

Table (1) : Triglycerides, phospholipids, Cholesterol, ATP obtained from erythrocyte membrane, plasma calcium and intracorpascular calcium (Mean $\pm$ SE) in normal control group (Group I).

No.	Triglycerides (mg/ml)	Phospholipids (g/ml)	Cholesterol (mg/ml)	ATP umol/dl	Plasma Ca++ (mg/dl)	Intracorpascular Ca++ (mg/dl)
1	97.10	1.72	139.0	506	8.90	8.5
2	99.60	1.61	138.0	489	9.80	8.0
3	101.50	1.83	141.5	504	9.00	8.2
4	105.30	1.75	138.0	469	9.90	7.8
5	97.70	1.78	152.6	486	9.10	8.4
6	92.60	1.80	127.0	491	9.80	7.1
7	102.80	1.72	123.0	497	10.60	8.0
8	82.30	1.77	125.0	508	9.30	7.5
9	92.20	1.69	133.0	538	8.30	7.6
10	87.30	1.74	145.0	497	8.80	8.5
11	93.60	1.76	130.0	434	10.80	7.5
12	97.80	1.75	131.0	491	8.88	7.8
13	107.80	1.58	156.0	485	8.40	8.5
14	87.90	1.93	162.0	439	9.90	8.4
No.	14	14	14	14	14	14
Range	82.3-107.8	1.58-1.93	123-162	434-538	8.3-10.8	7.1-8.5
Mean	96.11	1.75	138.65	488.14	9.39	7.99
S.D.	7.249	0.086	11.840	26.821	0.763	0.452
S.E.	1.937	0.023	3.164	7.168	0.204	0.121

Table (2) : ATPase and protein kinase activities obtained from erythrocyte membrane (Mean $\pm$ SE) in normal control group (Group I).

No.	Total ATPase (picomol pi/ml/hour)	Ca++ Mg++ ATP ase	Na+ K+ ATP ase	Casein_Kinase cAMP independent (picomol pi/ml/10 min)	Histon_Kinase cAMP independent (picomol pi/ml/10 min)	Histon_Kinase + cAMP dependent
1	388	192	186	400	910	1098
2	380	190	180	390	895	1080
3	396	207	189	409	901	1082
4	382	196	186	395	890	1085
5	390	197	183	410	913	1091
6	383	192	181	392	885	1088
7	398	217	181	410	918	1100
8	395	214	182	413	909	1084
9	412	212	200	401	910	1098
10	410	220	190	415	920	1100
11	393	197	196	408	920	1081
12	385	191	194	391	880	1089
13	407	210	197	409	912	1090
14	405	200	205	415	925	1095
No.	14	14	14	14	14	14
Range	380-412	190-220	180-205	390-415	880-925	1080-1100
Mean	394.57	202.50	189.29	404.14	906.29	1090.07
S.D.	10.675	10.501	7.975	9.097	13.980	7.152
S.E.	2.853	2.806	2.131	2.431	3.736	1.911

Table (3) : Age, RBCs count, Hb% and Haemoglobin electrophoresis (%)
(Mean $\pm$ SE) in normal control group (Group I).

No.	Age Year	R.B.Cs /cmm	Hb (%)	HbA1 (%)	HbF (%)	HbA2 (%)
1	12.0	4.00	14.08	98.00	0.00	2.00
2	4.0	3.50	12.50	99.00	0.00	1.00
3	13.0	4.25	11.28	99.50	0.00	0.50
4	4.0	3.50	10.00	98.00	0.00	2.00
5	9.0	4.10	14.50	99.00	0.00	1.00
6	4.0	3.50	12.00	97.50	0.00	2.50
7	6.0	4.50	12.00	98.00	0.00	2.00
8	2.5	4.28	11.90	99.00	0.00	1.00
9	10.0	4.42	12.30	98.00	0.00	2.00
10	6.0	4.80	13.60	99.00	0.00	1.00
11	6.0	4.10	11.40	98.00	0.00	2.00
12	11.0	3.50	12.50	99.50	0.00	0.50
13	6.0	4.24	11.80	98.00	0.00	2.00
14	9.0	4.14	11.50	99.00	0.00	1.00
No.	14	14	14	14		14
Range	2.5-13	3.5-4.8	10-14.5	97.5-99.5		0.5-2.5
Mean	7.32	4.06	12.24	98.54		1.46
S.D.	3.326	0.417	1.180	0.664		0.664
S.E.	0.889	0.111	0.315	0.177		0.177

ble (4) : Triglycerides, phospholipids, cholesterol, ATP obtained from erythrocyte membrane, plasma Ca++ and intracorpascular Ca++ (Mean $\pm$ SE) in B thalassaemic patients with splenectomy (Group II)

No.	Triglycerides (mg/ml)	Phospholipids (g/ml)	Cholesterol (mg/ml)	ATP (umol/dl)	Plasma Ca++ (mg/dl)	Intracorpascular Ca++ (mg/dl)
1	60	0.97	97	266	9.60	7.35
2	61	0.86	111	246	8.90	7.27
3	51	0.91	126	212	9.25	7.31
4	55	0.94	140	236	11.10	8.60
5	46	1.01	136	226	8.60	7.95
6	42	0.85	130	200	10.70	9.37
7	56	0.91	98	224	10.20	7.81
8	46	0.94	124	249	9.90	8.51
9	45	1.09	137	188	7.37	6.94
10	48	0.93	130	224	7.76	6.53
11	60	0.89	139	228	8.15	7.52
12	51	0.81	148	214	8.93	7.02
13	54	0.98	143	208	8.41	8.01
14	45	0.92	153	224	8.96	7.51
o.	14	14	14	14	14	14
ange	42-61	0.81-1.09	97-153	188-266	7.37-11.1	6.53-9.37
ean	51.43	0.93	129.43	224.64	9.13	7.69
.D.	6.333	0.070	17.118	20.387	1.080	0.752
.E.	1.693	0.019	4.575	5.449	0.289	0.201

Table (5) : Age, RBCs count, Hb% and Haemoglobin electrophoresis (%) (Mean $\pm$ SE) in B thalassaemic patients with splenectomy (Group II).

No.	Age Year	R.B.Cs /cmm	Hb (%)	HbA1 (%)	HbF (%)	HbA2 (%)
1	7.0	2.00	5.90	80.0	10.0	10.0
2	16.0	3.22	8.60	93.0	0.0	7.0
3	7.0	1.80	5.50	69.4	18.4	12.2
4	9.0	2.90	7.80	80.0	10.0	10.0
5	9.0	2.20	6.70	32.5	67.5	0.0
6	8.0	4.80	7.30	70.0	20.0	10.0
7	9.0	2.30	6.90	32.0	62.0	6.0
8	4.5	2.00	5.60	0.0	97.0	3.0
9	18.0	2.70	7.00	84.0	16.0	0.0
10	7.5	2.00	6.60	36.0	63.0	1.0
11	17.0	2.20	6.90	83.0	15.0	2.0
12	14.0	2.00	5.10	71.0	28.0	1.0
13	10.0	2.20	6.70	35.0	55.0	10.0
14	7.0	1.80	4.70	30.0	65.0	5.0
No.	14	14	14	14	14	14
Range	2.5-13	3.5-4.8	10-14.5	0-93	0-97	0-12.2
Mean	10.21	2.44	6.52	56.85	37.64	5.51
S.D.	4.250	0.796	1.066	28.292	29.615	4.369
S.E.	1.136	0.213	0.285	7.561	7.915	1.168

Table (6) : Triglycerides, phospholipids, Cholesterol erythrocyte membrane, plasma Ca++ and int. (Mean $\pm$ SE) in non-splenectomized B thala:

No.	Triglycerides (mg/ml)	Phospholipids (g/ml)	Cholesterol (mg/ml)	A'
1	36	1.13	87	
2	51	1.33	126	
3	40	1.03	135	
4	50	1.09	144	
5	63	1.33	125	
6	58	1.36	134	
7	48	1.01	123	
8	44	1.11	113	
9	47	1.08	112	
10	43	1.09	115	
11	40	1.15	155	
12	38	1.02	145	
13	45	1.10	132	
14	33	1.12	122	
15	36	1.11	150	
16	41	1.07	104	
17	42	1.04	140	
18	48	1.10	150	
19	46	1.01	145	
20	50	1.05	140	
21	45	1.04	157	
22	38	1.07	98	
23	47	0.87	151	
24	44	0.70	143	
25	53	0.78	136	
26	50	0.84	138	
27	51	0.96	141	
28	55	1.09	148	
No.	28	28	28	
Range	33-63	0.7-1.36	87-157	183-
Mean	45.79	1.06	132.46	221
S.D.	6.935	0.146	17.817	19.
S.E.	1.311	0.028	3.367	3.

Table (7) : ATPase and protein kinase activities obtained from erythrocyte membrane (Mean $\pm$ SE) in non-splenectomized B thalassaemic patients (Group III).

No.	Total ATP ase (picomol pi/ml/hour)	Ca++ ATP ase	Mg++ ATP ase	Na+ K+ ATP ase	Casein_Kinase cAMP independent	Histon_Kinase cAMP independent (picomol pi/ml/10min)	Histon_Kinase + cAMP dependent
1	250		132	118	239	480	600
2	274		144	130	228	498	610
3	258		148	110	245	500	613
4	273		160	113	241	510	619
5	268		162	106	235	513	620
6	270		154	116	233	507	615
7	267		138	129	243	485	605
8	255		129	126	228	485	610
9	256		128	128	230	491	612
10	264		135	129	240	483	603
11	260		134	126	245	488	607
12	266		139	127	240	490	610
13	265		136	129	244	493	608
14	250		121	129	220	480	600
15	250		124	126	225	481	607
16	256		125	131	238	495	610
17	270		151	119	244	505	620
18	250		129	121	235	490	613
19	262		140	122	245	495	615
20	251		126	125	229	488	610
No.	20	20	20	20	20	20	20
Range	250-274	121-162	106-131	220-245	480-513	600-620	
Mean	260.75	137.75	123.00	236.35	492.85	610.35	
S.D.	8.239	12.030	7.189	7.569	9.980	5.833	
S.E.	1.842	2.690	1.608	1.693	2.232	1.304	

Table (8) : Age, RBCs count, Hb% and Haemoglobin electrophoresis (%) (Mean $\pm$ SE) in non-splenectomized B thalassaemic patients (Group III).

No.	Age Year	R.B.Cs /cmm	Hb (%)	HbA1 (%)	HbF (%)	HbA2 (%)
1	11.0	2.30	8.0	68	30	2
2	14.0	2.60	7.5	78	28	2
3	14.0	2.70	8.1	50	48	2
4	2.0	3.67	6.7	60	38	2
5	8.0	3.80	7.4	58	40	2
6	15.0	3.50	6.5	85	12	3
7	7.0	2.50	6.7	10	90	0
8	4.0	1.80	5.5	48	50	2
9	2.0	2.10	5.9	86	12	2
10	3.5	2.40	6.8	52	45	3
11	1.5	2.50	6.4	50	48	2
12	3.0	2.50	6.8	20	78	2
13	7.0	2.50	7.0	68	30	2
14	8.0	1.10	4.3	0	97	3
15	6.0	1.40	4.8	48	50	2
16	14.0	2.30	5.6	69	29	2
17	1.5	2.70	6.7	88	10	2
18	3.5	2.21	6.5	35	60	5
19	7.0	2.50	7.5	70	25	5
20	2.0	1.70	4.0	22	75	3
21	13.0	2.50	7.3	57	40	3
22	5.0	2.90	7.2	82	16	2
23	14.0	1.80	5.5	75	21	4
24	8.0	2.00	5.1	83	15	2
25	4.0	2.20	6.2	70	25	5
26	8.0	2.20	6.3	88	10	2
27	4.5	0.70	3.8	48	50	2
28	2.0	2.00	6.4	0	98	2
No.	28	28	28	28	28	28
Age	1.5-15	3.7-3.8	3.8-8.1	10-88	10-98	2-5
Mean	6.88	2.32	6.30	56.00	41.79	2.50
S.D. $\pm$	4.496	0.680	1.135	26.155	26.101	1.106
S.E. $\pm$	0.850	0.129	0.214	4.943	4.933	0.209

Table (1) shows triglycerides, phospholipids, cholesterol, ATP obtained from erythrocyte membrane, plasma Ca^{++} and intracorpascular Ca^{++} (mean $\pm$ SE) in normal control group (group I). The mean value of triglycerides level $\pm$ SE was 96.11 ± 1.937 mg/ml. Phospholipids, was 1.75 ± 0.023 g/ml. Cholesterol was 138.65 ± 3.164 mg/ml. ATP was 488.14 ± 7.168 umol/dl. Plasma Ca^{++} was 9.39 ± 0.204 mg/dl and intracorpascular Ca^{++} was 7.99 ± 0.121 mg/dl.

Table (2) shows ATP level, ATPase and protein kinase activities obtained from erythrocyte membrane (mean $\pm$ SE) in normal control group (group I). The mean value of total ATPase activities $\pm$ SE was 394.57 ± 2.853 picomol pi/ml/hour, Ca^{++} Mg^{++} ATPase was 202.50 ± 2.806 picomol pi/ml /hour. Na^+ K^+ ATPase was 189.29 ± 2.131 picomol pi/ml/hour. As regards protein kinase activities, casein kinase cAMP independent (mean $\pm$ SE) was 404.14 ± 2.431 picomol pi/ml/10 min. Histone kinase cAMP independent was 906.29 ± 3.736 picomol pi/ml/10min. And Histone kinase + cAMP dependent was 1090.07 ± 1.911 picomol pi/ml/10 min.

Table (3) shows Age, RBCs count, Hb% and Haemoglobin electrophoresis % (mean $\pm$ SE) in normal control group (group

I). The mean value of age range/year $\pm$ SE was 7.32 ± 0.889 years. RBCs count was $4.06 \pm 0.111/\text{cmm}$. Hb% was $12.24 \pm 0.315\%$. HbA₁% was $98.54 \pm 0.177\%$, and HbA₂% was $1.46 \pm 0.177\%$. There was no HbF in normal control group.

Table (4) : shows triglycerides, phospholipids, cholesterol, ATP obtained from erythrocyte membrane, plasma Ca⁺⁺ and intracorpascular Ca⁺⁺ (mean $\pm$ SE) in B thalassaemic patients with splenectomy (group II). The mean value of triglycerides level $\pm$ SE was 51.43 ± 1.693 mg/ml. Phospholipids was 0.93 ± 0.019 g/ml. Cholesterol was 129.43 ± 4.575 mg/ml. ATP level was 224.64 ± 5.449 $\mu\text{mol/dl}$. Plasma Ca⁺⁺ was 9.13 ± 0.289 mg/dl and intracorpascular Ca⁺⁺ was 7.69 ± 0.201 mg/dl.

Table (5) shows Ag, RBCs count, Hb% and haemoglobin electrophoresis % (mean $\pm$ SE) in B thalassaemic patients with splenectomy (group II). The mean value of age range/year $\pm$ SE was 10.21 ± 1.136 years. RBCs count was $2.44 \pm 0.213/\text{cmm}$. Hb% was $6.52 \pm 0.285\%$. HbA₁ was $56.85 \pm 7.561\%$ HbF was $37.64 \pm 7.915\%$ and HbA₂ was $5.51 \pm 1.168\%$.

Table (6) shows triglycerides, phospholipids, cholesterol, ATP obtained from erythrocyte membrane, plasma

Ca^{++} and intracorpascular Ca^{++} (mean $\pm$ SE) in non-splenectomized B thalassaemic patients (group III). The mean value of triglycerides level $\pm$ SE was 45.79 ± 1.311 mg/ml. Phospholipids was 1.06 ± 0.028 g/ml. Cholesterol was 132.46 ± 3.367 mg/ml. ATP was 227.18 ± 3.696 μ mol/dl. Plasma Ca^{++} was 9.14 ± 0.162 mg/dl. And intra-corpascular Ca^{++} was 8.17 ± 0.173 mg/dl.

Table (7) shows ATPase and protein kinase activities obtained from erythrocyte membrane (mean $\pm$ SE) in non-splenectomized B thalassaemic patients (Group III). The mean value of total ATPase activities $\pm$ SE was 260.75 ± 1.842 picomol pi/ml/hour. Ca^{++} Mg^{++} ATPase was 137.75 ± 2.690 picomol pi/ml/hour. Na^+K^+ ATPase was 123.00 ± 1.608 picomol pi/ml/hour. As regards protein kinase activities, casein kinase cAMP independent (mean $\pm$ SE) was 236.35 ± 1.693 picomol pi/ml/10 min. Histone kinase cAMP independent was 492.85 ± 2.232 picomol pi/ml/10 min, and histone kinase + cAMP dependent was 610.35 ± 1.304 picomol pi/ml/10 min.

Table (8) shows age, RBCs count, Hb% and haemoglobin electrophoresis % (mean $\pm$ SE) in non-splenectomized B thalassaemic patients (group III). The mean value of age

range/year $\pm$ SE was 6.88 ± 0.850 years. RBCs count was $2.32 \pm 0.129/\text{cmm}$. Hb% was $6.30 \pm 0.214\%$. HbA₁ was $56.00 \pm 4.943\%$. HbF was $41.79 \pm 4.933\%$ and HbA₂ was $2.50 \pm 0.209\%$.

Table (9) : Shows One Way ANOVA test of triglycerides level (mg/ml) in erythrocyte membrane obtained from normal control group and the thalassaemic patients groups.

	Group I	Group II	Group III
No.	14	14	28
Mean	96.11	51.43	45.79

F : 263.970

P < 0.001 *

* : Significant

Table (10) : Comparative Data of triglycerides level (mg/ml) in erythrocyte membrane obtained from normal control group and the thalassaemic patients groups.

	Group I	Group II	Group III
No.	14	14	28
Mean	96.11	51.43	45.79
S.D. $\pm$	7.249	6.333	6.936
S.E. $\pm$	1.937	1.693	1.311
p1		< 0.001 *	< 0.001 *
p2			< 0.001 *

Group I : Normal control group

Group II : B thalassaemia major with splenectomy

Group III : B thalassaemia major with no splenectomy

p1 : Group II and Group III compared to Group I

p2 : Group III compared to Group II

* : Significant

Fig. 1 : Comparative data of triglycerides level (mg/ml) in erythrocyte membrane obtained from normal control group and the thalassaemic patients groups.

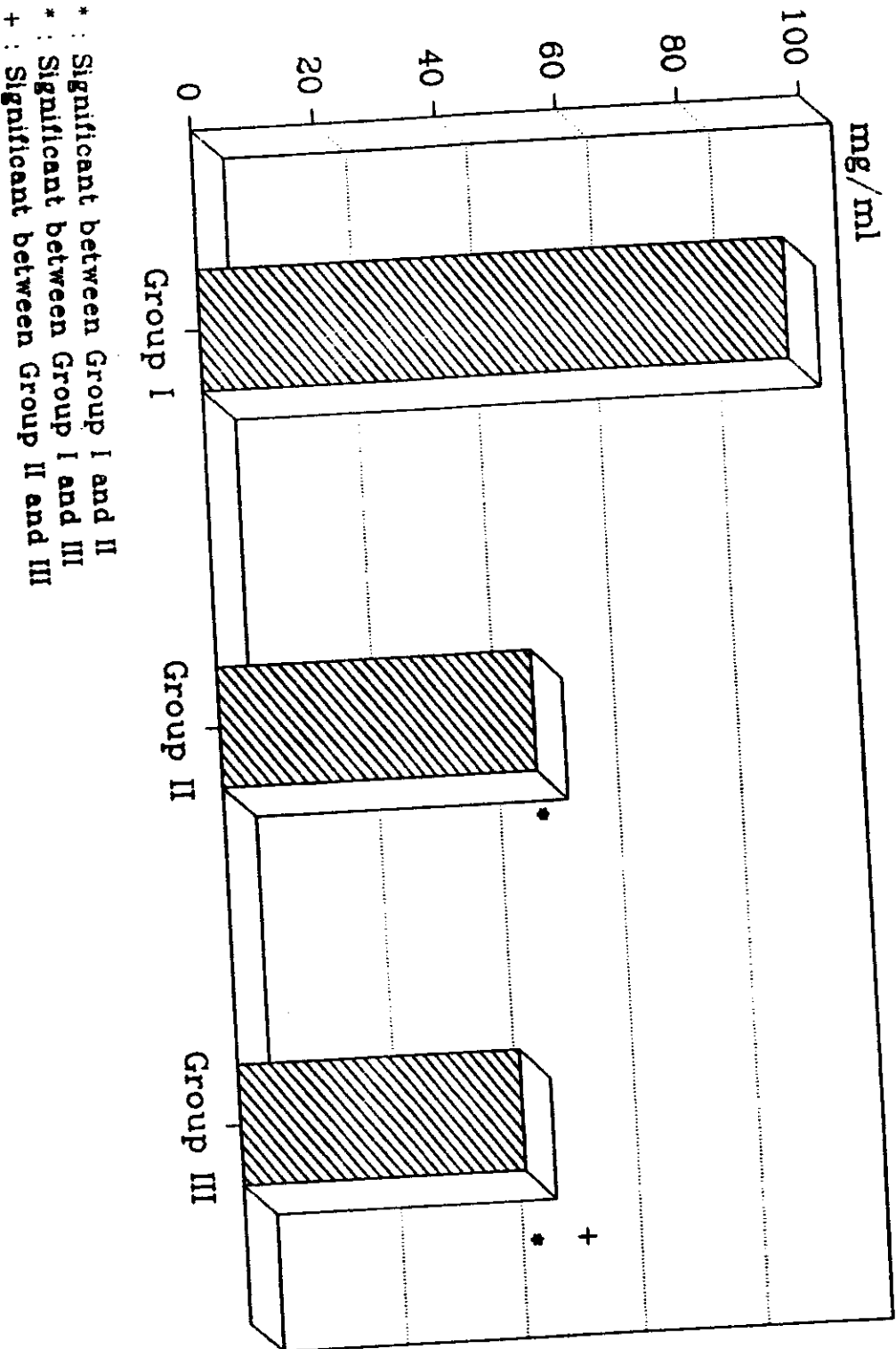


Table (9) & (10) and Fig. (1) shows comparative data of triglycerides level (mg/ml) in erythrocyte membrane obtained from normal control group and the thalassaemic patients groups.

In group I (normal control group), the mean value of triglycerides level $\pm$ SE was 96.11 ± 1.937 mg/ml. And group II (B thalassaemia major with splenectomy) it was 51.43 ± 1.693 mg/ml. Moreover, in group III (B thalassaemia major with no splenectomy), it was 45.79 ± 1.311 mg/ml.

Comparison between the 3 groups concerning triglycerides level by Anova test. Table (9) shows significant difference in between groups ($P < .001$).

Comparison between individual groups showed that there was a significant decrease in triglycerides level in both group II and III compared to group I ($P_1 < .001$ & $P_1 < .001$) respectively.

And also there was significant decrease in group III, compared to group II $P_2 (< .001)$.

Table (11) : Shows One Way ANOVA test of phospholipids level (g/ml) in erythrocyte membrane obtained from normal control group and the thalassaemic patients groups.

	Group I	Group II	Group III
No.	14	14	28
Mean	1.75	0.93	1.21

F : 206.421
* : Significant

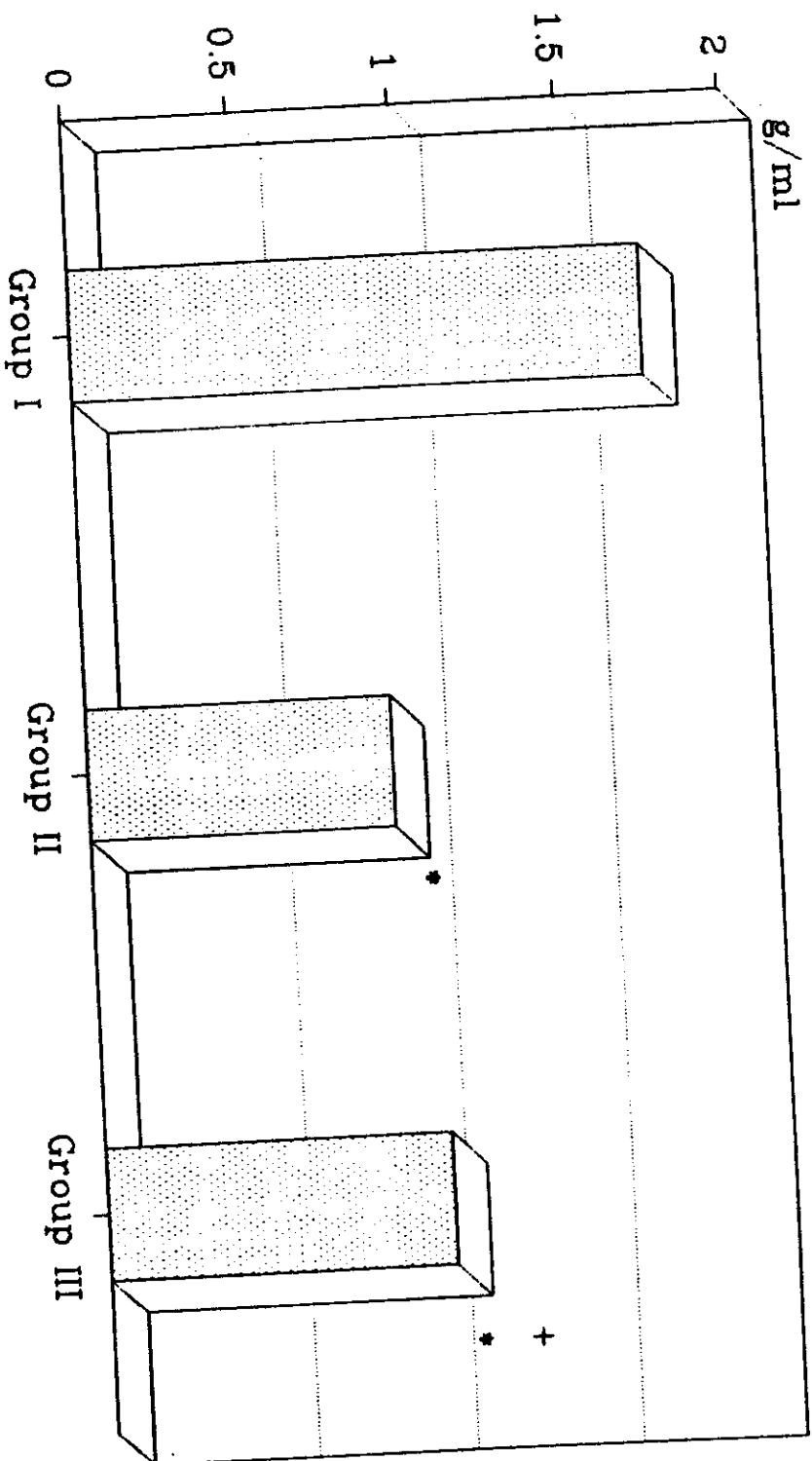
P < 0.001 *

Table (12) : Comparative Data of phospholipids level (g/ml) in erythrocyte membrane obtained from normal control group and the thalassaemic patients groups.

	Group I	Group II	Group III
No.	14	14	28
Mean	1.75	0.93	1.21
S.D. ±	0.086	0.070	0.269
S.E. ±	0.023	0.019	0.051
p1		< 0.001 *	< 0.001 *
p2			< 0.001 *

Group I : Normal control group
Group II : B thalassaemia major with splenectomy
Group III : B thalassaemia major with no splenectomy
p1 : Group II and Group III compared to Group I
p2 : Group III compared to Group II
* : Significant

Fig. 2 : Comparative data of phospholipids level (g/ml) in erythrocyte membrane obtained from normal control group and the thalassaemic patients groups.



* : Significant between Group I and II
 * : Significant between Group I and III
 + : Significant between Group II and III

Table (11) & (12) and Fig. (2) shows comparative data of phospholipids level (g/ml) in erythrocyte membrane obtained from normal control group and the thalassaemic patients groups.

In group I, the mean value of phospholipids level $\pm$ SE was 1.75 ± 0.023 (g/ml). In group II, it was 0.93 ± 0.019 (g/ml). In group III, it was 1.21 ± 0.051 (g/ml).

Comparison between the 3 groups concerning phospholipids level by Anova test. Table (11) showed significant difference in between groups ($P < .001$).

Comparison between individual groups showed there was a significant decrease in phospholipids level in both group II and group III compared to group I ($P_1 < .001$ & $P_1 < .001$) respectively. But there was significant increase in group III compared to group II ($P_2 < .001$).

Table (13) : Shows One Way ANOVA test of cholesterol level (mg/ml) in erythrocyte membrane obtained from normal control group and the thalassaemic patients group.

	Group I	Group II	Group III
No.	14	14	28
Mean	138.65	129.43	132.46

F : 1.175

P > 0.1

Table (14) : Comparative Data of cholesterol level (mg/ml) in erythrocyte membrane obtained from normal control group and the thalassaemic patients groups.

	Group I	Group II	Group III
No.	14	14	28
Mean	138.65	129.43	132.46
S.D. $\pm$	11.840	17.118	17.817
S.E. $\pm$	3.164	4.575	3.367
p1		> 0.1 N.S	> 0.1 N.S
p2			> 0.1 N.S

Group I : Normal control group

Group II : B thalassaemia major with splenectomy

Group III : B thalassaemia major with no splenectomy

p1 : Group II and Group III compared to Group I

p2 : Group III compared to Group II

Fig. 3 : Comparative data of cholesterol level (mg/ml) in erythrocyte membrane obtained from normal control group and the thalassaemic patients groups.

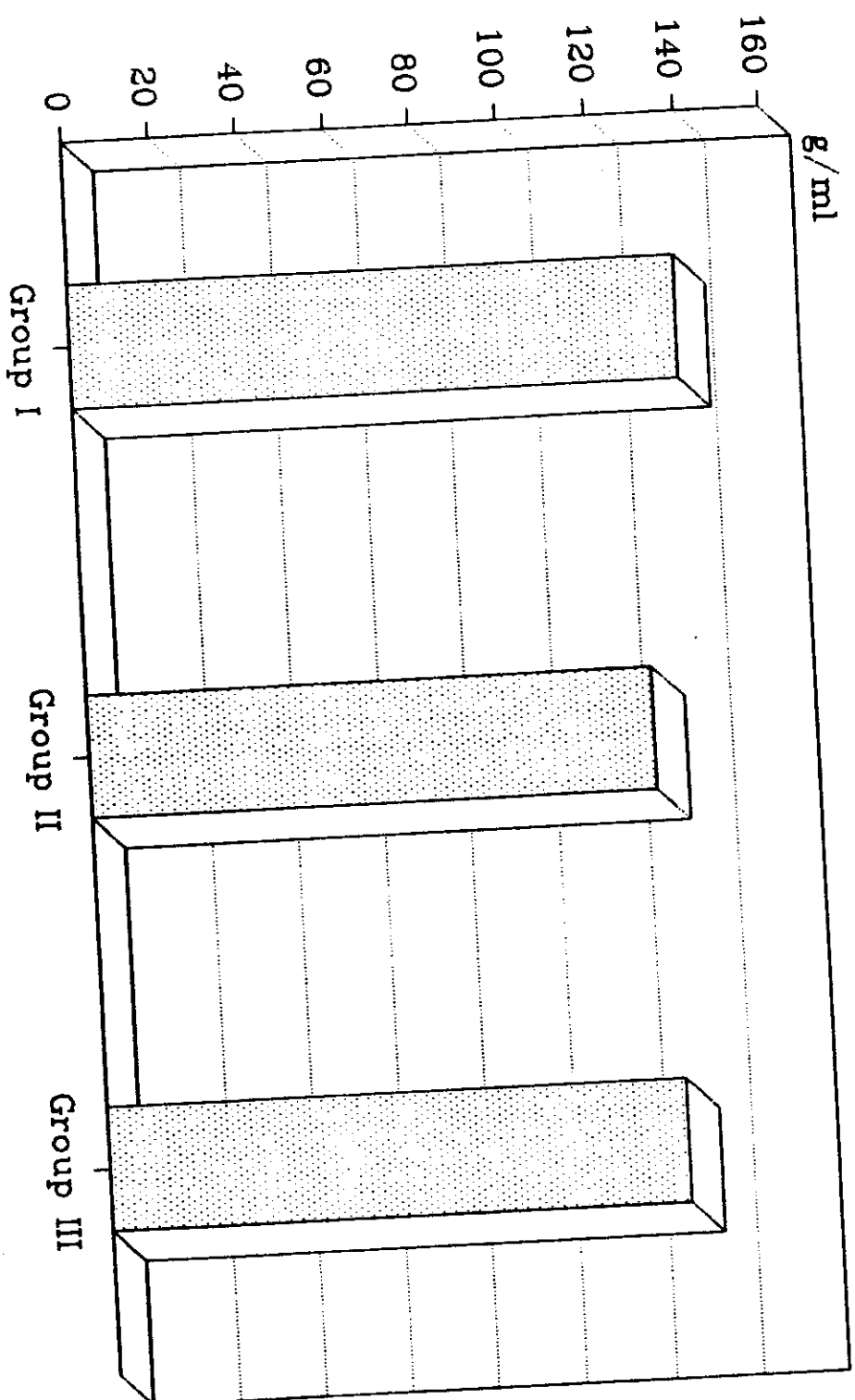


Table (13) & (14) and Fig. (3) shows comparative data of cholesterol level (mg/ml) in erythrocyte membrane obtained from normal control group and the thalassaemic patients groups.

In group I, the mean value of cholesterol level $\pm$ SE was 138.65 ± 3.164 (mg/ml). In group II, it was 129.43 ± 4.575 (mg/ml). And in group III, it was 132.46 ± 3.367 (mg/ml).

Comparison between the 3 groups concerning cholesterol level by Anova Test. Table (13) showed no significant difference in between groups ($P > 0.1$).

Table (15) : Shows One Way ANOVA test of Adenosine triphosphate (ATP) level (umol/dl) in erythrocyte membrane obtained from normal control group and the thalassaemic patients groups

	Group I	Group II	Group III
No.	14	14	28
Mean	488.14	224.64	227.18

F : 760.496
* : Significant

P < 0.001 *

Table (16) : Comparative Data of Adenosine triphosphate (ATP) level (umol/dl) erythrocyte membrane obtained from normal control group and the thalassaemic patients group

	Group I	Group II	Group III
No.	14	14	28
Mean	488.14	224.64	227.18
S.D. ±	26.821	20.387	19.556
S.E. ±	7.168	5.449	3.696
p1		< 0.001 *	< 0.001 *
p2			> 0.3

Group I : Normal control group
Group II : B thalassaemia major with splenectomy
Group III : B thalassaemia major with no splenectomy
p1 : Group II and Group III compared to Group I
p2 : Group III compared to Group II
* : Significant

Fig. 4 : Comparative data of Adenosine triphosphate (ATP) level (u mol/dl) in erythrocyte membrane obtained from normal control group and the thalassaemic patients groups.

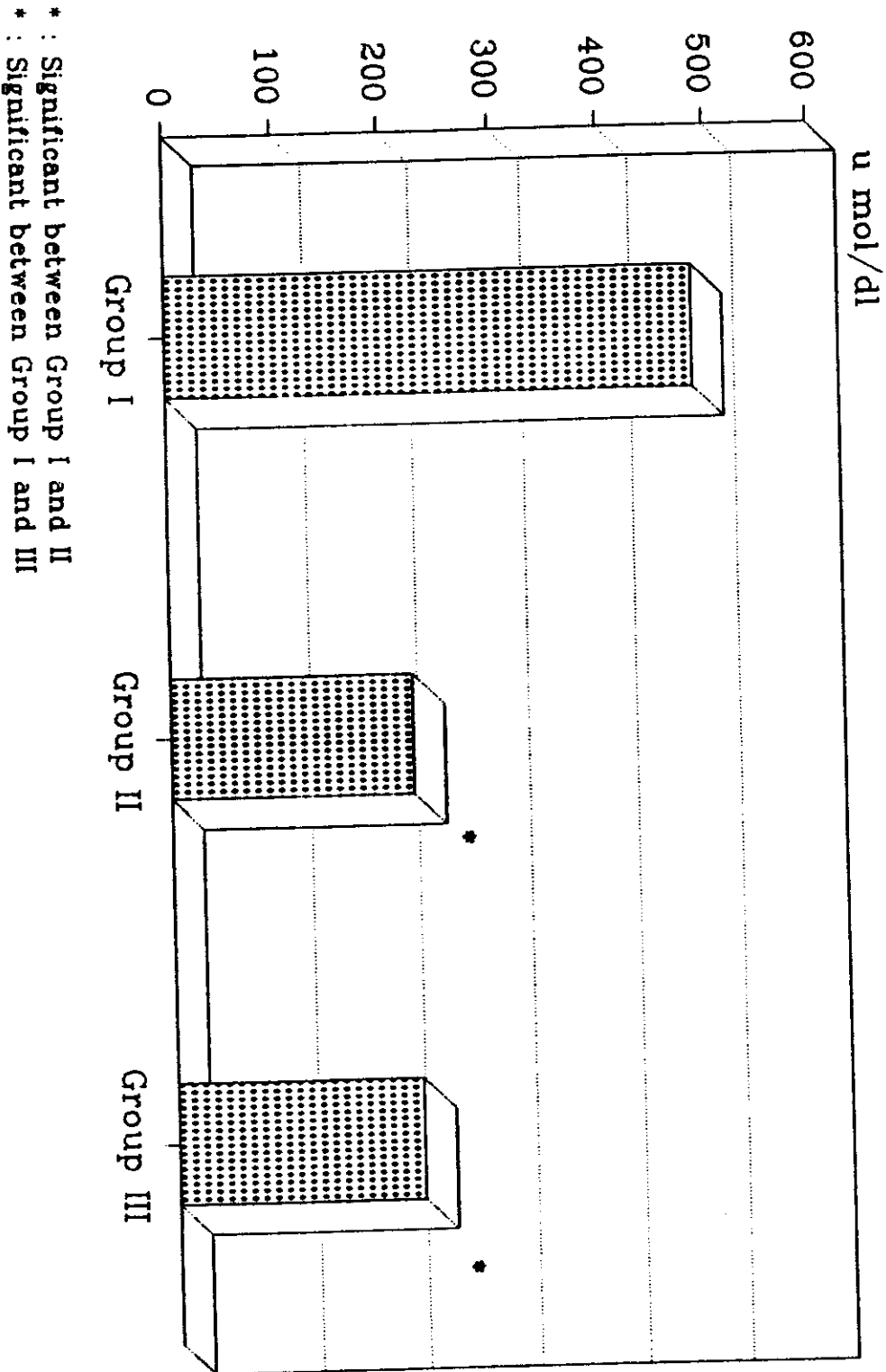


Table (15) & (16) and Fig. (4) shows comparative data of Adenosine triphosphate (ATP) level ($\mu\text{mol/dl}$) in erythrocyte membrane obtained from normal control group and the thalassaemic patients groups.

In group I the mean value of ATP level $\pm$ SE was 488.14 ± 7.168 ($\mu\text{mol/dl}$). In group II, it was 224.64 ± 5.449 ($\mu\text{mol/dl}$). And in group III, it was 227.18 ± 3.696 ($\mu\text{mol/dl}$).

Comparison between the 2 groups concerning ATP level by Anova Test. Table (15) showed significant difference in between groups ($P < 0.001$).

Comparison between individual groups showed that there was a significant decrease in ATP level in both group II and group III compared to group I ($P_1 < .001$ & $P_1 < .001$) respectively. But there was no significant difference in group III compared to group II.

Table (17) : Comparative data of Adenosine Triphosphatase (ATPase) activities (Picomol Pi/ml/hour) in erythrocyte membrane obtained from normal control group and the thalassaemic patients group.

	Total ATPase	Ca++ Mg++ ATPase	Na+ - K+ ATPase
Group I			
No.	14	14	14
Mean	394.57	202.50	189.29
S.D. ±	10.675	10.501	7.975
S.E. ±	2.853	2.806	2.131
Group III			
No.	20	20	20
Mean	260.00	137.75	123.00
S.D. ±	8.239	12.030	7.189
S.E. ±	1.842	2.690	1.608
p1	< 0.001*	< 0.001*	< 0.001*

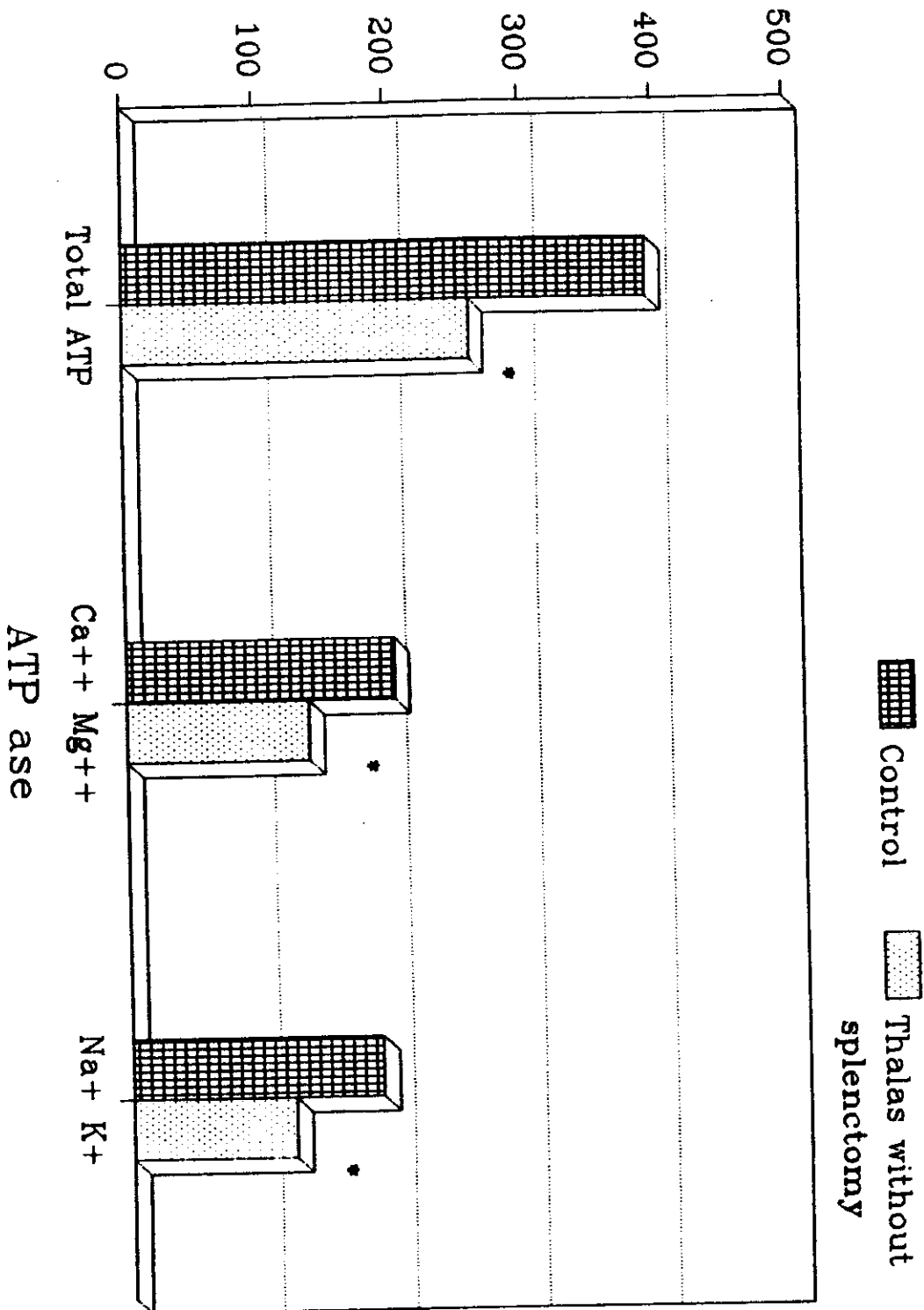
Group I : Normal control group

Group III : B thalassaemia major with no splenectomy

p1 : Group III compared to Group I

* : Significant

Fig. 5 :Comparative data of Adenosine triphosphatase (ATPase) activities (picomol pi/ml/hour) in erythrocyte membrane obtained from normal control group and the thalassaemic patients group.



* : Significant

Table (17) and Fig. (5) shows comparative data of adenosine triphosphatase (ATPase) activities (Picomol Pi/ml/1 hour) in erythrocyte membrane obtained from normal control group and the thalassaemic patients groups.

In group I, the mean value of total ATPase activities $\pm$ SE was 394.57 ± 2.853 (Picomol Pi/ml/hour). The mean value of Ca^{++} Mg^{++} ATPase activities $\pm$ SE was 202.50 ± 2.806 (Picomol Pi/ml/hour). And, the mean value of Na^{+} - K^{+} ATPase activities $\pm$ SE was 189.29 ± 2.131 (Picomol Pi/ml/hour).

In group III, the mean value of total ATPase activities $\pm$ SE was 260.00 ± 1.842 (Picomol Pi/ml/hour). The mean value of Ca^{++} Mg^{++} ATPase activities $\pm$ SE was 137.75 ± 2.690 (Picomol Pi/ml/hour). And the mean value of Na^{+} - K^{+} ATPase activities $\pm$ SE was 123.00 ± 1.608 (Picomol Pi/ml/hour).

Comparison between individual groups showed that there was a significant decrease in total ATPase, Ca^{++} Mg^{++} ATPase and Na^{+} - K^{+} ATPase activities in group III compared to group I ($P_1 < .001$ & $P_1 < .001$ and $P_1 < .001$) respectively.

Table (18) : Comparative data of protein kinase activities (picomol pi/ml/10min) in erythrocyte membrane obtained from normal control group and the thalassaemic patients group.

	Casein Kinase CAMP independent	Histone kinase -CAMP independent	Histone kinase +CAMP dependent
Group I			
No.	14	14	14
Mean	404.14	906.29	1090.07
S.D. ±	9.097	13.980	7.152
S.E. ±	2.431	3.736	1.911
Group III			
No.	20	20	20
Mean	236.35	492.85	610.35
S.D. ±	7.569	9.980	5.833
S.E. ±	1.693	2.232	1.304
p1	< 0.001*	< 0.001*	< 0.001*

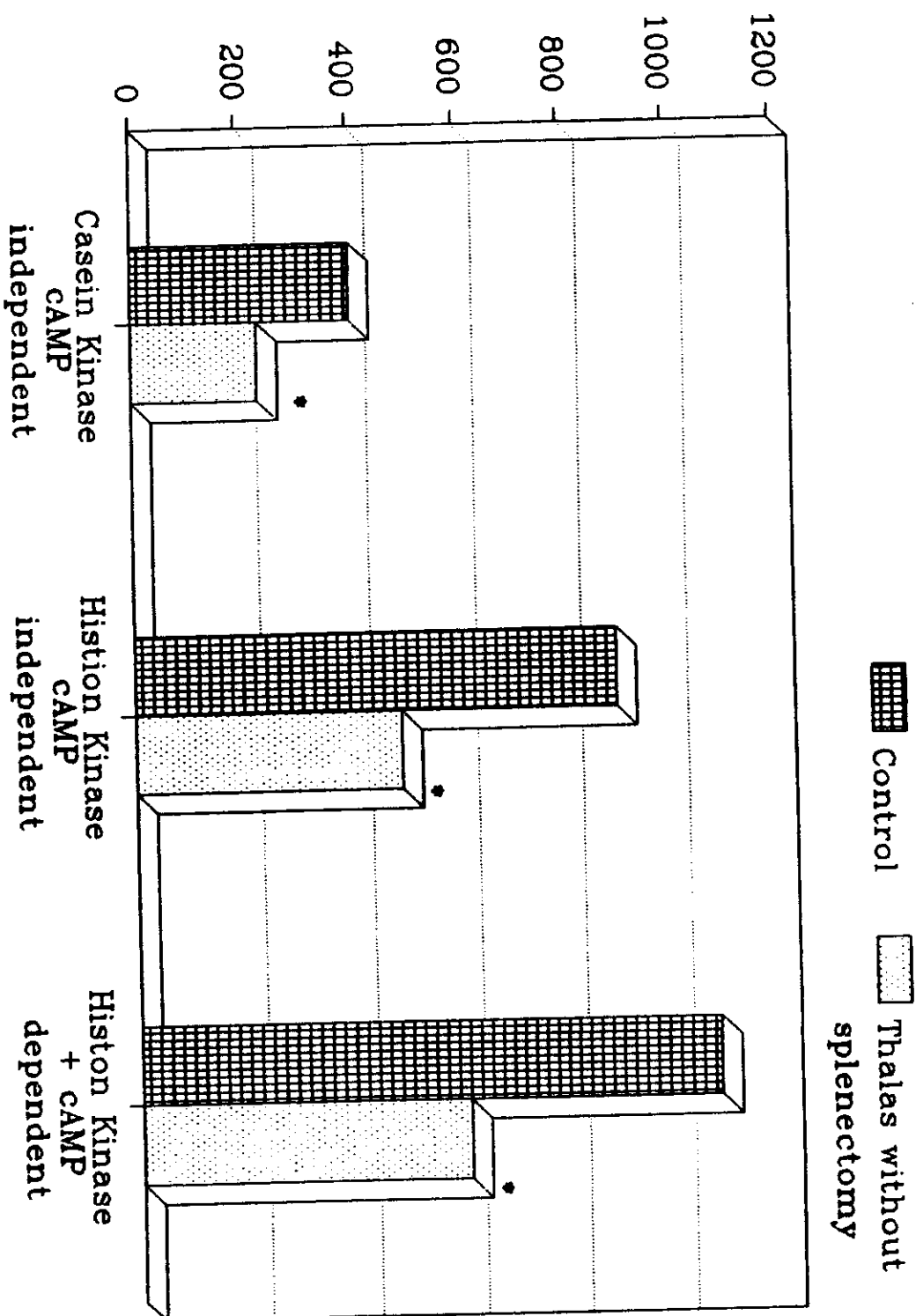
Group I : Normal control group

Group III : B thalassaemia major with no splenectomy

p1 : Group III compared to Group I

* : Significant

Fig. 6 : Comparative data of protein kinase activities (picomol pi/ml/10min) in erythrocyte membrane obtained from normal control group and the thalassaemic patients group.



* : Significant

Table (18) and Fig. (6) shows comparative data of protein kinase activities in erythrocyte membrane obtained from normal control group and the thalassaemic patients groups.

In group I, the mean value of casein kinase cAMP independent activities $\pm$ SE was 404.14 ± 2.431 (Picomol Pi/10 min/400 mg casein). The mean value of histone kinase cAMP independent activities $\pm$ SE was 906.29 ± 3.736 (Picomol Pi/10 min/200 mg histone). And, the mean value of histone kinase + cAMP dependent activities $\pm$ SE was 1090.07 ± 1.911 (Picomol Pi/10 min/200 mg histone).

In group III, the mean value of casein kinase cAMP independent activities $\pm$ SE was 236.35 ± 1.693 (Picomol Pi/10 min/400 mg casein). The mean value of histone kinase cAMP independent activities $\pm$ SE was 492.85 ± 2.232 (Picomol Pi/10 min/200 mg histone). And, the mean value of histone kinase + cAMP dependent activities $\pm$ SE was 610.35 ± 1.304 (Picomol Pi/10 min/200 mg histone).

Comparison between individual groups showed that there was a significant decrease in casein kinase cAMP independent, histone kinase cAMP independent and histone

kinase + cAMP dependent activities in group III compared to group I ($P_1 < .001$ & $P_1 < .001$ and $P_1 < .001$) respectively.

Table (19) : Shows One Way ANOVA test of plasma calcium level (Ca++) (mg/dl) obtained from normal control group and the thalassaemic patients groups.

	Group I	Group II	Group III
No.	14	14	28
Mean	9.39	9.13	9.14

F : 0.432

P > 0.5

Table (20) : Comparative Data of plasma calcium level (Ca++) (mg/dl) obtained from normal control group and the thalassaemic patients groups.

	Group I	Group II	Group III
No.	14	14	28
Mean	9.39	9.13	9.14
S.D. $\pm$	0.763	1.080	0.855
S.E. $\pm$	0.204	0.289	0.162
p1		> 0.5	> 0.5
p2			> 0.5

Group I : Normal control group

Group II : B thalassaemia major with splenectomy

Group III : B thalassaemia major with no splenectomy

p1 : Group II and Group III compared to Group I

p2 : Group III compared to Group II

Fig. 7 : Comparative data of plasma calcium level (Ca^{++}) (mg/dl) obtained from normal control group and the thalassaemic patients groups.

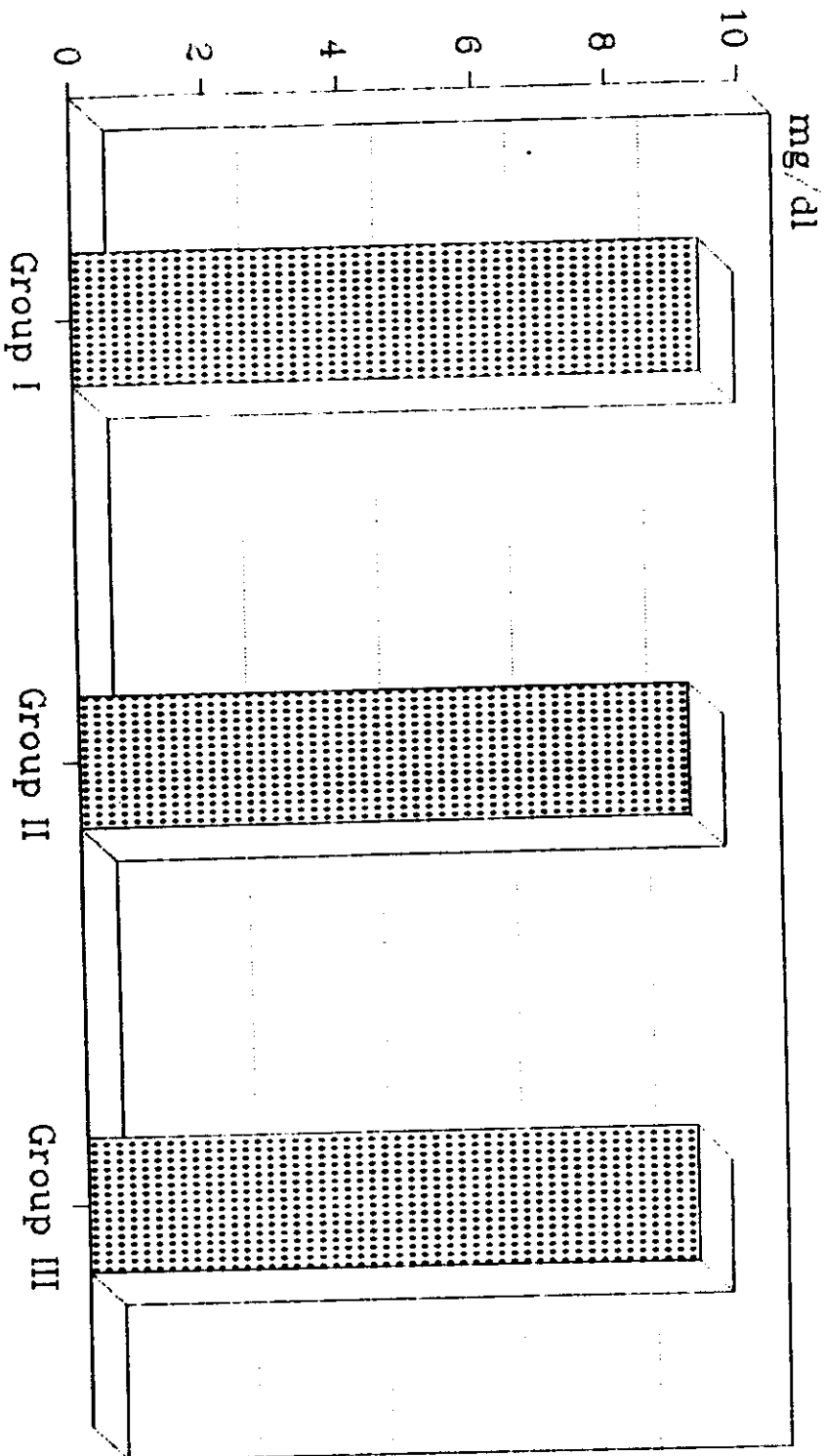


Table (19 & 20) and Fig. (7) showed comparative data of plasma calcium level (Ca^{++}) (mg/dl) obtained from normal control group and the thalassaemic patients groups.

In group I, the mean value of Ca^{++} level $\pm$ SE was 9.39 ± 0.204 mg/dl. In group II, it was 9.13 ± 0.289 mg/dl. And in group III, it was 9.14 ± 0.162 mg/dl.

Comparison between the 3 groups concerning plasma Ca^{++} level by Anova test. Table (19) showed no significant difference in between groups ($P > 0.5$).

Table (21) : Shows One Way ANOVA test of Intracorpascular Ca++ (haemolysate fluid Ca++) (mg/dl) obtained from normal control group and the thalassaemic patients groups.

	Group I	Group II	Group III
No.	14	14	28
Mean	7.99	7.69	8.17

F : 1.744

P > 0.1

Table (22) : Comparative data of Intracorpascular Ca++ (haemolysate fluid Ca++) (mg/dl) obtained from normal control group and the thalassaemic patients groups.

	Group I	Group II	Group III
No.	14	14	28
Mean	7.99	7.69	8.17
S.D. ±	0.452	0.752	0.916
S.E. ±	0.121	0.201	0.173
p1		> 0.1	> 0.1
p2			> 0.1

Group I : Normal control group

Group II : B thalassaemia major with splenectomy

Group III : B thalassaemia major with no splenectomy

p1 : Group II and Group III compared to Group I

p2 : Group III compared to Group II

Fig. 8 : Comparative data of Intracorpascular Ca^{++} (haemolysate fluid Ca^{++}) (mg/dl) obtained from normal control group and the thalassaemic patients groups.

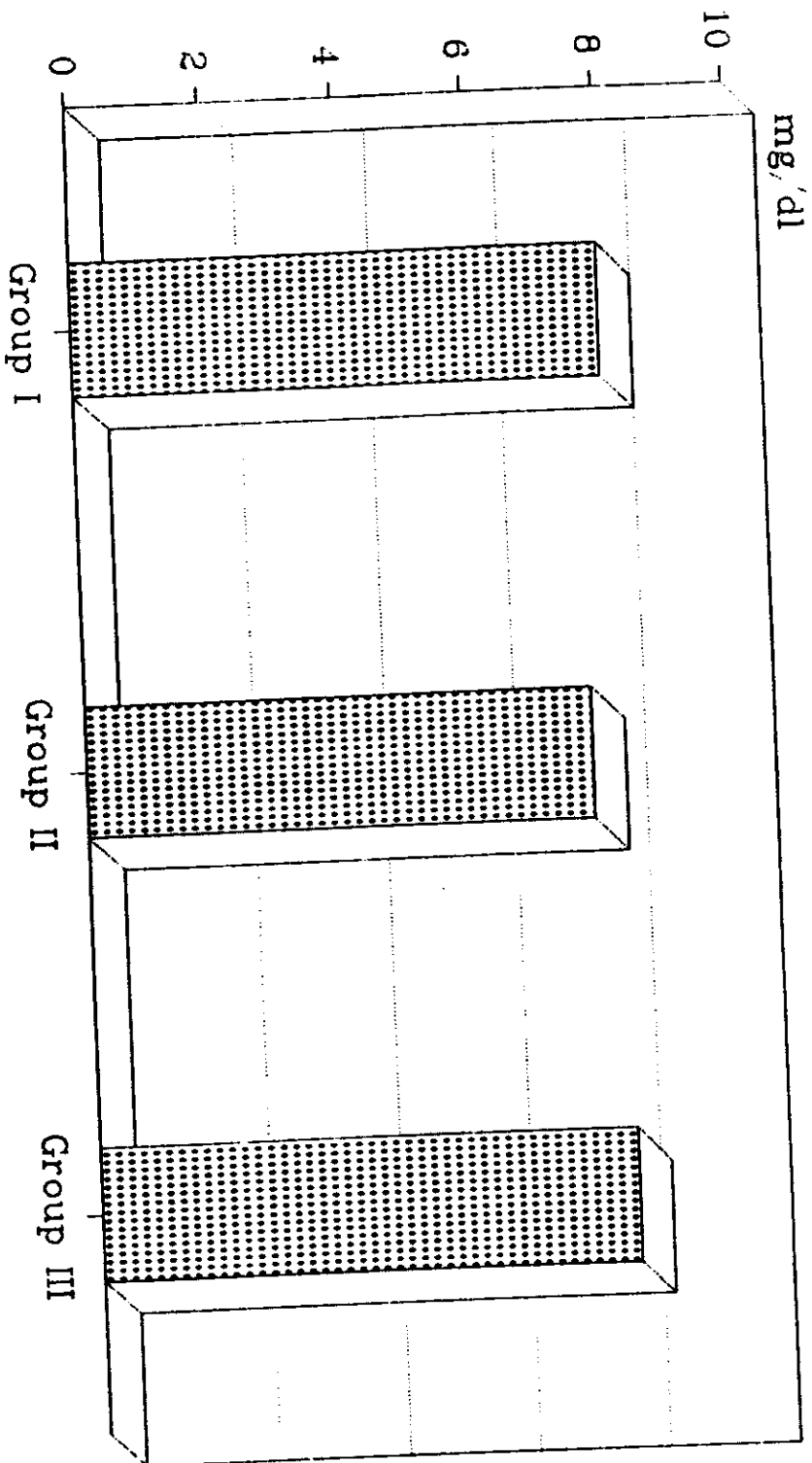


Table (21) & (22) and Fig. (8) showed comparative data of intracorpascular Ca^{++} level (haemolysate fluid Ca^{+}) (mg/dl) obtained from normal control group and the thalassaemic patients groups.

In group I, the mean value of intracorpascular Ca^{++} level $\pm$ SE was 7.99 ± 0.121 mg/dl. In group II, it was 7.69 ± 0.201 mg/dl. In group III, it was $8.17 \pm .173$ mg/dl.

Comparison between the 3 groups concerning intracorpascular Ca^{++} level by Anova test. Table (21) showed no significant difference in between groups ($P > 0.1$).

Table (23) : Shows One Way ANOVA test of red blood corpuscles count (/cmm) obtained from normal control group and the thalassaemic patients groups.

	Group I	Group II	Group III
No.	14	14	28
Mean	4.06	2.44	2.32

F : 35.025

P < 0.001 *

* : Significant

Table (24) : Comparative data of red blood corpuscles count (/cmm) obtained from normal control group and the thalassaemic patients groups.

	Group I	Group II	Group III
No.	14	14	28
Mean	4.06	2.44	2.32
S.D. ±	0.417	0.796	0.680
S.E. ±	0.111	0.213	0.129
p1		< 0.001 *	< 0.001 *
p2			> 0.3

Group I : Normal control group

Group II : B thalassaemia major with splenectomy

Group III : B thalassaemia major with no splenectomy

p1 : Group II and Group III compared to Group I

p2 : Group III compared to Group II

* : Significant

Fig. 9 : Comparative data of red blood corpuscles count /cmm
obtained from normal control group and the
thalassaemic patients groups.

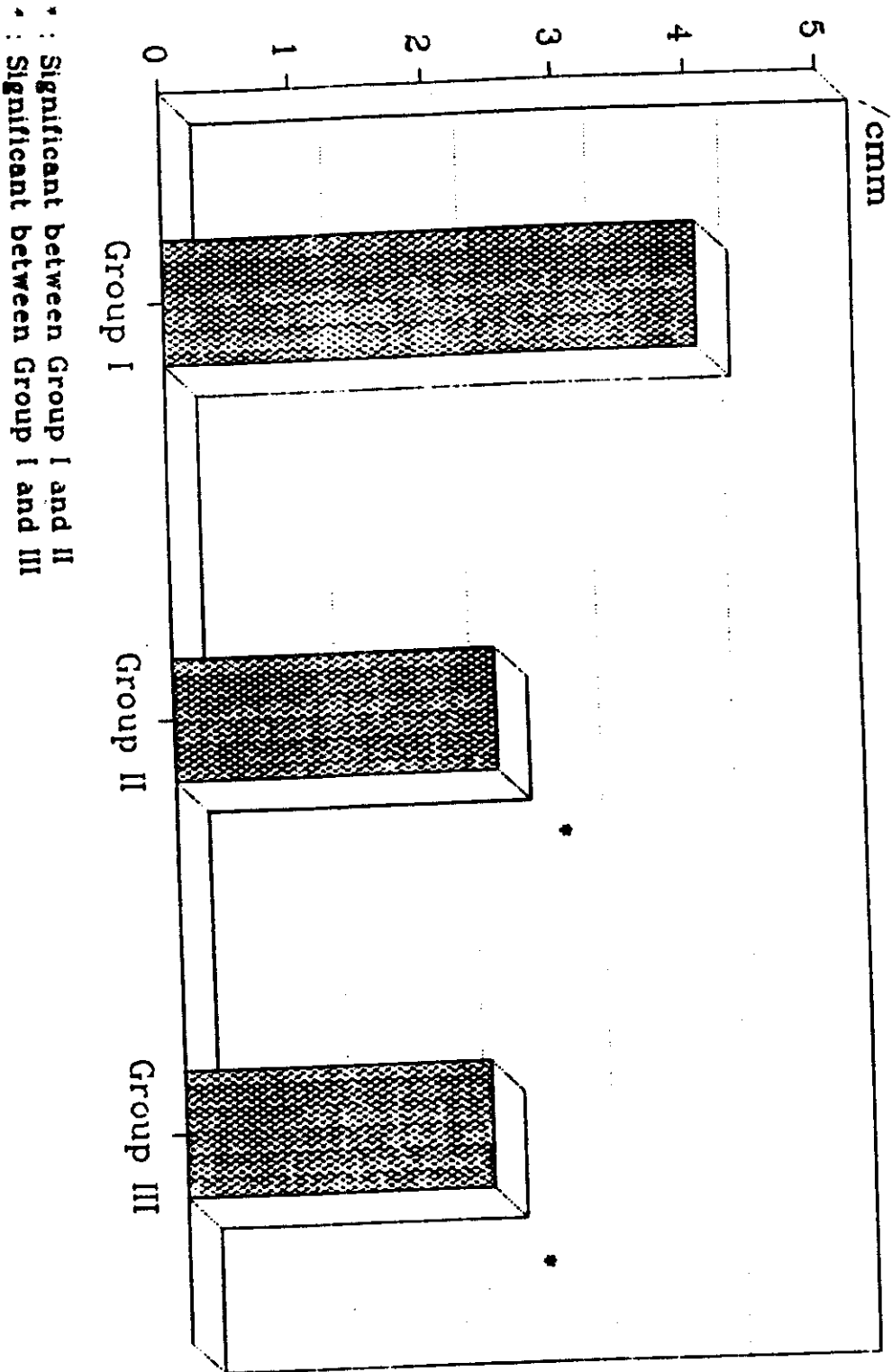


Table (23) & (24) and Fig. (9) showed comparative data of red blood corpuscles (RBCs count) (/cmm) obtained from normal control group and the thalassaemic patients groups.

In group I, the mean value of RBCs count (/cmm) $\pm$ SE was $4.06 \pm 0.111/\text{cmm}$. In group II, it was $2.44 \pm 0.213/\text{cmm}$. In group III, it was $2.32 \pm 0.129/\text{cmm}$.

Comparison between the 3 groups concerning RBCs count by Anova test. Table (23) showed a significant difference in between group ($P < 0.001$).

Comparison between individual groups showed that there was a significant decrease in RBCs count in both group II and III compared to group I ($P_1 < .001$ & $P_1 < .001$) respectively. But there was no significant difference between group III compared to group II.

Table (25) : Shows One Way ANOVA test of Haemoglobin (%) obtained from normal control group and the thalassaemic patients groups.

	Group I	Group II	Group III
No.	14	14	28
Mean	12.24	6.52	6.30

F : 141.637

P < 0.001 *

* : Significant

Table (26) : Comparative data of Haemoglobin (%) obtained from normal control group and the thalassaemic patients groups.

	Group I	Group II	Group III
No.	14	14	28
Mean	12.24	6.52	6.30
S.D. ±	1.180	1.066	1.135
S.E. ±	0.315	0.285	0.214
p1		< 0.001 *	< 0.001 *
p2			> 0.3

Group I : Normal control group

Group II : B thalassaemia major with splenectomy

Group III : B thalassaemia major with no splenectomy

p1 : Group II and Group III compared to Group I

p2 : Group III compared to Group II

* : Significant

Fig. 10 : Comparative data of haemoglobin percentage (%) obtained from normal control group and the thalassaemic patients group.

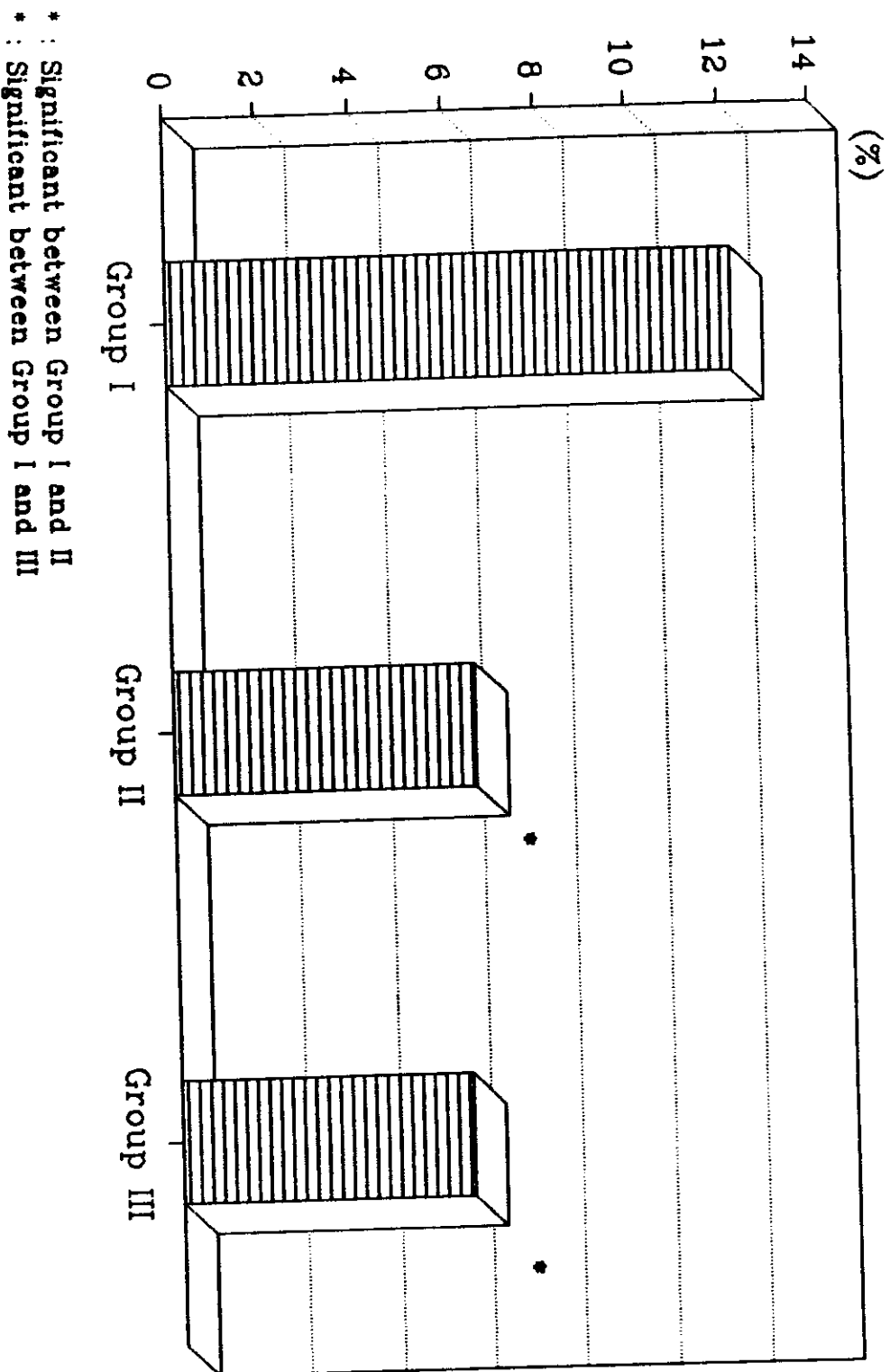


Table (25) & (26) and Fig. (10) showed comparative data of haemoglobin percentage (Hb%) obtained from normal control group and the thalassaemic patients groups.

In group I, the mean value of Hb% $\pm$ SE was 12.24 $\pm$ 0.315%. In group II, it was 6.52 $\pm$ 0.285% and in group III, it was 6.30 $\pm$ 0.214%.

Comparison between the 3 groups concerning Hb% by Anova test. Table (25) showed significant decrease in between groups ($P < .001$).

Comparison between individual groups showed there was a significant decrease in Hb% in both group II and III compared to group I ($P_1 < .001$ & $P_1 < .001$) respectively). But, there was no significant difference in group III compared to group II.

Table (27) : Shows One Way ANOVA test of Haemoglobin electrophoresis (%) obtained from normal control group and the thalassaemic patients group.

		Group I	Group II	Group III
HbA1	No. Mean	14 98.54	14 56.85	28 56.00
F : 17.206		P < 0.001 *		
HbF	No. Mean	14 0.00	14 37.64	28 41.79
F : 0.216		P > 0.05		
HbA2	No. Mean	14 1.46	14 2.51	28 2.50
F : 11.872		P < 0.001 *		

* : Significant

Table (28) : Comparative data of Haemoglobin electrophoresis obtained from normal control group and the thalassaemic patients groups.

	Group I	Group II	Group III
HbA1 %			
No.	14	14	28
Mean	98.54	59.66	56.00
S.D. $\pm$	0.664	24.389	26.155
S.E. $\pm$	0.177	6.518	4.943
p1		< 0.001 *	< 0.001 *
p2			> 0.5
HbF %			
No.	14	14	28
Mean	0.00	137.75	123.00
S.D. $\pm$	0.000	12.030	7.189
S.E. $\pm$	0.000	3.215	1.359
p2			> 0.5
HbA2 %			
No.	14	14	28
Mean	1.46	5.51	2.50
S.D. $\pm$	0.664	4.369	1.106
S.E. $\pm$	0.177	1.168	0.209
p1		< 0.001*	< 0.001*
p2			< 0.001*

Group I : Normal control group

Group II : B thalassaemia major with splenectomy

Group III : B thalassaemia major with no splenectomy

p1 : Group II and Group III compared to Group I

p2 : Group III compared to group II

* : Significant

Fig. 11 : Comparative data of haemoglobin electrophoresis obtained from normal control group and the thalassaemic patients groups.

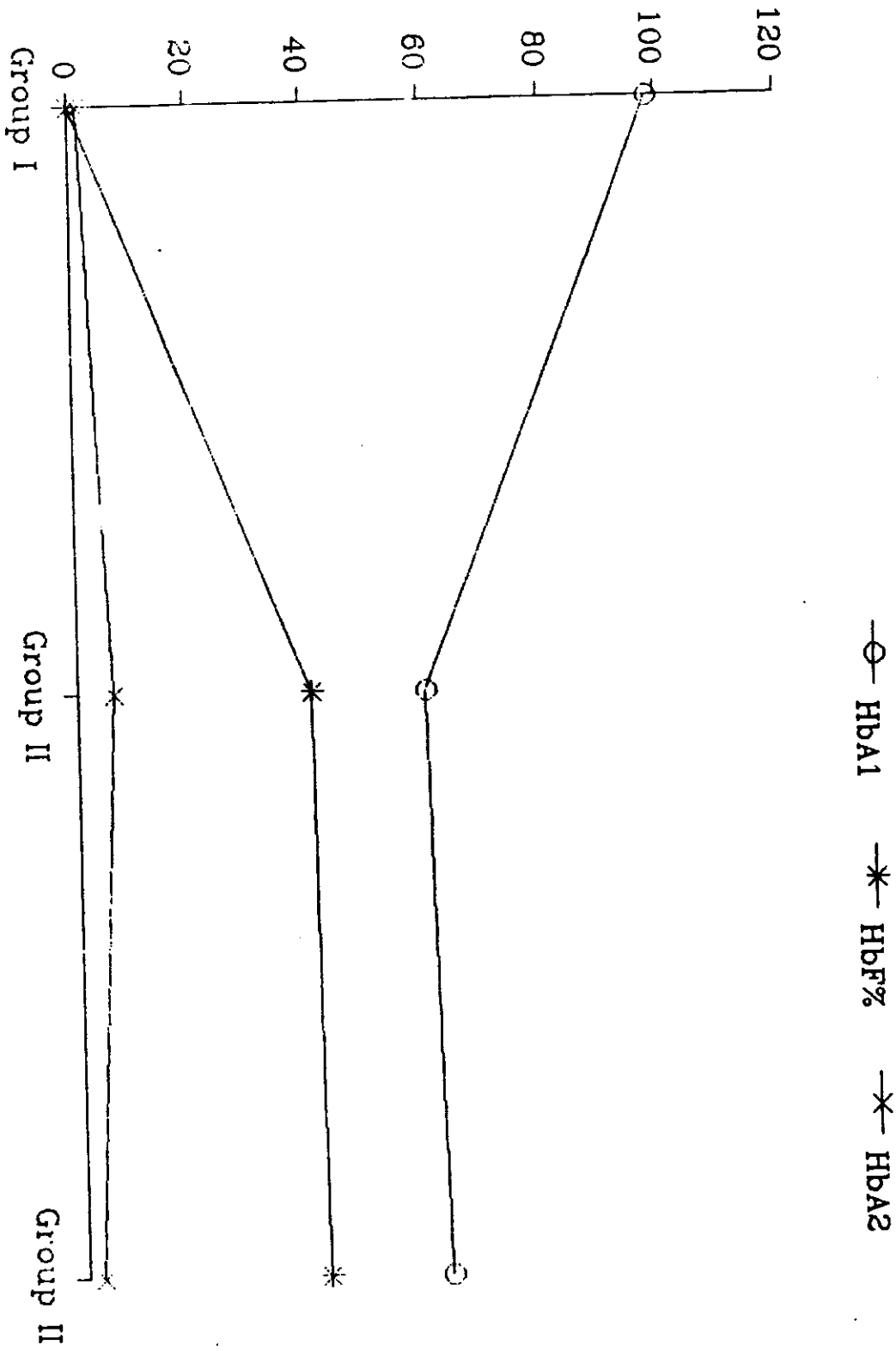


Table (27) & (28) and Fig. (11) shows comparative data of haemoglobin electrophoresis obtained from normal control group and the thalassaemic patients groups.

In group I, the mean value of $\text{HbA}_1\% \pm \text{SE}$ was $98.54 \pm .177\%$. $\text{HbA}_2\%$ was $1.46 \pm 0.177\%$. In group II, the mean value of $\text{HbA}_1\% \pm \text{SE}$ was $56.85 \pm 7.561\%$. $\text{HbF}\%$ was $37.64 \pm 7.915\%$. And $\text{HbA}_2\%$ was $5.51 \pm 1.168\%$. In group III, the mean value of $\text{HbA}_1\% \pm \text{SE}$ was $56.00 \pm 4.943\%$, $\text{HbF}\%$ was $41.79 \pm 4.933\%$. And $\text{HbA}_2\%$ was $2.50 \pm 0.205\%$.

Comparison between the 3 groups concerning Hb electrophoresis percentage by Anova test. Table (27) showed significant difference in both HbA_1 & A_2 in between groups ($P < 0.001$) respectively but no significant difference was found in HbF in between groups.

Comparison between individual groups showed that there was a significant decrease in $\text{HbA}_1\%$ in both group II and III compared to group I ($P_1 < .001$ & $P_1 < .001$) respectively. And there was a significant increase in HbA_2 in both group II and III compared to group I ($P_1 < .001$ & $P_1 < .001$) respectively.

But there was a significant decrease in HbA₂ in group III compared to group II ($P_1 < 0.001$).

There was no significant difference in HbF between the groups. And also no significant difference in HbA₁ in group III compared to group I.

Table (29) : Shows One Way ANOVA test of Age obtained from normal control group and the thalassaemic patients groups.

	Group I	Group II	Group III
No.	14	14	28
Mean	7.32	10.21	6.88

F : 3.117

P > 0.05

Table (30) : Comparative data of Age / year obtained from normal control group and the thalassaemic patients groups.

	Group I	Group II	Group III
No.	14	14	28
Mean	7.32	10.21	6.88
S.D. $\pm$	3.326	4.250	4.496
S.E. $\pm$	0.889	1.136	0.850
p1		> 0.05	> 0.05
p2			

Group I : Normal control group
 Group II : B thalassaemia major with splenectomy
 Group III : B thalassaemia major with no splenectomy
 p1 : Group II and Group III compared to Group I
 p2 : Group III compared to Group II

Fig. 12 : Comparative data of age/year obtained from normal control group and the thalassaemias patients groups.

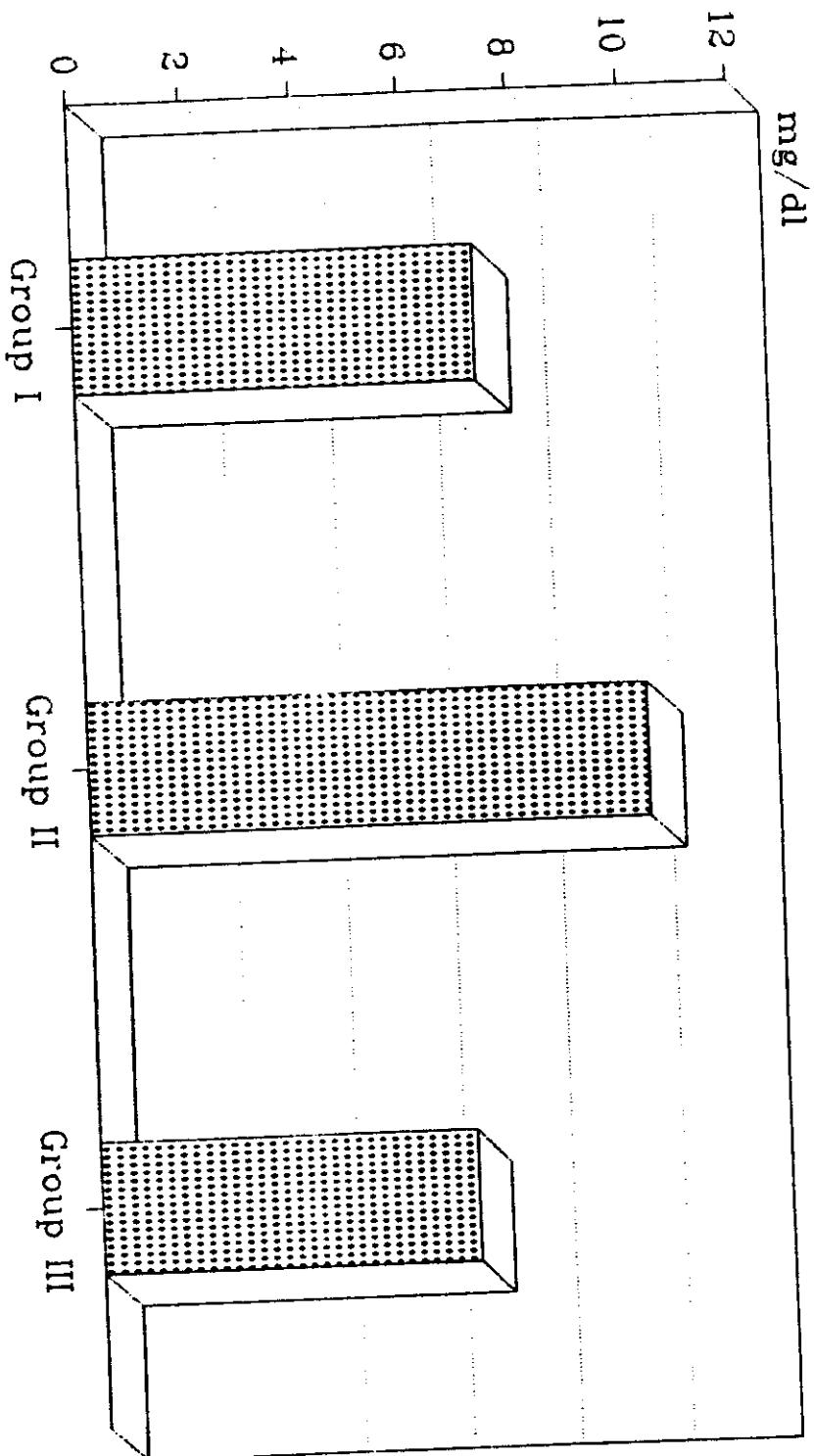
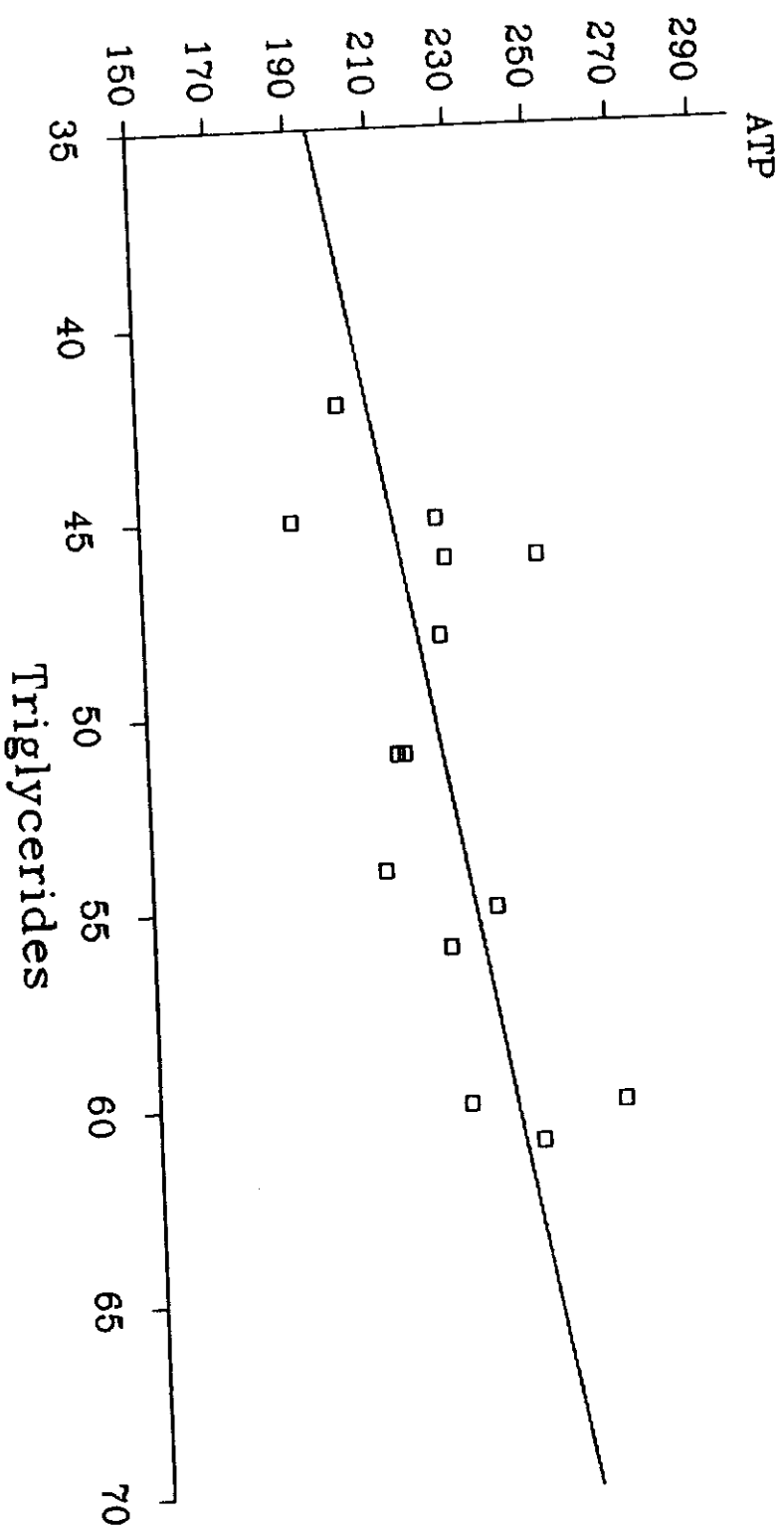


Table (29) & (30) and Fig. (12) shows comparative data of age/year obtained from normal control group and the thalassaemic patient groups.

In group I, mean value of age range/year $\pm$ SE was 7.32 $\pm$.889 years. In group II, it was 10.21 $\pm$ 1.136 year. And in group III it was 6.88 $\pm$ 0.850 year.

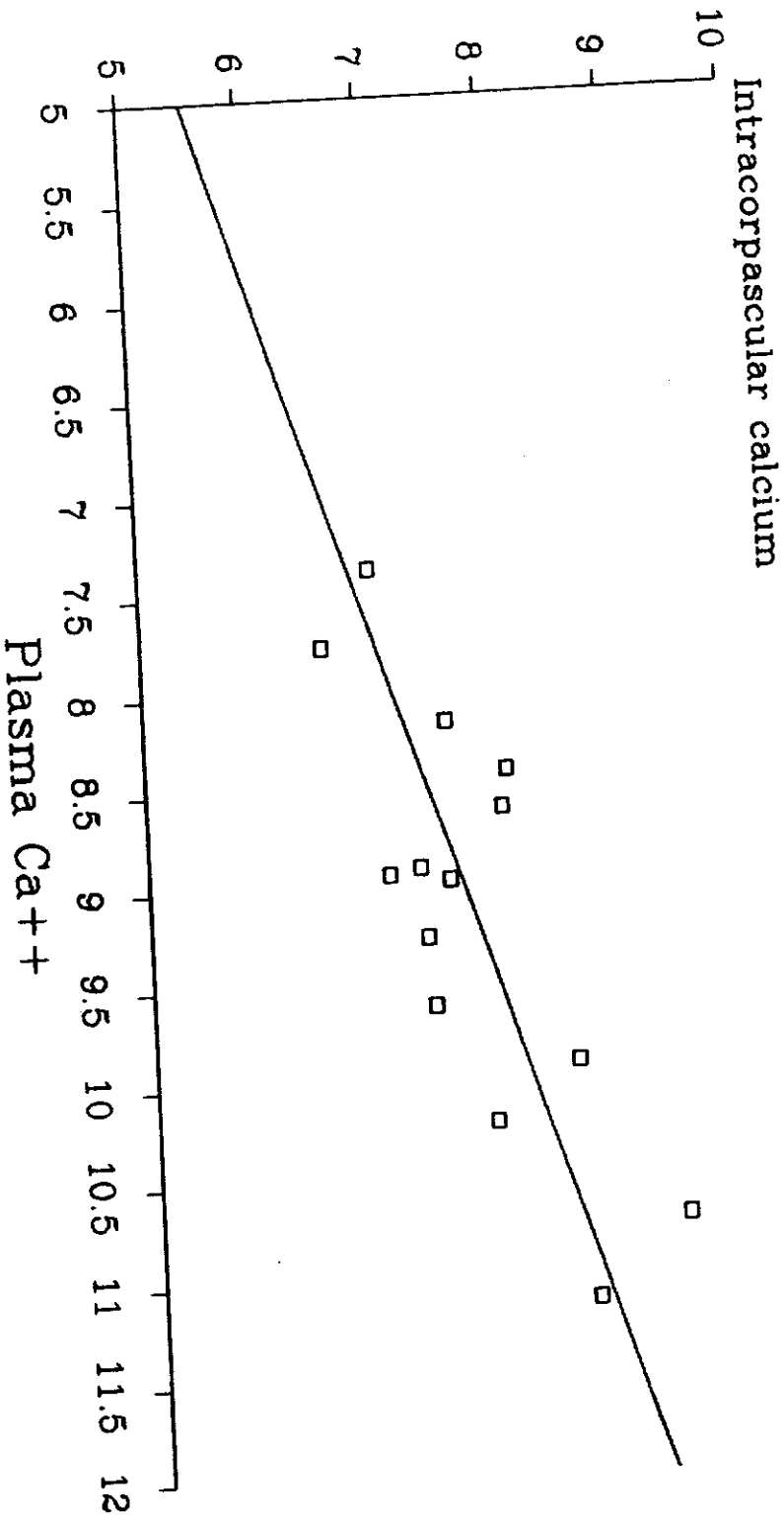
Comparison between the 3 groups concerning age range/year by Anova test. Table (29) showed no significant difference in between groups ($P > 0.05$).

Fig. 13 : Correlation between
triglycerides and ATP in splenectomized
B thalassaemic patients
 $n = 14$ $r = 0.55236$
 $P < 0.05 *$



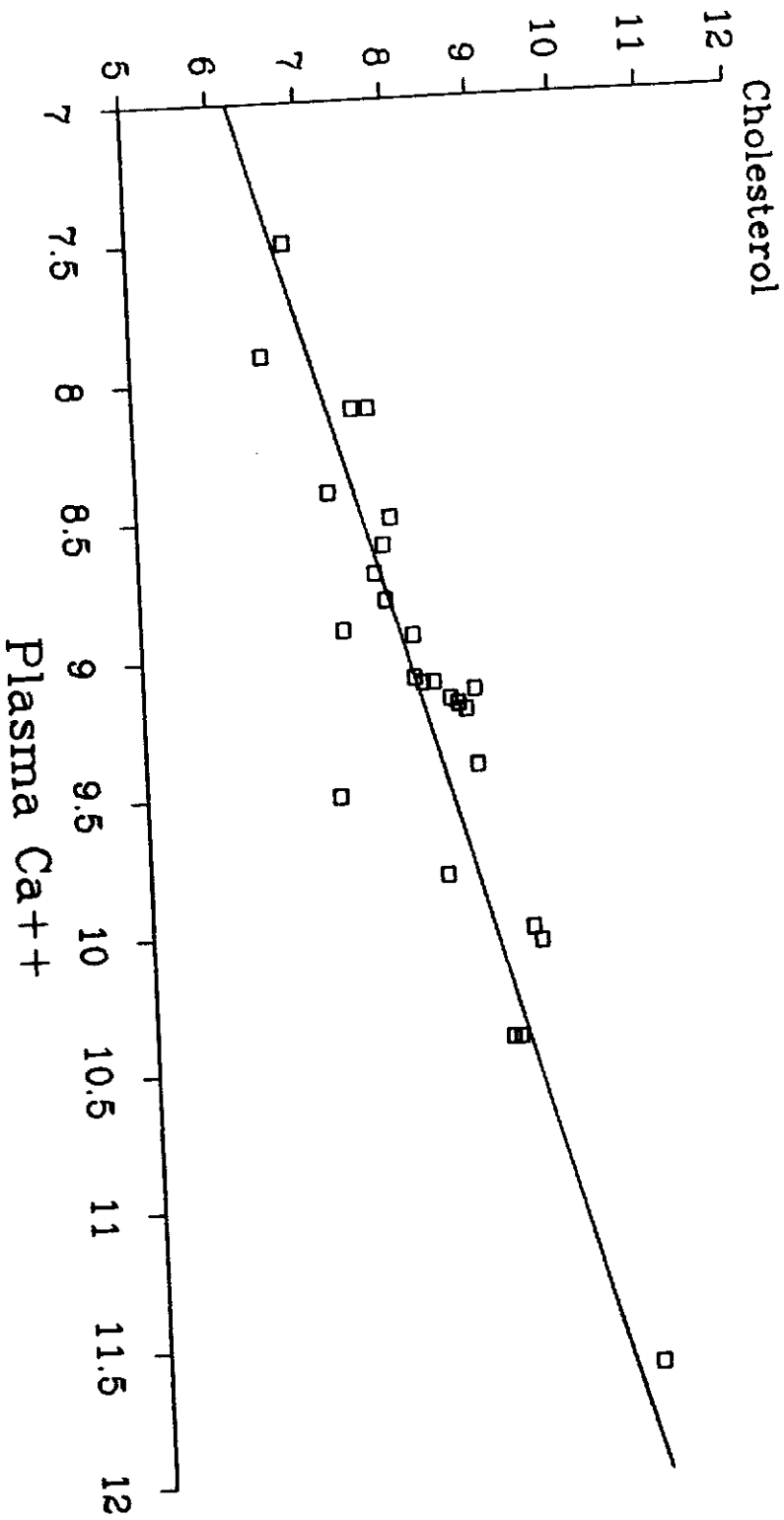
* : Significant

Fig. 14 : Correlation between plasma
Ca++ and intracorpascular Ca++ in
splenectomized B thalassaemic patients
 $n = 14$ $r = 0.75257$
 $P < 0.001 *$



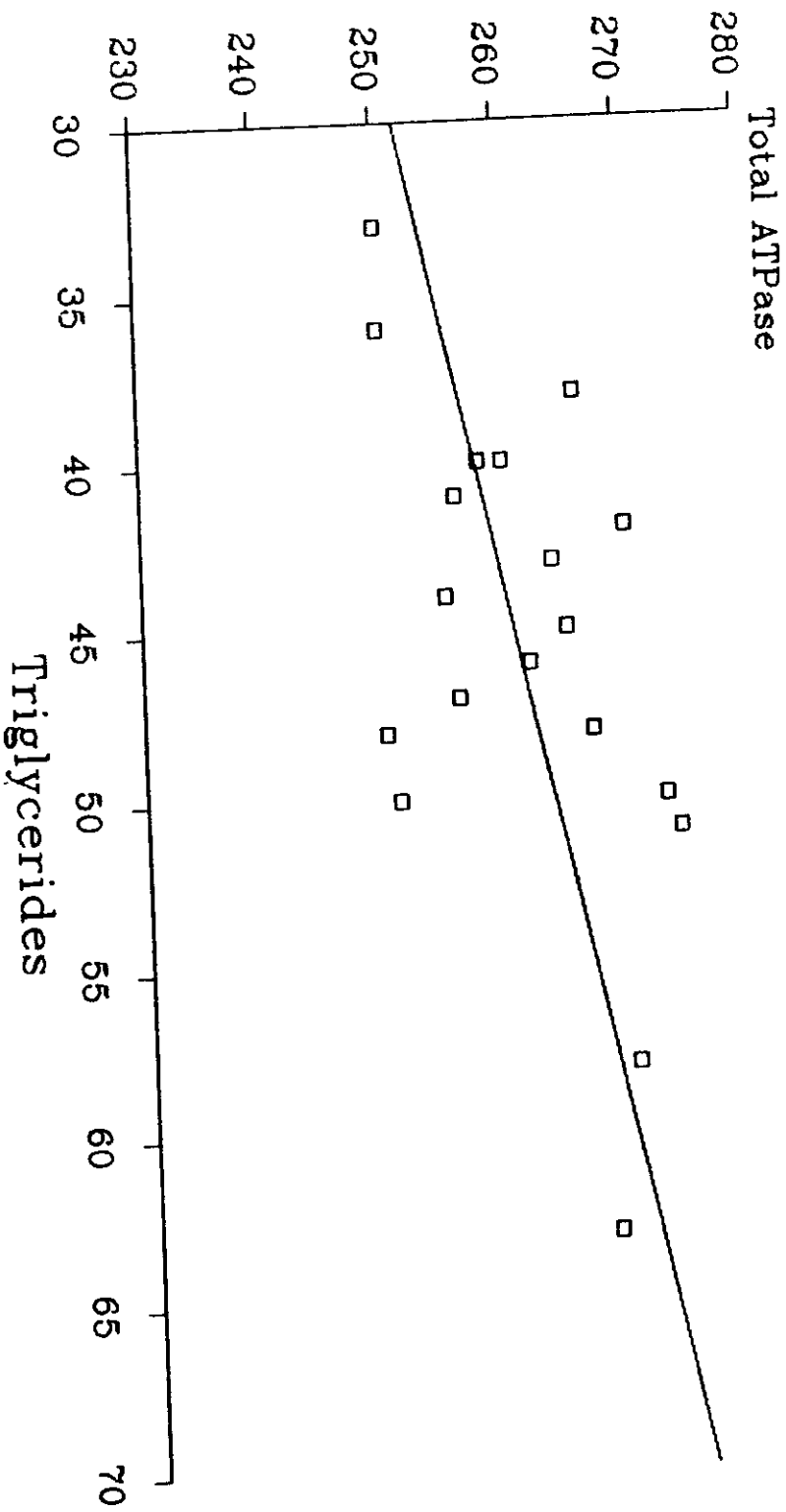
* : Significant

Fig. 15 : Correlation between plasma
Ca++ and cholesterol in non-
splenectomized B thalassaemic patients
n = 28
r = 0.84578
P < 0.001 *



* : Significant

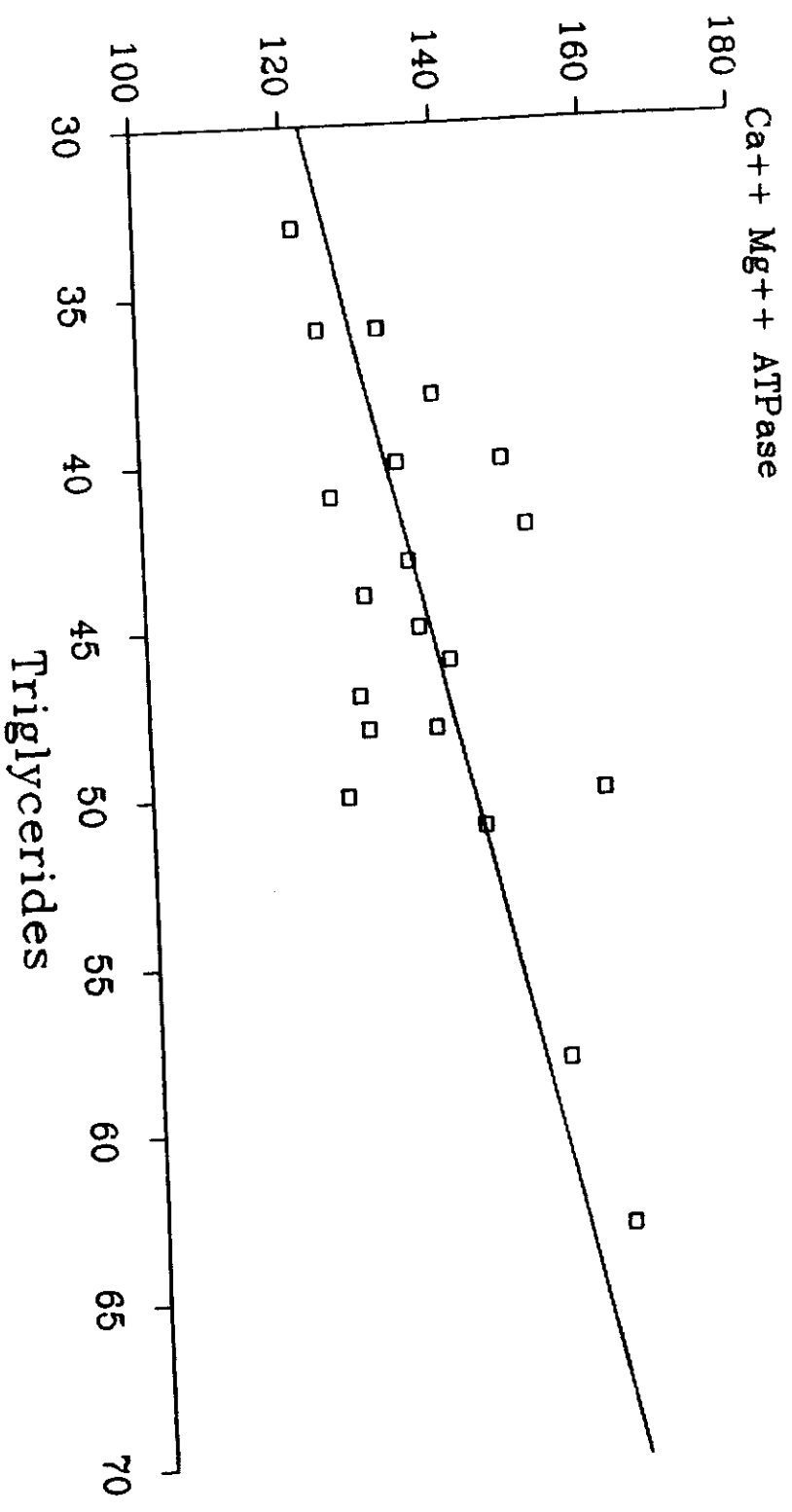
Fig. 16 : Correlation between
triglycerides and total ATPase in non-
splenectomized B thalassaemic patients
 $n = 20$ $r = 0.53158$
 $P < 0.02 *$



* : Significant

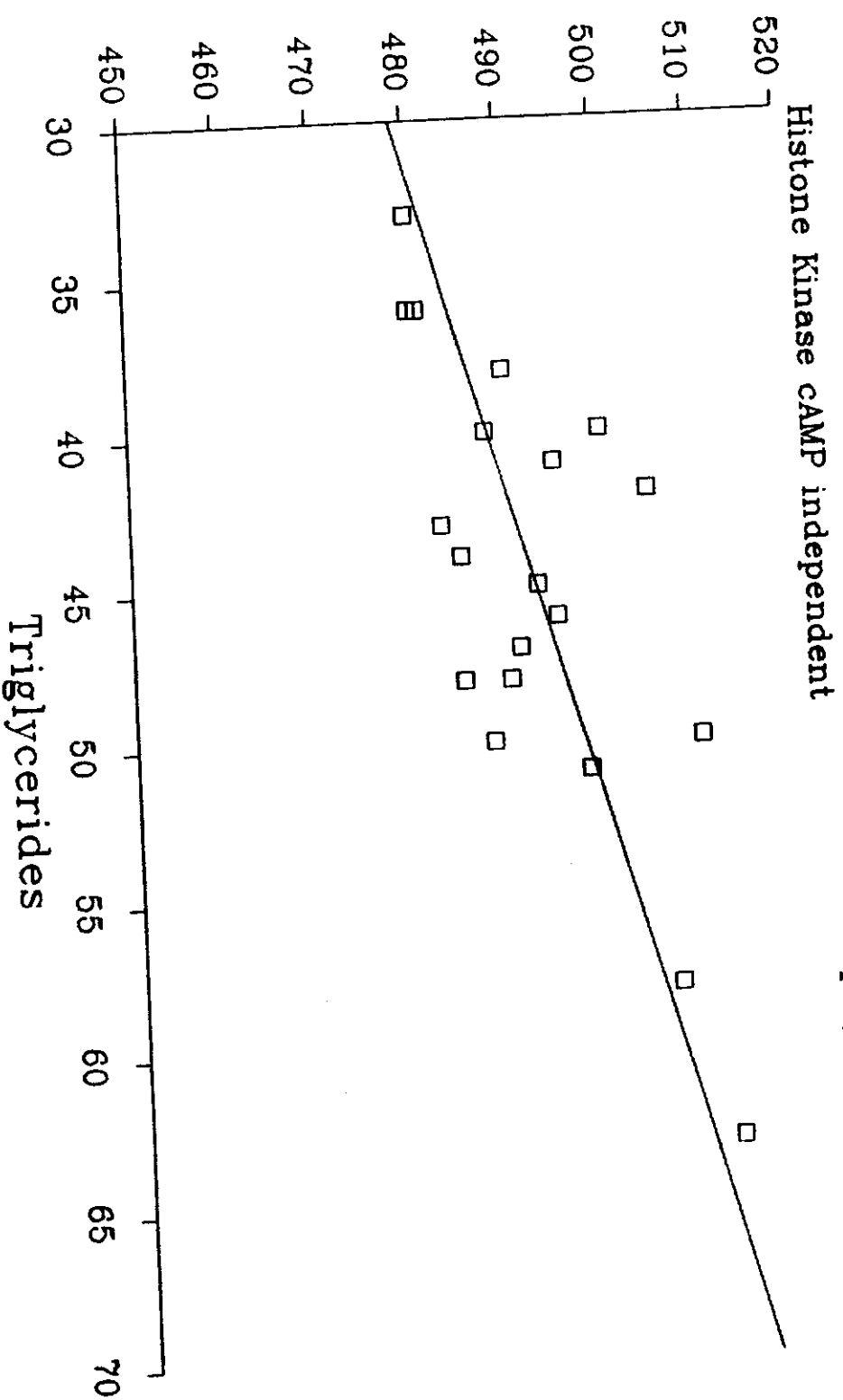
Fig. 17 : Correlation between
triglycerides and Ca^{++} Mg^{++} ATPase in
non-splenectomized B thalassaemic
patients

$n = 20$ $r = 0.62522$
 $P < 0.01 *$



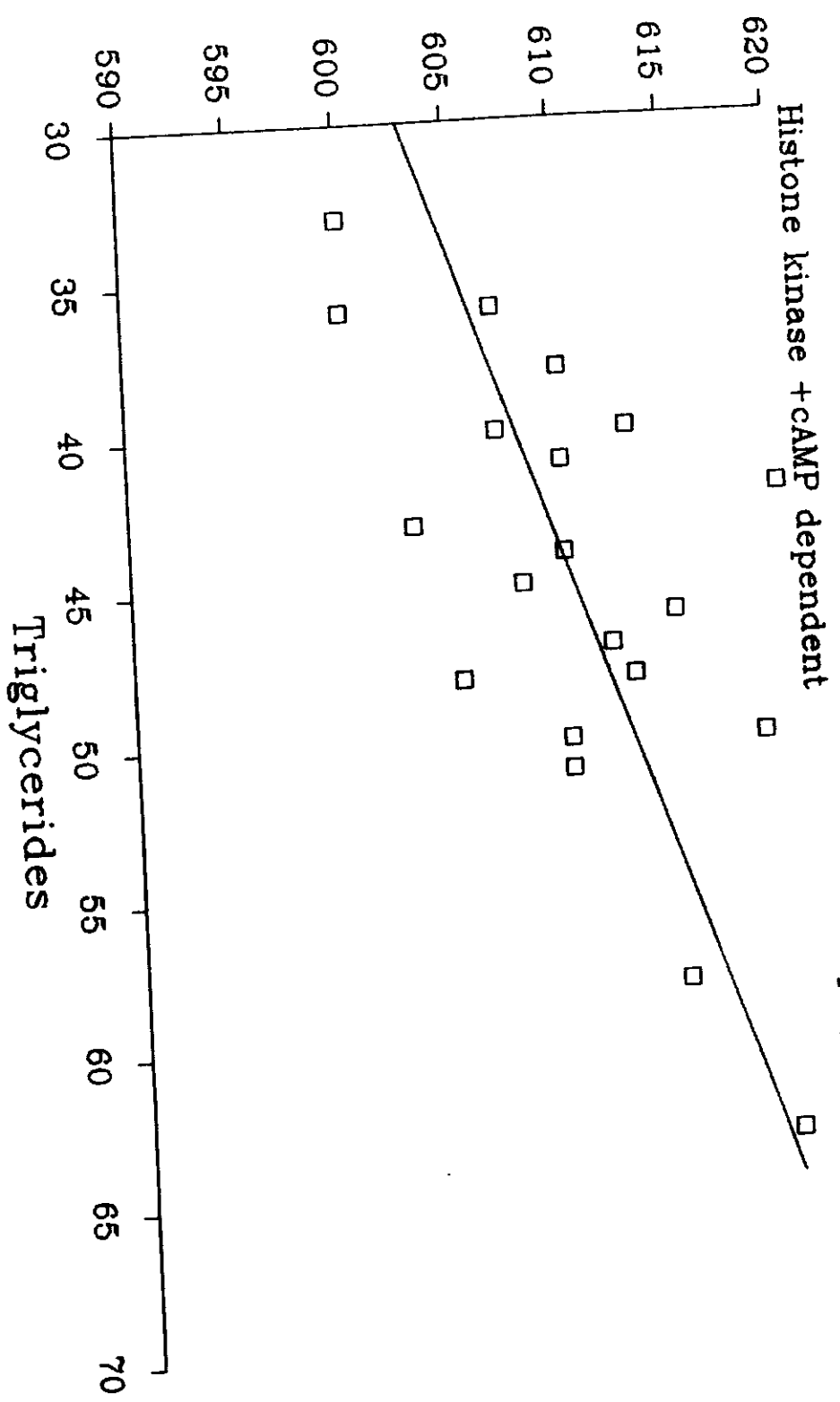
* : Significant

Fig. 18 : Correlation between triglycerides
and histone kinase cAMP independent in non-
splenectomized B thalassaemic patients
 $n = 20$ $r = 0.69445$
 $P < 0.001 *$



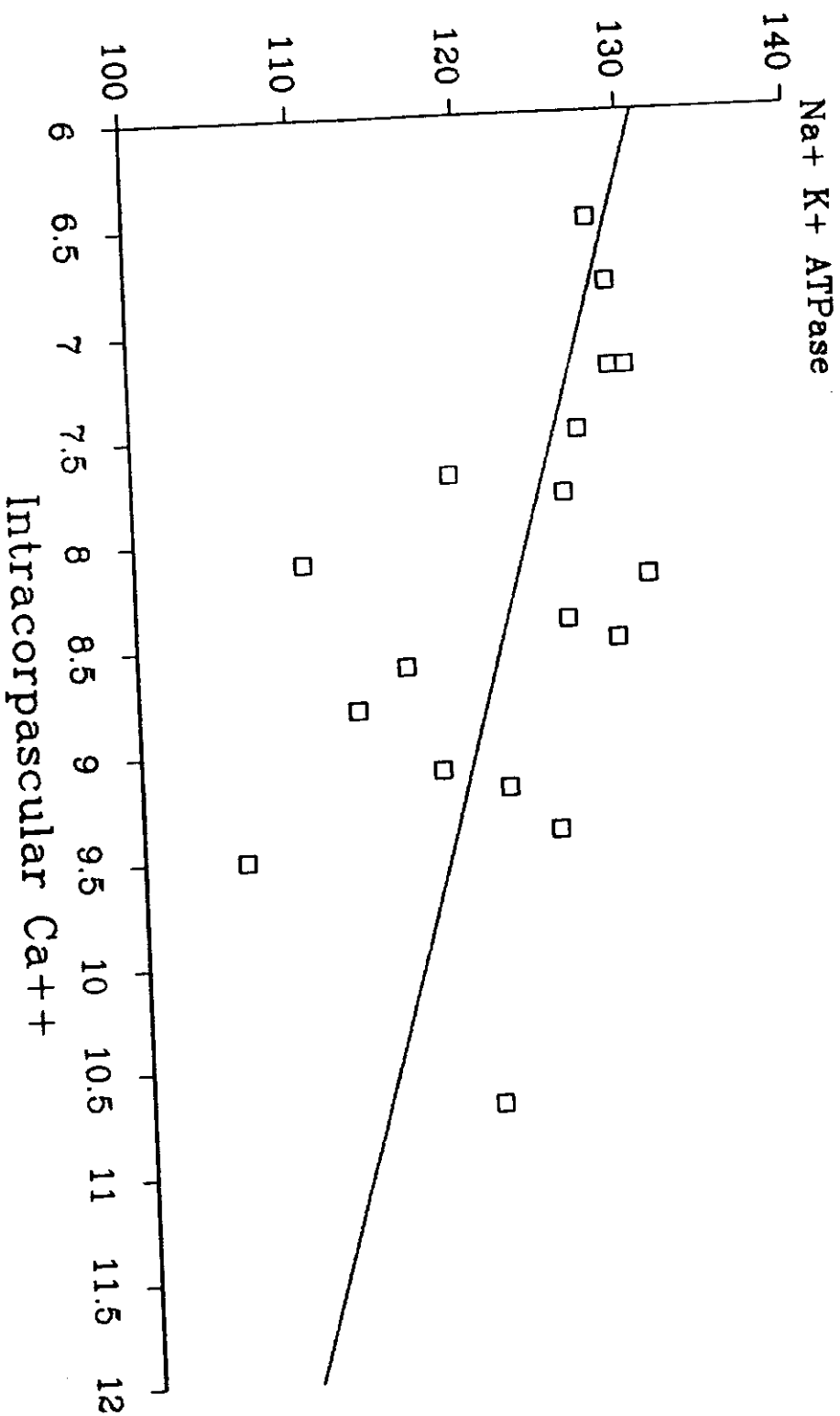
* : Significant

Fig. 19 : Correlation between triglycerides and
histone kinase +cAMP dependent in non-
splenectomized B thalassaemic patients
 $n = 20$ $r = 0.62817$
 $P < 0.01 *$



* : Significant

Fig. 20 : Correlation between intracorpascular Ca^{++} and $\text{Na}^+ \text{K}^+ \text{ATPase}$ in non-splenectomized B thalassaemic patients
 $n = 20$ $r = -0.52128$
 $P < 0.02 *$



* : Significant

CORRELATION STUDIES

In group II (patients with B thalassaemia major with splenectomy), there was a positive correlation between triglyceride, level obtained from erythrocyte membrane on one hand and ATP on the other hand (Fig. 13) ($r = 0.66236$).

And also, there was a positive correlation between plasma Ca^{++} on one hand and intracorpascular Ca^+ on the other hand (Fig. 14) ($r = 0.7627$).

As regards group III (splenectomized B thalassaemic patients), there was a positive correlation between plasma Ca^{++} on one hand and cholesterol level obtained from erythrocyte membrane on the other hand (Fig. 15) ($r = 0.85$).

Also, there was a positive correlation between triglycerides level on one hand and both total ATPase and Ca^{++} Mg^{++} ATPase on the other hand (Figs. 16 & 17) ($r = 0.63168$) and ($r = .62622$) respectively.

Moreover, there was a positive correlation between triglycerides level on one hand and both histone kinase cAMP independent activities and histone kinase + cAMP dependent

activities on the other hand (Figs. 18 & 19) ($r = .69449$) and ($r = .62817$) respectively.

But there was a negative correlation between intracorpascular Ca^{++} on one hand and $\text{Na}^+ \text{K}^+$ ATPase activities on the other hand (Fig. 20) ($r = .52128$).