RESULTS

ANALYSIS OF THE RESULTS

(Table 14) shows the frequency of clinical data of the four studied groups of patients. As shown in the table the most frequent manifestations are abdominal distension, gastrointestinal disorders in the form of abdominal pain and loss of appetite. Jaundice, hepatomegly and splenomegaly. On the other hands bleeding tendency, oedema, ascites, abdominal veins were the lowest common presentations.

(Table 15) and **(Fig 15)** show the mean, standered deviation and P value of liver function tests among the studied groups. High significant difference were found among the groups as regard total serum bilirubin, SGOT, SGPT, alkaline phosphatase and prothrombin concentration.

(Table 16) and **(Fig 16)** show the mean, standered deviation and P value of serum proteins among the four groups of patients and control group. High significant difference were found among four groups of patients as regard albumin, globulin and A/G ratio, while significant difference was found as regard total serum proteins.

(Table 17,18,19,20) illustrates the frequencies of positive hepatitis B viral markers among the different groups of patients.

(Table 21) and **(Fig 17)** shows the mean value, standered deviation and p value of the immunoglobulins among the studied groups. As shown in the table there were significant differnce between the studied and control groups.

(Table 22) and **(Fig 18)** illustrated the mean value, standered deviation and p value of the complement among the studied groups of patients and control group. As shown in the table there was significant differnce between the studied and control groups as regard C_4, while no significant differnce was shown as regard C_3c.

(Table 23) and **(Fig 19)** shows the mean value, standered deviation and p value of the T cell subsets among the studied groups of patients and control group. As shown in the table there were highly significant differnce between the studied and control groups as regard OKT_3 (total T. lymphocyte), OKT_4 (helper T.lymphocyte, OTK_8 (suppressor/cytotxic T lymphocyte) and OKT_4/OKT_8 ratio.

(Table 24) and shows the correlation coefficient and probability value of the variables related to IgG, IgA, OKT_4, OKT_8, HBs Ag and anti-HBe.

Immunoglobulin G was positively correlated with serum globulin, total serum bilirubin, total serum proteins, alkaline phosphatase while negatively correlated with A/G ratio and prothrombin concentration.

Immunoglobulin A was positively correlated with total serum bilirubin, serum transaminases , while negatvely correlated with prothrombin concentration.

The OKT_4 positive cells (helper T lymphocytes) was positively correlated with OKT_4/OKT_8 ratio and OKT_3 (total T lymphocytes), while negatively correlated with OKT_8 (suppressor/cytotoxic T lymphocytes).

The OKT_8 positive cells was negatively correlated with OKT_4. (T helper lymphocytes) and OKT_4/OKT_8 ratio.

The HB_s Ag was positively correlated with HB_e Ag while anti-HB_e was positively correlated with anti-HB_s.

(Table 25) and **(Fig 20)** show the unstandardized canonical discriminant function coefficients of the variables which were found to be statistically significant and can be used to distinguish between chronic active and chronic persistent hepatitis.

These variables were considered predictor variables and were used for generation of an equation that can discriminate between the two groups. The efficiency of the equation was 100%.

(Table 26) and **(Fig 21)** show the unstandardized canonical discriminant function csefficients of the variables with the most loading unstandardized coefficients in the previous equation. These variables were used to generate simplified equation than the previous one with some efficiency (100%).

(Table 27) show the predictor variables used in predicting regression equation for the different groups of chronic liver diseases, their weight (Beta) and test of significance for weight (or beta).

The predicting regression equation

y = constant + $B_1 X_1 + B_2 X_2 \ldots\ldots\ldots B_n X_n$

y = dependent variable

B_1 = weight of the first predicting variable

X_1 = mean of the first predicting variable

The predicting regression equation for the different groups of chronic liver diseases (dependent variable is the group) = constant (8.52888)+OKT_8 x -0.0538 + IgM x -0.3885 + SGPT x -0.31033 + Anti-HBc IGg x -0.20897 + Alkaline phosphatase x -0.17305.

(Table 28) shows the predicting variables used in predicting regression equation for liver span, oedema,splenomegaly, ascites and Jaundice among the children with chronic liver diseases (CAH, CPH, bilharzial hepatic fibrosis and hepatic cirrhosis).

Table (14)
Clinical data of the four groups of patients and control group

Group	Mean age in years	Symptoms						Signs						
		Abd.dist	Jaund-ice	G.I disorders	Bilh. infect.	Bleeding	Ul. trans.	Jaundice	Oedema	Abd. veins	Ascites	Splenomegly	Liver	
													Span (cm)	Lt.L. m. M. L. cm
Chronic active hepatitis	x =7.95 + 3.847 R 2 - 12.5	80%	70%	60%	-	20% Epistax	20%	60%	30%	30%	40%	100%	x =11.1 + 1.912	x =6 + 2.449
Chronic persistent hepatitis	x =8.50 + 4.496 R 2 - 15	90%	40%	60%	-	-	30%	20%	-	-	10%	50%	x =10 + 1.764	x =4.6 + 2.011
Bilharzial hepatic fibrosis	x =10.6 + 3.247 R 5.5 - 15	90%	30%	60%	100% intestinal 20% urinary	-	-	-	-	10%	40%	100%	x =11.7 + 2.83	x =7.5 + 2.17
Hepatic cirrhosis	x =8.82 + 4.349 R 2 - 15	63.6%	72.7%	45.5	9.1% urinary 18.2% intestinal	27.2% epistax. 9.1% hematemesis & melena	45.5%	54.5%	27.3%	27.3%	36.47%	81.8%	x =10.27 + 2.20	x =6.88 + 3.74
Control group	x 6.6 + 2.07 R 3 -11	-	-	-	-	-	-	-	-	-	-	-	x =7.5 + 1.06	x =0 + 0

x = Mean
± = SD
R = Rang

Table (15)
liver function tests among the four groups of patients and control group

Test	Different groups										Analysis of variance	
	Chronic active hepatitis		Chronic persistent hepatitis		Bilharzial hepatic fibrosis		Hepatic cirrhosis		Control group		F Ratio	P Value
	Mean	SD ±	Mean	SD ±	Mean	SD ±	Mean	SD ±	Mean	SD ±		
Total serum bilirubin mg/dl	1.967	1.148	0.667	0.3157	0.477	0.112	1.568	1.274	0.45	0.159	7.725	<0.01
SGOT u/l	91.7	47.924	49	31.131	40.9	12.485	55.18	26.51	9.02	1.526	10.723	<0.01
SGPT u/l	114.5	74.494	24.6	12.085	19.4	10.844	31.64	20.82	8.39	1.633	14.785	<0.01
SGOT/SGPT	1.058	0.66	2.167	0.977	2.66	1.378	2.086	1.041	1.108	0.269	5.572	<0.01
Alkaline phosphatase u/l	97.9	57.790	37.2	10.717	57.9	15.066	163.727	99.288	23.97	5.986	11.730	<0.01
Prothrombin%	69.8	24.635	81.2	9.784	76.5	11.702	65.818	14.669	86.7	8.056	5.004	<0.01

P <0.01 highly significant.

Fig (15) Liver function tests among the studied groups

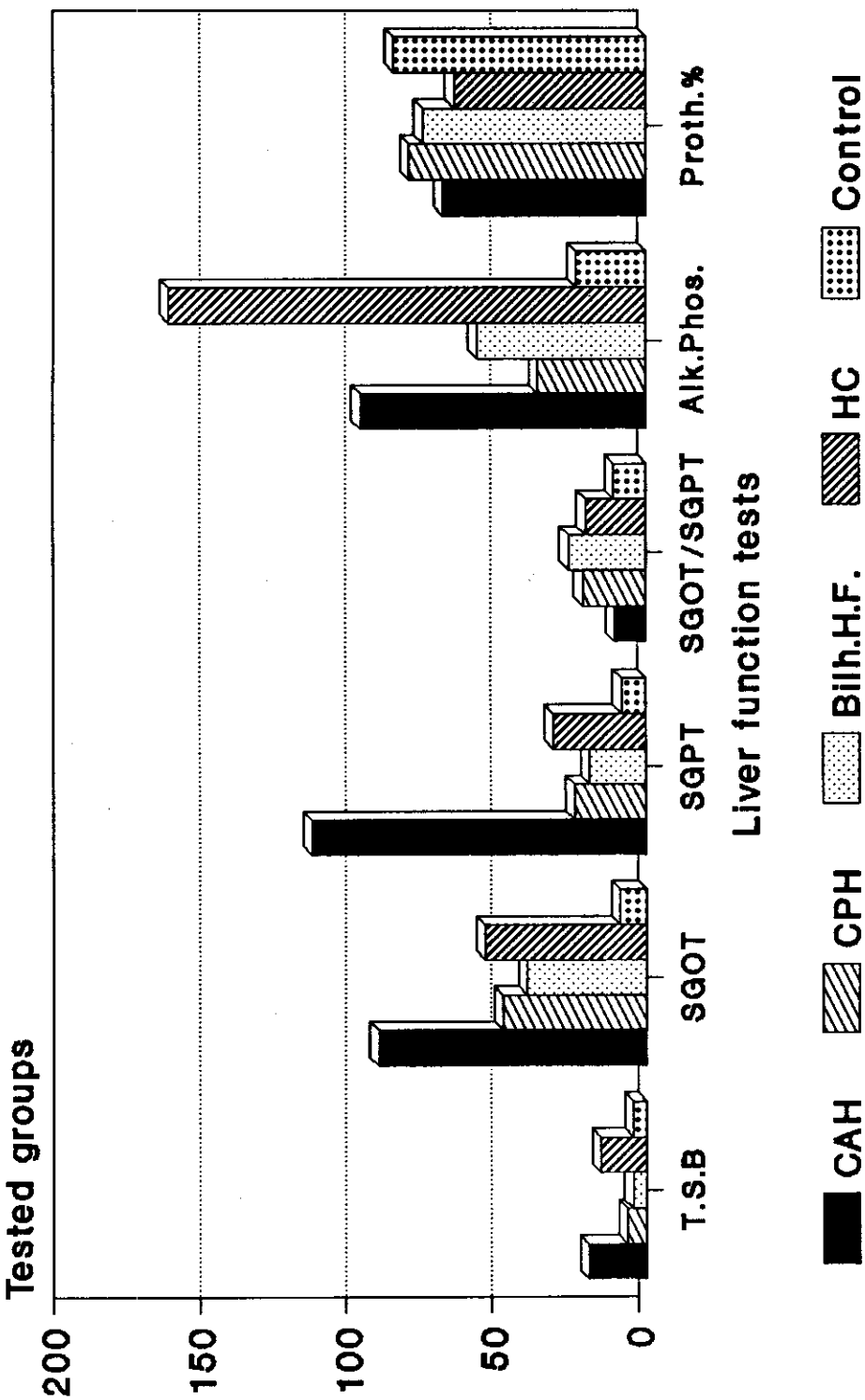


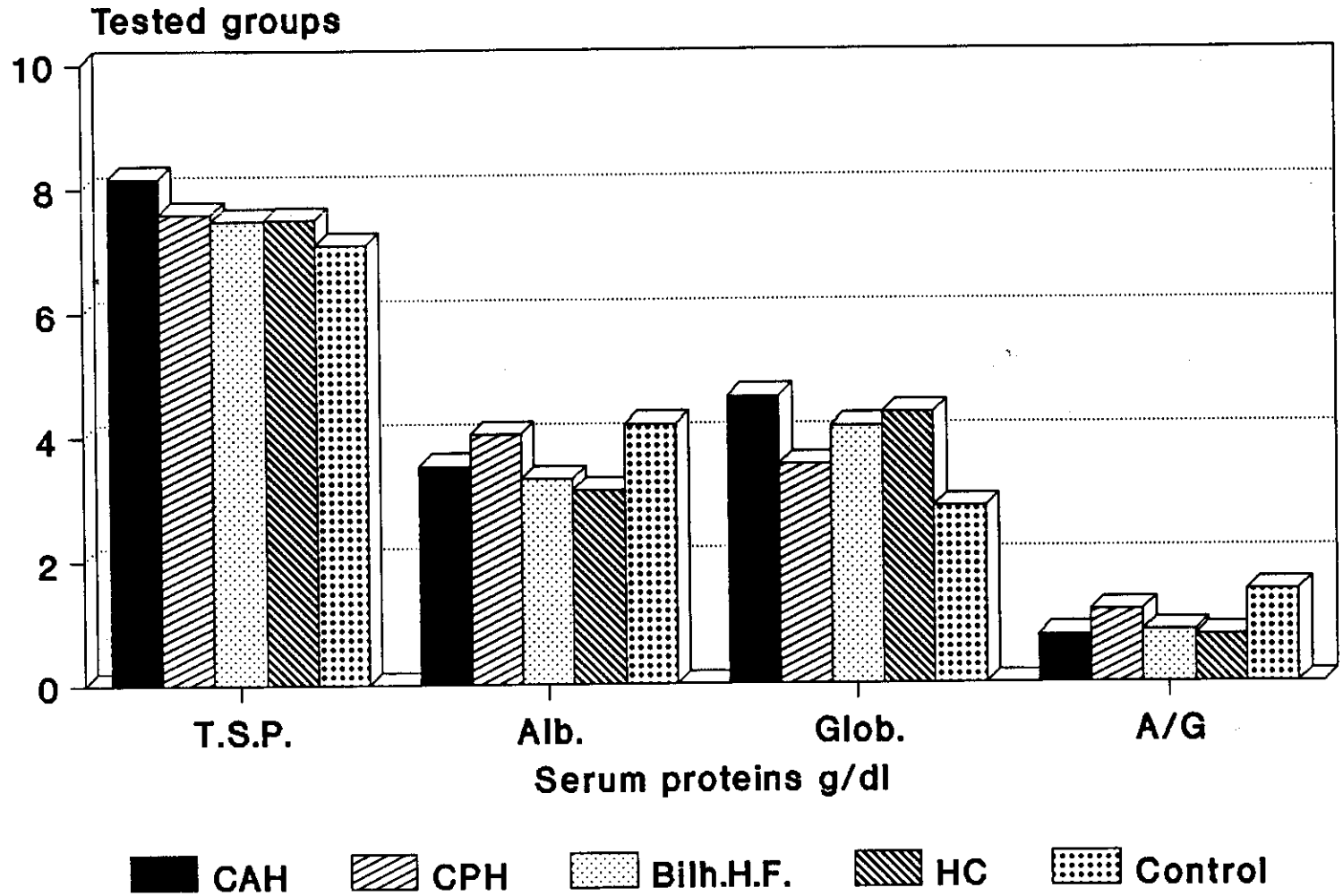
Table (16)

Serum proteins among the four groups of patients and the control group

Test	Different groups										Analysis of variance	
	Chronic active hepatitis		Chronic persistent hepatitis		Bilharzial hepatic fibrosis		Hepatic cirrhosis		Control group		F. ratio	P. value
	Mean	SD ±	Mean	SD ±	Mean	SD ±	Mean	SD ±	Mean	SD ±		
Total serum proteins g/dl	8.17	0.837	7.6	0.483	7.49	0.58	7.5	0.808	7.1	0.427	3.439	<0.05
Albumin g/dl	3.53	0.691	4.04	0.552	3.32	0.569	3.13	0.508	4.2	0.404	7.152	<0.01
Globulin g/dl	4.64	0.506	3.54	0.493	4.16	0.717	4.37	0.957	2.86	0.270	12.623	<0.01
A/G ratio	0.77	0.172	1.169	257	0.83	0.237	0.765	0.272	1.478	0.177	19.323	<0.01

P <0.01 highly significant.
<0.05 significant

Fig (16) Serum proteins among the tested groups



T.S.P.($P<0.05$).Alb., Glob., A/G ($P<0.01$)

Table (17)

Hepatitis B virus markers in chronic active hepatitis.

No. of patients	HBs Ag	Anti-HBc IgM	Anti-HBc IgG	HBe Ag	Anti-HBe	Anti-HBs
1	−	−	+	+	−	−
2	+	−	+	−	+	−
3	−	−	+	−	+	+
4	+	−	+	+	−	−
5	−	−	−	−	−	−
6	−	−	−	−	−	−
7	−	−	+	−	+	+
8	+	−	+	+	−	−
9	−	−	−	−	−	−
10	−	−	+	+	−	−
Total	30%	0%	70%	40%	30%	20%

Table (18)

Hepatitis B virus markers in chronic persistent hepatitis.

No. of patients	HBs Ag	Anti-HBc IgM	Anti-HBc IgG	HBe Ag	Anti-HBe	Anti-HBs
1	–	–	+	–	+	+
2	–	–	+	–	+	+
3	–	–	–	–	–	–
4	–	–	–	–	–	–
5	–	–	+	–	–	–
6	–	–	–	–	–	–
7	–	–	–	–	–	–
8	–	–	–	–	–	–
9	–	–	–	–	–	–
10	+	–	+	–	–	+
Total	10%	0%	40%	0%	20%	30%

Table (19)

Hepatitis B virus markers in bilharzial hepatic fibrosis group.

No. of patients	HBs Ag	Anti-HBc Ig M	Anti-HBc Ig G	HBe Ag	Anti-HBe	Anti-HBs
1	–	–	–	–	–	–
2	–	–	+	–	+	+
3	–	–	+	–	+	+
4	+	–	+	+	–	–
5	–	–	+	–	–	–
6	–	–	–	–	–	+
7	–	–	–	–	–	–
8	–	–	–	–	–	–
9	–	–	+	–	+	+
10	–	–	–	–	–	–
Total	10%	0%	50%	10%	30%	40%

Table (20)

Hepatitis B virus markers in hepatic cirrhosis group.

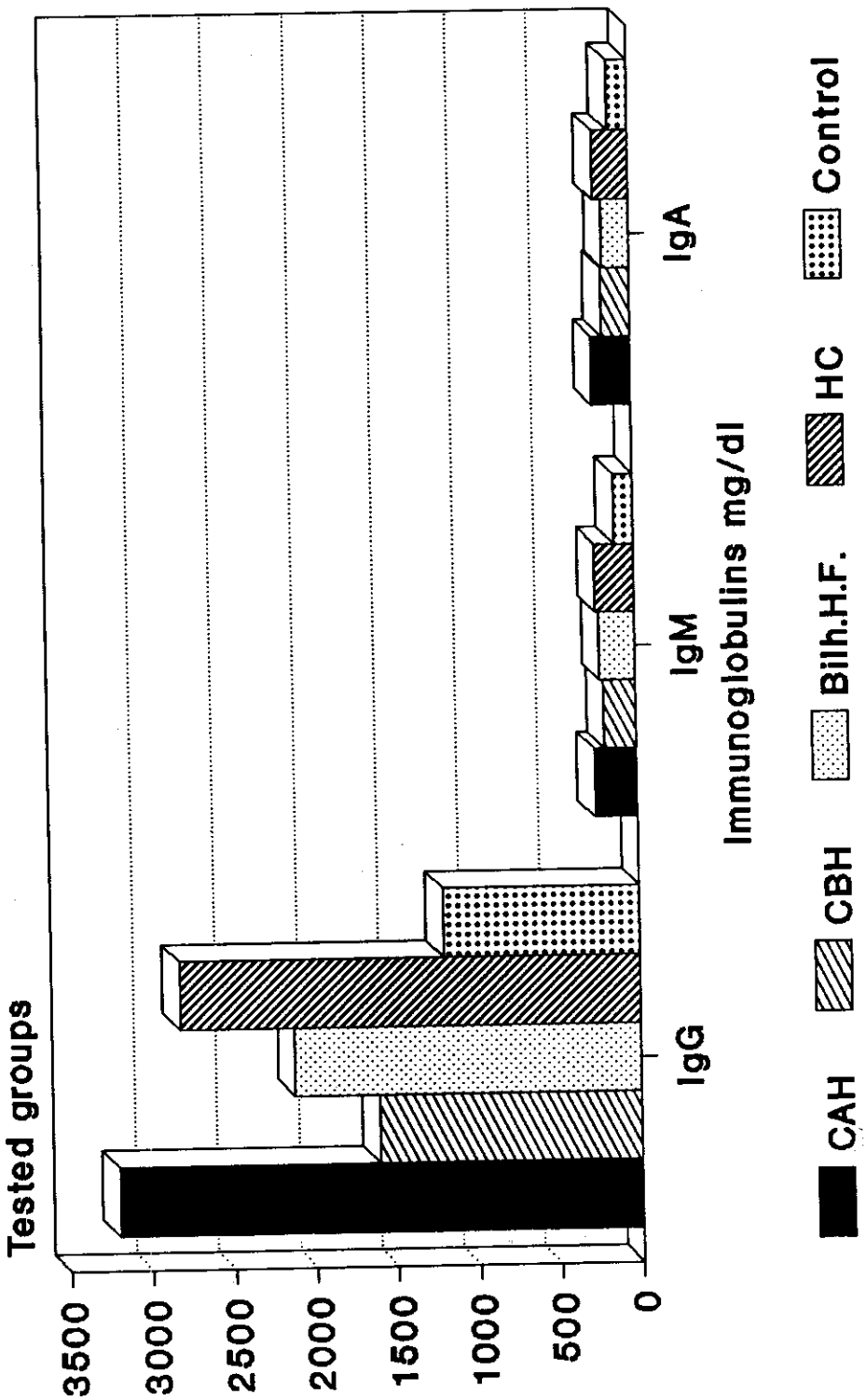
No. of patients	HBs Ag	Anti-HBc Ig M	Anti-HBc Ig G	HBe Ag	Anti-HBe	Anti-HBs
1	–	–	+	–	–	–
2	–	–	–	–	–	–
3	–	–	–	–	–	–
4	–	–	+	–	+	–
5	–	–	–	–	–	–
6	–	–	–	–	–	+
7	–	–	–	–	–	–
8	–	–	+	–	–	+
9	–	–	–	–	–	–
10	–	–	–	–	–	–
11	–	–	–	–	–	–
Total	0%	0%	27.3%	0%	9.1%	18.2%

Table (21)
Immuno-globulins among the four groups of patients and control group

Test	Different										Analysis of variance	
	Chronic active hepatitis		Chronic persistent hepatitis		Bilharzial hepatic fibrosis		Hepatic cirrhosis		Control group		F Ratio	P Value
	Mean	SD ±	Mean	SD ±	Mean	SD ±	Mean	SD ±	Mean	SD ±		
Ig G mg/dl	3202	578.077	1607	534.791	2124	724.557	2821	873.428	1204	155.915	17.598	<0.01
Ig M mg/dl	258.3	74.194	198.8	85.406	220.8	62.07	242	85.568	120.1	21.2	5.962	<0.01
Ig A mg/dl	239.2	106.687	178.8	47.254	165.5	43.546	223.182	73.265	127	28.906	4.752	<0.05

P : <0.01 highly significant
<0.05 significant

Fig (17) Immunoglobulins among the tested groups



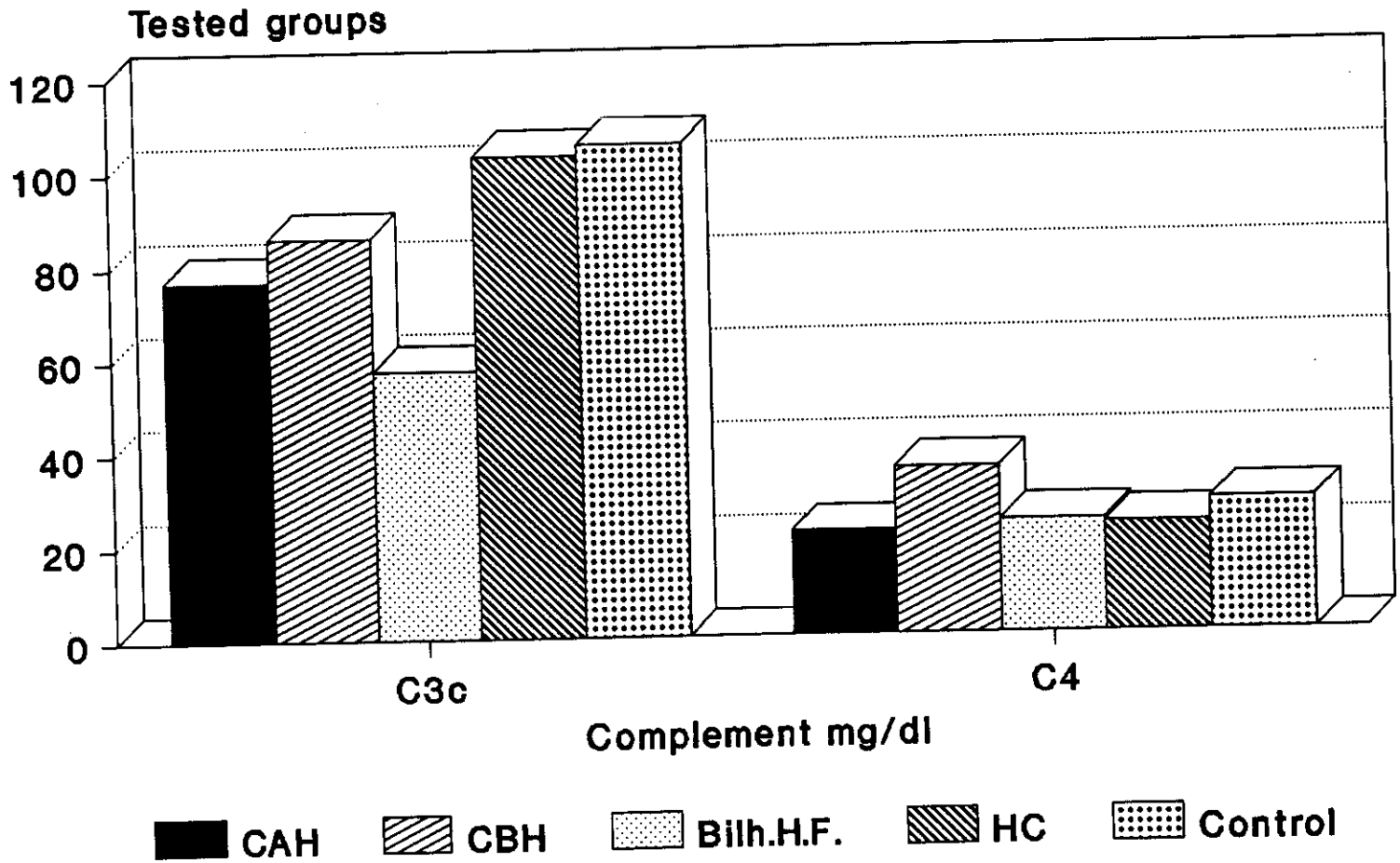
IgG, IgM ($P<0.01$). IgA ($P<0.05$)

Table (22)
Complement C_{3c} and C_4 among the four groups of patients and control group

Complement	Different groups										Analysis of variance	
	Chronic active hepatitis		Chronic persistent hepatitis		Bilharzial hepatic fibrosis		Hepatic cirrhosis		Control group		F Ratio	P Value
	Mean	SD ±	Mean	SD ±	Mean	SD ±	Mean	SD ±	Mean	SD ±		
C_{3c} mg/dl	76.87	58.38	85.92	46.01	57.43	30.78	103.21	63.56	105.34	17.87	1.813	>0.01
C_4 mg/dl	22.1	6.7	35.44	16.28	24.13	11.98	23.38	7.68	27.98	4.26	2.801	<0.05

P : <0.01 highly significant
<0.05 significant

Fig (18) Complement C3c and C4 among tested groups



C3c P>0.01 C4 P<0.05

Table (23)
T cell subsets among the four groups of patients and control group

Monoclonal	Different groups										Analysis of variance	
	Chronic active hepatitis		Chronic persistent hepatitis		Bilharzial hepatic fibrosis		Hepatic cirrhosis		Control group		F.ratio	P.value
	Mean	SD ±	Mean	SD ±	Mean	SD ±	Mean	SD ±	Mean	SD ±		
OKT3 %	72.9	3.956	73.4	3.718	63.4	3.565	69.364	4.523	69.5	2.17	11.704	<0.01
OKT4 %	42.4	4.3	41	3.09	35.9	4.818	49.09	3.27	47	3.09	20.493	<0.01
OKT8 %	30.9	2.923	32.8	3.011	28.2	3.521	20.55	2.876	22.8	2.04	33.498	<0.01
OKT4/OKT8	1.388	0.236	1.232	0.178	1.306	0.316	2.432	0.378	2.084	0.296	35.604	<0.01

P : Value *<0.01 highly significant*
OkT3 *Total T lymphocytes*
OKT4 *Helper T lymphocytes*
OKT8 *Superessor / cytotoxic T lymphocyte*

Fig (19) T cell subsets among the tested groups

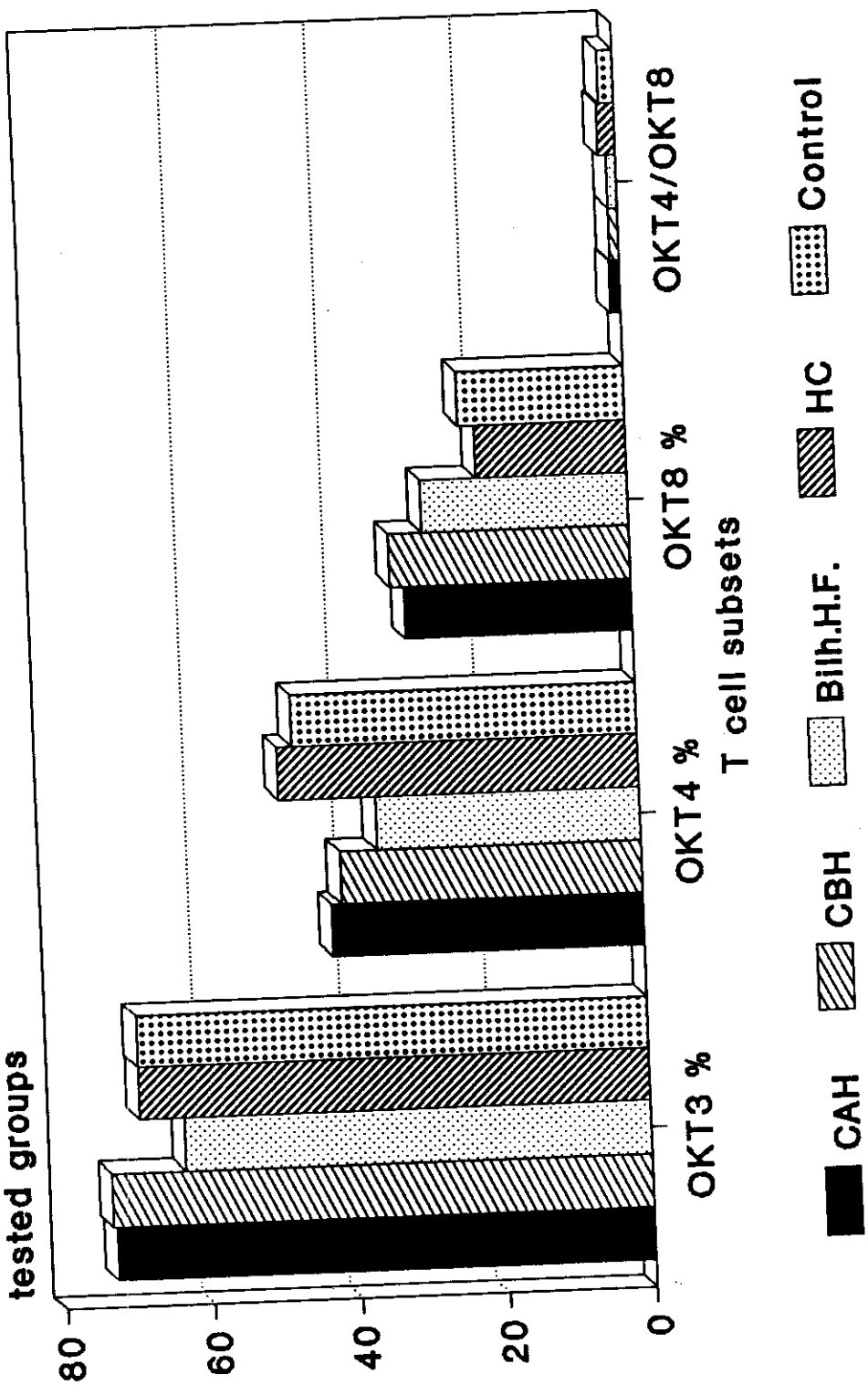


Table (24)
Correlations

Variable	Correlations	r	p	Strength of correlation
Ig G	Serum globulins	0.9486	<0.01	High + ve correlation
	Total serum bilirubin	0.6348	<0.01	Moderate + ve correlation
	Total serum proteins	0.5834	<0.01	Moderate + ve correlation
	Alkaline phosphatase	0.5096	<0.01	Moderate + ve correlation
	A/G ratio	−0.8229	<0.01	High − ve correlation
	Prothombin %	−0.5487	<0.01	Moderate − ve correlation
Ig A	Bilirubin	0.6241	<0.01	Moderate + ve correlation
	SGOT	0.6162	<0.01	Moderate + ve correlation
	SGPT	0.5469	<0.01	Moderate + ve correlation
	Prothrombin %	−0.5512	<0.01	Moderate − ve correlation
OKT4	OKT4/OKT8	0.8206	<0.01	High + ve correlation
	OKT3	0.5055	<0.01	Moderate + ve corlelation
	OKT8	−0.6038	<0.01	Moderate − ve correlation
OKT8	OKT4	−0.6038	<0.01	Moderate − ve correlation
	OKT4/OKT8	−0.9214	<0.01	High − ve correlation
HBs Ag	HBe Ag	0.6311	<0.01	Moderate + ve correlation
Anti HBe	Anti-HBs	0.6098	<0.01	Moderate + ve correlation

r = correlation coefficient

Table (25)
Unstandarized canonical discriminant function coefficients between chronic active hepatitis group and chronic persistent hepatitis group.

Variable	Functional coefficient
Ig G	0.003160873
C_4	−0.02139429
T.S bilirubin	−2.239509
SGOT	−0.009487814
SGPT	0.03189338
SGOT/SGPT	0.951221
Alk. phosph	0.01958925
Prothrombin %	0.01490897
S.Globulin	−0.9461150
A/G ratio	−0.0568288
Spleen	3.206965
Constant	−8.049525

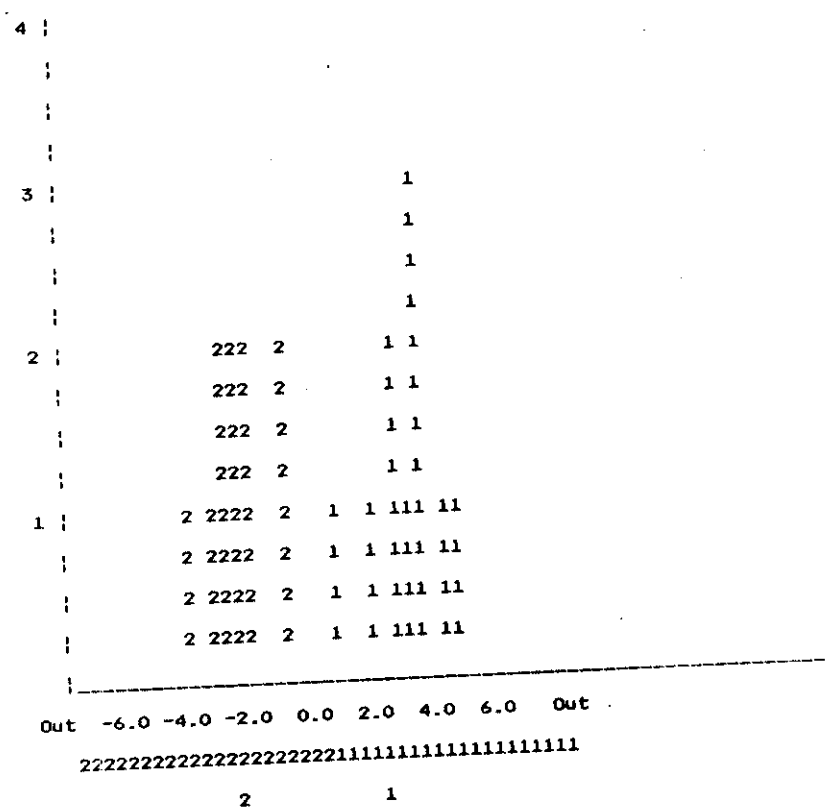
Canonical disriminant functions evaluated at group means (group centroids)

Group	Functional coefficient
Chronic active hepatitis	2.71379
Chronic persistent hepatitis	−2.711379

Z Cutting score = zero

(Figure 20)

All-groups stacked Histogram Canonical Discriminant Function



Classification results

Actual group	Number of cases	Predicted group group 1		Group membership group group 2	
		No.	%	No.	%
Chronic active hepatitis	10	10	100%	0	0%
Chronic persistent hepatitis	10	0	0%	10	100%

Percent of grouped cases correctly classified 100%

Table (26)
Unstandarized canonical discriminant function coefficients between chronic active and chronic persistent hepatitis groups.

Variable	Functional coefficient
Bilirubin	0.1760069
SGOT/SGPT	−0.1157225
Globulin	1.74621
Spleen	1.747247
Constant	−8.497608

Canonical disriminant function evaluated at group means (group centroids)

Group	Functional coefficient
Chronic active hepatitis	1.58
Chronic persistent hepatitis	−1.58

Z Cutting score = zero

Table (27)
Multiple regression equation for
the studied four groups of chronic liver diseases.

Dependent variable	Predictor variables	Beta	T	P
Group	OKT8	−0.53823	−7.189	<0.01
	Ig M	−0.38885	−5.740	<0.01
	SGPT	−0.31033	−3.959	<0.01
	Anti-HBc IgG	−0.20897	−2.819	<0.01
	Alkaline phosphatase	−0.17305	2.262	<0.05
	Constant	8.52888	15.301	<0.01

Beta : standard regression weight. It is weight that results when the predicting variable has corrected to standard score (Z scores) and the regression is calculated.

T : Test of significant of Beta.

The predicting regession equation for the different groups of diseases = 8.52888 (constant) + OKT8 x −0.53823 + IgM − 0.38885 + SGPT x − 0.1033 + Anti − HBc x − 0.20897 + Alkaline phosphatase x − 0.17305

Table (28)

Multiple regression equations for liver span, oedema , spleen , ascites and jaundice among the studied four groups of chronic liver diseases

Dependent variable	Indepenent variable Predicting variables	Beta	T	P
Liver span	Ig G	0.43579	3.545	<0.01
	OKT4	−0.42187	−3.432	<0.01
	Constant	14.98921	7.030	<0.01
Odema	Ascites	0.36043	2.827	<0.01
	Ig G	0.33142	2.599	<0.05
	Constant	−0.19828	−2.044	<0.05
Spleen	Ig G	0.55388	5.004	<0.01
	OKT4	−0.3371	−2.984	<0.01
	Anti-HBc IgG	0.22738	2.057	<0.05
	Constant	1.11343	2.895	<0.01
Ascites	HBe Ag	0.44711	4.080	<0.01
	Oedema	0.43107	3.934	<0.01
	Constant	0.12946	2.497	<0.05
Jaundice	Ig G	0.53109	4.388	<0.01
	Constant	−0.27595	−2.20	<0.05

(Fig 22) Chronic active hepatitis showing piece meal necrosis (H & E X 160)).

(Fig 23) Chronic active hepatitis showing prominant piece meal necrosis and bridging necrosis with very thick fibrous septa. (H & E X 160).

(Fig 24) Chronic persistent hepatitis showing mononuclear infiltrates of the portal tracts. (H & E X 100).

(Fig 25) Chronic persistent hepatitis showing mononuclear infiltrates of the portal tracts with intact limiting plate of the hepatic lobule (H & E X 100).

(Fig 26)Bilharzial hepatic fibrosis showing marked fibrosis and bilharzial ova within granulomatous reaction. (H & E X 160).

(Fig 27) Bilharzial hepatic fibrosis showing marked fibrosis of portal tract, with eosinophilic infiltration within the granulomatous reaction. (H & E X 100).

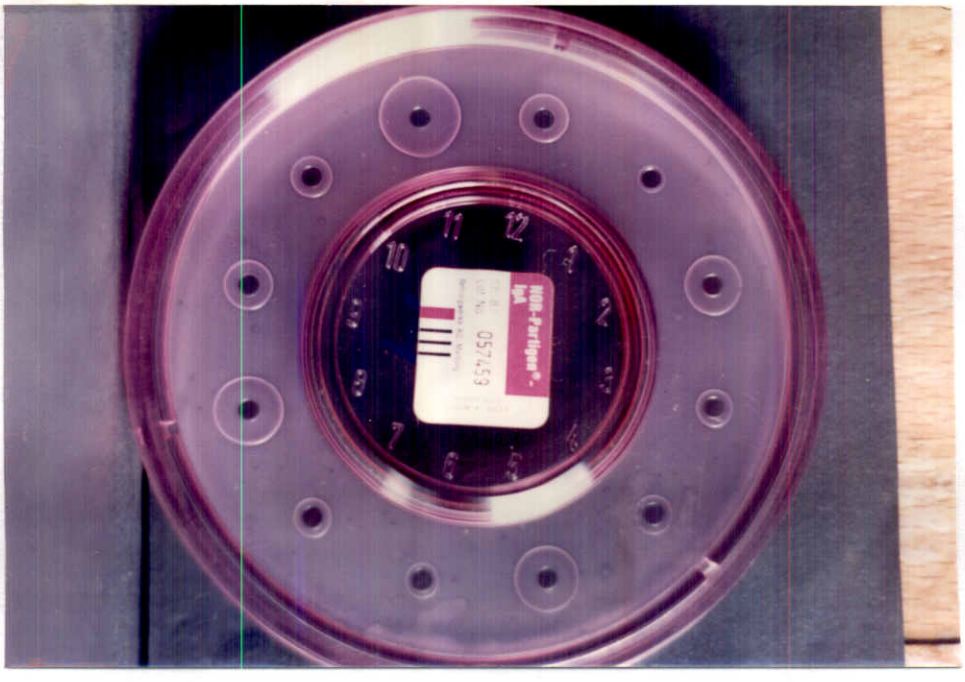
(Fig 28) Hepatic cirrhosis showing variable nodules surrounded by thick fibrous septa. (H & E X 40).

(Fig 29) Hepatic cirrhosis showing variable sized nodules surrounded by fibrous tissue septa entangling proliferated bile ducts.(H & E X 100).

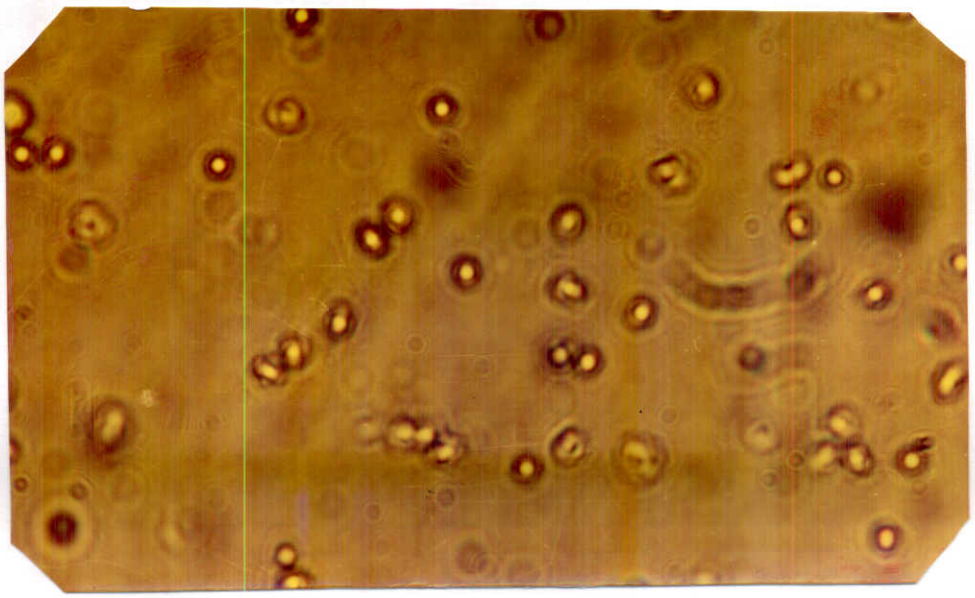
(Fig 30) High power examination of hepatic cirrhosis showing proliferated bile ducts, lymphocytic infiltration of fibrous tissue septa and ballooning of hepatocytes.

(Fig 31) Immunoglobulin G (IgG) among the studied groups.

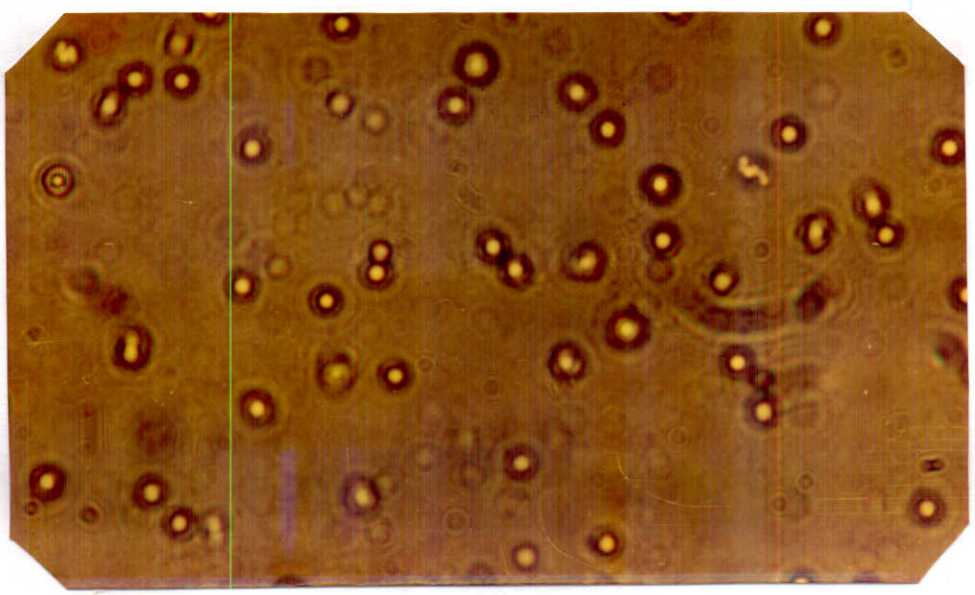
(Fig 32) Immunoglobulin M (IgM) among the studied groups



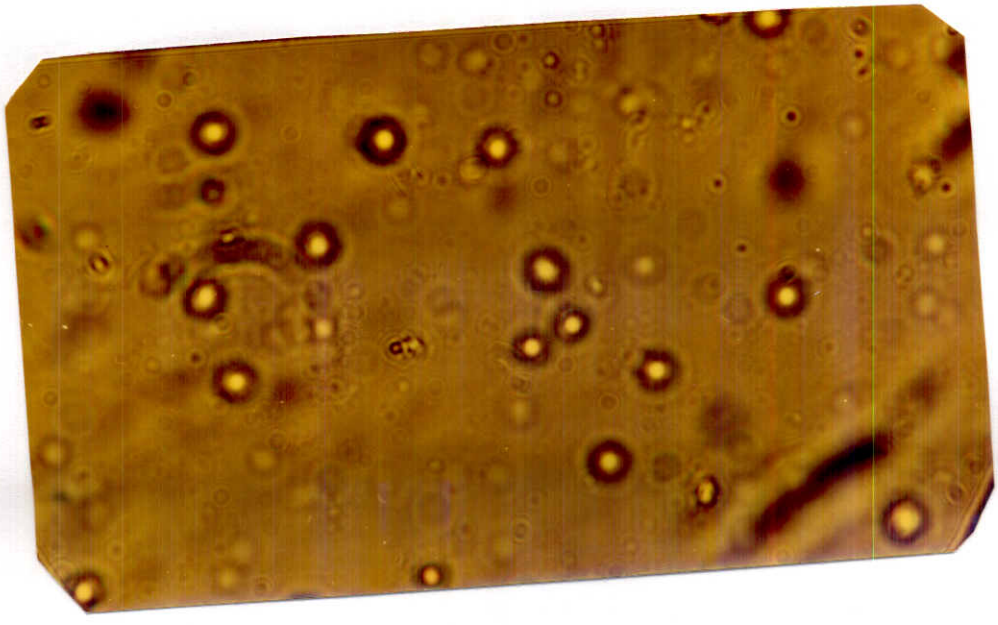
(Fig 33) Immunoglobulin A (IgA) among the studied groups.



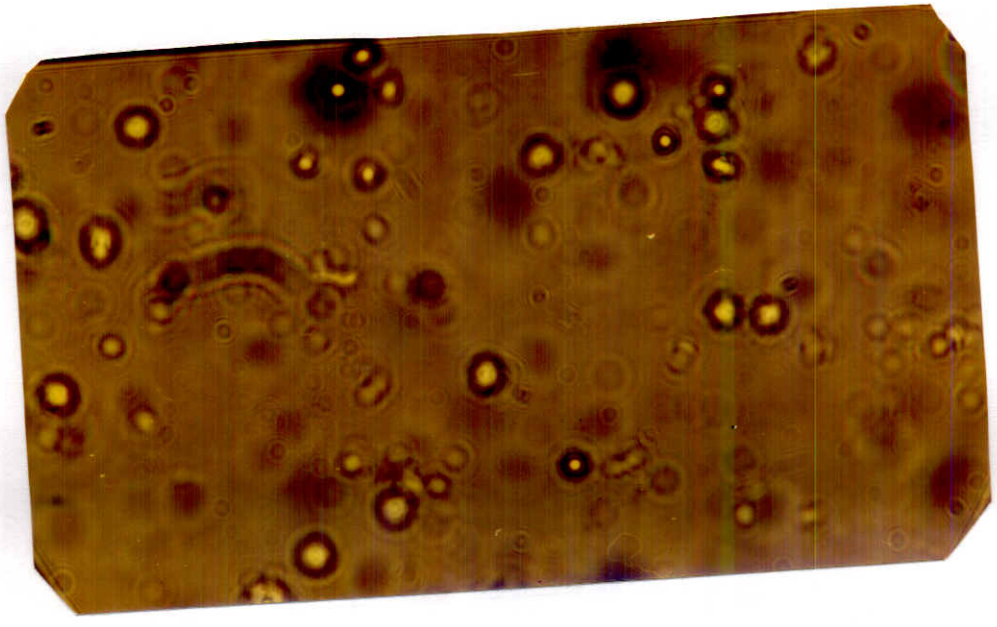
(Fig 38) OKT_3 Positive cells in biharzial hepatic fibrosis.



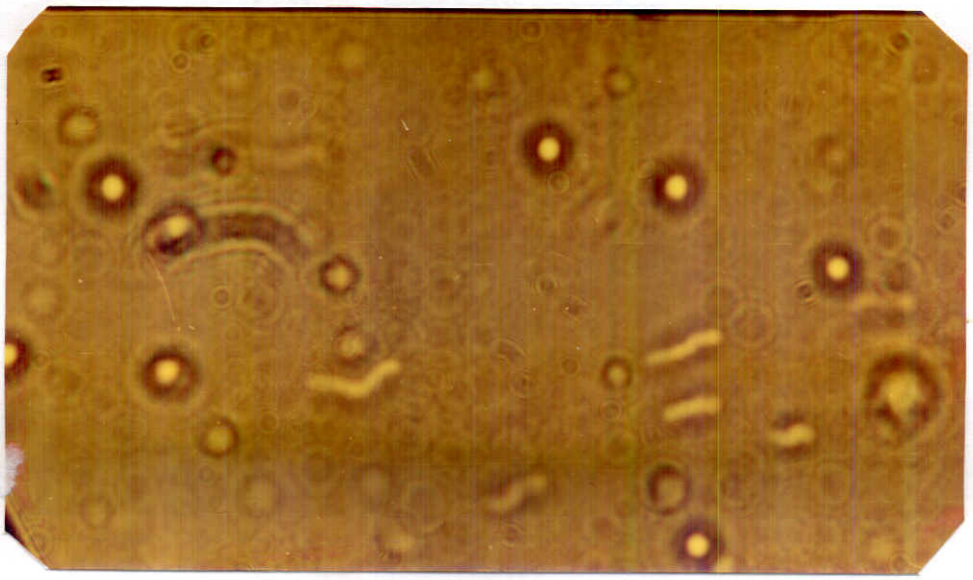
(Fig 39) OKT_3 Positive cells in hepatic cirrhosis.



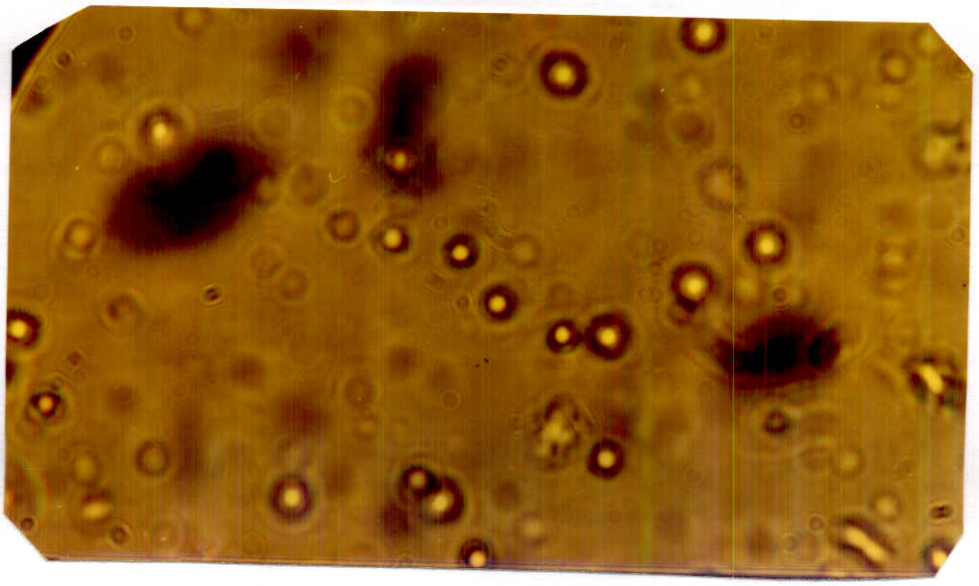
(Fig 46) OKT_8 Positive cells in chronic active hepatitis.



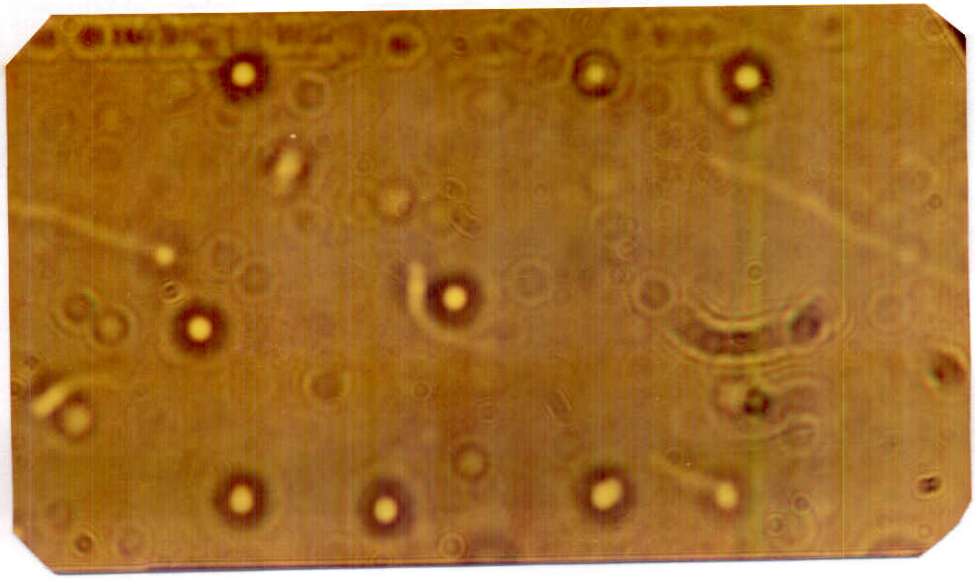
(Fig 47) OKT_8 Positive cells in chronic persistent hepatitis.



(Fig 48) OKT_8 Positive cells in bilharzial hepatic fibrosis.



(Fig 49) OKT_8 Positive cells in hepatic cirrhosis.



(Fig 50) OKT_8 Positive cells in control group.