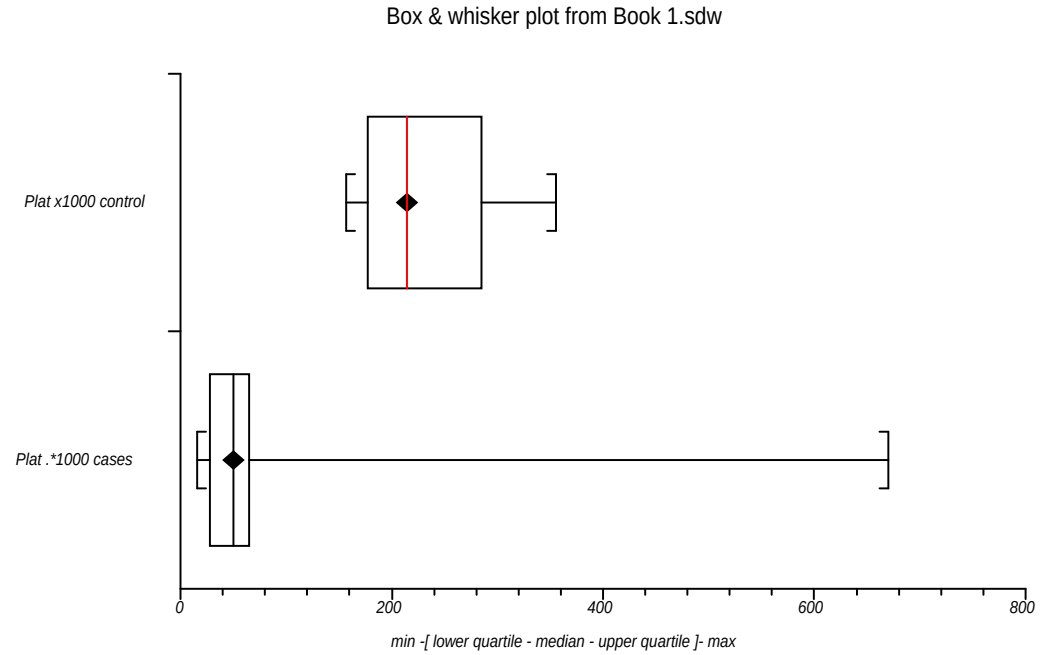


Fig (14): Comparison between cases and control groups regarding ESR 1st hour(mm).

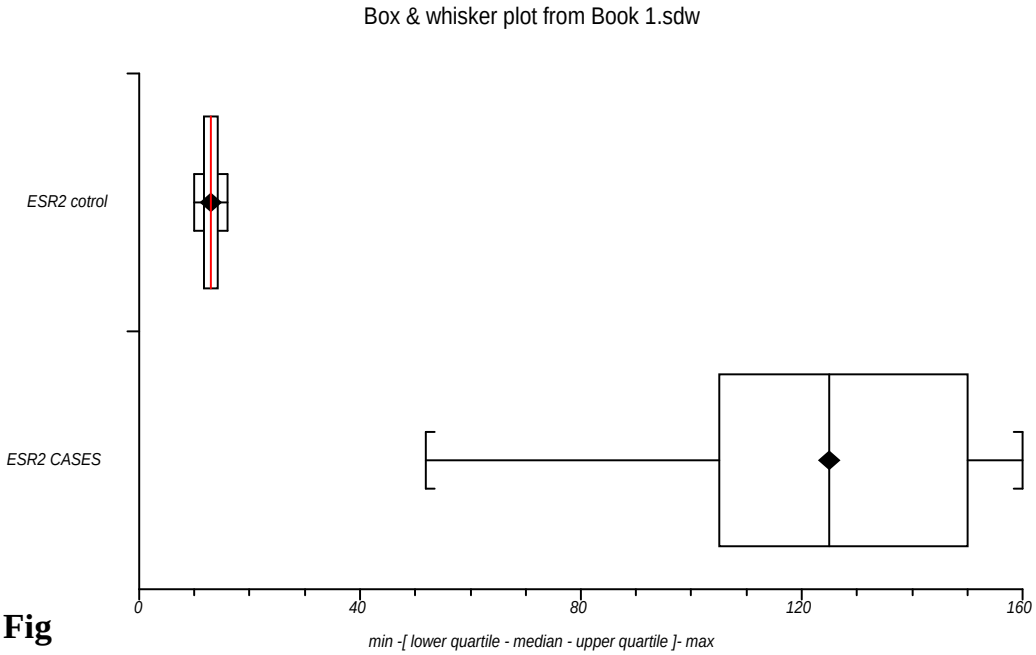


Fig (15): Comparison between cases and control groups regarding ESR 2nd hour(mm)

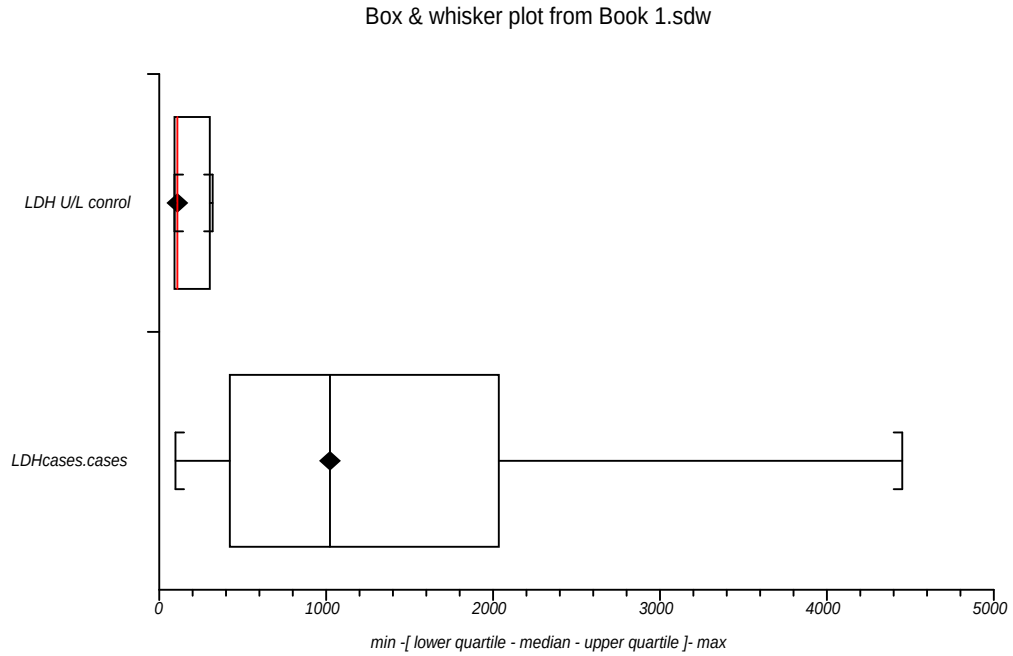


Fig (16): Comparison between cases and control groups regarding serum LDH level (U/L)

Table(7): Comparison between cases and control regarding serum ferritin level(ug/l)

Serum ferritin. (Ug/L)	Cases (n=25)	Control (n=10)
Min	**300**	**20**
Max	**1300**	**400**
Mean	**854.8**	**137.2**
SD	**296.5**	**124.5**
t	**7.6**	
p	**<0.001****	

***P value <0.05=significant **p value <0.01=highly significant**

This table shows that there is highly statistically significant increase in serum ferritin in cases compared to control group.

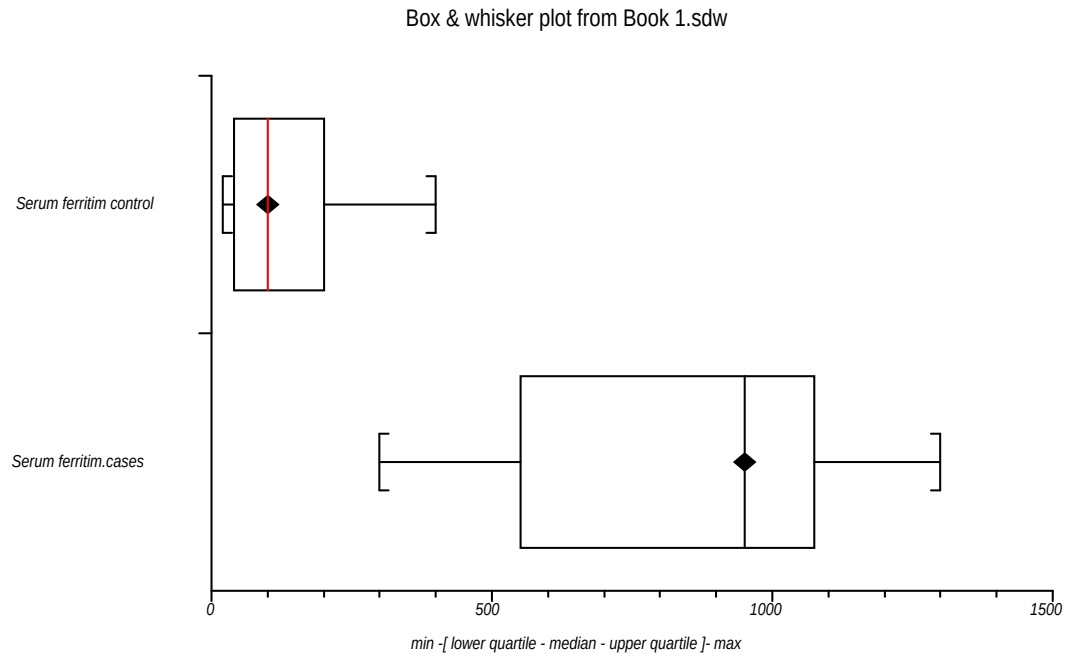


Fig (17): Comparison between cases and control groups regarding serum ferritin level (Ug/L)

Table(8): Comparison between cases and control regarding serum iron level (u/dl)

Serum iron u/dl	Cases (n=25)	Control (n=10)
Min	**12.2**	**43.1**
Max	**57.8**	**134.9**
Mean	**35**	**89**
SD	**6.8**	**15.3**
T	**7**	
P	**000*** **	

***very**high significant**

- This table shows that there is very highly statistically significant decrease in serum iron in cases compared to control group.

Table (9): Correlation between serum hepcidin and different laboratory findings.

Item	r	p
HB gm%	-8277	<0.001**
Ferritin ug/L	0.394	<0.05*
Iron u/dl	-453	<0.05*
WBC**x1000/cmm**	-0.0781	>0.05
Lymphocytes **x1000/cmm**	0.1848	>0.05
Neutrophils **x100/cmm**	0.0520	>0.05
PLT **x1000/cmm**	-0.0870	>0.05
LDHU/L	-0.00810	>0.05
Reticulocytes	-0.049	>0.05

This table shows that there are

- Significant inverse relationship between serum hepcidin and serum iron &haemoglobin concentration.
- Significant positive relationship between hepcidin & ferritin.
- No significant relationship between serum hepcidin level& reticulocytes**,** WBC**s** count**,** lymphocytic count**,** neutrophils count**,**PLT count and serum LDH level**.**

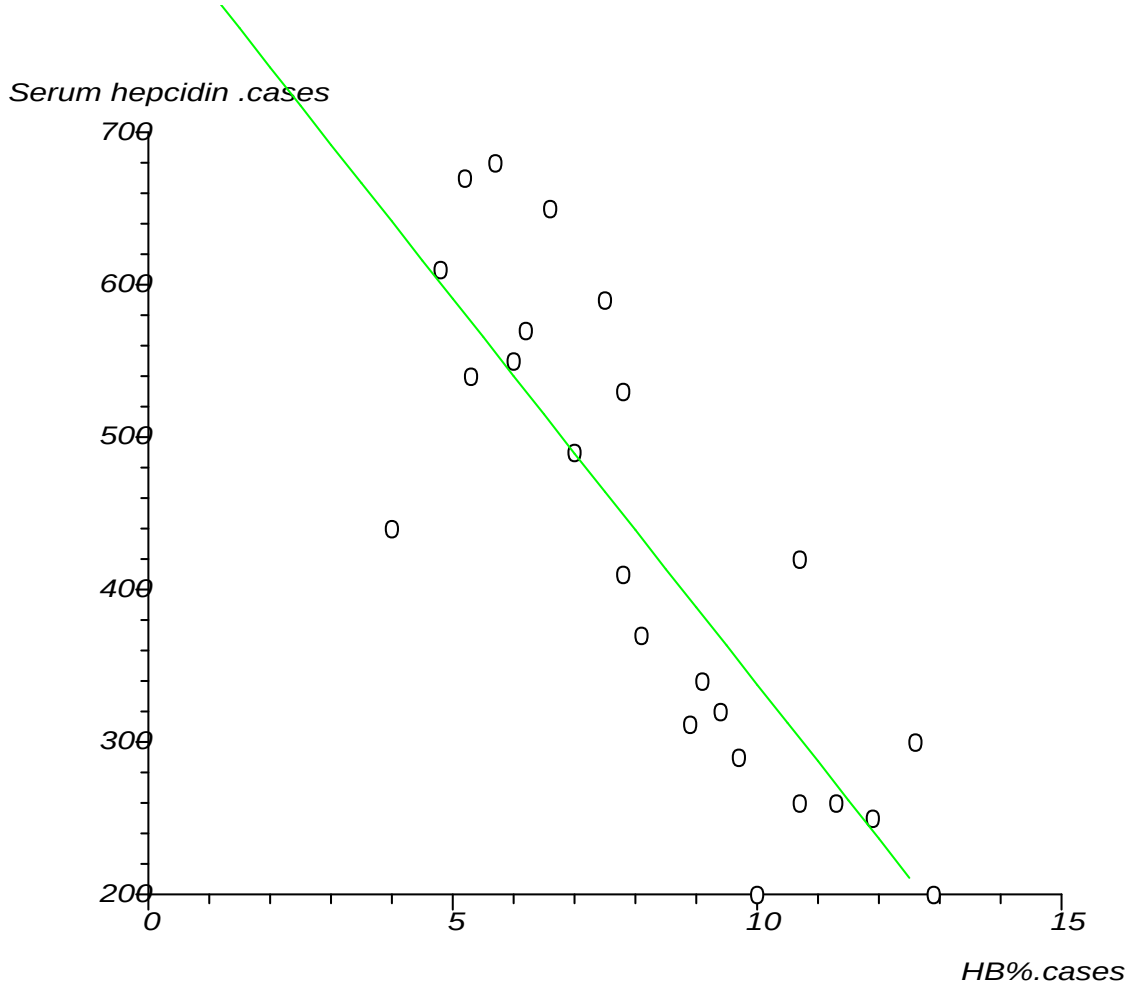


Fig (18): Correlation between serum hepcidin level(ng/dl)& haemoglobin concentration (gm%)

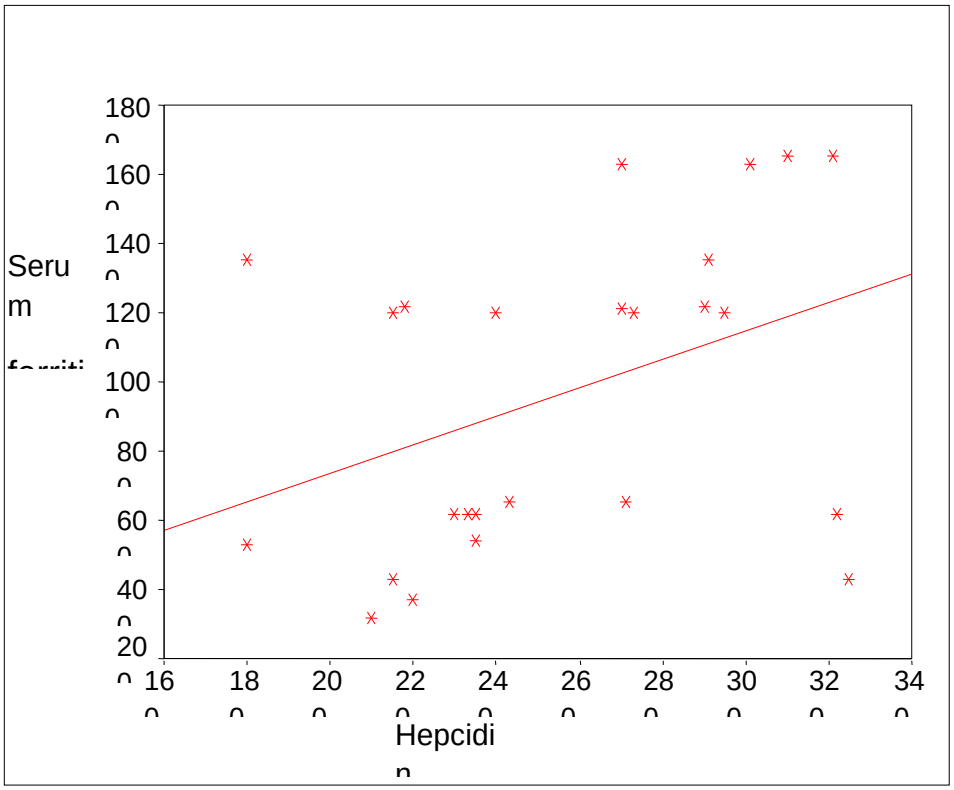


Figure (19): Correlation between serum hepcidin level(ng/dl) and ferritin level (ug/l)

Table (10): Correlation between Serum ferritin level (ug/l)and HB cocentration(gm%)

Serum ferritin and HB	
R	-0.386
P-value	0.057

There is no statistically significance between serum ferritin and HB concentration.