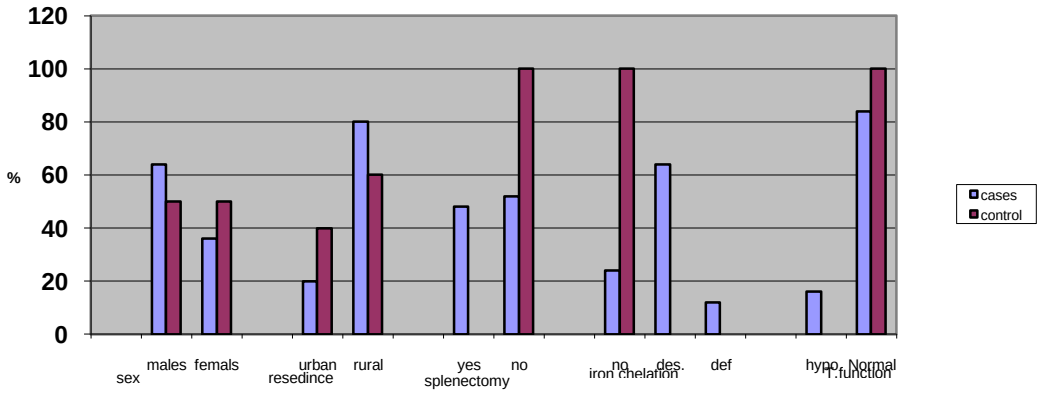
RESULTS

Table (1): Demographic data of studied groups.

St. group / parameters	Cases N=25		Controls N=10	
	No	**%**	**No**	**%**
1- **Sex**				
Males	16	64.0	5	50.0
Females	9	36.0	5	50.0
2-Residence				
Urban	5	20.0	4	40.0
Rural	20	80.0	6	60.0
3-Splenectomy				
Yes	12	48.0	0	0.0
No	13	52.0	10	100.0
4-Iron chelation				
No	6	24.0	10	100.0
Desferoxomin	16	64.0	0	0.0
Deferiprone	3	12.0	0	0.0

Chart (1) demographic data of the studied groups



Growth parameters of studied groups.

St. group / parameters	Cases N=25		Controls N=10	
	No	**%**	**No**	**%**
Weight				
<5th	5	20.0	1	10.0
<25th	15	60.0	4	40.0
<50th	3	12.0	3	40.0
<75th	2	8.0	1	10.0
<95th	0	0	1	0
Height				
<5th	10	40.0	-	-
<25th	11	44.0	4	40.0
<50th	3	12.0	3	30.0
<75th	1	4.0	1	10.0
<95th	0	0	2	20.0
Body mass index				
<5th	2	8.0	-	-
<25th	10	40.0	1	10.0
<50th	7	28.0	1	10.0
<75th	2	8.0	-	-
<95th	2	8.0	3	30.0
95th:100th	2	8.0	5	50.0.

Table (2): Means ± SD of **ages** among cases and control groups

Study group / parameters	Cases(25) $\bar{X}$ ± SD	Controls(10) $\bar{X}$ ± SD	T	P
Age (years)	12.6±2.7	13.9±5.2	.75	> 0.05

Table(2) shows that , there was no statistically significant difference ($p > 0.05$) between cases and control groups as regard age

Table (3): Means ± SD of **growth parameters** among cases and control groups

Study group / parameters	Cases(25) $\bar{X}$ ± SD	Controls(10) $\bar{X}$ ± SD	t	P
Hight (cm)	138.75 ± 18.22	155.2 ± 24.142	0.26	< 0.05
Weight (kg)	36.2± 10.1	41.1 ± 15.9	0.9	> 0.05
Body mass index[kg/(m^2)]	18.4± 3.2	17.8 ± 3.1	0.51	> 0.05

Table (3) shows that there was statistically significant decrease in height in cases compared to control groups but there was no statistically significant difference ($p > 0.05$) between cases and control groups as regard weight and BMI.

Table (4): Means ± SD of **some Laboratory data** among cases and control groups

Study group / Laboratory data	Cases(25) $\bar{X}$ ± SD	Controls(10) $\bar{X}$ ± SD	T	P
S. Ferritin ng/ml	3767.4±1462.1	186.2 ± 631	12.2	<0.001
ALT U/L.	69.6±60.2	26.1 ± 6.1	3.57	<0.01
AST U/L.	76.7±54.1	24.1 ± 7.1	4.76	<0.001
HB mg/dl	6.7 ± 0.8	11.9 ± 0.7	19.04	<0.001

Table (4) and chart (2,3,4) show that , there was highly statistically significant difference (p< 0.05) between cases and control groups as regard hemoglobin level, liver functions and serum ferritin .

Chart (2) means ofS. ferritin among the study group

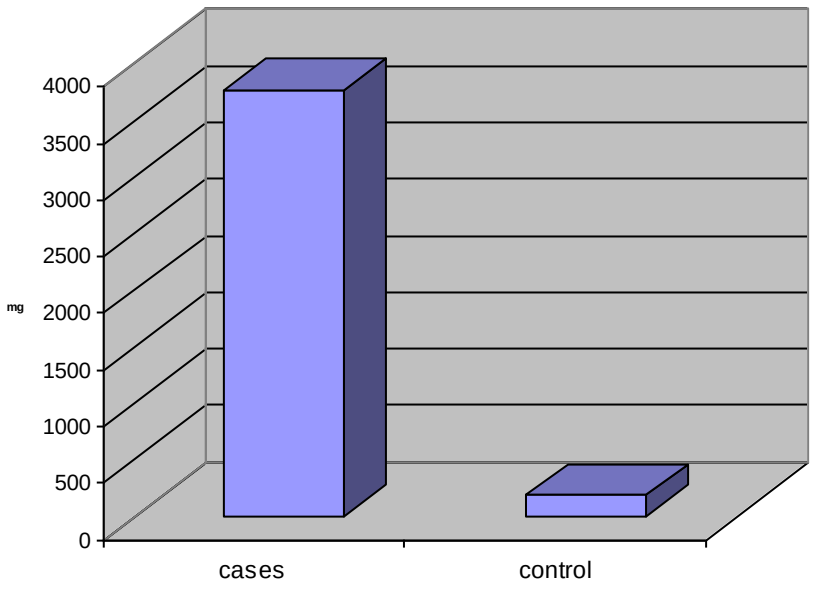


Chart (3) means of ALT & AST among the study group

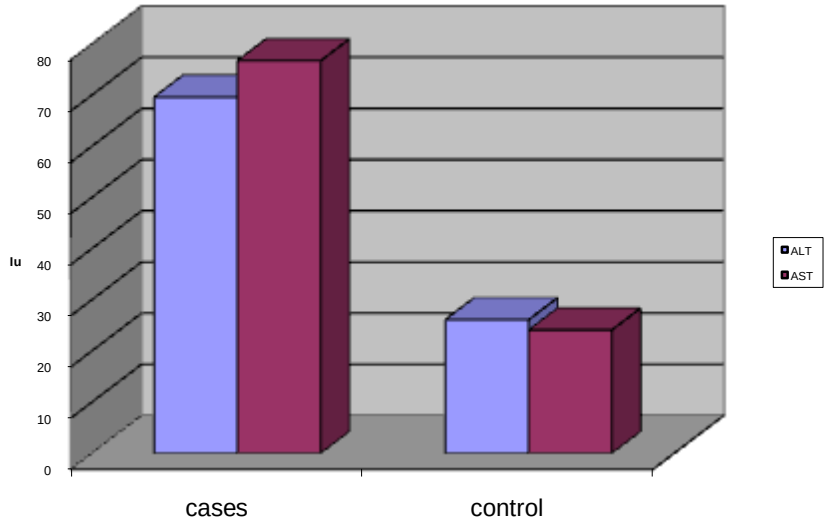


Chart (4) means of HB among the study group

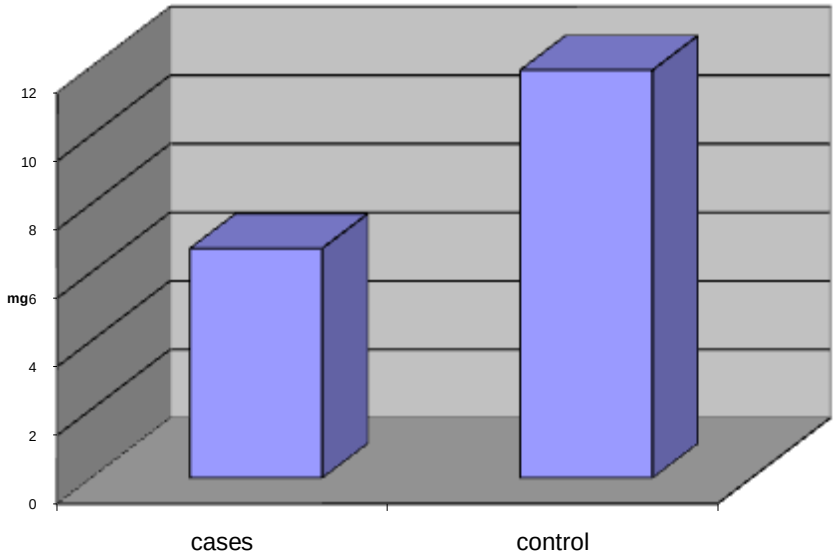


Table (5): Means ± SD of **Laboratory data** among cases according to iron chelation therapy.

Treatment / **Laboratory data**	No (6) $\bar{X}$ ± SD	Oral (3) $\bar{X}$ ± SD	injection (16) $\bar{X}$ ± SD	F test	P
S.Ferritin ng/ml	4840.2±1514.8	2892.3±1014.1	3529.2±1357.9	4.89	<0.05
ALT U/L	70.7±44.1	79.3±67.7	67.4±67.2	2.16	>0.05
AST U/L	65.8±29.4	109±59.2	74.7±60.6	4.12	<0.05
HB mg/dl	6.7±0.7	6.3±1.1	6.8±0.8	1.93	>0.05

Table (5) shows that there was statistically significant difference in s.ferritin and AST in case with chelation therapy comparison to cases without chelation therapy but there was no statistically significant difference in ALT and Hb in cases with or without chelation therapy.

Table (6): Distribution of study group according to thyroid function test

St. group parameters	**Cases N=25**		**Controls N=10**	
	No	**%**	**No**	**%**
Thyroid function				
Hypothyroidism	4	16.03	**0**	0.0
Euthyroid	21	6.0	**10**	100.0

Table (7): Means ± SD of **thyroid hormone level** among cases

Cases / Thyroid functions	Hypothyroidism(4) $\bar{X}$ ± SD	Euthyroid (21) $\bar{X}$ ± SD	T	P
TSH IU/ml	5.5± 0.8	2.4 ± 0.9	6.7	<0.001
FT4pg/ml	1.2± 0.05	1.3 ± 0.2	1.99	>0.05

Table (7) and chart (5) show that, there was highly statistically significant ($p< 0.05$) increase in TSH serum level in hypothyroid cases compared to euthyroid cases, but there was no statistically significant difference ($p> 0.05$) in FT4 serum level in hypothyroid cases compared to euthyroid cases

Chart (5) means of TSH & FT4 among cases according to thyroid hormone level

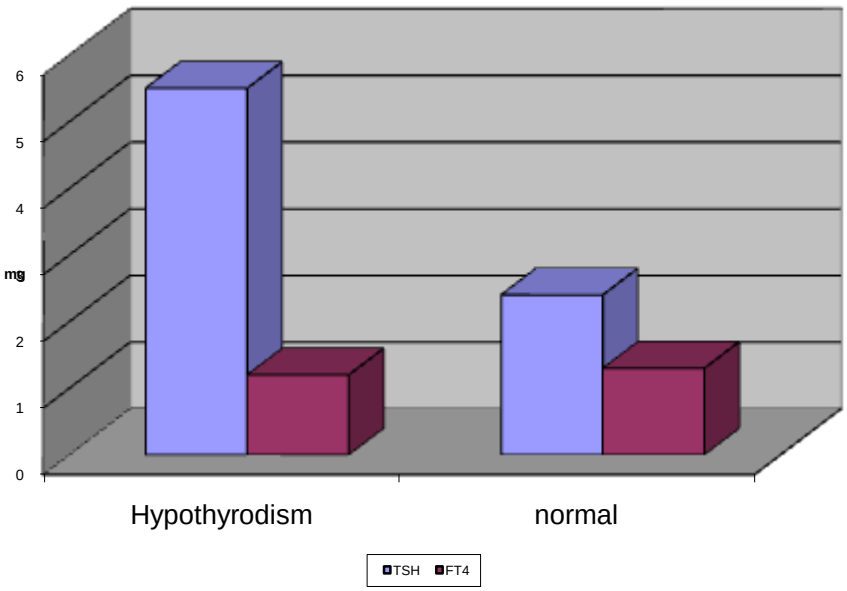


Table (8): Means ± SD of thyroid functions among cases and control groups

Study group / Thyroid functions	Cases(25) $\bar{X}$ ± SD	Controls(10) $\bar{X}$ ± SD	T	P
TSH IU/ml	2.9±1.4	2.7±0.95	0.49	> 0.05
FT4 pg/ml	1.3 ± 0.2	1.5 ± 0.2	2.67	<0.01

Table (8) and chart (6) show that , there was statistically significant decrease in serum level of FT4 in cases compared to control but there was no statistically significant difference (p >0.05) between cases and control groups as regard TSH .

Chart (6) means of FT4 among cases and control groups

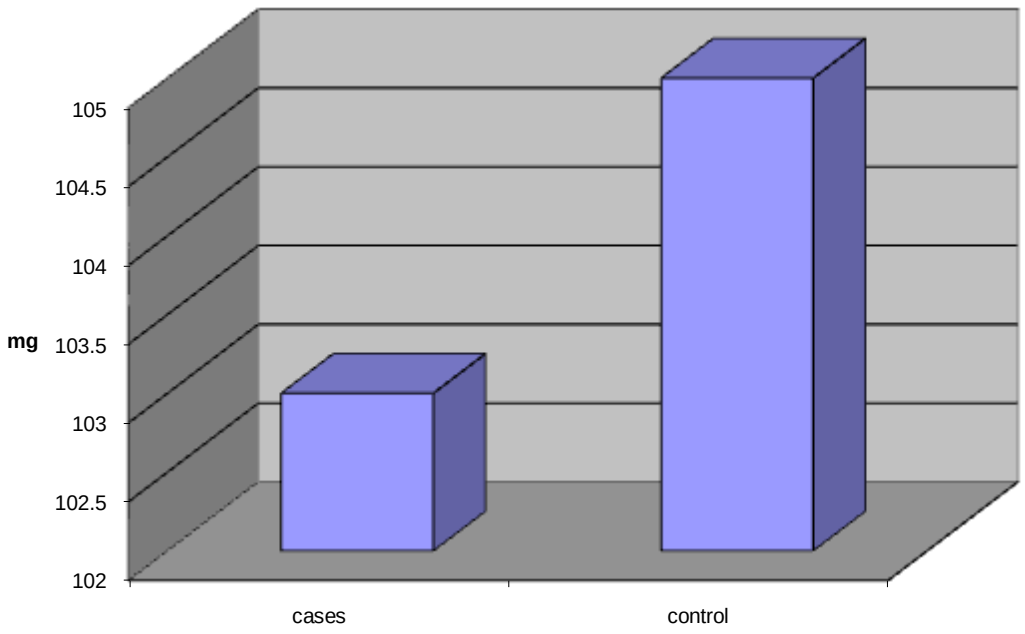


Table (9): Means ± SD of **ages** among cases according to thyroid functions

Cases / **parameter**	Hypothyroidism(4) $\bar{X}$ ± SD	Euthyroid(21) $\bar{X}$ ± SD	t	P
Age (years)	16.8 ± 1.7	13 ± 2.7	2.13	<0.05

Table (9) and chart (7) show that, there was statistically significant increase mean of age in hypothyroid cases compared to euthyroid cases

Chart (7) means of age among cases according to thyroid functions

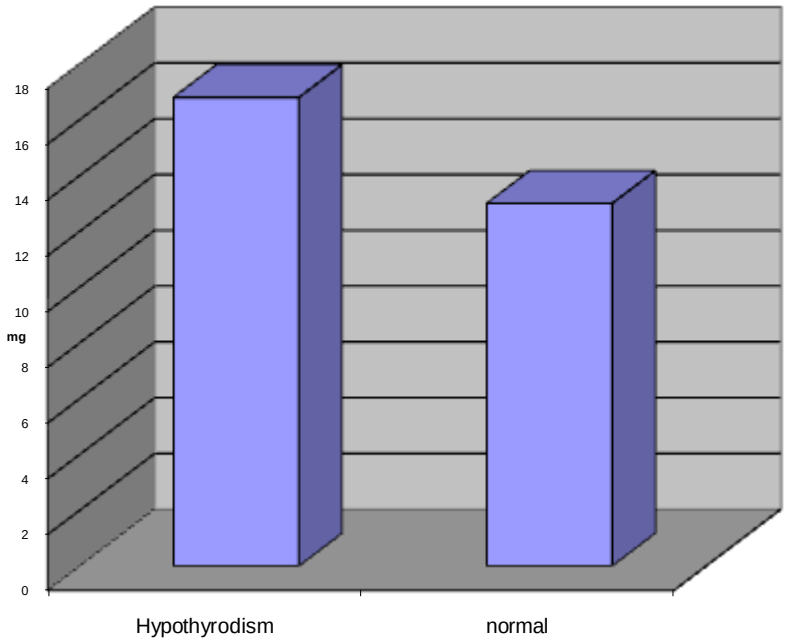


Table (10): Means ± SD of **growth parameters** among cases according to thyroid functions

Cases / parameters	Hypothyroidism (4) $\bar{X}$ ± SD	Euthyroid(21) $\bar{X}$ ± SD	t	P
Hight(cm)	127 ± 7.3	137.7 ± 10.3	3.26	< 0.01
Weight(kg)	28.2± 0.9	41.1 ± 15.9	4.14	<0.001
Body mass index[kg/(m^2)]	17.6±1.5	18.6 ± 3.4	0.95	> 0.05

Table (10) and chart (8) show that, there was highly statistically significant decrease in height and weight in hypothyroid cases compared to euthyroid cases but there was no statistically significant difference (p> 0.05) in hypothyroid cases and euthyroid cases as regard body mass index

Chart (8) means of Wt amog cases according to thyroid functions

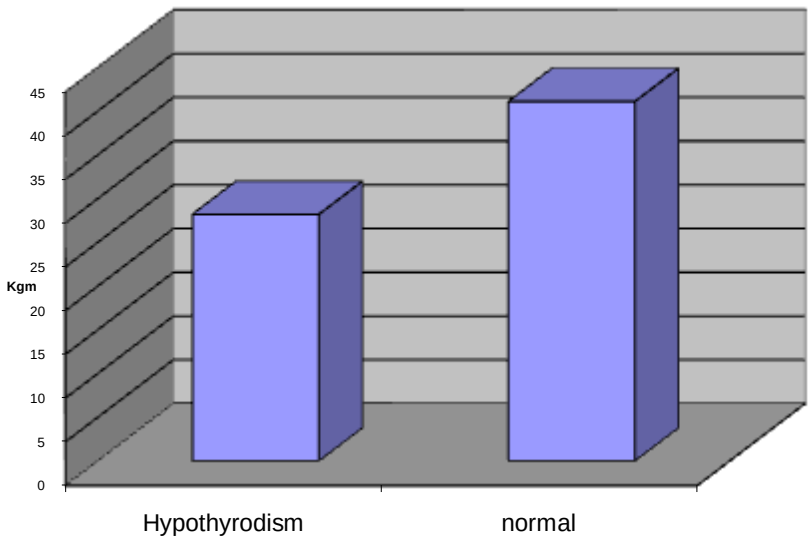


Table (11): Means ± SD of **Laboratory data** among cases according to splenectomy

Spleenectomy / Laboratory data	Yes (12) $\bar{X}$ ± SD	No (13) $\bar{X}$ ± SD	t	P
TSH I.U/ml	3.1±1.3	2.7±1.5	0.71	>0.05
FT4 pig/ml	1.3±0.2	1.2±0.2	1.24	>0.05

Table (15) shows that there was no statistically significant difference in both serum level of TSH and FT4 in case with or without splenectomy**.**

Table (12): Means ± SD of **Laboratory data** among cases

Cases / Laboratory data	Hypothyroidism(4) $\bar{X}$ ± SD	Normal (21) $\bar{X}$ ± SD	t	P
S. Ferritin ng/ml	4106.7± 1808.5	3703 ± 1431	0.42	>0.05
ALT u/l	106± 13.2	62.7 ± 38.2	0.66	>0.05
AST u/l	117± 10.2	69 ± 38.7	0.91	>0.05
HB mg/dl	6.2 ± 1.1	6.8 ± 0.8	1.04	>0.05

Table (12) shows that there was no statistically significant difference in hypothyroid & euthyroid cases as regard Hb, ALT, AST and S.ferritin

Table (13): Means ± SD of **thyroid hormone level** among cases according to type of iron chelation therapy

Treatment / **thyroid functions**	No (6) $\bar{X}$ ± SD	Oral (3) $\bar{X}$ ± SD	injection (16) $\bar{X}$ ± SD	F test	P
TSH IU/ml	3.1±1.3	2.3±1.3	2.9±1.5	2.92	>0.05
FT4 pg/ml	1.2±0.1	1.6±0.3	1.3±0.2	1.68	>0.05

Table (13)shows that there was no statistically significant difference in serum levels of both TSH and FT4 in thalassemia major according to type of chelation therapy

Table (14): Means ± SD of **TSH** among cases according to demographic data

TSH / **Parameters**	$\bar{X}$ ± SD	t	P
Residence			
Rural (20)	2.8±1.4	1.79	> 0.05
Urban (5)	3.4± 1.6		
Sex			
Males(16)	2.8±1.7	1.6	>0.05
Females(9)	3.01± 0.7		>0.05
Iron chelation			
Non(6)	3.1±1.2	-	--
Desferoxomine(16)	2.9± 0.7	T1=0.32	>0.05
Deferiprone(3)	2.3± 0.2	T2=0.89	>0.05

T1= Non versus Desferoxamine group&

T2=Non versus Deferiprone group

Table (14) shows that there was no statistically significant difference (p>0.05) in TSH serum level among cases as regard sex, residence and iron chelation.

Table (15): Means ± SD of **FT 4** among cases according to demographic data

FT4 / **Parameters**	$\bar{X}$ ± SD	t	P
Residence Rural (20)	1.25±0.2	1.48	> 0.05
Urban (5)	1.46± 0.3		
Sex Males (16)	1.26±0.2	1.3	>0.05
Females (9)	1.34± 0.2		
Iron chelation Non (6)	1.22±0.1	-	-
Desferoxomine(16)	1.26± 0.2	T1=0.62	>0.05
Deferiprone (3)	1.6± 0.3	T2=0.24	>0.05

T1= Non versus Desferoxamine group&

T2= Non versus Deferiprone group

Table (15) shows that there was no statistically significant difference (p>0.05) in FT4 serum level among cases as regard sex, residence and iron chelation.

Table (16): Correlation coefficient of TSH serum level and **age** among cases

TSH / **parameter**	"r"	P
Age	- 0.014	>0.05

Table(16) shows that there was negative correlation between TSH serum level and ages among cases but did not reach to statistically significant.

Table (17): Correlation coefficient of TSH serum level and **growth parameters** among cases

TSH / **parameter**	"r"	P
Hight (cm)	- 0.211	>0.05
Weight(kg)	- 0.262	>0.05
Body mass index[kg/(m^2)]	- 0.243	>0.05

Table (17) shows that there was negative correlation between TSH serum level and growth parameters among cases but did not reach to statistically significant.

Table (18): Correlation coefficient of TSH serum level and **FT4** among cases

TSH / **thyroid functions**	"r"	P
FT4 Iu/ ml	- 0.284	>0.05

Table(18) shows that there was negative significant correlation between TSH serum level and FT4 among cases but did not reach to statistically significant.

Table (19): Correlation coefficient of TSH serum level and **Laboratory data** among cases

TSH / **Laboratory data**	"r"	P
ALT u/ L	0.429	<0.01
AST U/L	0.307	>0.05
HB mg/dl	-0.241	>0.05
S. Ferritin pg/ml	0.408	<0.01

Table (19) and chart (9,10) show that there was a significant positive correlation between serum level of TSH and ALT & S.Ferritin but there was no significant correlation was found between TSH and both AST &HB.

Chart (9) correlation between S.ferritin and TSH

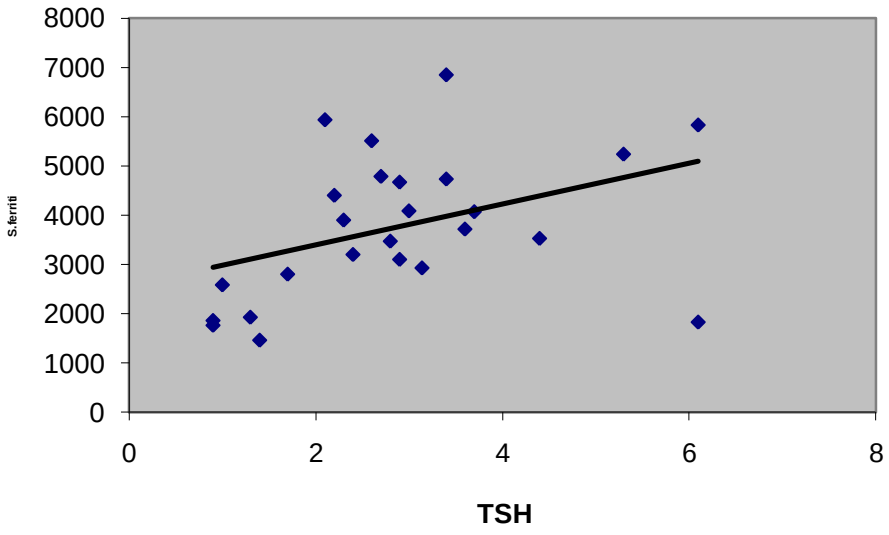


Chart (10) correlation between ALT and TSH

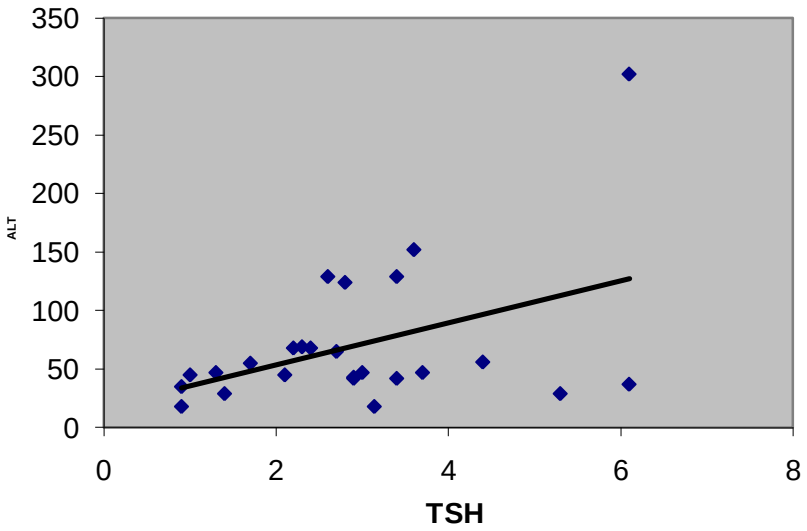


Table (20): Correlation coefficient of **S. Ferritin level** and **age** among cases

S. Ferritin / Parameter	"r"	P
Age (years)	0.37	<0.05

Table(20) shows that there was statistically significant positive correlation between S.ferritin & age among cases

Table (21): Correlation coefficient of **S. Ferritin level** and **growth parameters** among cases

S. Ferritin / growth parameters	"r"	P
Hight (cm)	0.452	<0.01
Weight(kg)	0.151	>0.05
Body mass index[kg/(m^2 **)]**	- 0.323	>0.05

Table (21) and chart (12) show that there was positive significant correlation between S.ferritin & Ht but there was no significant correlation between S.ferritin and bothWt & BMI

Chart (11) corelation between S.ferritin and Ht

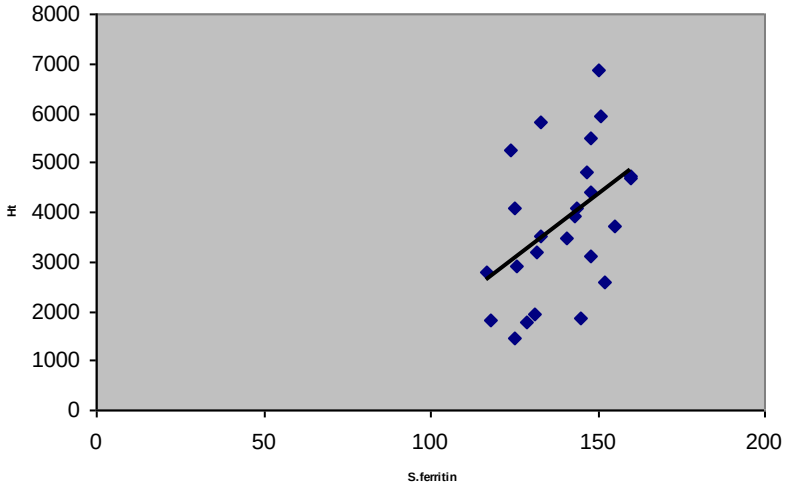


Table (22): Correlation coefficient of S. ferritin level and serum level of **FT4**among cases

S. ferritin / **Laboratory data**	"r"	P
FT4 IU/ml	- 0.334	>0.05

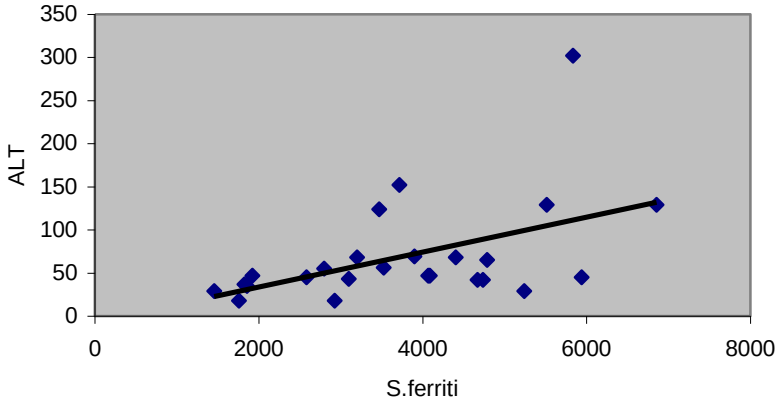
Table(22) shows that there was negative significant correlation between S.ferritin &level of FT4.but did not reach to statistically significant

Table (23): Correlation coefficient of S. ferritin level and **Laboratory data** among cases

S. ferritin / **Laboratory data**	"r"	P
ALT U/L	0.492	<0.01
AST U/L	0.101	>0.05
HB\\\Mg/dl	- 0.041	>0.05

Table (23) and chart (13) show that there was positive significant correlation between S.ferritin & ALT but there was no significant correlation between S.ferritin and both AST & HB

Chart (12) corelation between S.ferritin and ALT



Group	Age	Sex	Order in family	Residence (U-R)	Degree of consanguinity	Number of sibs affected	Age of diagnosis (Yr)	Age of first blood transfusion (Yr)	Frequency of transfusion every	H/O of operation	Age of splenectomy	Liver span in Cm	Spleen span below costal margin
1	16	F	1	R	1st	2	1.5	1.5	6w	splenectomy	10	14	Ectomy
2	14	M	1	R	NO	2	3	3.5	4W	splenectomy	8	13	ectomy
3	16	M	3	R	1st	2	2	2	3w	No	-	14.5	5
4	14	F	6	R	1st	1	2	2.5	3w	No	-	14.5	6
5	11	M	5	R	2nd	1	2	2	4w	splenectomy	6	12	ectomy
6	11	M	2	R	NO	1	1.5	1.5	5w	No	-	10.5	4
7	13	F	2	U	2nd	1	1.5	1.5	4w	splenectomy	10	13	ectomy
8	9	M	6	R	2nd	2	1	1.5	4w	NO	-	11	8
9	12	F	1	U	1st	2	1.5	2	3w	NO	-	13	7
10	11	F	3	R	1st	3	2	2	3w	NO	-	12	4
11	13	F	2	R	no	1	1	1	4W	splenectomy	5	13	ectomy
12	13	M	7	R	no	1	1.5	2	3w	NO	-	15	6
13	10	M	2	R	NO	1	1.5	1.5	2w	NO	-	10.5	4
14	8	M	6	R	2nd	2	1	1.5	4w	splenectomy	5	11	ectomy
15	11	M	5	R	2ND	1	2	2	2W	splenectomy	8	12	ectomy
16	14	M	1	R	NO	2	3	3	4W	splenectomy	8	13	ectomy
17	10	M	1	U	no	1	1.5	1.5	4w	splenectomy	5	12	ectomy
18	11	M	1	R	NO	0	1.5	1.5	3W	NO	-	10	7
19	8	M	3	R	NO	0	1	1	4W	NO	-	12	6
20	16	M	3	R	1st	2	2	2	3w	NO	-	14.5	5
21	18	F	3	U	no	2	1	1	2w	splenectomy	15	16	ectomy
22	16	M	1	R	no	1	2.5	2.5	2w	NO	-	14.5	6
23	12	M	7	R	NO	1	1.5	2	3W	splenectomy	5	15	ectomy
24	16	F	1	R	1st	1	2	2	4W	NO	-	13.5	7
25	13	F	2	U	2nd	1	1.5	1.5	4w	splenectomy	6	13	ectomy

GROUP	Iron chelation	Age of start desferal (yr/age)	Dose of chelating drug (mg/kg)	Frequency of chelating / week	Chelation therapy in last 6 month	Weight (Kg)	Weight percentile	Height (Cm)	Height percentile	BMI	BMI percentile	Hb pre-transfusion gm%	AST	ALT	S.ferritin	FT4	T.S.H
1	none	0	0	0	none	43	5	150	6	19	15	7.5	65	129	6854	1.2	3.4
2	none	0	0	0	none	45	8	151	8	17.7	20	6.9	55	45	5940	1.2	2.1
3	desferoxomine	7	10	1	pump	49	10	160	7	19.4	30	6.1	48	42	4672	1.1	2.9
4	desferoxomine	6	12	2	pump	39	7	148	7.5	17.6	15	7.5	65	129	5513	1.3	2.6
5	desferoxomine	4	20	2	pump	26	3	125	1	16.6	25	5.8	56	47	4070	1.2	3.7
6	desferoxomine	5	35	1	pump	29	10	133	8	16.4	25	5.2	261	302	5834	1.2	6.1
7	desferoxomine	6	15	3	pump	35	5	147	15	16.2	8	7.4	48	65	4789	1.3	2.7
8	none	0	0	0	none	28	40	124	7.5	18.2	65	6.5	124	29	5241	1.1	5.3
9	desferoxomine	3	20	3	pump	34	10	148	37	15.5	7	6.9	46	68	4403	1.4	2.2
10	desferoxomine	2	15	3	PUMP	36	40	144	50	17.35	35	7.6	56	47	4087	1.0	3.0
11	desferoxomine	3	17	3	PUMP	29	7	133	1	16.4	10	5.5	55	56	3527	1.2	4.4
12	desferoxomine	2	25	1	pump	41	9	152	38	17.7	27	7.6	55	45	2582	1.1	1.0
13	desferoxomine	4	20	0.5	pump	25	7	131	7	21.25	80	6.9	56	47	1924	1.2	1.3
14	none	0	0	0	pump	25	45	117	3	18.25	75	5.9	45	55	2800	1.4	1.7
15	desferoxomine	2	18	3	pump	29	10	126	1	18.3	50	7.3	165	18	2927	1.4	3.14
16	desferoxomine	6	15	1	PUMP	65	78	145	3	31	97	8.1	25	35	1857	1.2	0.9
17	desferoxomine	3	18	1	PUMP	27	15	118	1	19.4	70	7.6	28	37	1825	1.2	6.1
18	deferiprone	2	18	3	tablet	29	15	129	1	17.4	37	5.2	165	18	1760	1.4	0.9
19	desferoxomine	3	15	2	PUMP	35	90	125	90	19.2	80	6.5	124	29	1457	1.8	1.4
20	nono	0	0	0	none	49	10	160	7	19.4	30	6.1	48	42	4735	1.1	3.4
21	deferiprone	3	10	3	tablet	50	15	155	20	20.6	20	5.7	115	152	3717	1.5	3.6
22	desferoxomine	4	12	3	PUMP	37	1	148	1	17	3	6.1	59	43	3100	1.2	2.9
23	desferoxomine	2	15	3	PUMP	33	10	143	25	16.1	22	7.1	48	69	3900	1.4	2.3
24	none	0	0	o	none	43	5	141	1	21.6	45	7.6	58	124	3471	1.3	2.8
25	deferiprone	6	20	2	tablet	24	3	132	1	13.8	3	7.2	47	68	3200	1.9	2.4

Control group	Age	Sex	Order in family	Residence (U-R)	Weight	Height	Hb	AST	ALT	S.Ferritin	FT4	TSH
1	4	male	1	R	20	98	11	20	21	153	0.9	3.9
2	6	male	2	R	21	112	11.5	21	25	150	1.6	3.8
3	18	male	6	U	60	174	12.3	15	20	214	1.5	4.1
4	17	male	1	R	49	170	12.5	24	39	123	1.4	2.5
5	18	male	5	R	56	172	13	40	31	345	1.5	3.1
6	12	female	2	U	25	139	12.1	25	21	212	1.4	2.1
7	14	female	1	R	27	149	11.7	32	30	159	1.5	1.9
8	14	female	2	U	46	148	12.4	23	21	153	1.4	2.4
9	18	female	6	U	53	168	11.1	19	24	195	1.7	1.5
10	18	female	4	R	54	167	11.4	22	29	158	1.9	1.8