

RESULTS

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Oral Glucose Tolerance Test.

Fasting blood Glucose levels : (Tables 1&2), (Fig. 3 , 4)

The fasting blood glucose level of the control group (73 ± 7.2 mg / dl) is significantly lower than that of the thalassemic group with intact spleen 80.7 ± 10.4 mg / dl ($P < 0.05$). The fasting blood glucose level of the thalassemic group without spleen was (77.4 ± 8.5 mg / dl) is not significantly different from that of the control group ($P > 0.05$). Also there

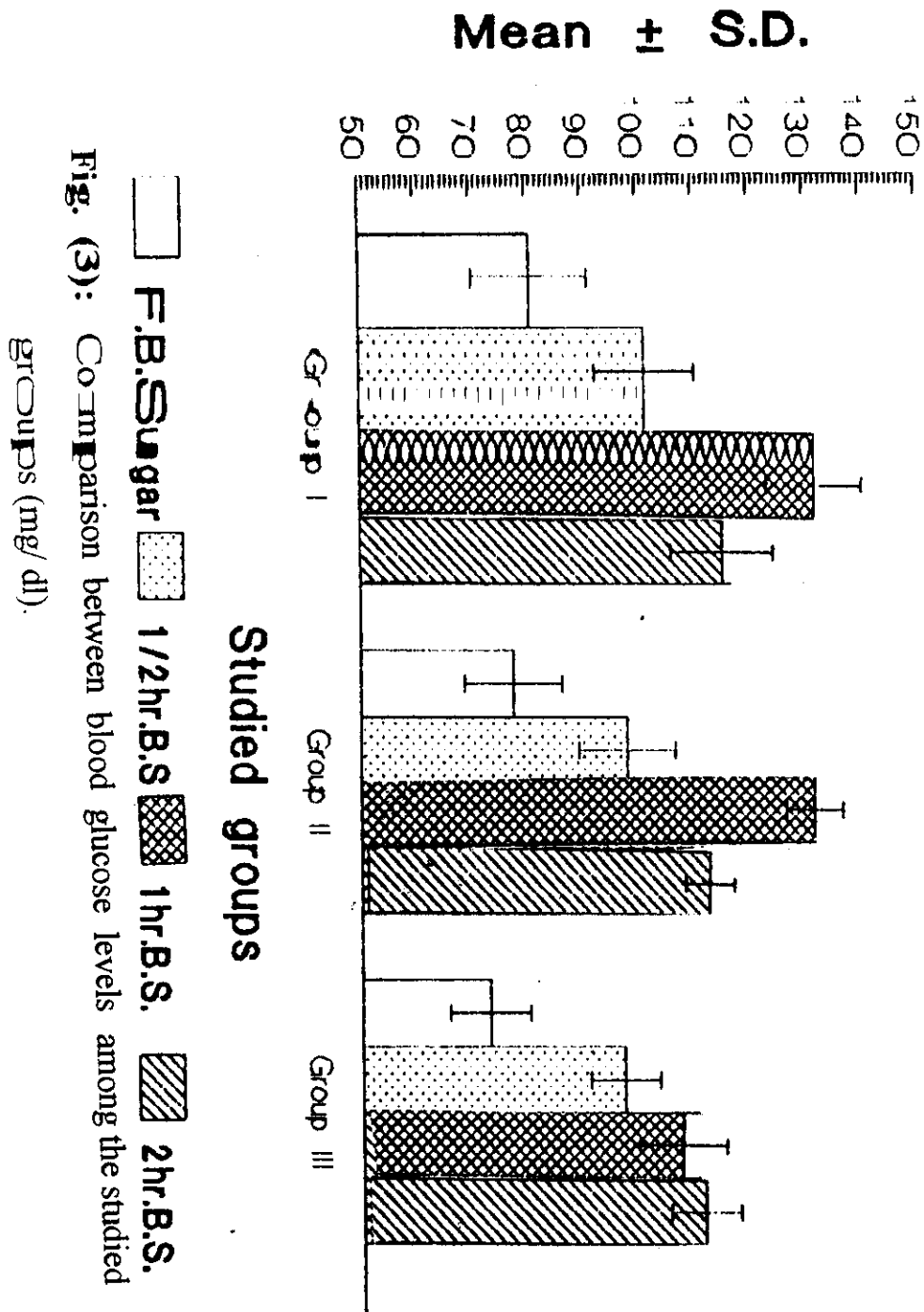
is no significant difference between the fasting blood glucose level of the thalassemic group with intact spleen and that of thalassemic group without spleen ($P > 0.05$). There is a positive correlation between fasting blood glucose and serum iron, serum ferretin and T.I.B.C. ($P < 0.05$),

Table (1) : Fasting blood glucose levels among the studied groups.

F.B.G mg / dl groups	$\bar{X}$	$\pm$ SD	Test of significance versus control	
			T	P
I.cases with spleen	80.7	± 10.4	2.475	< 0.05
II. cases without spleen	77.4	± 8.8	1.567	> 0.05
III. control	73	± 7.2	--	--
F	3.171			
P	> 0.05			

**Table (2) : Correlation coefficient (r) and probability value (p)
between fasting blood glucose and other parameters**

Parameters	Fasting blood glucose	
	r	p
½ hour blood glucose	+ 0.366	< 0.05
1 hour blood glucose	+ 0.294	< 0.05
2 hour blood glucose	+ 0.058	> 0.05
Serum lipase	- 0.199	> 0.05
Fasting C - peptide	- 0.124	> 0.05
½ H. C- peptide	- 0.419	< 0.05
Age	- 0.108	> 0.05
weight	+ 0.002	> 0.05
Duration of disease	- 0.256	> 0.05
Blood transfusion	+ 0.237	> 0.05
Desferal therapy	+ 0.113	> 0.05
Serum Iron	+ 0.350	< 0.05
Serum Ferritin	+ 0.463	< 0.05
T.I. B. C	+ 0.294	< 0.05
Hb	- 0.314	< 0.05
Fasting insulin	- 0.144	> 0.05
30 minut insulin after glucose ingestion	- 0.186	> 0.05



F B G

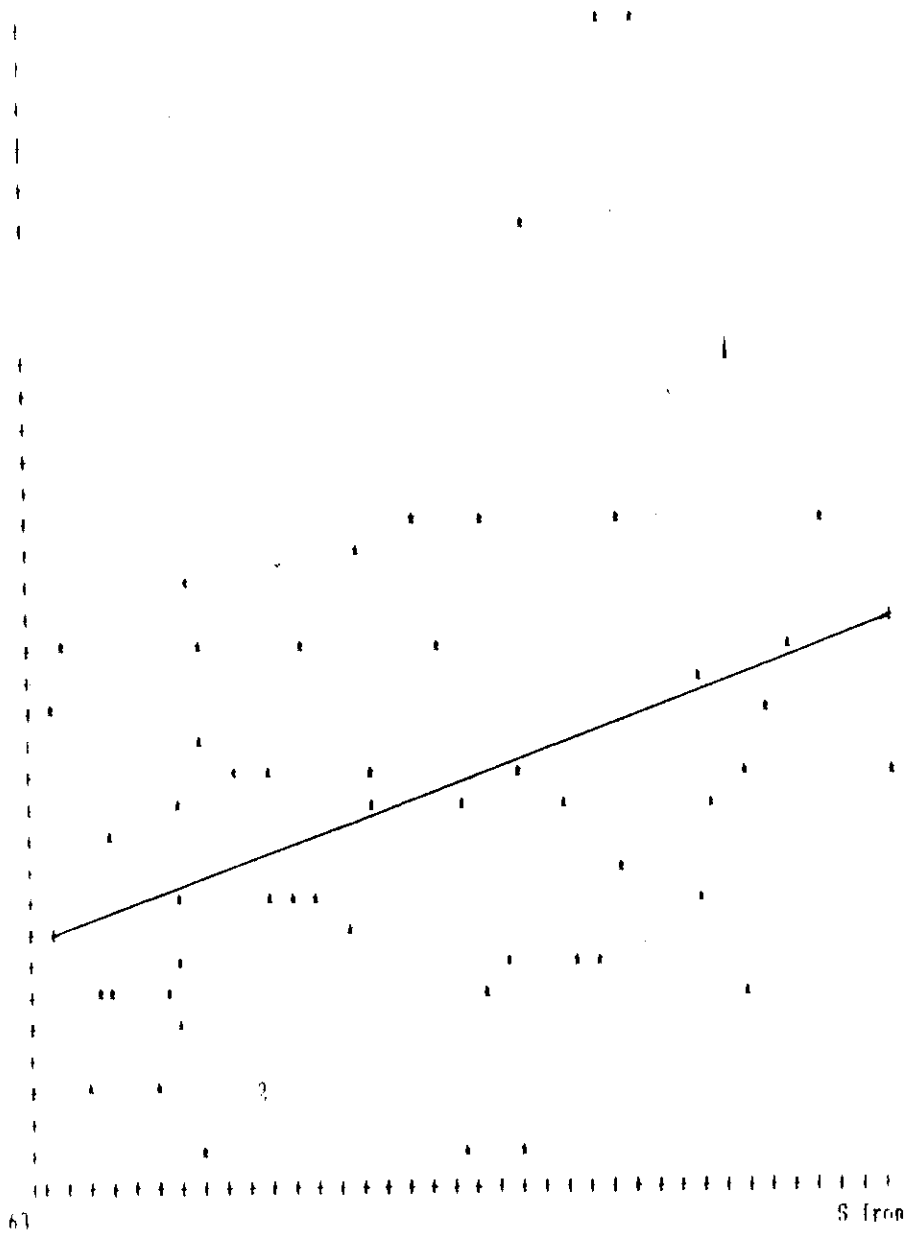


Fig.(4) : Correlation between fasting blood glucose and serum iron

Half an hour blood glucose levels after glucose intake : (Tables 3 & 4), (Fig 3)

The blood glucose level half an hour after glucose ingestion of the control group was (97.2 ± 6.3 mg / dl) the thalassemic group with intact spleen was (101.3 ± 9.0 mg / dl) and the thalassemic group without spleen was (97.9 ± 8.7 mg / dl) so there is no significant difference between the three groups ($P > 0.05$). There is a positive correlation between T.I.B.C. and the half an hour blood glucose level ($P < 0.05$).

Table(3):Half an hour blood glucose levels among the studied group.

$\frac{1}{2}$ hour blood glucose (mg /dl)	$\bar{X}$	$\pm$ SD	Test of significance versus control	
			T	P
I.cases with spleen	101.3	± 9.0	1.525	> 0.05
II.cases without spleen	97.9	± 8.7	0.272	> 0.05
III. Control	97.2	± 6.3	--	--
F	1.341			
P	> 0.05			

**Table (4) : Correlation coefficient (r) and probability value (p)
between ½ hour blood glucose and different parameters**

Parameters	½ Hour blood glucose	
1 Hour blood glucose	+ 0.265	> 0.05
2 Hour blood glucose	+ 0.368	< 0.05
Lipase.	- 0.100	> 0.05
Fasting C - Peptide	+ 0.089	> 0.05
½ Hour C - Peptide	- 0.151	> 0.05
Age	- 0.140	> 0.05
Weight	- 0.094	> 0.05
Duration of disease	+ 0.070	> 0.05
Blood Transfusion	+ 0.195	> 0.05
Desferal	+ 0.051	> 0.05
Serum Iron	+ 0.249	> 0.05
Serum Ferritin	+ 0.239	> 0.05
T. I. B. C.	+ 0.293	< 0.05
Hb.	- 0.216	> 0.05
Fasting insulin	- 0.0175	> 0.05
30 minutes insulin	- 0.071	> 0.05

**One hour blood glucose levels after glucose ingestion :
(Tables 5 & 6) (Fig. 3, 5)**

The blood glucose level one hour after glucose ingestion of the control group was (106.3 ± 7.8 mg / dl) is significantly lower than the blood glucose level of the thalassemic group with intact spleen ($131.2 \pm$

8.5 mg / dl) ($P < 0.05$), and that of the thalassemic group without spleen (130.9 ± 5 mg /dl) ($P < 0.05$). No significant difference between thalassemic group with intact spleen and thalassemic group without spleen ($P > 0.05$). There is a positive correlation between the one hour blood sugar level and the duration of disease, number of blood transfusion, desferal duration serum iron, serum ferritin and T.I.B.C ($P < 0.05$).

Table (5) : One hour blood glucose levels among the studied group.

One hour blood glucose (mg /dl) groups	$\bar{X}$	$\pm$ SD	Test of significance versus control	
			T	P
I.cases with spleen	131.2	± 8.5	9.051	< 0.01
II.cases without spleen	130.9	± 5	1.952	< 0.01
III. control	106.3	± 7.8	--	--
F	62.31			
P	< 0.01			

**Table (6) : Correlation coefficient (r) and probability value(p)
between one hour blood glucose and other parameters**

Parameters	one Hour blood glucose	
Lipase	- 0.531	< 0.05
Fasting C - Peptid	- 0.179	> 0.05
½ Hour C - Peptide	- 0.607	< 0.05
Age	+ 0.063	> 0.05
Weight	+ 0.106	> 0.05
Duration of disease	+ 0.811	< 0.05
Blood Transfusion	+ 0.643	< 0.05
Desferal therapy	+ 0.699	< 0.05
Serum Iron	+ 0.503	< 0.05
Serum Ferritin	+ 0.688	< 0.05
T. I. B. C	+ 0.566	< 0.05
Hb.	+ 0.799	< 0.05
Fasting insulin	- 0.0185	> 0.05
30 minutes insulin	- 0.0236	> 0.05

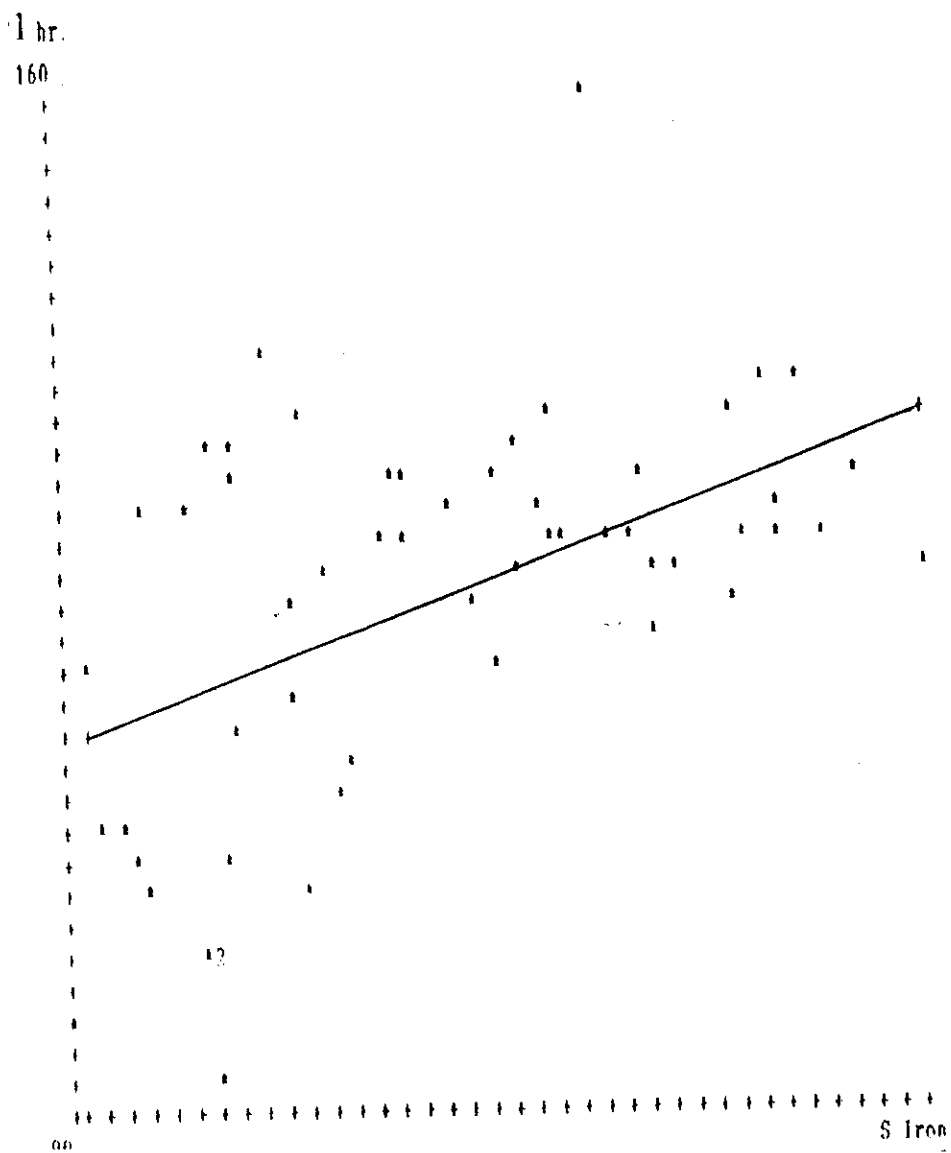


Fig. (5): Correlation between one hour blood glucose and serum iron.

**Two hour blood glucose level after ingestion of glucose :
(Tables 7&8) (Fig. 3)**

The blood glucose level two hour after glucose ingestion of the control group were (110.5 ± 6.2 mg /dl). This is not significantly differ from that of the thalassemic group with intact spleen (114.9 ± 9.1 mg / dl) ($P > 0.05$) and that of the thalassemic group without spleen (111.3 ± 9.4 mg / dl) ($p > 0.05$). No significant difference between thalassemic group with spleen and thalassemic group without spleen ($P > 0.05$).

Table (7) : Two hour blood glucose levels among the studied groups.

Two hour blood glucose (mg / dl)	$\bar{X}$	$\pm$ SD	Test of significance versus control	
			T	P
I. cases with spleen	114.9	± 9.1	1.653	> 0.05
II. cases without spleen	111.3	± 9.4	0.468	> 0.05
III. control	110.5	± 6.2		--
F	2.157			
P	> 0.05			

**Table (8) : Correlation coefficient (r) and probability value (p)
between two hour blood glucose and other parameters**

Parameters	Two hour blood glucose	
	r	p
1 Hour blood glucose	+ 0.294	< 0.05
Lipase	- 0.187	> 0.05
Fasting C- Peptide	- 0.025	> 0.05
½ Hour C - peptide	- 0.110	> 0.05
Age.	+ 0.187	> 0.05
Weight.	+ 0.229	> 0.05
Duration of disease	+ 0.159	> 0.05
Blood transfusion	+ 0.192	> 0.05
Desferal therapy	+ 0.111	> 0.05
Serum iron	+ 0.130	> 0.05
Serum Ferritin	+ 0.182	> 0.05
T. I. B. C.	+ 0.293	< 0.05
Hb.	- 0.216	> 0.05
Fasting insulin	- 0.080	> 0.05
30 minutes insulin	- 0.054	> 0.05

Serum lipase level : (Tables 9 &10) (Fig. 6, 7, 8)

The serum lipase level of the thalassemic group with intact spleen (21.6 ± 4.3 u/l). This is significantly lower than the serum lipase of the control group (70.1 ± 25.0 u/l) and the serum lipase of the thalassemic group without spleen (47.7 ± 16.3) ($=P < 0.05$). Also the serum lipase level of the thalassemic group without spleen is significantly lower than that of the control group $P < 0.05$.

There is a negative correlation between serum lipase level and the duration of disease, number of blood transfusion, desferal duration, serum iron, serum ferritin ($P < 0.05$).

Table (9) : Lipase levels among the studied groups.

Lipase (U / l) groups	X	± SD	Test of significance versus control	
			T	P
I. cases with spleen	21.6	± 4.3	8.977	< 0.01
II. cases without spleen	47.7	± 16.3	3.109	< 0.05
III. control	70.1	± 25.0	--	--
F	40.975			
P	< 0.01			

**Table (10) : Correlation coefficient (r) and probability value (p)
between lipase levels and other parameters**

Parameters	Lipase	
	r	p
Fasting C- peptide	- 0.050	> 0.05
½ Hour C- Peptide	+ 0.431	< 0.05
Age	- 0.060	> 0.05
Weight	- 0.125	> 0.05
Duration of disease	- 0.516	< 0.05
Blood transfusion	- 0.696	< 0.05
Desferal therapy	- 0.537	< 0.05
Serum Iron	- 0.665	< 0.05
Serum Ferritin	- 0.568	< 0.05
T. I. B. C.	+ 0.538	< 0.05
Hb.	+ 0.708	< 0.05
Fasting insulin	- 0.0159	< 0.05
30 minutes insulin	+ 0.020	< 0.05

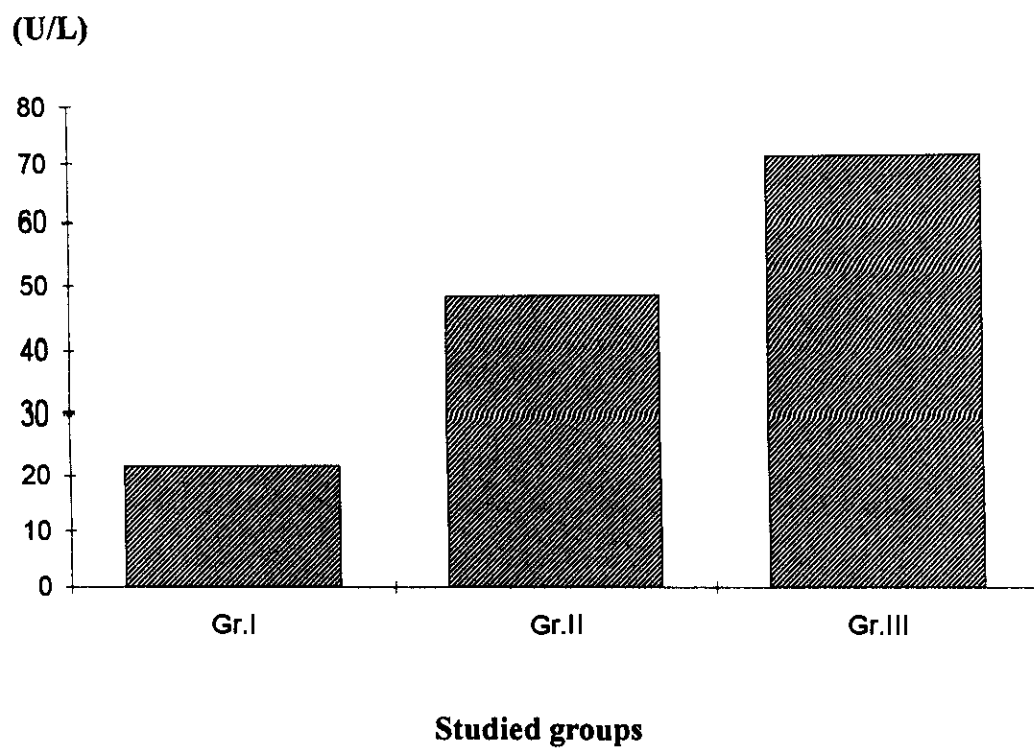


Fig. (6): Comparison between lipase levels among the studied groups.

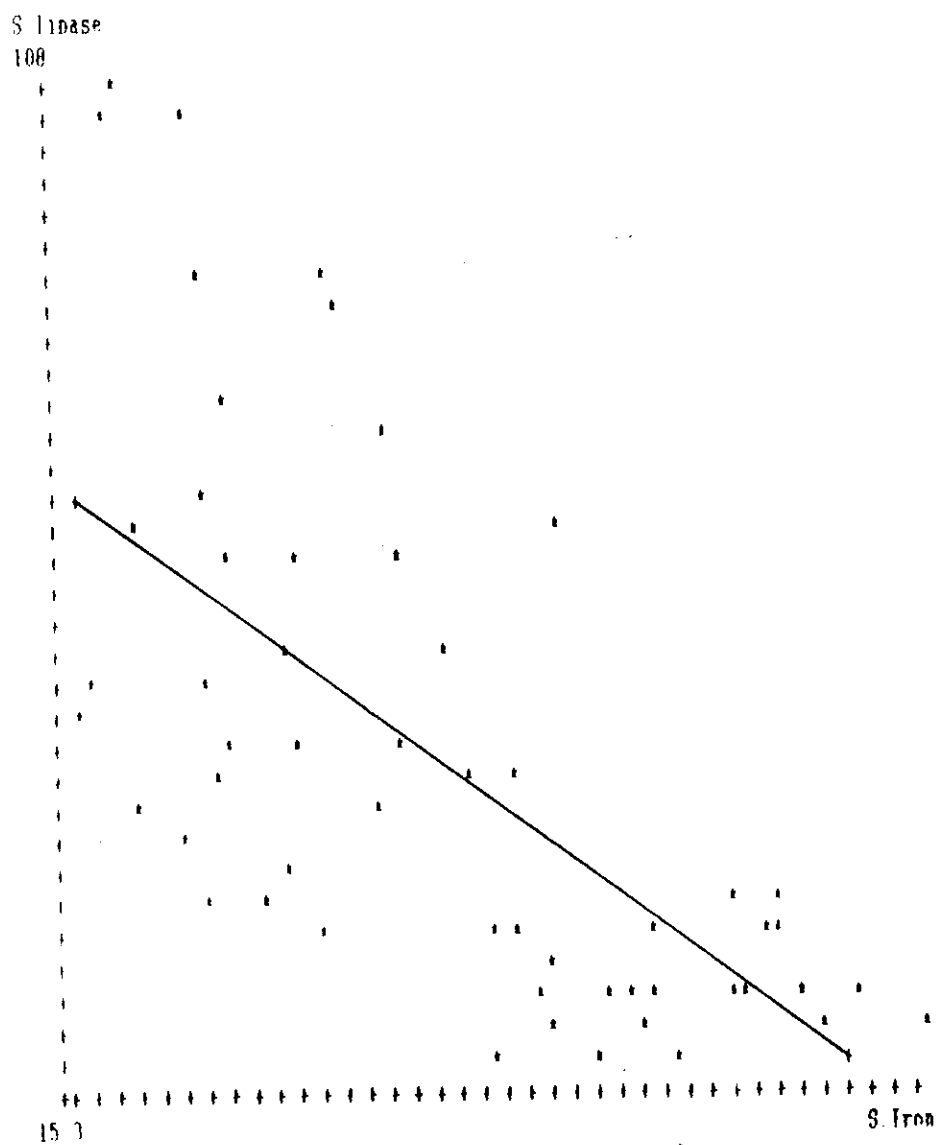


Fig. (7) : Correlation between lipase level and serum iron.

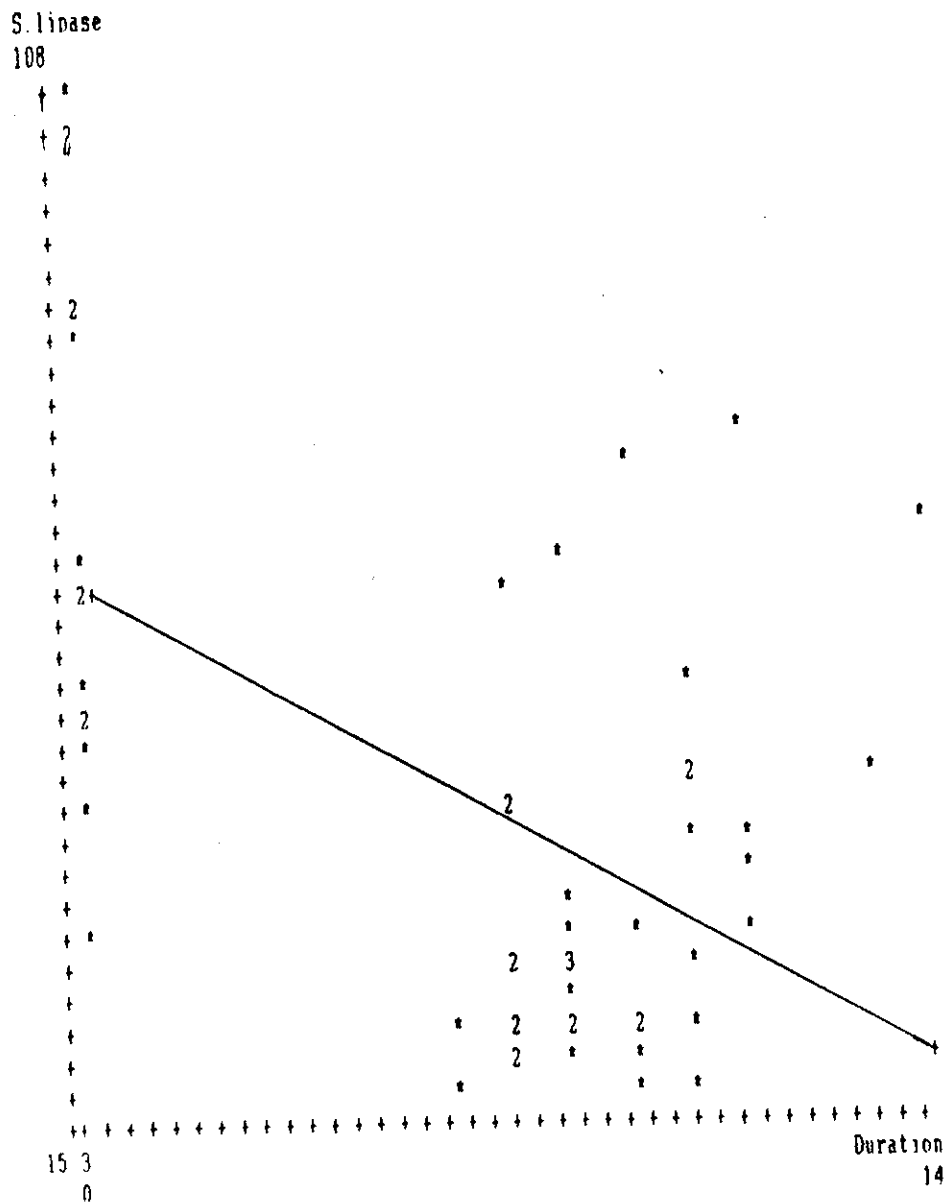


Fig. (8) : Correlation between lipase level and duration of disease.

C - Peptide level

The fasting C-Peptide levels : (Tables 11&12) (Fig. 9)

The fasting C-Peptide level in the control group, (1.17 ± 0.26 ng / ml). This is not significantly different from that of the thalassemic group with intact spleen (1.19 ± 0.24 ng / ml) and that of the thalassemic group without spleen (1.09 ± 0.26 ng / ml) ($P > 0.05$). Also there is no significant difference in the fasting C-peptide levels between the two thalassemic groups ($P > 0.05$).

Table (11) : Fasting C- Peptide levels among the studied groups.

Fasting C- Peptide (ng / ml)	$\bar{X}$	$\pm$ SD	Test of significance versus control	
			T	P
I.cases with spleen	1.19	± 0.24	0.241	> 0.05
II. cases without spleen	1.09	± 0.26	0.852	> 0.05
III. control	1.17	± 0.26	--	--
F	0.785			
P	> 0.05			

**Table (12) : Correlation coefficient (r) and probability value (p)
between fasting C - Peptide and othe parameters.**

Parameters	Fasting C-peptide	
	r	p
½ Hour C- Peptide	+ 0.314	< 0.05
Age	- 0.115	> 0.05
Weight	- 0.131	> 0.05
Duration	- 0.132	> 0.05
Blood Transfusion	+ 0.053	> 0.05
Desferal therapy	- 0.90	> 0.05
Serum Iron	+ 0.173	> 0.05
Serum Ferritin	- 0.005	> 0.05
T. I. B. C	+ 0.112	> 0.05
Hb.	- 0.050	> 0.05
Fasting insulin	+ 0.611	< 0.05
30 minutes insulin	+ 0.567	< 0.05

Half an hour C-peptide levels after glucose ingestion : (Tables 13&14) (Fig. 10, 11, 12)

The C-peptide level 30 minutes after glucose ingestion of the thalassemic group with intact spleen (3.4 ± 0.52 ng/ml). This is not significantly different from that of the thalassemic group without spleen (3.6 ± 0.6 ng/ml) ($P > 0.05$) but is significantly lower than that of the control group (4.5 ± 0.74 ng/ml) ($p < 0.05$). Also the C-Peptide level 30 minutes after glucose ingestion is significantly lower in the thalassemic group without spleen than that of the control group ($P < 0.05$). There is a negative correlation between duration of disease, number of blood transfusions, desferal duration, serum iron and serum ferritin and the half an hour blood C-peptide level ($P < 0.05$).

Table (13) : C-peptide levels 30 minutes after glucose ingestion among the studied group. (ng / ml).

C-Peptide 30 min. after glucose ingestion (ng / ml) groups	$\bar{X}$	$\pm$ SD	Test of significance versus control	
			T	P
I. cases with spleen	3.4	± 0.52	5.311	< 0.01
II. cases without spleen	3.6	± 0.6	3.777	< 0.01
III. control	4.5	± 0.74	--	--
F	15.361			
P	< 0.01			

Table (14) : Correlation Coefficient (r) and probability value (p)
between ½ hour C - Peptide and othe parameters :

Parameters	½ Hour C - Peptide	
	r	p
Age	+ 0.136	> 0.05
Weight	+ 0.029	> 0.05
Duration	- 0.553	< 0.05
Blood Transfusia	- 0.542	< 0.05
Desferal therapy	- 0.472	< 0.05
Serum Iron	- 0.397	< 0.05
Serum Ferritin	- 0.599	< 0.05
T. I. B. C.	+ 0.450	< 0.05
Hb.	+ 0.599	< 0.05
Fasting insulin	+ 0.388	< 0.05
30 minutes insulin	+ 0.427	< 0.05

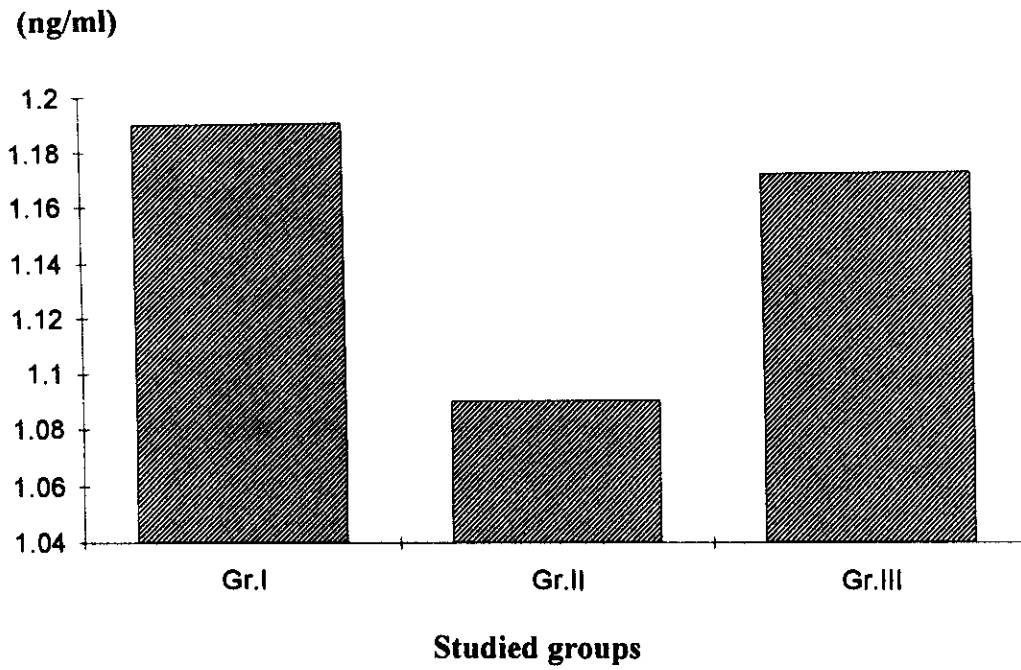


Fig. (9): Comparison between fasting C-peptide levels among the studied groups.

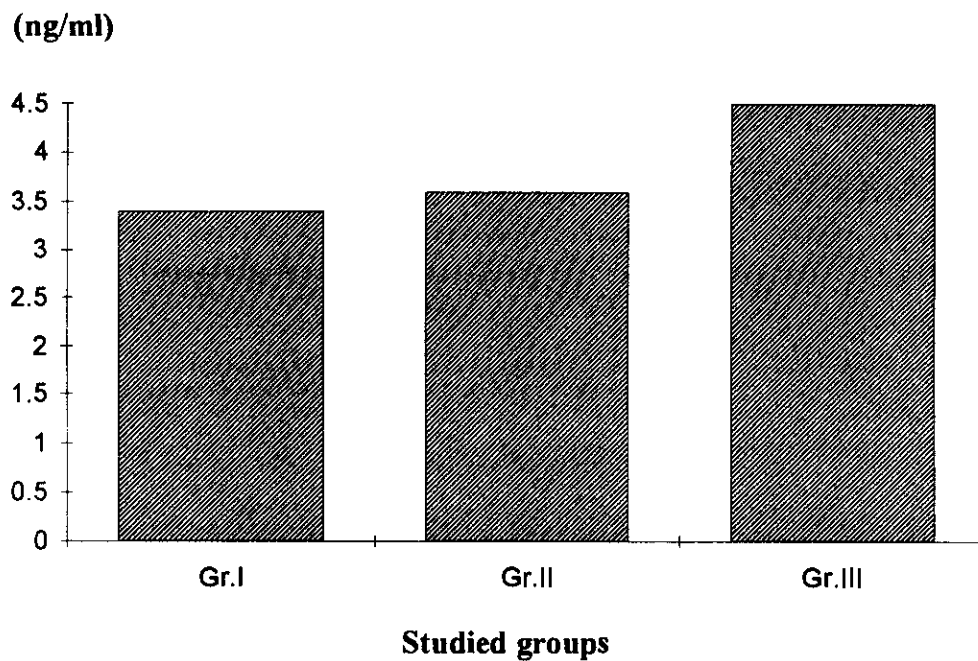


Fig. (10): Comparison between C-peptide levels 30 minutes after glucose ingestion among the studied groups.



ingestion and duration of disease.

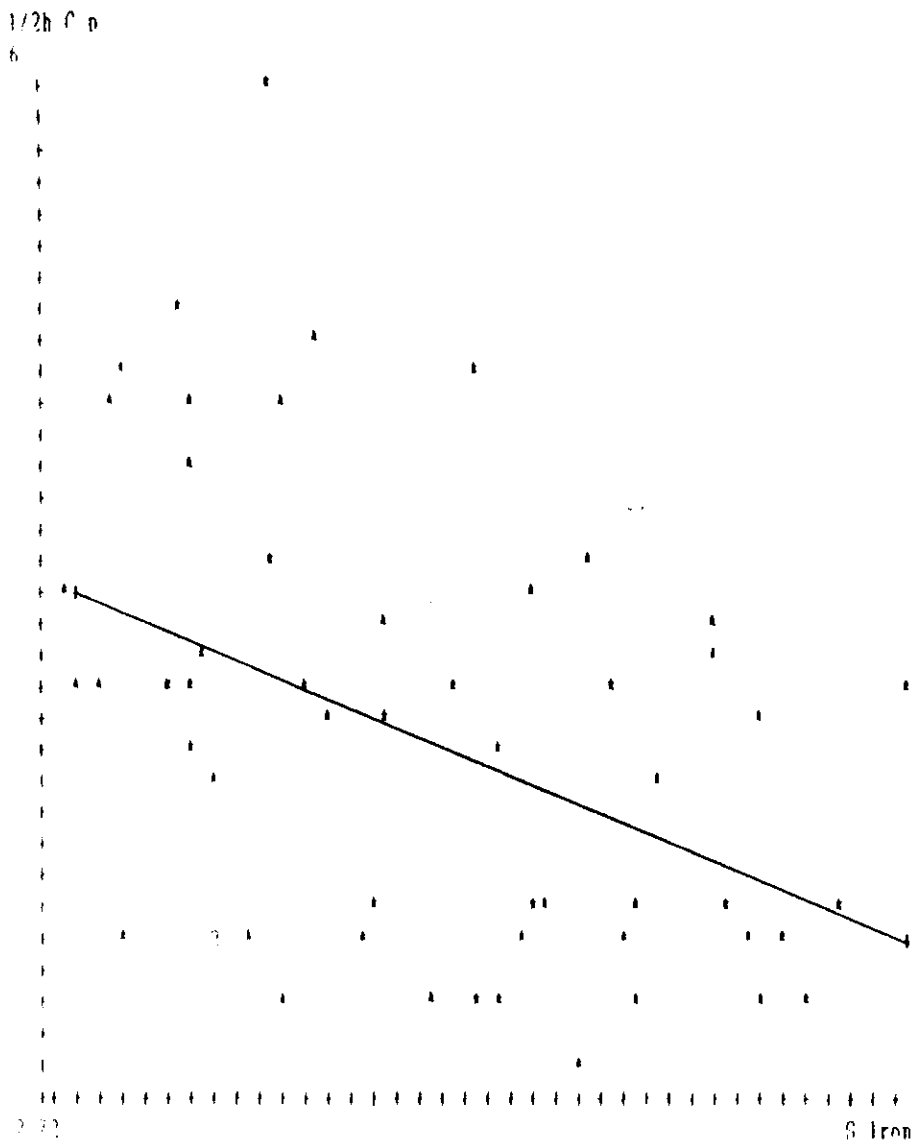


Fig. (12) : Correlation between C-peptide 30 min. after glucose ingestion and serum iron.

Insulin level (Table 15) (Fig. 13, 14)

The fasting insulin level of the control group (5.69 ± 2.77 mIU/ml). This is not significantly different from insulin level of the thalassemic group with intact spleen (5.39 ± 2.5 mIU/ml) ($P > 0.05$) and the thalassemic group without spleen (5.50 ± 2.18 mIU/ml) ($P > 0.05$).

Table (15) : Fasting insulin levels among the studied groups.

Fasting Insulin (mIU/ml)	$\bar{X}$	$\pm$ SD	Test of significance		
Groups.				t	p
I	5.39	± 2.50	I /III	0.340	> 0.05
II	5.50	2.18	II / III	0.217	> 0.05
III	5.69	2.77	I /II	0.146	> 0.05

The insulin level 30 minutes after glucose ingestion of the control group (39.08 ± 14.52 mIU/ml). This is not significantly different from that of the thalassemic group with intact spleen (30.64 ± 18.21 mIU/ml) ($P > 0.05$) and that of the thalassemic group without spleen (38.25 ± 11.65 mIU/ml) ($P > 0.05$).

Table (16) : Insulin levels 30 min. after glucose ingestion among the studied groups.

Insulin (mIU/ml)	$\bar{X}$	$\pm$ SD	Test of significance		
Groups.				t	p
I	30.64	18.21	I /III	1.498	> 0.05
II	38.25	11.65	II / III	0.182	> 0.05
III	39.08	14.52	I /II	1.533	> 0.05

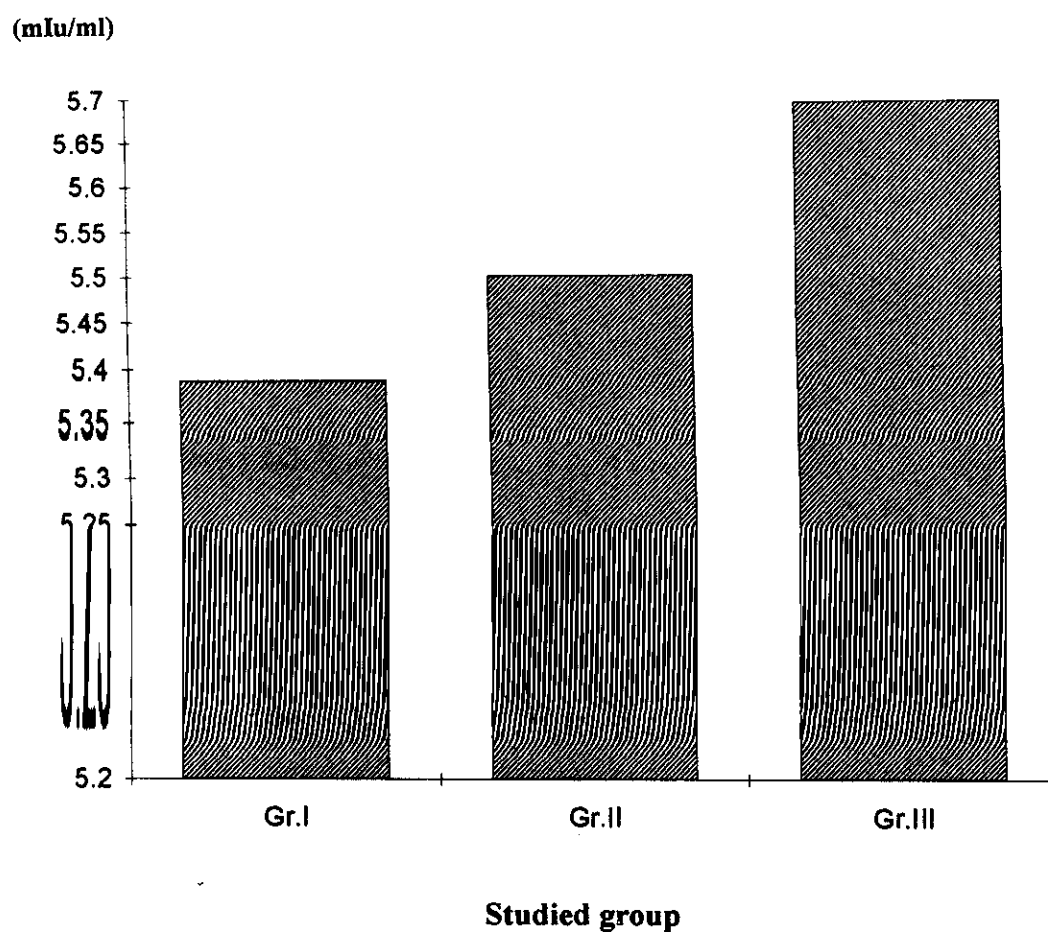


Fig. (13) : Comparison between fasting insulin levels among the studied groups (mIu/ml).

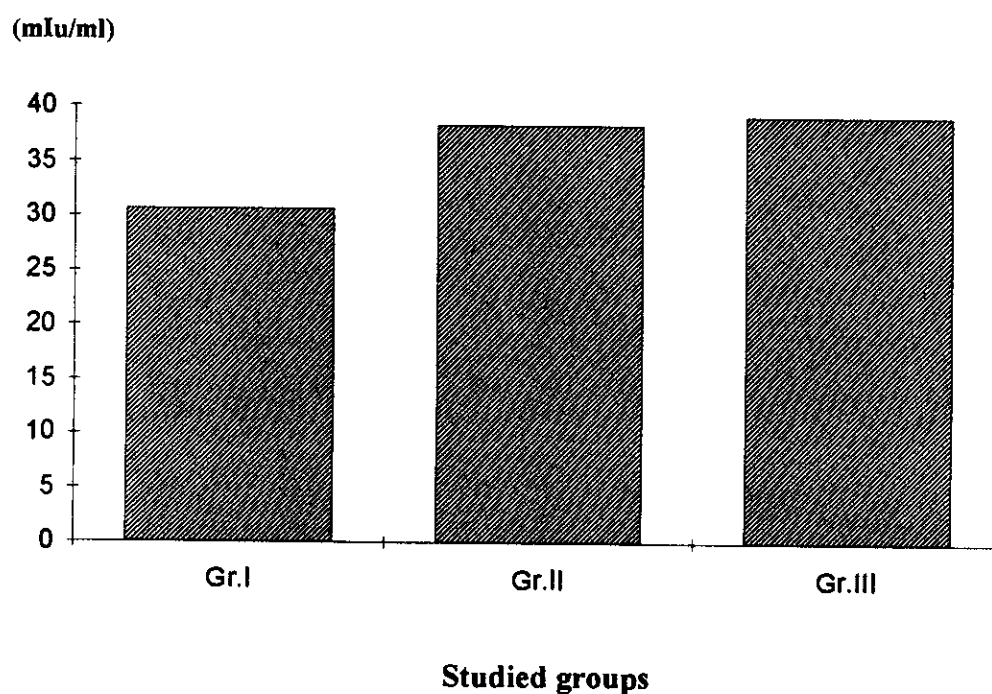


Fig. (14): Comparison between insulin levels 30 minutes after glucose ingestion among the studied groups (mIu/ml).

Number of blood transfusions : (Table 17)

The mean number of blood transfusion in the thalassemic group with intact spleen (16 ± 5.0 times / year). This is significantly higher than the mean number of blood transfusions in the thalassemic group without spleen (9.0 ± 1.8 times / year) ($P < 0.05$). There is a positive correlation between number of blood transfusions, and desferal dose, serum iron and serum ferritin ($P < 0.05$).

Table (17): Means $\pm$ SD of blood transfusions (times / year) among the studied groups.

Blood transfusions (times / year)	Means	$\pm$ SD	Range.
Cases			Minim - Maxim.
I. cases with spleen	16.0	± 5.0	6.0 - 24
II. cases without spleen	9.0	± 1.8	6 - 12
T	5.662		
P	< 0.01		

Duration of desferal therapy : (Tables 18 &19)

The mean duration of desferal therapy in the thalassemic group with intact spleen (3.7 ± 1.3 years), and in the thalassemic group without spleen (4.0 ± 1.4 years), so there is no significant difference between the two groups ($P > 0.05$). There is a positive correlation between serum iron and serum ferritin and duration of desferal ($P < 0.05$).

Table (18) : Duration of desferal therapy among the studied cases.

Cases Duration(year)	I		II		Total	
	No	%	No	%	No	%
2 - < 4	12	54.6	8	44.5	20	50.0
4 - < 6	7	31.8	6	33.3	13	32.5
6 -	3	13.6	4	22.2	7	17.5
Total	22	100.0	18	100.0	40	100.0

$$X^2 = 0.626 \quad P > 0.05$$

Table (19) : Mean $\pm$ SD of duration of desferal therapy (mg. / kg. / y.) among the studied cases.

Duration of desferal therapy (year)	Mean	$\pm$ SD	Range
Cases			Minim. Maxim.
I. cases with spleen	3.7	± 1.3	2 - 6
II cases without spleen	4.0	± 1.4	2 - 6
T	0.723		
P	> 0.05		

Serum iron level : (Table 20) (Fig. 15)

The mean serum iron level in the thalassemic group with intact spleen ($149.2 \pm 16.5 \mu\text{g/dl}$). This is significantly higher than the mean serum iron level of the thalassemic group without spleen ($101.8 \pm 17.4 \mu\text{g/dl}$) ($P, 0.05$) and also significantly higher than the mean serum iron level in the control group ($82.3 \pm 11.8 \mu\text{g/dl}$) ($P < 0.05$). The mean serum iron

level of thalassemic group without spleen is significantly higher than the control group ($P < 0.05$).

Table (20) : Means $\pm$ SD of serum iron among the studied groups.

Serum Iron ($\mu\text{g} / \text{dl}$)	$\bar{X}$	$\pm$ SD	Test of significance versus control	
groups			T	p
I. Cases with spleen	149.2	± 16.5	13.471	< 0.01
II. Cases without spleen	101.8	± 17.4	3.671	< 0.05
III. Control	82.3	± 11.8	--	--
F	90.702			
P	< 0.01			

Serum ferritin level : (Table 21) (Fig. 15)

The mean level of serum ferritin in the thalassemic group with intact spleen (337.9 ± 63.7 ng/ml). This is significantly higher than the level of serum ferritin in the thalassemic group without spleen (243.3 ± 100.6 ng/ml) and the control group (95.5 ± 9.7 ng/ml) ($P < 0.01$). The serum level of serum ferritin in the thalassemic group without spleen is significantly higher than the serum ferritin level of control group ($P < 0.01$).

Table (21) : Levels of Serum ferritin Among the studied groups.

Serum ferritin (ng /ml)	$\bar{X}$	$\pm$ SD	Test of significance versus control	
groups			T	p
I.cases with spleen	337.9	± 63.7	17.570	< 0.01
II.cases without spleen	243.3	± 100.6	7.563	< 0.01
III. control	45.5	± 9.7	--	--
F	77.358			
P	< 0.01			

Total iron binding capacity : (T.I.B.C.) (Table 22) (Fig. 15)

The mean level of serum T.I.B.C. in the thalassemic group with intact spleen ($238.1 \pm 30.3 \mu\text{g/dl}$) is significantly lower than the level of T.I.B.C. in the thalassemic group without spleen ($294.9 \pm 31.8 \mu\text{g/dl}$) and the control group ($328.2 \pm 20.8 \mu\text{g/dl}$) ($P < 0.01$). The mean level of T.I.B.C. of the thalassemic group without spleen is significantly lower than the T.I.B.C. of the control group ($P < 0.01$).

Table (22) : Levels of serum total iron binding capacity (T. I. B. C) among the studied groups.

T.I. B. C. ($\mu\text{g} / \text{dL}$)	$\bar{X}$	$\pm \text{SD}$	Test of significance versus control	
groups			T	p
I. cases with spleen	238.1	± 30.3	10.054	< 0.01
II. cases without spleen	294.9	± 31.8	3.500	< 0.01
III. control	328.2	± 20.8	--	--
F	47.496			
P	< 0.01			

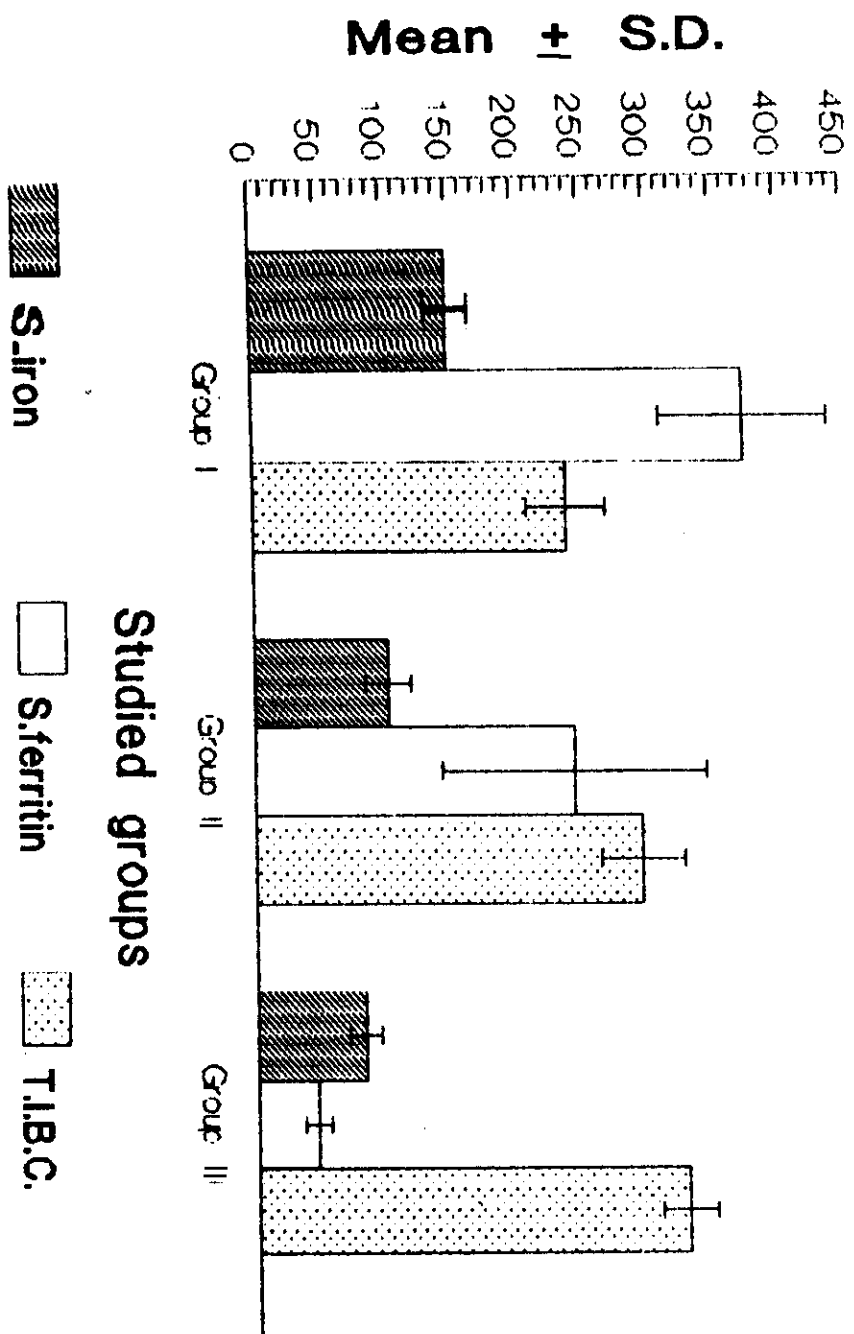


Fig. (15) Comparison between levels of serum iron, ferritin and TIBC among the studied groups.

Hemoglobin concentration : (Table 23) (Fig. 16)

The mean hemoglobin concentration in thalassemic group with intact spleen (5.9 ± 0.8 gm/dl). This is significantly lower than the mean hemoglobin concentration of the thalassemic group without spleen (7.3 ± 0.7 gm/dl) and the control group (13.2 ± 0.3 gm/dl) ($P < 0.01$). The mean hemoglobin concentration in the thalassemic group without spleen is significantly lower than the control group ($P < 0.01$). There is a positive correlation between removal of spleen and hemoglobin concentration ($P < 0.05$). But there is a negative correlation between hemoglobin concentration and number of blood transfusions.

Table (23) : Hemoglobin levels among the studied groups.

Hb : (gm / dl)	$\bar{X}$	$\pm$ SD	Test of significans versus control	
groups			T	p
I.cases with spleen	5.9	± 0.8	34.665	< 0.01
II. cases without spleen	7.3	± 0.7	29.745	< 0.01
III.control	13.2	± 0.3	--	--
F	579.5			
P	< 0.01			

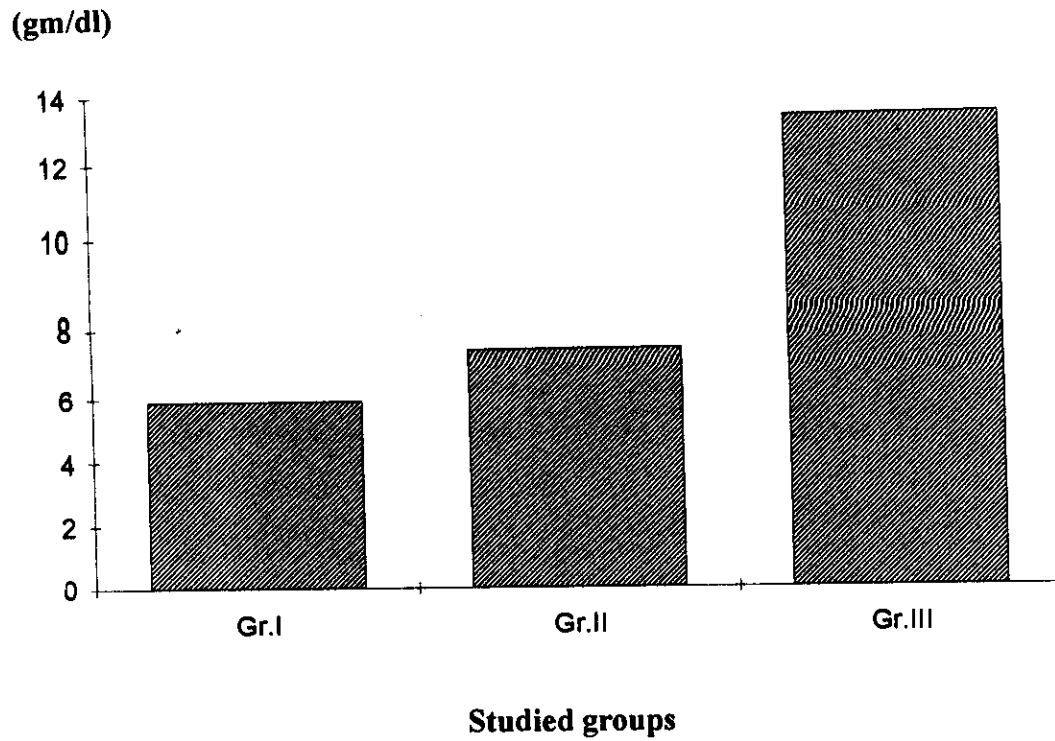


Fig. (16) : Comparison between hemoglobin levels among the studied groups.

Duration of disease : (Table 24)

The duration of disease in the thalassemic group with intact spleen (8 ± 1.3 years). This is significantly less than the duration of disease in the thalassemic group without spleen (9.6 ± 2.0 years) ($P < 0.05$). There is a positive correlation between duration of disease and size of spleen, number of blood transfusion and desferal duration ($P < 0.05$).

Table(24):means $\pm$ SD of duration of disease among the studied cases/year.

Duration of disease/y	$\bar{X}$	$\pm$ SD		Range
Cases				Minim. Maxim.
I. Cases with spleen	8.0	± 1.3		6.0 - 11.0
II. Cases without spleen	9.6	± 2.0		7.0 - 14.0
T	3.02			
P	< 0.05			

As regard to the age, weight and sex : (table ,25 26, 27)

No significant difference between the thalassemic group with intact spleen and the thalassemic group without spleen as regard to the age, sex and weight ($P > 0.05$).

Table (25) : Means $\pm$ SD of age. among the studied groups.

Age / y	$\bar{X}$	$\pm$ SD	Test of significance versus control	
Groups			T	P
I. Cases with spleen no=22	12.8	$\pm$ 2.1	0.256	> 0.05
II. Cases without spleen no=18	12.8	$\pm$ 2	0.255	> 0.05
III. Control no=15	12.9	$\pm$ 1.4	--	--
F	0.037			
P	> 0.05			

Table (26) : Means $\pm$ SD of weight among the studied groups.

weight / kg.	$\bar{X}$	$\pm$ SD	Test of significance versus controls	
Group			T	P
I. Cases with spleen	36.3	$\pm$ 5.6	0.262	> 0.05
II. Cases without spleen	34.8	$\pm$ 6.7	0.517	> 0.05
III. Control	35.9	$\pm$ 4.2	--	--
F	0.0346			
P	> 0.05			

Table (27) : Comparison between males and females regarding different parameters.

Sex	Males	Females	t	p
Parameters	$\bar{x} \pm S.D$	$\bar{x} \pm S.D$		
Fasting blood glucose (mg/dl)	76.8 $\pm$ 10.4	78.4 $\pm$ 8.3	0.592	> 0.05
Half hour blood glucose (mg/dl)	99.2 $\pm$ 8.1	98.9 $\pm$ 8.8	0.105	> 0.05
One hour blood glucose (mg/dl)	123 $\pm$ 12.9	125.9 $\pm$ 15.7	0.811	> 0.05
Two hour blood glucose (mg/dl)	111.6 $\pm$ 5.2	113.7 $\pm$ 9.1	0.957	> 0.05
Serum lipase (u/l)	41.1 $\pm$ 25.2	46 $\pm$ 26.3	0.786	> 0.05
Fasting C -peptide (ng/ml)	1.1 $\pm$ 0.2	1.2 $\pm$ 0.3	0.262	> 0.05
C - peptide 30 min. after glucose ingestion. (ng/ml)	4 $\pm$ 0.7	3.6 $\pm$ 0.7	1.689	> 0.05

Table (28): Showing the difference between the three groups as regard different parameters.

Parameters	Group I	Group II	Group III	Test of significance between Group. I & III		Test of significance between Group. II & III		Test of significance between Group. I & II	
				t	p	t	p	t	p
Fasting blood glucose (mg/dl)	80.7 ± 10.4	77.4 ± 8.8	73 ± 7.2	2.475	< 0.05	1.567	> 0.05	1.084	> 0.05
½ hour blood glucose (mg/dl)	101.3 ± 9.0	97.9 ± 8.7	97.2 ± 6.3	1.525	< 0.05	0.272	> 0.05	1.184	> 0.05
One hour blood glucose (mg/dl)	131.2 ± 8.4	130.9 ± 5	106.3 ± 7.8	9.051	< 0.01	1.952	< 0.01	0.194	> 0.05
Two Hour blood glucose (mg/dl)	114.9 ± 9.1	111.3 ± 9.1	110.5 ± 6.2	1.653	> 0.05	0.468	> 0.05	1.534	> 0.05
Fasting C - peptide (ng/ml)	1.19 ± 0.42	1.09 ± 0.26	1.17 ± 0.26	0.241	> 0.05	0.862	> 0.01	1.227	> 0.05
C - peptid after glucose (ng/ml)	3.4 ± 0.52	3.6 ± 0.6	4.5 ± 0.74	5.311	< 0.05	3.777	< 0.05	1.311	> 0.05
Fasting insulin (mlu/ml)	5.39 ± 2.50	5.50 ± 2.18	5.69 ± 2.77	0.340	> 0.05	0.217	> 0.05	0.146	> 0.05
insulin after glucose(mlu/ml).	30.64 ± 18.21	38.25 ± 11.65	39.08 ± 14.52	1.498	> 0.05	0.182	> 0.05	1.533	> 0.05
Serum Lipase (u/l)	21.6 ± 4.3	47.7 ± 16.3	70.1 ± 25	8.977	< 0.05	3.109	< 0.05	7.212	< 0.05
Serum iron (µg/dl)	194.2 ± 16.5	101.8 ± 17.4	82.3 ± 11.8	13.471	< 0.01	3.671	< 0.05	8.80	< 0.01
Serum ferritin (ng/ml)	337.9 ± 63.7	243.3 ± 190.6	45.5 ± 9.7	17.570	< 0.01	7.563	< 0.01	4.617	< 0.05
T.L.B.C. (µg/dl)	238.1 ± 30.3	294.9 ± 31.8	328.2 ± 20.8	10.054	< 0.01	3.500	< 0.05	5.755	< 0.05
Hemoglobin (g/dl)	5.9 ± 0.28	7.3 ± 0.7	13.2 ± 0.3	34.665	< 0.05	29.745	< 0.01	5.80	< 0.05

Table (29) : Correlation coefficient (r) and probability value (P) between the clinical and laboratory status of the studied groups and the different parameters of the studies pancreatic functions.

	Fasting blood glucose		½ Hour blood glucose		One hour blood glucose		Two Hour blood glucose		Fasting C-peptide		C-peptide 30 min.		Fasting insulin		Insulin 30 min after glucose		Lipase	
	r	P	r	P	r	P	r	P	r	P	r	P	r	P	r	P	r	P
Serum Iron	+0.350	< 0.05	+0.249	> 0.05	+0.503	< 0.05	+0.130	> 0.05	+0.173	> 0.05	-0.397	< 0.05	-0.136	> 0.05	-0.189	> 0.05	-0.665	< 0.05
Serum ferritin	+0.463	< 0.05	+0.239	> 0.05	+0.688	< 0.05	+0.182	> 0.05	-0.005	> 0.05	-0.599	< 0.05	-0.179	> 0.05	-0.341	< 0.05	-0.568	< 0.05
T.L. B.C	+0.294	< 0.05	+0.293	> 0.05	+0.566	< 0.05	+0.293	< 0.05	+0.112	> 0.05	+0.450	< 0.05	0.235	> 0.05	-0.367	< 0.05	+0.538	< 0.05
Deferoxamine therapy	+0.113	> 0.05	+0.051	> 0.05	+0.699	< 0.05	+0.111	> 0.05	-0.90	> 0.05	-0.472	< 0.05	-0.12	> 0.05	0.118	> 0.05	-0.537	< 0.05
frequency of blood transfusion / year	+0.237	> 0.05	+0.195	> 0.05	+0.643	< 0.05	+0.192	> 0.05	+0.053	> 0.05	-0.542	< 0.05	-0.131	> 0.05	-0.279	< 0.05	-0.696	< 0.05
Age	-0.108	> 0.05	-0.140	> 0.05	+0.063	> 0.05	+0.187	> 0.05	-0.115	> 0.05	+0.136	> 0.05	+0.053	> 0.05	+0.812	< 0.05	-0.060	> 0.05
duration of disease	-0.256	> 0.05	+0.070	> 0.05	+0.811	< 0.05	+0.159	> 0.05	-0.132	> 0.05	-0.553	< 0.05	-0.131	> 0.05	+0.176	> 0.05	-0.096	< 0.05

Master sheet of group 1

no.	Age/Y	Wt./ (kgm)	Durat- ion/Y	Spleen	Bl.Tr. /Y	Def. /Y	Siron µg/dl	S. ferritin ng/ml	T.B.C. µg/dl	Hb.gm /dl	F.Blood glucose mg/dl	1/2 hr. Bl.G. mg/dl	1 hr. Bl.G. mg/dl	2 hr. Bl.G. mg/dl	Lipase u/l	Fasting C- peptide ng/ml	1/2h.C- peptide ng/ml	Fasting insulin mIU/ml	1/2 hr. insulin mIU/ml
1	11.00	33.00	7.00	1.00	24.00	-4.00	145.00	358.00	215.00	5.90	74.00	96.00	122.00	115.00	21.00	1.18	3.20	4.9	23.6
2	15.00	45.00	11.00	1.00	12.00	-6.00	163.00	340.00	289.00	6.00	79.00	101.00	131.00	104.00	28.80	.93	2.91	3.2	12.8
3	11.00	31.00	8.00	1.00	24.00	-6.00	141.00	400.00	305.00	6.40	71.00	101.00	128.00	109.00	20.00	1.36	3.98	5.5	26.2
4	13.00	38.00	10.00	1.00	16.00	3.00	148.00	336.00	230.00	5.70	103.00	111.00	126.00	113.00	15.90	1.61	3.66	9.6	61.2
5	10.00	24.00	6.00	1.00	9.50	3.00	173.00	431.00	215.00	6.90	89.00	115.00	134.00	105.00	20.00	.91	3.30	5.4	17.2
6	14.00	39.00	9.00	1.00	16.00	4.00	129.00	338.00	193.00	5.90	71.00	79.00	130.00	110.00	21.00	1.18	3.18	3.5	12.8
7	14.00	39.00	9.00	1.00	12.00	3.00	136.00	386.00	223.00	6.30	77.00	118.00	160.00	151.00	15.30	.93	2.72	3.4	16.6
8	15.00	44.00	10.00	1.00	24.00	5.00	158.00	289.00	249.00	5.80	77.00	108.00	128.00	110.00	20.00	1.29	3.20	4.1	21.8
9	11.00	36.00	7.00	1.00	12.00	2.00	161.00	403.00	195.00	6.00	95.00	106.00	139.00	118.00	27.00	1.21	3.10	6.5	41.2
10	10.00	25.00	6.00	1.00	9.50	2.00	123.00	406.00	238.00	6.10	77.00	102.00	119.00	112.00	15.50	1.25	2.90	6.2	28.6
11	12.00	36.00	8.00	1.00	24.00	3.00	131.00	306.00	206.00	6.20	63.00	100.00	137.00	118.00	18.30	.79	3.29	2.9	24.7
12	13.00	38.00	7.00	1.00	16.00	5.00	145.00	400.00	218.00	5.90	89.00	93.00	126.00	114.00	26.00	.77	2.90	3.9	11.5
13	13.00	36.00	8.00	1.00	16.00	4.00	163.00	369.00	235.00	5.70	70.00	98.00	128.00	110.00	27.20	1.25	3.88	5.2	14.6
14	12.00	35.00	8.00	1.00	12.00	3.00	156.00	229.00	263.00	6.80	73.00	101.00	123.00	117.00	29.00	1.35	4.11	7.1	73.3
15	12.00	31.00	7.00	1.00	12.00	3.00	183.00	339.00	223.00	5.80	79.00	89.00	125.00	109.00	19.40	1.44	3.98	6.2	42.3
16	11.00	35.00	7.00	1.00	16.00	2.00	165.00	276.00	230.00	5.70	81.00	102.00	139.00	113.00	20.00	1.05	3.18	6.1	33.8
17	19.00	45.00	9.00	1.00	12.00	6.00	138.00	231.00	270.00	6.10	71.00	108.00	128.00	120.00	21.90	1.70	4.41	11.6	68.6
18	15.00	44.00	8.00	1.00	16.00	4.00	156.00	380.00	216.00	5.90	82.00	94.00	138.00	118.0	22.00	1.23	4.18	3.9	26.9
19	10.00	35.00	7.00	1.00	24.00	3.00	168.00	330.00	230.00	2.70	83.00	104.00	128.00	115.00	18.50	1.44	2.98	3.3	24.8
20	13.00	37.00	8.00	1.00	16.00	2.00	126.00	260.00	271.00	6.10	89.00	106.00	135.00	116.00	27.40	1.10	2.91	2.8	19.2
21	14.00	40.00	9.00	1.00	16.00	3.00	143.00	380.00	280.00	5.90	103.00	112.00	134.00	117.00	16.90	.92	3.11	2.8	21.2
22	13.00	33.00	8.00	1.00	12.00	5.00	131.00	219.00	245.00	5.80	79.00	90.00	129.00	114.00	23.50	1.26	4.30	10.6	51.2

Group 1 : Thalassemic group with intact spleen.

spleen : 1.00 Means intact spleen.

Master sheet of group II

no.	Age/Y	Wt. (kg)	Durat- ion/Y	Spleen	B.T.r. /Y	Def. /Y.	Serum iron µg/dl	S. ferritin mg/ml	T.I.B.C. µg/dl	Hb.gm /dl	Fasting BLG. mg/dl	1/2 hr. BLG mg/dl	1 hr. BLG mg/dl	2 hr. BLG mg/dl	lipase u/l	Fasting C-peptide ng/ml	1/2 hr. C-peptide ng/ml	Fasting insulin mU/ml	1/2 hr. insulin mU/ml
23	10.00	25.00	8.00	.00	12.00	3.00	132.00	481.00	320.00	7.60	97.00	100.00	128.00	104.00	66.00	1.18	3.20	6.1	38.6
23	10.00	25.00	8.00	.00	12.00	3.00	132.00	481.00	320.00	7.60	97.00	100.00	128.00	104.00	66.00	1.18	3.20	6.1	38.6
24	10.00	23.00	7.00	.00	12.00	4.00	110.00	327.00	295.00	6.70	77.00	113.00	132.00	117.00	63.00	1.45	4.20	6.6	44.2
24	10.00	23.00	7.00	.00	12.00	4.00	110.00	327.00	295.00	6.70	77.00	113.00	132.00	117.00	63.00	1.45	4.20	6.6	44.2
25	15.00	39.00	10.00	.00	9.50	4.00	98.00	118.00	316.00	6.90	73.00	90.00	126.00	115.00	25.90	0.96	4.01	5.5	32.6
25	15.00	39.00	10.00	.00	9.50	4.00	98.00	118.00	316.00	6.90	73.00	90.00	126.00	115.00	25.90	0.96	4.01	5.5	32.6
26	13.00	33.00	10.00	.00	9.50	6.00	95.00	124.00	336.00	7.10	78.00	103.00	138.00	117.00	46.00	0.92	2.90	5.3	40.2
26	13.00	33.00	10.00	.00	9.50	6.00	95.00	124.00	336.00	7.10	78.00	103.00	138.00	117.00	46.00	0.92	2.90	5.3	40.2
27	16.00	42.00	14.00	.00	8.00	5.00	87.00	243.00	240.00	8.20	77.00	103.00	135.00	110.00	68.00	0.81	4.00	5.3	40.2
27	16.00	42.00	14.00	.00	8.00	5.00	87.00	243.00	240.00	8.20	77.00	103.00	135.00	110.00	68.00	0.81	4.00	5.3	40.2
28	15.00	43.00	13.00	.00	8.00	3.00	110.00	353.00	280.00	6.90	79.00	88.00	128.00	111.00	46.00	1.15	2.90	3.0	24.6
28	15.00	43.00	13.00	.00	8.00	3.00	110.00	353.00	280.00	6.90	79.00	88.00	128.00	111.00	46.00	1.15	2.90	3.0	24.6
29	14.00	39.00	11.00	.00	8.00	2.00	86.00	339.00	270.00	7.30	80.00	86.00	136.00	114.00	79.00	0.78	3.17	4.3	31.2
29	14.00	39.00	11.00	.00	8.00	2.00	86.00	339.00	270.00	7.30	80.00	86.00	136.00	114.00	79.00	0.78	3.17	4.3	31.2
30	11.00	31.00	9.00	.00	7.00	3.00	108.00	326.00	306.00	6.30	87.00	103.00	133.00	112.00	75.00	1.40	3.20	3.3	35.2
30	11.00	31.00	9.00	.00	7.00	3.00	108.00	326.00	306.00	6.30	87.00	103.00	133.00	112.00	75.00	1.40	3.20	3.3	35.2
31	10.00	25.00	7.00	.00	9.00	2.00	119.00	232.00	240.00	7.10	83.00	111.00	123.00	105.00	43.00	1.10	4.00	4.0	24.6
31	10.00	25.00	7.00	.00	9.00	2.00	119.00	232.00	240.00	7.10	83.00	111.00	123.00	105.00	43.00	1.10	4.00	4.0	24.6
32	14.00	38.00	10.00	.00	12.00	5.00	106.00	128.00	321.00	6.80	72.00	106.00	129.00	110.00	39.80	0.96	3.18	5.7	36.2
32	14.00	38.00	10.00	.00	12.00	5.00	106.00	128.00	321.00	6.80	72.00	106.00	129.00	110.00	39.80	0.96	3.18	5.7	36.2
33	12.00	36.00	9.00	.00	8.00	6.00	90.00	224.00	304.00	8.10	79.00	96.00	141.00	115.00	54.00	0.87	2.98	3.6	28.3
33	12.00	36.00	9.00	.00	8.00	6.00	90.00	224.00	304.00	8.10	79.00	96.00	141.00	115.00	54.00	0.87	2.98	3.6	28.3
34	14.00	40.00	10.00	.00	8.00	4.00	116.00	326.00	240.00	8.30	89.00	99.00	130.00	115.00	33.00	1.70	4.41	8.1	54.1
34	14.00	40.00	10.00	.00	8.00	4.00	116.00	326.00	240.00	8.30	89.00	99.00	130.00	115.00	33.00	1.70	4.41	8.1	54.1
35	12.00	37.00	8.00	.00	9.50	3.00	94.00	271.00	310.00	7.90	66.00	110.00	123.00	112.00	33.00	1.70	4.41	8.1	54.1
35	12.00	37.00	8.00	.00	9.50	3.00	94.00	271.00	310.00	7.90	66.00	110.00	123.00	112.00	33.00	1.70	4.41	8.1	54.1
36	10.00	24.00	7.00	.00	9.50	2.00	126.00	153.00	345.00	7.90	69.00	86.00	125.00	104.00	41.00	0.92	3.78	6.1	41.3
36	10.00	24.00	7.00	.00	9.50	2.00	126.00	153.00	345.00	7.90	69.00	86.00	125.00	104.00	41.00	0.92	3.78	6.1	41.3
37	13.00	38.00	10.00	.00	9.50	5.00	85.00	139.00	298.00	6.70	84.00	89.00	134.00	112.00	46.00	1.11	3.66	5.3	40.1
37	13.00	38.00	10.00	.00	9.50	5.00	85.00	139.00	298.00	6.70	84.00	89.00	134.00	112.00	46.00	1.11	3.66	5.3	40.1
38	12.00	32.00	8.00	.00	8.00	3.00	123.00	146.00	306.00	6.50	63.00	89.00	134.00	112.00	25.90	1.52	5.08	12.6	71.2
38	12.00	32.00	8.00	.00	8.00	3.00	123.00	146.00	306.00	6.50	63.00	89.00	134.00	112.00	25.90	1.52	5.08	12.6	71.2
39	15.00	41.00	11.00	.00	6.00	6.00	79.00	223.00	270.00	6.30	65.00	92.00	130.00	115.00	37.30	0.96	3.98	5.2	47.1
39	15.00	41.00	11.00	.00	6.00	6.00	79.00	223.00	270.00	6.30	65.00	92.00	130.00	115.00	37.30	0.96	3.98	5.2	47.1
40	14.00	41.00	11.00	.00	6.00	6.00	73.00	226.00	310	8.60	76.00	99.00	131.00	104.00	38.00	0.88	3.10	3.6	21.8
40	14.00	41.00	11.00	.00	6.00	6.00	73.00	226.00	310	8.60	76.00	99.00	131.00	104.00	38.00	0.88	3.10	3.6	21.8

Group II : Thalassmic group without spleen.

Spleen : .00 means without spleen

Master sheet of Control group

no.	Age /y	Wt (kgm)	Durat- ion /y	Spleen	Bl.Tr. /y	Deaf. /y.	Serum Iron µg/dl	S. ferritin ng/ml	T.I.B.C. µg/dl	Hb gm /dl	F. B.G. (mg/dl)	1/2 hr. B.G mg/dl	1 hr. B.G mg/dl	2 hr. B.G mg/dl	lipase u/l	Fasting C-peptide ng/ml	1/2h. C-peptide ng/ml	Fasting insulin mIU/ml	1/2 hr. insulin mIU/ml
41	13.00	35.00	.00	2.00	.00	.00	83.00	55.00	380.00	13.00	73.00	92.00	100.00	90.00	28.90	1.62	4.70	14.5	80.6
42	15.00	43.00	.00	2.00	.00	.00	71.00	63.00	318.00	12.90	70.00	100.00	110.00	105.00	108.00	1.18	4.90	5.6	38.2
43	12.00	35.00	.00	2.00	.00	.00	102.00	33.00	340.00	13.30	73.00	104.00	110.00	113.00	86.00	1.68	3.87	5.7	51.2
44	10.00	26.00	.00	2.00	.00	.00	69.00	40.00	310.00	13.00	66.00	100.00	115.00	108.00	104.00	1.08	3.95	3.8	26.2
45	13.00	34.00	.00	2.00	.00	.00	81.00	33.00	336.00	13.50	70.00	98.00	110.00	110.00	104.00	1.31	5.25	6.2	31.9
46	12.00	34.00	.00	2.00	.00	.00	100.00	46.00	308.00	13.70	84.00	109.00	115.00	100.00	90.00	.98	5.18	3.9	22.6
47	14.00	41.00	.00	2.00	.00	.00	84.00	39.00	316.00	13.30	86.00	102.00	113.00	105.00	43.00	.74	4.10	5.9	42.1
48	14.00	38.00	.00	2.00	.00	.00	67.00	42.00	329.00	12.90	83.00	90.00	103.00	108.00	50.00	.88	3.98	3.2	21.8
49	13.00	33.00	.00	2.00	.00	.00	86.00	37.00	315.00	13.20	63.00	90.00	106.00	115.00	64.00	1.22	3.10	4.9	36.1
50	15.00	42.00	.00	2.00	.00	.00	93.00	49.00	333.00	13.70	65.00	101.00	120.00	117.00	53.00	1.16	6.00	5.4	38.2
51	13.00	35.00	.00	2.00	.00	.00	73.00	56.00	313.00	13.60	69.00	97.00	109.00	103.00	67.00	.98	5.10	4.1	39.9
52	14.00	39.00	.00	2.00	.00	.00	65.00	35.00	361.00	12.90	81.00	101.00	123.00	119.00	49.00	1.41	4.31	8.4	51.2
53	11.00	33.00	.00	2.00	.00	.00	82.00	51.00	326.00	13.00	71.00	86.00	110.00	98.00	90.00	1.32	4.92	5.6	29.9
54	12.00	35.00	.00	2.00	.00	.00	96.00	59.00	308.00	13.20	73.00	98.00	110.00	104.00	63.00	.99	4.90	3.4	33.2
55	13.00	35.00	.00	2.00	.00	.00	83.00	45.00	330.00	13.50	68.00	90.00	103.00	100.00	52.00	.97	3.80	4.8	43.3

Spleen 2 : Means normal spleen.