Determination of Alpha-Protein, Carcino-embryonic antigen and c-reactive protein in patients with malignant liver pathology

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Abstract

In this paper there are presented values of AFP, CEA, CRP in malignant liver pathologies. Alpha-Fetoprotein AFP is an oncofetal protein. The pathological increase in AFP is increased in malignant liver pathologies, testicular cancer and ovarian cancer. A significant increase in AFP is noted in hepatocellular carcinoma, with AFP up to 3000 ng / ml. AFP is a useful tumor marker in the diagnosis and monitoring of hepatocellular carcinoma treatment. AFP levels in blood sera above 3000 ng / ml attest to the presence of hepatocellular carcinoma. In laboratory practice AFP is measured by analysis of immunoassay techniques. In 20 patients diagnosed with liver cancer, AFP was measured in blood serum using the ELISA analytical method. Measurements were performed on the ELISA Human READER HS microfotometer.

Study data indicate that in malignant liver pathologies, there is a statistically significant increase in the concentration of AFP in blood serum. ($P < 0.001$).

Carcinoembryonic antigen (CEA) is a glycoprotein with molecular weight 180 KD. This glycoprotein is synthesized during normal fetal development in the gastrointestinal and pancreas tracts. It is then secreted into the circulatory system. CEA is widely used as a marker of gastrointestinal cancer. Other malignant pathologies can cause high levels of CEA. Among these malignant pathologies are liver cancer. CEA concentration was measured in the above 20 patients, in whom AFP was also determined. Determination of CEA was performed by immunofluorescence method on nitro cellulose supernatant. Measurements were made with microfluorometers equipped with parametric microchips. It results that in malignant liver pathologies the concentration of CEA in blood serum increases statistically significantly ($P < 0.001$).

C-Reactive Protein (CRP) is a protein that is synthesized in the liver during the acute phase of acute processes. In many cases, malignant pathologies are associated with inflammatory phenomena. In cases where malignant pathology is associated with inflammatory processes, the determination of CRP in blood serum is useful. To measure CRP concentration in blood serum, in 20 patients with malignant liver pathology we selected the immunoturbidimetric method. Results show that in malignant liver pathologies the concentration of CRP in blood serum is also significantly ($P < 0.001$) increased, which proves the presence of necrosis and inflammation in these pathologies.

Keywords: Alpha-Protein, Carcino-embryonic antigen, C-reactive protein, malignant liver pathology.

I. Values of Alpha-Fetoprotein in Malignant Liver Pathology

Alpha-Fetoprotein AFP is an oncofetal protein. Depending on the analytical technique used to measure AFPS levels, its normal blood values are less than 10 ng / ml. A physiological increase in AFP is observed in gravidity. Most pregnant women have a high concentration of alpha-fetoprotein in their blood serum. The pathological increase in AFP is increased in malignant liver pathologies, testicular cancer and

ovarian cancer. A significant increase in AFP is noted in hepatocellular carcinoma, with AFP up to 3000 ng / ml. AFP is a useful tumor marker in the diagnosis and monitoring of hepatocellular carcinoma treatment. AFP levels in blood sera above 3000 ng / ml attest to the presence of hepatocellular carcinoma. In laboratory practice AFP is measured by analysis of immunoassay techniques. In 20 patients diagnosed with liver cancer, AFP was measured in blood serum using the ELISA analytical method. Measurements were performed on the ELISA Human READER HS microfotometer. The data obtained are given in Table 1.

Table number 1. AFP concentration in 20 patients with malignant liver pathology.

Number	Name Surname (first letters)	AFP (ng/ml)
1	V.P	35
2	E.L	45
3	S.P	30
4	A.L	45
5	V.S	105
6	V.R	60
7	Z.S	120
8	B.K	55
9	S.M	50
10	A.A	60
11	Z.D	150
12	F.S	100
13	R.Z	300
14	H.K	200
15	N.B	150
16	A.K	100
17	R.F	200
18	R.C	150
19	I.M	105
20	K.L	140

The data obtained for AFP concentration in malignant liver pathology were mathematically processed. The mean X value, standard deviation S.D and it was calculated the T-test and compared to normal AFP values, the data obtained are given in Table 2.

Table number 2: Mathematical-statistical processing data for the AFP concentration of 20 patients with malignant liver pathology

Group Name	Number of Cases N	Average values X (ng/ml)	Standard Deviation S.D	T-test
Patients with malignant pathology	20	100.4	74.7	tlog < ttab P<0.001
Normal Patients	20	1.5	2.0	

Mathematical-statistical processing data for the AFP concentration of 20 patients with

malignant liver pathology. From the table data it is obvious that in malignant liver pathology, AFP grow so obvious and this increase is statistically reliable.

II. Carcinoembryonic antigen values in malignant liver pathologies

Carcinoembryonic antigen (CEA) is a glycoprotein with molecular weight 180 KD. This glycoprotein is synthesized during normal fetal development in the gastrointestinal and pancreas tracts. It is then secreted into the circulatory system. CEA is widely used as a marker of gastrointestinal cancer. Other malignant pathologies can cause high levels of CEA. Among these malignant pathologies are liver cancer.

CEA concentration was measured in the above 20 patients, in whom AFP was also determined. Determination of CEA was performed by immunofluorescence method on nitro cellulose supernatant. Measurements were made with microfluorometers equipped with parametric microchips. The data obtained are given in Table 3.

Number	Name Surname (first letters)	CEA (ng/ml)
1	V.P	5.5
2	E.L	7.5
3	S.P	9.6
4	A.L	3.5
5	V.S	14.7
6	V.R	50.0
7	Z.S	16.0
8	B.K	37.0
9	S.M	43.2
10	A.A	25.0
11	Z.D	62.0
12	F.S	46.3
13	R.Z	41.2
14	H.K	6.52
15	N.B	4.48
16	A.K	52.4
17	R.F	63.0
18	R.C	32.0
19	I.M	16.0
20	K.L	56.5

Table number 3. CEA concentration in 20 patients with malignant liver pathology

The obtained data were statistically processed and obtained data are presented in Table 4.

Table number 4. Statistical mathematical processing data, for CEA concentration, in 20 patients with malignant liver pathology.

Group name	Number of cases N	Average Value X (ng/ml)	Standard Deviation S.D	T-test
Patients with malignant pathology	20	55.1	108	tllog < ttab P<0.001
Normal Patients	20	3.2	0.8	

The data in Table 4 indicate that in malignant liver pathologies, the concentration of CEA in blood serum increases and this increase is statistically significant ($P < 0.001$).

III. Values of C-Reactive Protein (CRP) in malignant liver pathology.
IV.

C-Reactive Protein (CRP) is a protein that is synthesized in the liver during the acute phase of acute processes. In many cases, malignant pathologies are associated with inflammatory phenomena. In cases where malignant pathology is associated with inflammatory processes, the determination of CRP in blood serum is useful. Many researchers are of the opinion that CRP synthesis in the liver in malignant pathology grows much faster than in inflammatory processes. A sharp decrease in CRP concentration in the serum indicates the efficacy of the therapy used in the treatment. Several methods are used to measure the concentration of CRP in blood serum. The most prominent are:

- Immunoturbidimetric method
- ELISA method
- Radial immunodiffusion
- Immunofluorescence with nitrocellulose plate etc.

To measure CRP concentration in blood serum, in 20 patients with malignant liver pathology we selected the immunoturbidimetric method. In this method, the anti-CRP antibodies contained in the latex-labeled analytical reagent enter into an immunological reaction with the CRP antigens present in the serum. As a consequence of this reaction, the latex antigen-anticorp complexes are formed which agglutinate giving a homogeneous turbidity. Turbulence intensity (or absorption magnitude) is measured in a turbidometer or programmable photo meter in a Fixed Time photometric program. The basic elements of this program are

Method: Fixed Time with standard
Unit: ng / ml
Wavelength: 546 nm
Incubation time in the calf: 10 sc
Measurement time (time interval): 120 sec
Suction volume: 400 μl
Direction of increasing (positive slope) reaction
Concentration of standard: 100 mg / l
Minimum normal value: 0 mg / l
Maximum normal value: 5 mg / l
Blank reagent: No

CRP determination was performed on the serum of 20 patients with malignant liver pathology in whom AFP and CEA concentrations were also measured. Diagnosis of these patients was made on the basis of clinical, imagery, laboratory, and biopsy data. Patients had received medical, surgical, chemotherapy or a combination of both therapies. Measurements were performed using an immunoturbidimetric kit and a programmable photometer, on which the above software was installed. The data obtained are given in Table 5.

Table number 5. CRP concentration in 20 patients with malignant liver pathology.

Number	Name Surname (first letters)	CRP (mg/ml)
1	V.P	21.1
2	E.L	4.49
3	S.P	11.9
4	A.L	43.2
5	V.S	63.8
6	V.R	5.72
7	Z.S	62.6
8	B.K	6.25
9	S.M	7.75
10	A.A	36.6
11	Z.D	55.4
12	F.S	57.4
13	R.Z	140.0
14	H.K	80.0
15	N.B	60.0
16	A.K	64.0
17	R.F	160.0
18	R.C	80.0
19	I.M	62.0
20	K.L	64.0

CRP concentration data in 20 patients with malignant liver pathology were statistically processed. The data obtained are given in table No.6.

Group name	Number of cases N	Average Value X	Standard Deviation S.D	T-test
Patients with malignant pathology	20	43.7	37.0	tllog < ttab P<0.001
Normal Patients	20	2.5	1.5	

Table number 6. Statistical mathematical processing data for CRP concentration, in 20 patients, with malignant liver pathology. The data show that in malignant liver pathologies, CRP levels are high, on average 17 times higher than normal levels.
This decrease in CRP values in malignant liver pathologies is statistically reliable, as evidenced by the T-test (P<0.001). This experimental fact can be explained for two reasons:
- Malignant liver pathologies are associated with necrotic processes of the affected tissue and it has already been proven that necrotic processes increase the concentration of CRP in blood serum.
- In malignant pathologies, there is always an element of inflammation, and this is another cause for increased CRP concentration. Such a conclusion is supported by literature sources (Shauma C. Anderson, Susan Coc Kayn. Clinical chemistry, 1993, 1999). Either way CRP is a non-specific marker. This is because CRP is also

increased during the organism's immune response to infection, tissue destruction, cell necrosis, malignant pathologies.However coupled with other biochemical tests, CRP has its values for differential diagnosis. It is worth adding to the list of classic and contemporary tumor markers of malignant pathologies CRP determination.

V. Conclusions

1. Study data indicate that in malignant liver pathologies, there is a statistically significant increase in the concentration of AFP in blood serum. ($P < 0.001$)
2. Also in malignant liver pathologies the concentration of CEA in blood serum increases statistically significantly ($P < 0.001$)
3. In malignant liver pathologies the concentration of CRP in blood serum is also significantly ($P < 0.001$) increased, which proves the presence of necrosis and inflammation in these pathologies.
4. In the list of classic and contemporary liver tumor markers such as ALP, LDH, CA-19.9, CEA may also be added AFP and CRP.