# RESULTS

The results of the present study are summarized, statistically analyzed and presented in (8) tables and (12) figures.

**Table (11): Comparison between control, liver cirrhosis and HCC groups according to blood picture and INR:**

| | | N | Median | t | | p | |
|---|---|---|---|---|---|---|---|
| Hb (gm/dl) | control | 20 | 12.6 | $t_1$ | 5.9 | $P_1$ | <0.01 |
| | Liver cirrhosis | 30 | 10.5 | $t_2$ | 4.9 | $P_2$ | <0.01 |
| | HCC | 30 | 11 | $t_3$ | 1.7 | $p_3$ | >0.05 |
| WBCs (x $10^9$ /L) | control | 20 | 7.1 | $t_1$ | 5.3 | $P_1$ | <0.01 |
| | Liver cirrhosis | 30 | 4. | $t_2$ | 4.7 | $P_2$ | <0.01 |
| | HCC | 30 | 4.1 | $t_3$ | 0.3 | $p_3$ | >0.05 |
| Platelets (x $10^9$ /L) | control | 20 | 104.5 | $t_1$ | 4.03 | $P_1$ | <0.01 |
| | Liver cirrhosis | 30 | 172 | $t_2$ | 7.4 | $P_2$ | <0.01 |
| | HCC | 30 | 108 | $t_3$ | 5.1 | $p_3$ | <0.01 |
| INR | control | 20 | 1 | t1 | 4.6 | $P_1$ | <0.01 |
| | Liver cirrhosis | 30 | 1.5 | t2 | 6.5 | $P_2$ | <0.01 |
| | HCC | 30 | 1.6 | t3 | 2.03 | $p_3$ | >0.05 |

$t_1$ & $p_1$ between control and liver cirrhosis.

$t_2$ & $p_2$ between control and HCC.

$t_3$ & $p_3$ between liver cirrhosis and and HCC.

p value > 0.05 is considered non significant.

p value < 0.05 is considered significant.

p value < 0.01 is considered highly significant.

There was highly significant statistical difference between control group and liver cihrrosis group and between control group and HCC group as

regard Hb , WBCs count , platelet count and INR (P<0.01).

There was highly significant statistical difference between HCC group and liver cihrrosis group as regard platelet count (P<0.01).

There was non significant statistical difference between HCC group and liver cihrrosis group as regard Hb , WBCs count and INR (p>0.05).

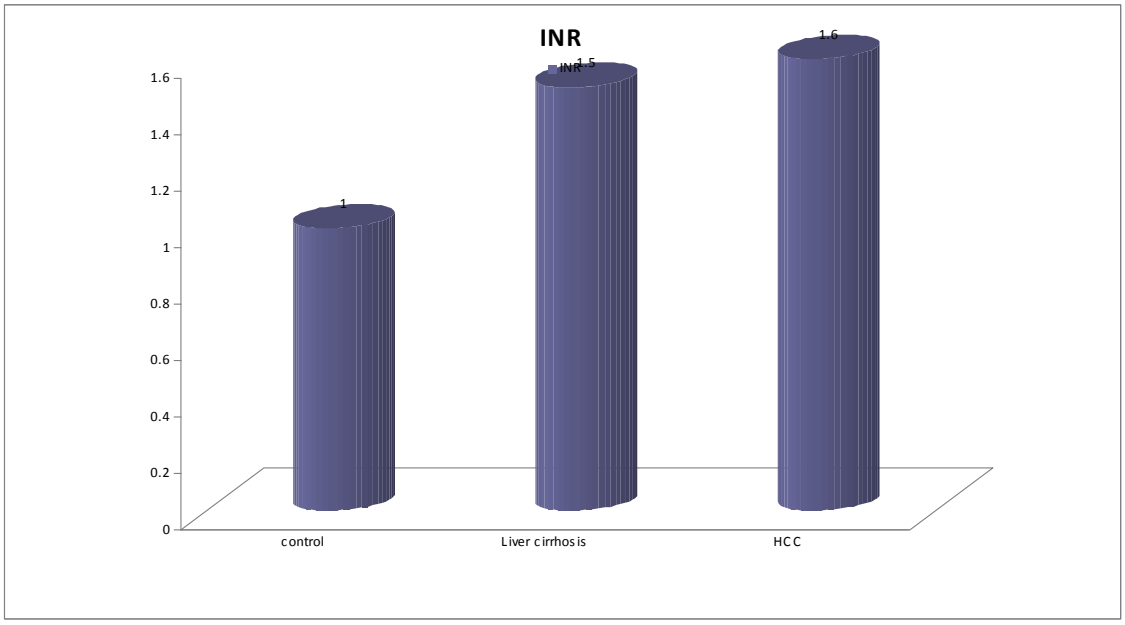


Figure 7: INR in the studied groups

**Table (12): Comparison between control, liver cirrhosis and HCC groups according to AST, ALT, and Alk.phosphatase, albumin, total bilirubin and direct bilirubin.**

| | | N | Median | t | | p | |
|---|---|---|---|---|---|---|---|
| **AST (U/L)** | control | 20 | 27.5 | t1 | 15.5 | p1 | <0.01 |
| | Liver cirrhosis | 30 | 67.5 | t2 | 13.6 | p2 | <0.01 |
| | HCC | 30 | 95 | t3 | 6.2 | p3 | <0.01 |
| **ALT (U/L)** | control | 20 | 24 | t1 | 12.9 | p1 | <0.01 |
| | Liver cirrhosis | 30 | 56 | t2 | 9.3 | p2 | <0.01 |
| | HCC | 30 | 58 | t3 | 2.9 | p3 | <0.05 |
| **Alk.phosphatase (U/L)** | control | 20 | 90 | t1 | 2.9 | p1 | <0.01 |
| | Liver cirrhosis | 30 | 114.5 | t2 | 3.3 | p2 | <0.01 |
| | HCC | 30 | 122 | t3 | 2.6 | p3 | <0.05 |
| **Albumin (g/dl)** | control | 20 | 4.25 | t1 | 3.9 | p1 | <0.01 |
| | Liver cirrhosis | 30 | 3.6 | t2 | 4.8 | p2 | <0.01 |
| | HCC | 30 | 3.4 | t3 | 3.5 | p3 | <0.05 |
| **Total bilirubin (mg/dl)** | control | 20 | 0.9 | t1 | 6.4 | p1 | <0.01 |
| | Liver cirrhosis | 30 | 1.5 | t2 | 3.6 | p2 | <0.05 |
| | HCC | 30 | 1.05 | t3 | 1.8 | p3 | >0.05 |
| **Direct bilirubin (mg/dl)** | control | 20 | 0.2 | t1 | 5.1 | p1 | <0.01 |
| | Liver cirrhosis | 30 | 0.4 | t2 | 3.4 | p2 | <0.05 |
| | HCC | 30 | 0.3 | t3 | 0.2 | p3 | >0.05 |

There was highly significant statistical difference between control group and liver cihrrosis group as regard AST, ALT , alkalin phosphatase, total bilirubin , direct bilirubin and albumin (P<0.01).

There was highly significant statistical difference between control group and HCC group as regard AST, ALT , alkalin phosphatase and albumin (P<0.01).

There was significant statistical difference between control group and HCC group as regard total bilirubin and direct bilirubin (P<0.05).
There was highly significant statistical difference between HCC group and liver cihrrosis group as regard AST (P<0.01).

There was significant statistical difference between HCC group and liver cihrrosis group as regard ALT, alkalin phosphatase and albumin (P<0.05).
There was non significant statistical difference between HCC group and liver cihrrosis group as regard total bilirubin , direct bilirubin (P>0.05).

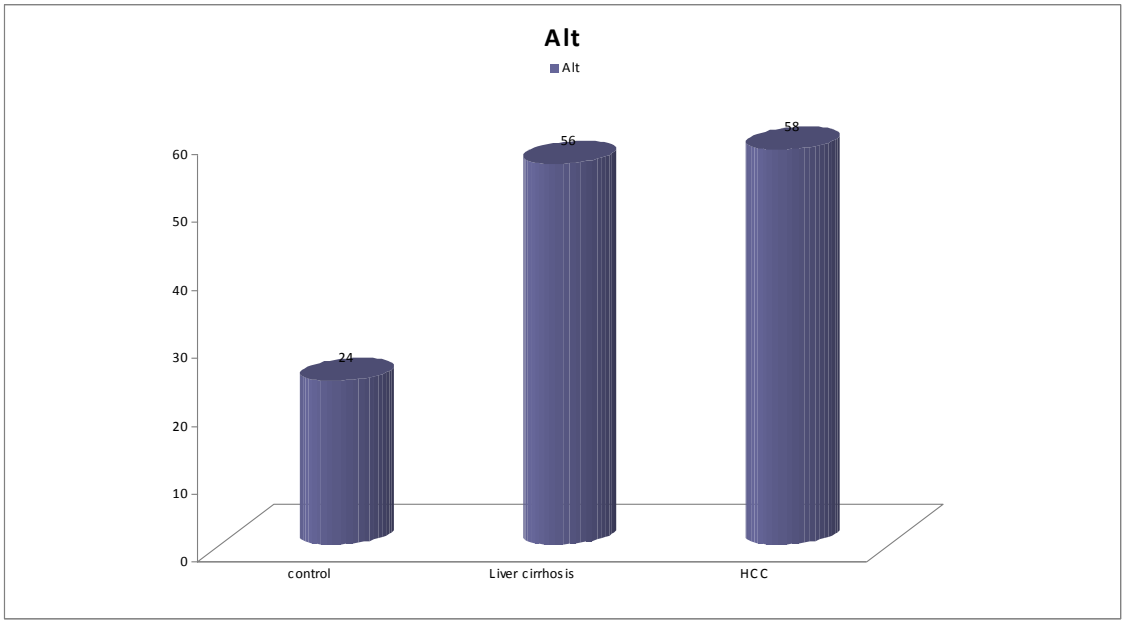


Figure 8: Serum ALT in the studied groups

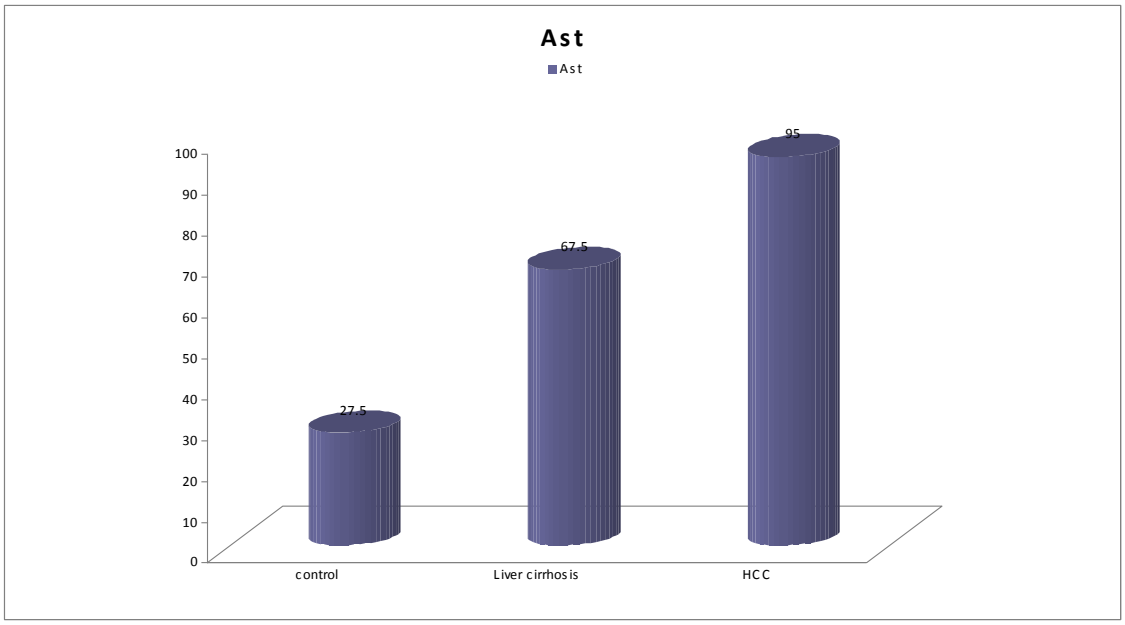


Figure 9: Serum AST in the studied groups

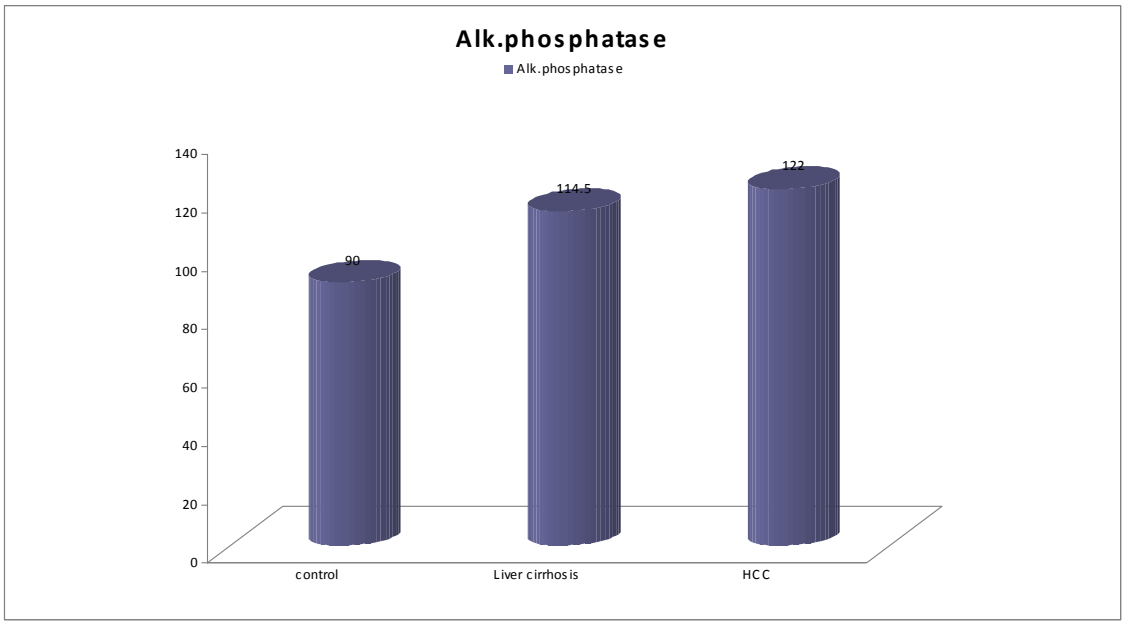


Figure 10: Serum ALK. phosphatase in the studied groups

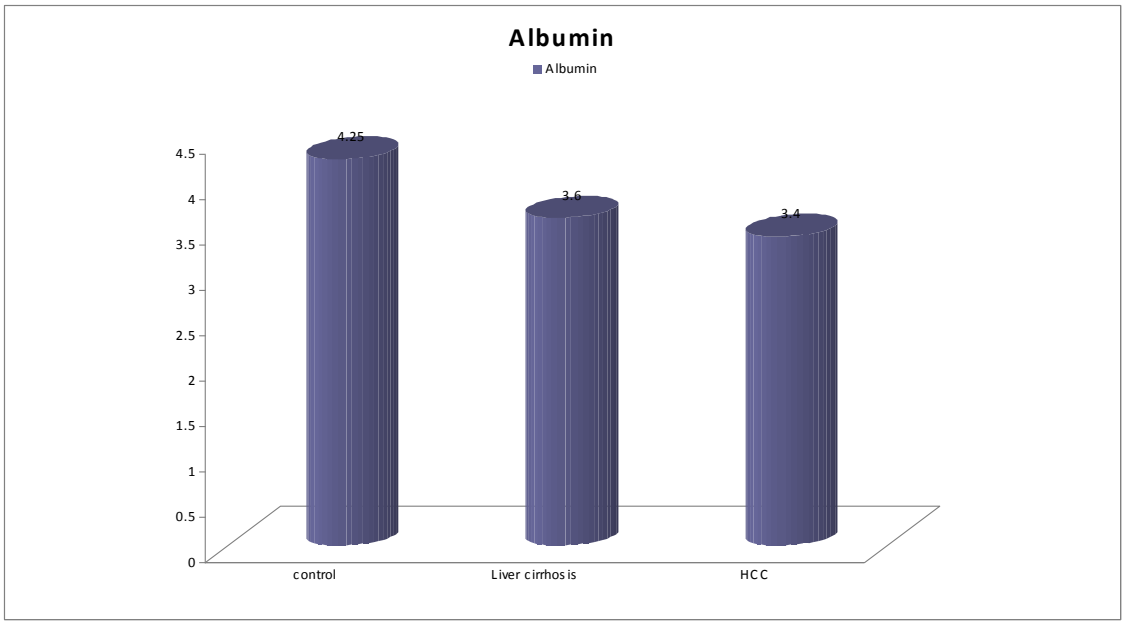


Figure 11: Serum albumin in the studied groups

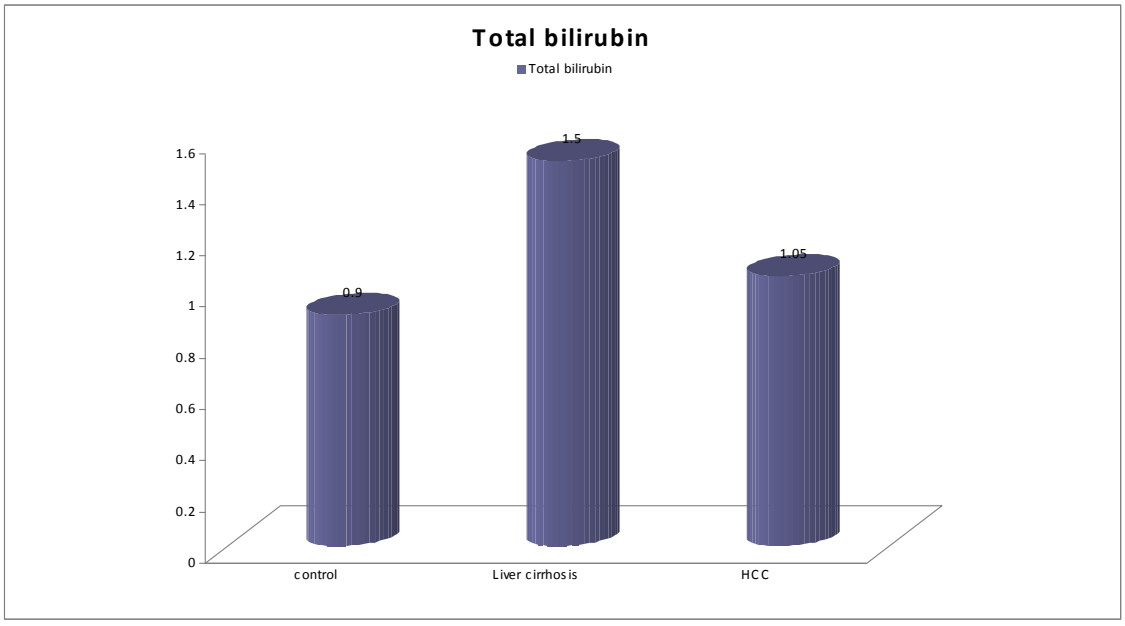


Figure 12: Serum total bilirubin  in the studied groups

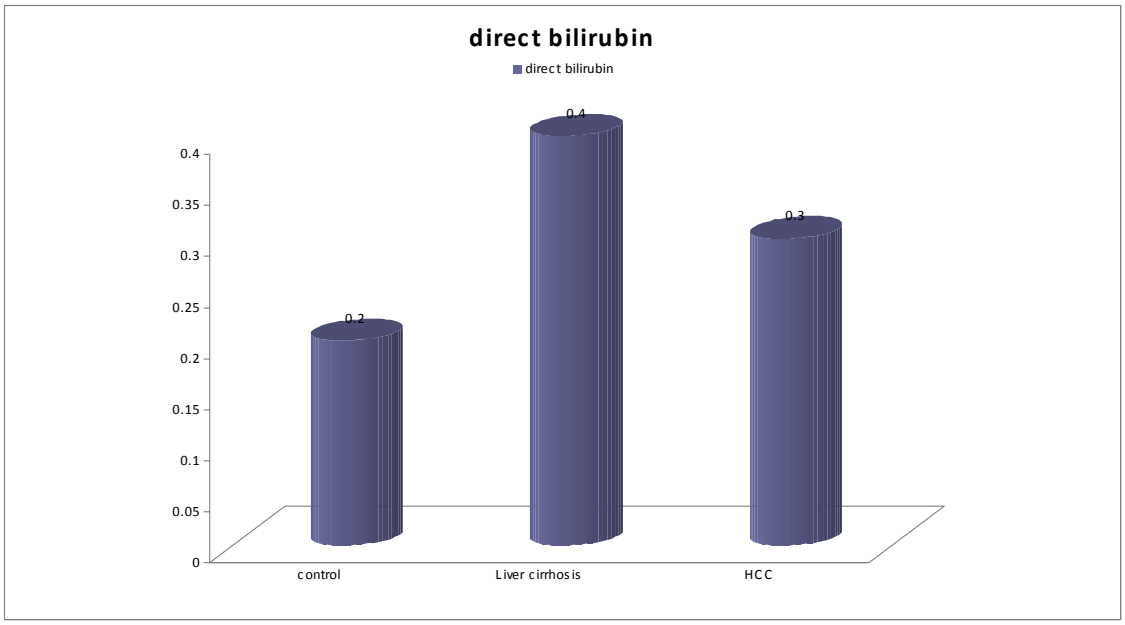


Figure 13: Serum direct bilirubin in the studied groups

**Table ( 13 ): Comparison between control, liver cirrhosis and HCC groups according to AFP & chromogranin A:**

| | | N | Median | t | | p | |
|---|---|---|---|---|---|---|---|
| AFP (ng/ml) | control | 20 | 2.75 | $t_1$ | 2.8 | $p_1$ | <0.05 |
| | Liver cirrhosis | 30 | 5.35 | $t_2$ | 3.6 | $p_2$ | <0.01 |
| | HCC | 30 | 26.5 | $t_3$ | 4.04 | $p_3$ | <0.01 |
| Chromogranin A (ng/ml) | control | 20 | 15.8 | $t_1$ | 2.1 | $p_1$ | <0.05 |
| | Liver cirrhosis | 30 | 19.5 | $t_2$ | 5.1 | $p_2$ | <0.01 |
| | HCC | 30 | 71.7 | $t_3$ | 5.2 | $p_3$ | <0.01 |

There was a significant statistical difference between control group and liver cihrrosis group as regard AFP and chromogrnin A (P<0.05).

There was a highly significant statistical difference between control group and HCC group and between liver cihrrosis group and HCC group as regard AFP and chromogrnin A(P<0.01).

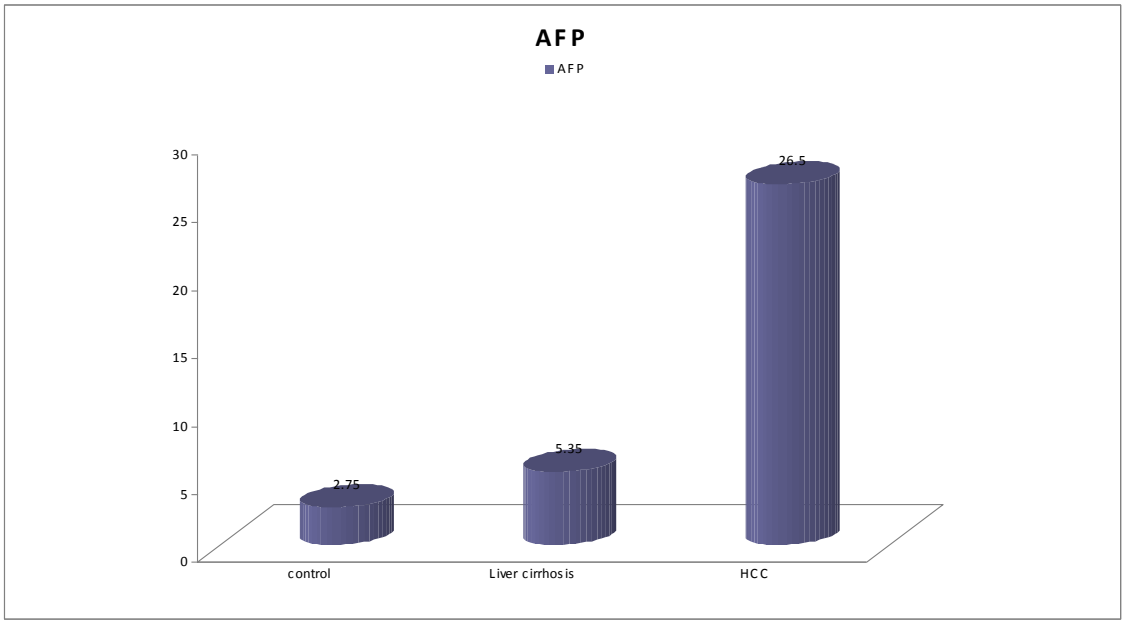


Figure 14: Serum AFP in the studied groups

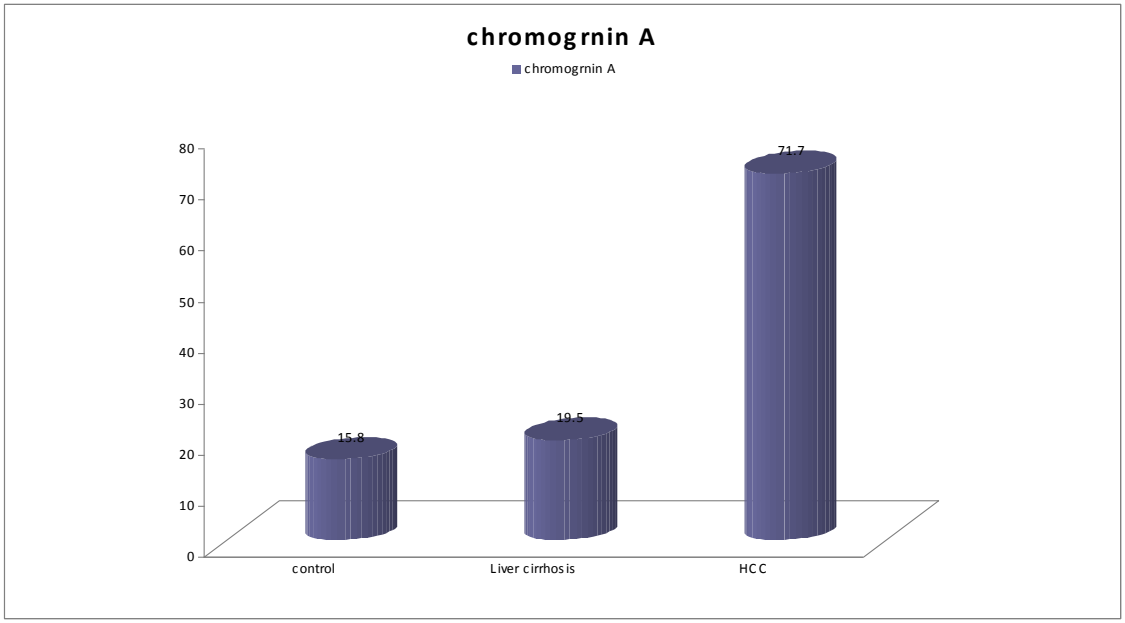


Figure 15: Serum chromogranin A in the studied groups

**Table (14 ): Comparison between control, liver cirrhosis and HCC groups according to kidney functions:**

| | | N | Median | t | | p | |
|---|---|---|---|---|---|---|---|
| Creatinine (mg/dl) | control | 20 | 1.05 | $t_1$ | 1.5 | p1 | >0.05 |
| | Liver cirrhosis | 30 | 0.9 | $t_2$ | 1.3 | p2 | >0.05 |
| | HCC | 30 | 0.9 | $t_3$ | 0.1 | p3 | >0.05 |
| Urea (mg/dl) | control | 20 | 31 | $t_1$ | 0.9 | p1 | >0.05 |
| | Liver cirrhosis | 30 | 24.5 | $t_2$ | 1.1 | p2 | >0.05 |
| | HCC | 30 | 33.5 | $t_3$ | 0.6 | p3 | >0.05 |

There was non significant statistical difference between the three studied groups as regard urea and creatinine (P>0.05).

**Table (15): Sensitivity, specificity, PPV, NPV of AFP, chromograninA and both:**

| | sensitivity | specificity | PPV | NPV | AUC | P value |
|---|---|---|---|---|---|---|
| AFP | 86.7% | 80% | 81.3% | 85.7% | 0.895 | <0.05 |
| Chromogranin(A) | 83.3% | 76.7% | 78.1% | 82.1% | 0.886 | <0.05 |
| AFP and chromogranin(A) | 90% | 83.3% | 81.8% | 89.3% | --- | --- |

PPV= Positive predictive value.

NPV= Negative predictive value.

AUC= Area under the curve.

The sensitivity of AFP was (86.7%) and the specificity was (80%) while the sensitivity of CgA was (83.3%) and the specificity was (76.7%). The combined use of the two markers AFP and CgA led to increase in the specificity of AFP and CgA to (83.3%) and increase in the sensitivity of AFP and CgA to (90%).

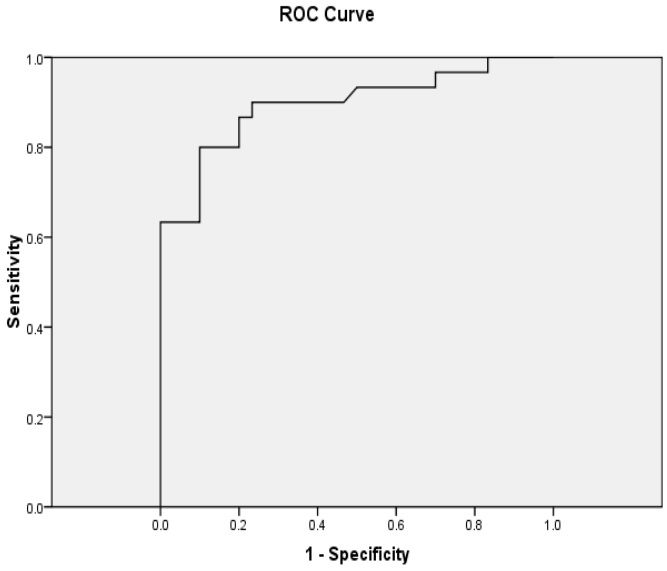


Figure 16: Roc curve for alpha fetoprotein

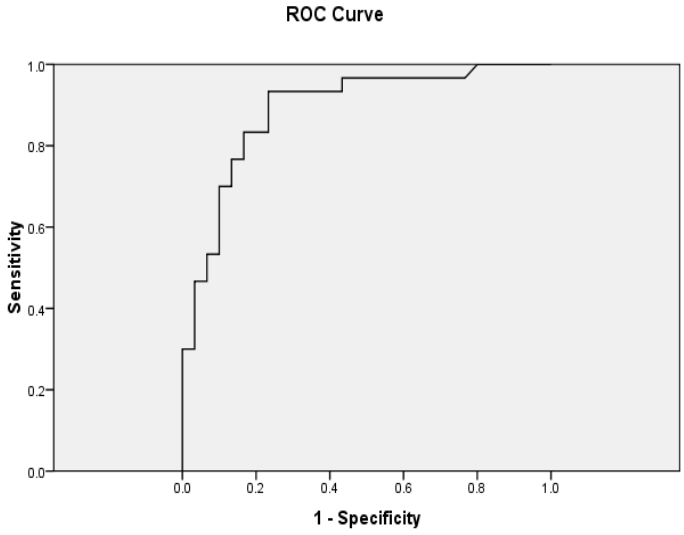


Figure 17: Roc curve for chromogranin A

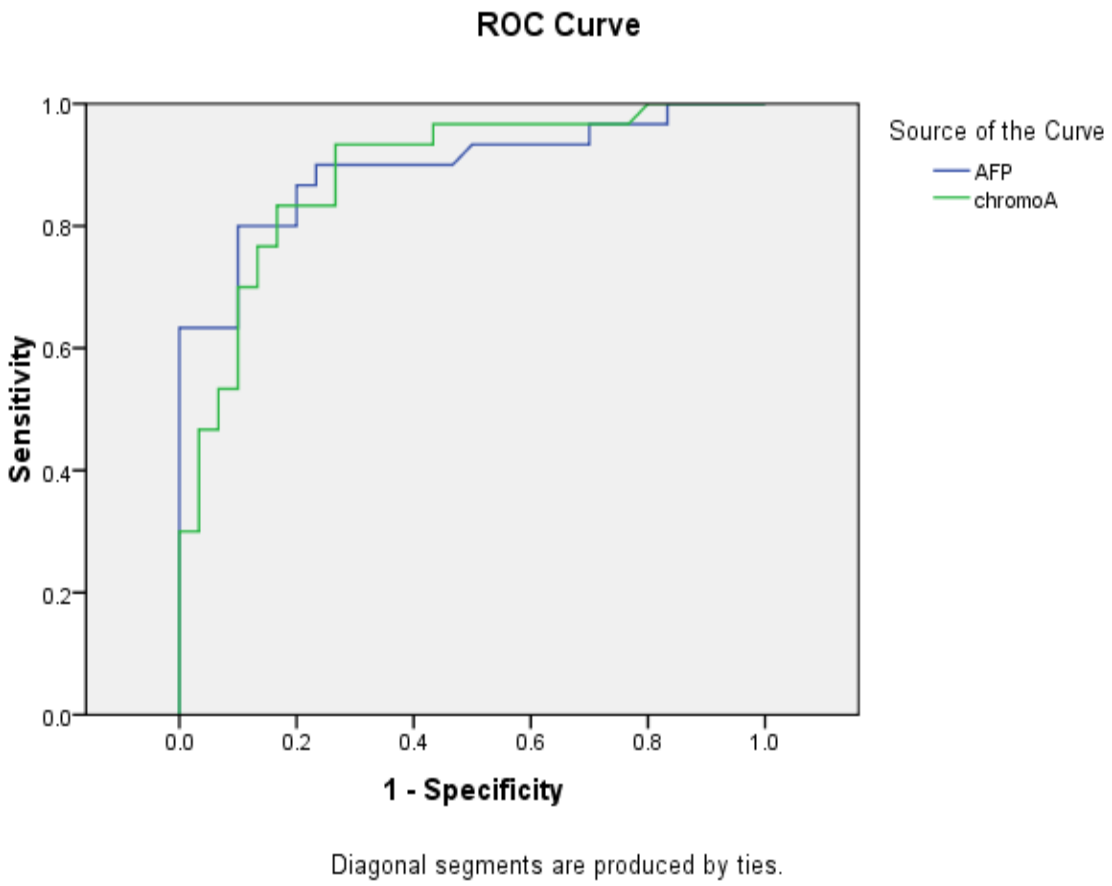


Figure 18: Comparison between AFP and chromogrnin A by ROC curve

**Table (16): Area Under the curve for AFP and Chromogranin A**

| Test Result Variable(s) | Area |
|---|---|
| AFP | 0.895 |
| Chromogranin A | 0.886 |

* The more the area under the curve, the better is the test

**Table (17): Correlation between AFP and different studied variables**

| | r | P |
|---|---|---|
| Chromogrnin A | -0.1 | >0.05 |
| Hb | -0.03 | >0.05 |
| WBCs | -0.03 | >0.05 |
| Platelets | 0.2 | >0.05 |
| INR | 0.5 | <0.05 |
| Creatinine | 0.1 | >0.05 |
| Urea | 0.4 | >0.05 |
| AST | 0.1 | >0.05 |
| ALT | -0.02 | >0.05 |
| Alk.phosphatase | -0.1 | >0.05 |
| Total bilirubin | 0.1 | >0.05 |
| Direct bilirubin | 0.03 | >0.05 |
| Albumin | -0.1 | >0.05 |

There was non significant correlation between AFP and chromograni A, Hb, WBCs, platelets , ALT, alkaline phosphatase, albumin, AST, total bilirubin and direct bilirubin, , creatinine and urea.

There was positive significant correlation between AFP and INR.

**Table ( 18 ): Correlation between chromogrnin A and different studied variables**

| | r | P |
|---|---|---|
| AFP | -0.1 | >0.05 |
| Hb | 0.23 | >0.05 |
| WBCs | 0.3 | >0.05 |
| Platelets | -0.04 | >0.05 |
| INR | 0.14 | >0.05 |
| Creatinine | -0.06 | >0.05 |
| Urea | 0.01 | >0.05 |
| AST | 0.1 | >0.05 |
| ALT | -0.1 | >0.05 |
| Alk.phosphatase | 0.85 | <0.05 |
| Total bilirubin | -0.1 | >0.05 |
| Direct bilirubin | 0.3 | >0.05 |
| Albumin | -0.86 | <0.05 |

There was non significant correlation between chromogranin A and AFP, Hb, WBCs, platelets , INR, ALT, AST, total bilirubin and direct bilirubin, creatinine and urea.

There was a negative significant correlation between chromogranin A and albumin .

There was a positive significant correlation between chromogranin A and alkaline phosphatase.