Results

The results of the present study are shown in Tables (12-24) and Figures (16-23).

B- Laboratory Features of Studied Groups:

1- Hematological data:

Group I: The WBC count ranged from 2.3 to 92×10^9/L (median 18) and (range 2.3-218), Hemoglobin (Hb) level ranged from 3.6 to 10.1 g/dl (mean±SD: 7.6±1.6) and platelets count from 6 to 249×10^9/L (median 47) and (range 6-249),The mean±SD of percentage of blasts in PB was 46.2±29.2 (range 2-92%), while that of blasts in BM was 73.4±22.8 (range 30-98%) (Table 12).

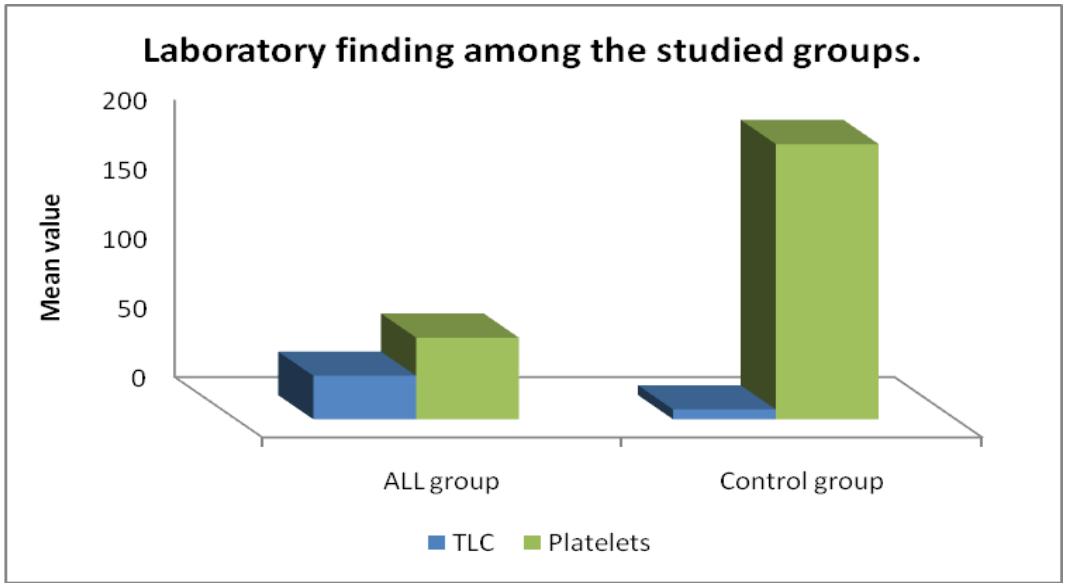
Group II: The WBC count ranged from 4.5 to 10.2 $\times10^9$/L (median 6.9) and (range: 4.5–10.2), Hb level from 10.9 to 13.5 g/dl (mean±SD: 12.5±1.1) and platelets count from 92 to 271×10^9/L (median: 194.5) and (range: 92-271). (Table 12).

Table (12): Laboratory data findings of the studied groups

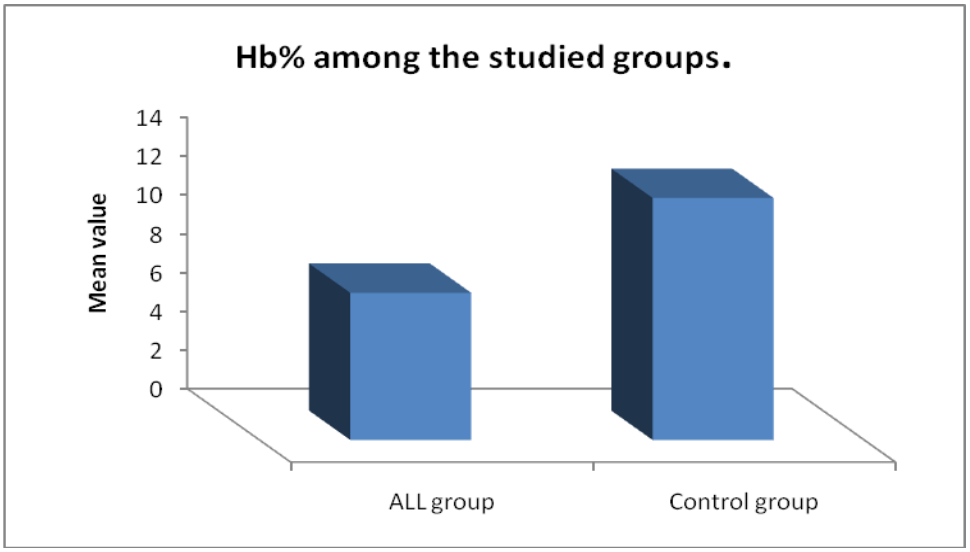
Laboratory data	Group I (De-Novo) (n=30)	Group II (Control) (n=10)	test of significance	p
TLC ($\times 10^9$/L)	18 (2.3 – 218)*	6.9 (4.5 – 10.2)*	**U**=68	0.01§
Hb (g/dl)	7.6 ± 1.6	12.5±1.1	**t**=9.06	<0.001§
Platelets ($\times 10^9$/L)	47 (6 – 249)*	194.5 (92 – 271)*	**U**=17	<0.001§
LDH (mg/dl)	1565±696.5	159.5±88.3	**t**=2.6	<0.05§
% of Blasts in PB	46.2±29.2	0	-	-
% of Blasts in BM	73.4±22.8	-	-	-

** data presented by median and range* *§ = Significant.*

This table shows elevated TLC, low Hb level, low platelets count, elevated LDH and increased peripheral and BM blasts.



Figure(16): TLC and platelets counts in the studied groups.



Figure(17): HB level in the studied groups.

Table (13): Frequency of FAB and immunophenotyping subtypes in patients group.

FAB	ALL group	
	n = 30	(%)
L1	9	30.0
L2	18	60.0
L3	3	10.0
Immunophenotyping		
Pro B-ALL	3	10.0
C-ALL	16	53.3
Pre B-ALL	2	6.7
Mature B-ALL	1	3.3
Pre T-ALL	2	6.7
T-ALL	2	6.7
Biphenotypic	4	13.3

This table shows:

-According to FAB subtypes, it shows that L2 is the most frequent type in ALL group

-According to immunophenotyping subtypes, It shows that C-ALL is the most frequent type in ALL group.

2- Cytochemical and immunophenotypic features:

Group I: According to morphology, and to the FAB classification, the patients were classified into 9 cases (30%) L1, 18 (60%) L2 and 3 cases (10%) L3 (Table 13).

Immunophenotypically, there were 3 (10%) Pro B-ALL, 2 (6.7%) precursor B-cell ALL cases, 15 (50%) common B-ALL, 2 (6.7 %) mature B-ALL, 2 (6.7%) pre T-ALL, 2 (6.7%) T-ALL and 4 (13.3%) biphenotypic leukemia. (Table 13).

3- As regard the Monoclonal antibodies used in the immunophenotyping:

CD34 was positive in 86.7% of ALL cases (mean±SD 66.3±23.9), CD19 was positive in 25 (83.3 %) of ALL cases (mean±SD 67± 33.4) and CD20 was positive in 17 (56.7%) of cases with a mean±SD value of 69.1±20 and 23 (76.7%) were positive for CD10 expression, with a mean±SD value of 72.4±23.9 and 28 (93.3%) of cases were positive for CD22, , with a mean±SD value of 79±16.3 and 29 (96.7%) cases were positive for HLA-DR expression, with a mean±SD value of 77.9±18.9 and 19(63.3%) cases were positive for CD7 with a mean±SD value of 69.6±29.7 and 6(20) with a mean±SD value of 62.4±22.1 for CD5, and 4(13.3%) cases were positive for CD3 expression, with a mean±SD value of 38.2±19.9 and 26(86.7%) cases

were positive for CD79a expression, with a mean of 76.5±18.5,and 28(93.3%) of cases were positive for TdT, with a mean±SD value of 66.2±20.7.

Nine (30%) of the 30 patients were positive for CD33 with a mean±SD value of 59.5±19.5 and 10 (33.3%) of the patients were positive for CD13 with a mean±SD value of 65.8 ±17.7, myeloperoxidase (MPO) was positive in 6 (20%) cases with a mean±SD value of 59.8 ±15.5. (14).

Table (14): Frequency of monoclonal antibodies in ALL group.

		No(%)	P	mean±SD	t	P
CD34(%)	**+ve**	**26 (86.7)**	**<.0001**	**66.3± 23.9**	**5.41**	**<0.001****
	-ve	**4 (13.3)**		**0.64±0.41**		
CD13 (%)	**+ve**	**10 (33.3)**	**0.02**	**65.8 ± 17.7**	**14.2**	**<0.001****
	-ve	**20 (66.7)**		**5.1 ± 4.7**		
CD33 (%)	**+ve**	**9 (30)**	**0.0045**	**59.5± 19.5**	**10.6**	**<0.001****
	-ve	**21 (70)**		**7.3 ± 6.9**		
HLA-DR	**+ve**	**29 (96.7)**	**<.0001**	**77.9 ± 18.9**	**3.7**	**0.001****
	-ve	**1 (3.3)**		**6.7**		
CD22	**+ve**	**28 (93.3)**	**<.0001**	**79 ± 16.3**	**6.2**	**<0.001****
	-ve	**2 (6.7)**		**6.04±4.1**		
CD10	**+ve**	**23 (76.7)**	**0.0001**	**72.4 ±23.9**	**7.3**	**<0.001****
	-ve	**7 (23.3)**		**4.5 ± 4.0**		
CD7	**+ve**	**19 (63.3)**	**0.07**	**69.6±29.7**	**6.5**	**<0.001****
	-ve	**11 (36.7)**	**NS**	**10.2±3.9**		
CD5	**+ve**	**6 (20)**	**<.0001**	**62.4±22.1**	**11.8**	**<0.001****
	-ve	**24 (80)**		**7.8±4.4**		
CD3	**+ve**	**4 (13.3)**	**<.0001**	**38.2±19.9**	**7.5**	**<0.001****
	-ve	**26 (86.7)**		**7.4±4.2**		
CD79a	**+ve**	**26 (86.7)**	**<.0001**	**76.5±18.5**	**6.98**	**<0.001****
	-ve	**4 (13.3)**		**10.1±7.7**		
CD20	**+ve**	**17(56.7)**	**0.4385**	**69.1±20**	**10.2**	**<0.001****
	-ve	**13 (43.3)**	**NS**	**10.6±5.7**		
MPO	**+ve**	**6 (20)**	**<.0001**	**59.8±15.5**	**11.96**	**<0.001****
	-ve	**24 (80)**		**7.9 ± 7.02**		
TDT	**+ve**	**28 (93.3)**	**<.0001**	**66.2±20.7**	**4.4**	**<0.001****
	-ve	**2 (6.7)**		**0.67±0.36**		
CD19	**+ve**	**25 (83.3)**	**<.0001**	**76.7 ± 15.4**	**10.3**	**<0.001****
	-ve	**5 (16.7)**		**3.98 ± 3.7**		
CD133	**+ve**	**10 (33.3)**	**0.02**	**44.7 ± 23.1**	**8.2**	**<0.001****
	-ve	**20 (66.7)**		**2.6 ± 2.1**		

There is highly significant increase in the number of ALL patients with positive expression of the following Moabs: CD34, HLA-DR, CD22, CD10, CD79a, TDT and CD19.

There is highly significant decrease in the number of ALL patients with negative expression of the following Moabs: CD13, CD33, CD5, CD3, CD7, MPO and CD133. No significant difference found between patients as regard CD7 and CD20.

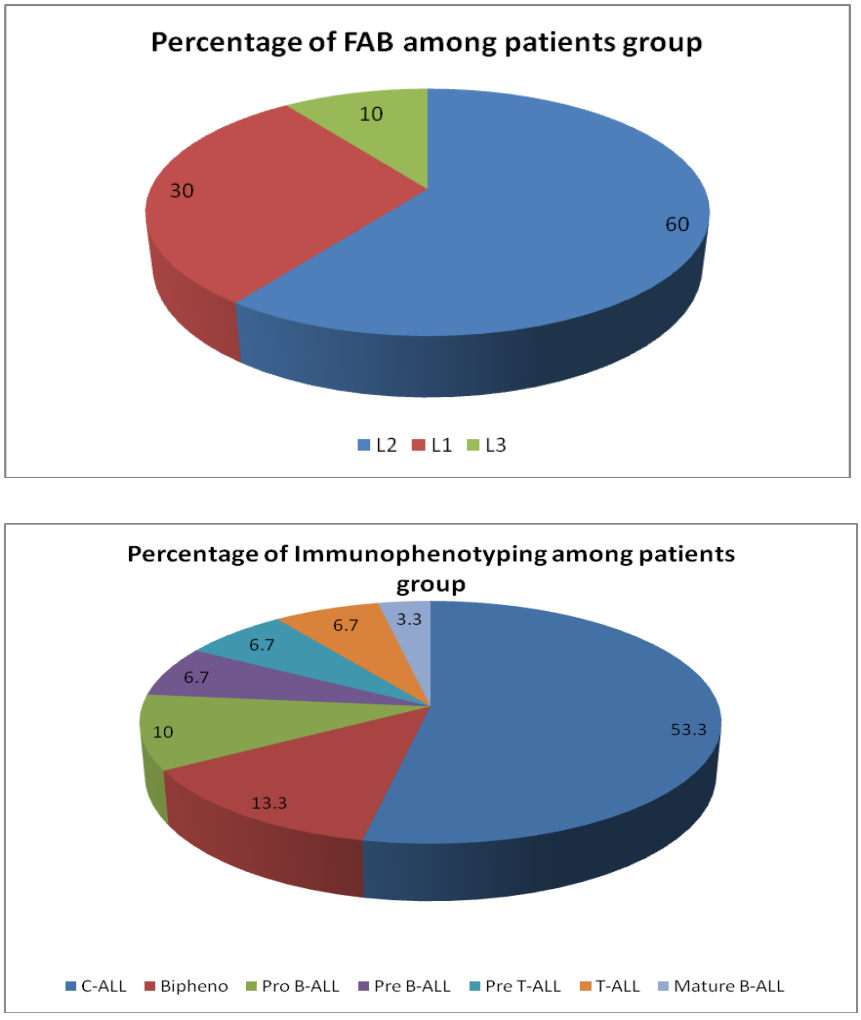


Figure (18): Two pie diagrams show the frequency of FAB and immunophenotyping among the ALL group.

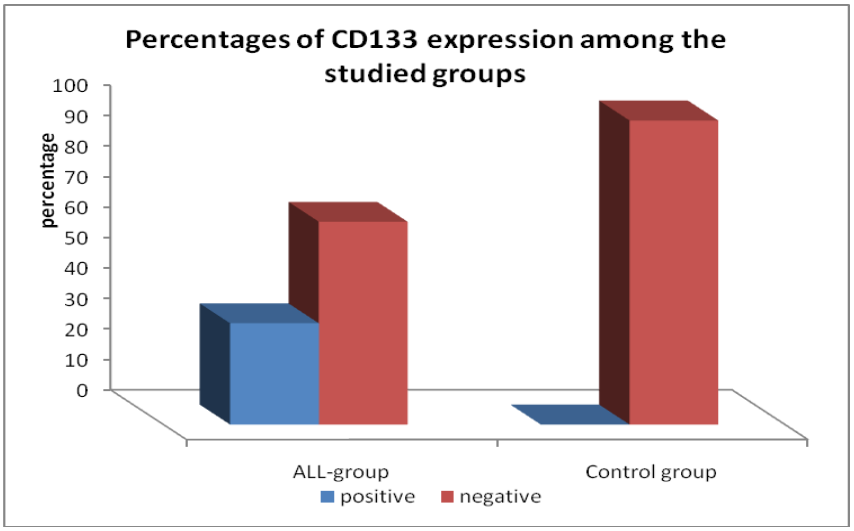
4- CD133 (CD133) expression:

Group I: The mean±SD of AC133 expression was 44.7± 23.1. Ten cases were positive (33.3%) for CD133 and 20 (66.7%) cases were negative for CD133 expression. There were no significant differences between the expressions of CD133 in control group when compared with the ALL group (Table 15).

Table (15): Percentages of CD133 expression in the studied groups.

Clinical data	Group I (DeNovo) (n=30)		Group II (Control) (n=10)		Test of significance	P
	No	%	No	%		
Positive cases (n=10)	10	33.3	0	0.0	χ^2=2.84	>0.05
Negative cases (n=30)	20	66.7	10	100.0		

No statistical significant difference between ALL group and Control group as regards CD133 expression.



Figure(19): percentages of CD133 expression among the studied groups

1- Association between CD133 expression and demographic, clinical and laboratory data:

No significant association was found between AC133 positive expression and any of the studied demographic or clinical parameters ($p>0.05$) of studied groups, as shown in (Tables 16,17).

Table (16): Distribution of percentage of CD133 expression and some demographic data in the ALL group.

		N=30	CD133				χ^2	P
			+ve N=10		-ve N=20			
			No	%	No	%		
Age	< 10 years	13	4	40.0	9	45.0	0.017	>0.05
	>10 years	17	6	60.0	11	55.0		
Gender	Male	18	8	80.0	10	50.0	1.4	>0.05
	Female	12	2	20.0	10	50.0		

This table shows no significant difference between CD133 expression and the age and gender of ALL patients.

Table (17): Relation between CD133 percentage and some clinical data in the studied group (ALL- group).

Parameter		N=30	CD133				χ^2	p
			+ve N=10		-ve N=20			
			No	%	No	%		
Pallor	+ve	24	8	80.0	16	80.0	0.234	>0.05
	-ve	6	2	20.0	4	20.0		
Fever	+ve	22	8	80.0	14	70.0	0.021	>0.05
	-ve	8	2	20.0	6	30.0		
Bleeding tendancy	+ve	8	1	10.0	7	35.0	1.04	>0.05
	-ve	22	9	90.0	13	65.0		
Lymph nodes	+ve	22	7	70.0	15	75.0	0.02	>0.05
	-ve	8	3	30.0	5	25.0		
Hepatosplenomegaly	+ve	17	6	60.0	11	55.0	0.017	>0.05
	-ve	13	4	40.0	19	45.0		
CNS manifestation	+ve	0	0	0.0	0	0.0	------	-------
	-ve	30	10	100.0	20	100.0		
Mediastinal mass	+ve	6	2	20.0	4	20.0	0.234	>0.05
	-ve	24	8	80.0	16	80.0		
Bone Pain	+ve	20	8	80.0	12	60.0	0.47	>0.05
	-ve	10	2	20.0	8	40.0		

This table shows no significant difference between CD133 expression and clinical data in ALL group.

Table (18): Relation between CD133 percentage and the laboratory data in the studied ALL group.

		No=30	CD133 (%)				X^2	p
			+ve N=10		-ve N=20			
			No	%	No	%		
TLC:	**>50×10^9/L**	5	3	30.0	2	10.0	0.75	>0.05
	<50×10^9/L	25	7	70.0	18	90.0		
Hb:	**>10g/dl**	2	0	0.0	2	10.0	0.07	>0.05
	<10g/dl	28	10	100.0	18	90.0		
Platelets:	**≤30×10^9/L**	11	3	30.0	8	40.0	0.018	>0.05
	>30×10^9/L	19	7	70.0	12	60.0		
FAB								
	L1	9	4	40.0	5	25.0	2.0	>0.05
	L2	18	6	60.0	12	60.0		
	L3	3	0	0.0	3	15.0		
Immunophenotyping								
	Pro-B	3	0	0.0	3	15.0	7.8	>0.05
	C-ALL	16	5	50.0	11	55.0		
	Pre B	2	2	20.0	0	0.0		
	Mature	1	0	0.0	1	5.0		
	Pre T-ALL	2	0	0.0	2	10.0		
	T-ALL	2	1	10.0	1	5.0		
	Biphenotypic	4	2	20.0	2	10.0		

This table shows no significant difference between CD133 expression and the laboratory data, FAB and immunophenotyping in ALL group.

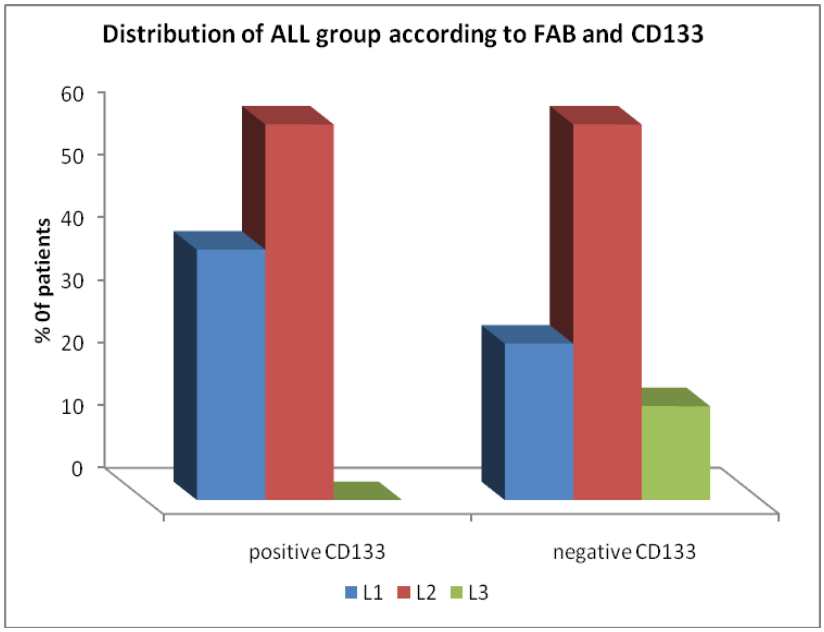


Figure (20): Distribution of ALL group according to FAB and CD133

Table (19): Relation between CD133 percentage and peripheral blood blasts,bone marrow blasts in the studied ALL group.

	CD133		t	p
	-ve $\bar{X} \pm SD$	+ve $\bar{X} \pm SD$		
PBB	42.0 ± 26.3	57.6 ± 33.3	- 1.4	> 0.05
BMB	74.8 ± 22.6	70.8 ± 24.12	0.44	> 0.05

This table shows no significant difference between CD133 expression and peripheral blood blasts,bone marrow blasts in the studied ALL group.

Table(20):Association between monoclonal antibodies (median and range) and immunophenotyping in ALL group.

		CD133		U	p
		Median	Range		
CD34(%)	+ve	3.8	0.02 - 68.28	38.0	>0.05
	-ve	1.04	0.25 - 68		
CD13 (%)	+ve	14.7	2.9 - 68.28	42.0	<0.05*
	-ve	2.3	0.02 - 68		
CD33 (%)	+ve	9.56	2.21 – 54.25	66.0	>0.05
	-ve	3.14	0.02 – 68.28		
HLA-DR (%)	+ve	3.68	0.02 – 68.28	---	----
	-ve	-	-		
CD22 (%)	+ve	3.54	0.02 – 68.0	19.0	>0.05
	-ve	35.2	2.2 – 68.28		
CD10 (%)	+ve	5.0	0.02 – 68.0	60	>0.05
	-ve	2.2	0.12 – 68.28		
CD7 (%)	+ve	3.4	0.02 – 68.28	88	>0.05
	-ve	3.68	0.55 – 68.0		
CD5 (%)	+ve	2.8	0.57 – 22.32	83	>0.05
	-ve	3.84	0.02 – 68.28		
CD3 (%)	+ve	12.86	1.51 – 68.28	37	>0.05
	-ve	3.41	0.02 – 68		
CD79a (%)	+ve	3.54	0.02 -65.99	39	>0.05
	-ve	34.75	0.57 – 68.28		
CD20(%)	+ve	2.9	0.02 – 68.0	41	<0.05*
	-ve	9.56	0.57 – 68.28		
MPO(%)	+ve	5.68	0.12 – 54.25	70	>0.05
	-ve	3.54	0.02 – 68.28		
TDT(%)	+ve	0.64	0.25 – 1.03	8	>0.05
	-ve	3.84	0.02 – 68.28		
CD19	+ve	9.56	2.21 – 54.25	43	>0.05
	-ve	3.14	0.02 – 68.28		

**= Significant*

This table shows positive significant difference between CD133 expression and CD13 and CD20. No significant difference were found between CD133 expression and other monoclonal antibodies.

2-Association between CD133 expression and studied standard prognostic factors:

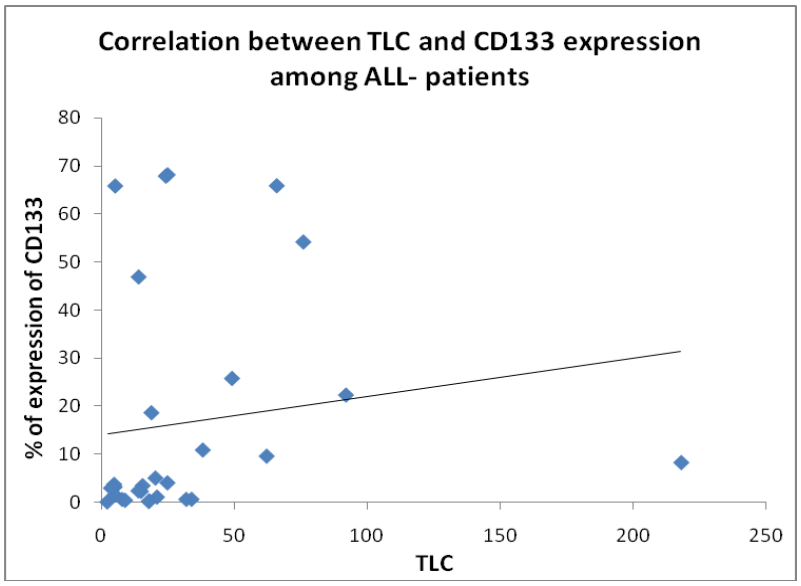
No statistically significant associations were detected between AC133 expression and any of the studied standard prognostic factors in studied groups (p>0.05), except for TLC .There was a statisticaly highly significant positive association between CD133 expression and TLC as shown in Tables (21).

Table (21): Relation between the CD133 and some prognostic parameters in ALL patients.

	CD133	
	r (Spearman's)	**p**
Age (years)	-0.016	>0.05
TLC $\times 10^9$/L	0.47	<0.01**
Hb g/dL	-0.23	>0.05
LDH mg/dl	-0.085	>0.05
Platelets $\times 10^9$/L	0.19	>0.05
BM blasts (%)	0.047	>0.05

**= Highly significant

This table shows highly significant difference between CD133 expression and TLC among ALL patients.



Figure(21):correlation between TLC and CD133 expression among ALL patients

Table (22): Correlation between the CD133 and immunophenotyping in ALL patients

	CD133%	
	r	p
CD34(%)	0.099	>0.05
CD13 (%)	0.334	>0.05
CD33 (%)	0.315	>0.05
HLA-DR (%)	-0.092	>0.05
CD22 (%)	-0.01	>0.05
CD10 (%)	0.164	>0.05
CD7 (%)	-0.309	>0.05
CD5 (%)	-0.107	>0.05
CD3 (%)	0.055	>0.05
CD79a (%)	-0.139	>0.05
CD20(%)	-0.222	>0.05
MPO(%)	0.088	>0.05
TDT(%)	0.237	>0.05
CD19(%)	0.13	>0.05

This table shows highly significant difference between CD133 expression and immunophenotyping among ALL patients.

3- Clinical outcome:

Group I: 22(73.3%) patients showed good response to chemotherapy and achieved complete remission till the end of follow up period (one year)., from whom 2 patient (6.7%) died. 6 (20%) patients developed resistance to chemotherapy (Table 23).

Table (23): frequency of outcome status among ALL group

Outcome	No	%
Complete remission	22	73.3
Resistant	6	20.0
Died	2	6.7
Total	30	100.0

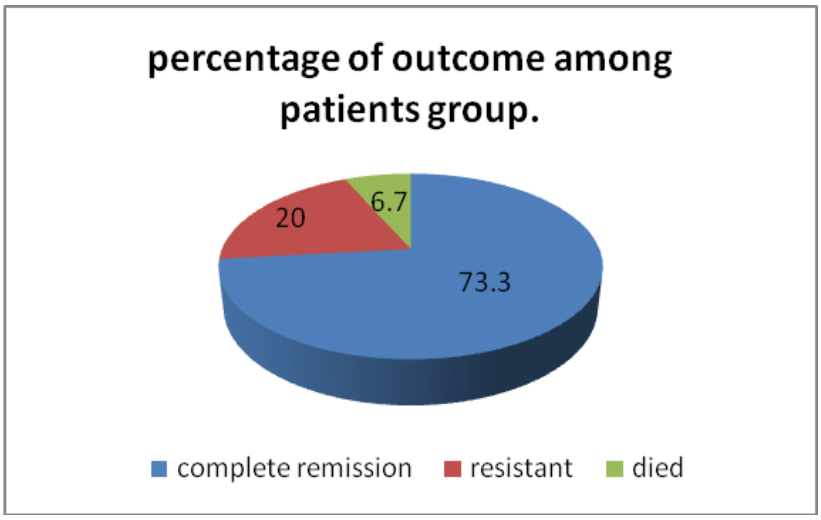


Figure (22): percentage of outcome among patients group

3-Association between CD133 expression and clinical outcome of ALL patients:

Significant association was found between positive AC133 expression and clinical outcome ($p<0.05$) in studied group (Tables 22). In group I, 40% who developed resistance and 10% died ,were positive for AC133 expression, while 85% of those who achieved complete remission were negative for the marker expression, as shown in Table (24).

Table (24): Differences of the percentage of CD133 expression between the ALL subgroups according to their clinical outcome.

	Remission(1) (n=22)		Resistance(2) (n=6)		Dead(3) (n=2)		Test of significant	p
	No	%	No	%	No	%		
CD133 +ve (n=10)	5	50.0	4	40.0	**1**	**10.0**	**X^2=4.4**	**>0.05**
-ve (n=20)	17	85.0	2	10.0	1	5.0		
CD133 (mean±SD)	10.2±18.9		40.3±30.7		17±12.4		**F= 4.64**	**<0.05***

= *Significant

(1): P< 0.05 shows significant difference between remission group with positive CD133 and remission group with negative CD133.

(2): P<0.05 shows significant difference between resistant group with positive CD133 and resistant group with negative CD133.

(3): P>0.05 shows no significant difference between dead group with positive CD133 and dead group with negative CD133.

- This table shows significant difference between CD133 expression and clinical outcome among ALL patients
- This table shows significant difference between remission group with positive CD133 and remission group with negative CD133 (Z test = 2.04), and show significant different between resistant group with positive CD133 and resistant group with negative CD133 (Z test = 1.94) and shows no significant difference between dead group with positive CD133 and dead group with negative CD133 (Z test = 0.52).

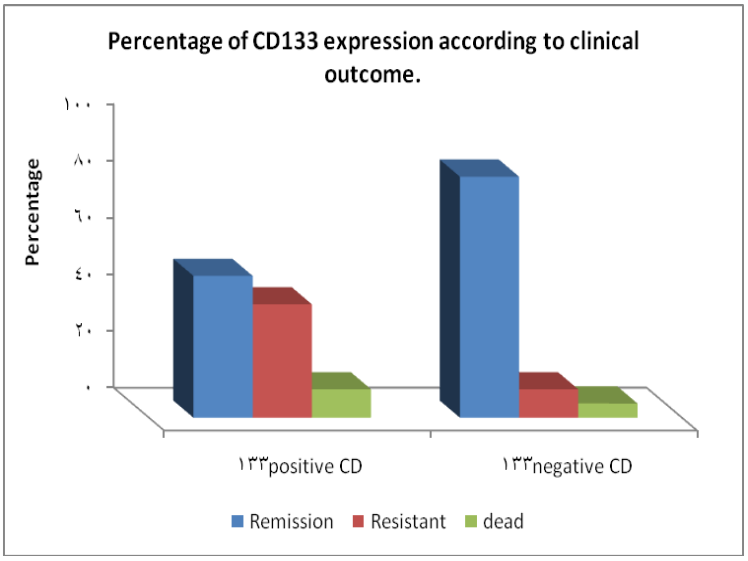


Figure (23): Percentage of CD133 expression according to clinical outcome