
ONCOLOGY

The Carcinoembryonic Antigen CA-19-9 and α -Fetoprotein in Patients with Diseases Other Than Cancer and Their Clinical Significance

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Tumor markers CA-19-9 (a carcinoembryonic antigen) and α -fetoprotein are measured in sera of 437 patients hospitalized for diseases other than cancer. The CA-19-9 level is increased in patients with peptic ulcer and cholelithiasis. The study demonstrates the advantages of immunological methods of examination in the diagnosis of latent tumors of the kidneys, stomach, pancreas, liver, gallbladder, and lungs. Tumor markers can be used as prognostic criteria in cirrhosis of the liver, chronic hepatitis, and circulatory diseases.

Key Words: CA-19-9; carcinoembryonic antigen; α -fetoprotein; noncancer diseases

Carbohydrate CA-19-9 antigen is used in oncology for diagnostics and monitoring of pancreaticoduodenal [5] and gastrointestinal [4] malignant tumors. There is evidence that serum CA-19-9 content is increased in patients with diseases other than cancer, such as chronic pancreatitis and hepatitis, cirrhosis of the liver, inflammatory diseases of the lungs [1-3].

Therapy of noncancer diseases accompanied by high blood levels of tumor markers (TM) requires repeated measurements of the marker or profound examinations of patients for detecting the tumor. If an abnormal blood level of TM is repeatedly detected and no cancer is diagnosed, TM levels are monitored over time. There are no published data on the course of noncancer diseases in the presence of increased levels of CA-19-9 and the relationship of this TM to the development of tumors in subjects at a high risk of cancer.

The purpose of this study was to detect a relationship between abnormal blood content of CA-19-9 in patients at a high risk of cancer and the development of malignant tumors within a year.

MATERIALS AND METHODS

Case histories and results of one-year follow-up of 437 patients with increased levels of CA-19-9, in whom no cancer was diagnosed, are analyzed. The patients were divided into the following groups:

- 1) circulatory disorders: 76 patients with myocardial infarction, essential hypertension, cardiosclerosis, various heart diseases, mean age 71 years;
- 2) acute and chronic pulmonary diseases: 53 patients (mean age 64.5 years) with acute and chronic pneumonia, asthma, and pulmonary tuberculosis;
- 3) chronic hepatitis: 59 patients with chronic viral hepatitis B and C, mean age 52.1 years;
- 4) cirrhosis of the liver: 40 patients with liver cirrhosis of viral etiology and biliary and alcohol cirrhosis, mean age 59.9 years;
- 5) peptic ulcer: 38 patients, mean age 60.7 years;
- 6) cholelithiasis: 39 patients, mean age 66.3 years;
- 7) chronic pancreatitis: 41 patient, mean age 57.2 years;
- 8) renal diseases: 32 patients with chronic pyelonephritis and nephrolithiasis, mean age 57.1 years;

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TABLE 1. Serum CA-19-9, CEA, and AFP Levels in Patients with Diseases Other Than Cancer

Patients with	Number of patients	CA-19-9, U/ml		CEA, ng/ml		AFP, U/ml	
		$\bar{X} \pm m$	max	$\bar{X} \pm m$	%	$\bar{X} \pm m$	%
Diseases of circulation	76	123.2 \pm 14.1	874.9	3.5 \pm 0.6	15.8	1.1 \pm 0.2	0
Acute and chronic diseases of the lungs	53	132.7 \pm 27.7	888.9	3.7 \pm 0.6	22.6	0.7 \pm 0.1	0
Chronic hepatitis	59	258.0 \pm 43.7	1060.3	3.2 \pm 0.4	11.9	5.9 \pm 2.5	17
Cirrhosis of the liver	40	287.8 \pm 56.1	1550.2	5.3 \pm 0.8	32.5	54.7 \pm 17.1	37.5
Peptic ulcer	36	114.3 \pm 18.9	465.4	4.3 \pm 0.9	19.4	2.9 \pm 1.5	5.6
Cholelithiasis	39	173.2 \pm 28.4	586.5	2.1 \pm 0.3	10.3	1.9 \pm 0.7	2.6
Chronic pancreatitis	41	82.3 \pm 9.2	172.2	4.3 \pm 1.0	14.6	1.9 \pm 0.6	0
Renal diseases	32	138.9 \pm 30.8	419.5	4.8 \pm 2.1	12.5	2.2 \pm 1.7	3.1
Endocrine diseases	34	88.8 \pm 17.1	248.3	3.3 \pm 0.6	5.9	0.8 \pm 0.3	0
Mental diseases	27	147.6 \pm 35.3	380.5	11.0 \pm 4.8	37.0	0.6 \pm 0.1	0

9) endocrine diseases: 34 patients with acute and chronic thyroiditis and diabetes mellitus, mean age 71.0 years;

10) mental diseases: 27 men aged over 70 (mean age 87.6 years) without any of the listed diseases or somatic diseases affecting their health status.

These patients were followed up for one year after the first measurement of CA-19-9 in the blood. In addition to CA-19-9, carcinoembryonic antigen (CEA) and α -fetoprotein (AFP) were measured using a DiaPlus enzyme immunoassay kit. The following values of TM were considered to be normal: CA-19-9 <37 U/ml, CEA <5 ng/ml, and AFP <10 U/ml.

RESULTS

CA-19-9 levels were maximal in cirrhosis of the liver and chronic hepatitis (Table 1).

The highest CA-19-9 content was recorded in patients with cirrhosis of the liver, chronic hepatitis, and cholelithiasis.

The highest CEA levels were detected in individuals suffering from mental diseases (Table 1). The greatest deviations of CEA level from the norm were revealed in 37% of these patients. Abnormal levels of CEA were found in many patients with cirrhosis of the liver, acute and chronic pulmonary diseases, and mental diseases.

The highest mean level of AFP was observed in patients with cirrhosis of the liver. Abnormal levels were detected in 37.5% of the patients (Table 1). In chronic hepatitis, the mean level of AFP was normal, but in 17% of patients it was increased. In the other groups the mean values of AFP were normal, and the incidence of abnormalities was negligible.

Five (18.5%) patients with mental diseases developed cancer within a year: pancreatic in 1 patient, gastric in 1 patient, pulmonary in 2 patients, and prostatic in 1 patient (Table 2). Three (8.3%) patients with peptic ulcer developed cancer during the first year. In the group with cholelithiasis, malignant tumors were diagnosed in 3 (7.7%) patients, cancer

TABLE 2. Cancer and Total Mortality Within a One-Year Period

Examined groups	Number of patients	Malignant tumors (abs./%)	Mortality (abs./%)
Diseases of circulation	76	0	10/13.2
Acute and chronic diseases of the lungs	53	1/1.9	2/3.8
Chronic hepatitis	59	0	2/3.4
Cirrhosis of the liver	40	1/2.5	11/27.5
Peptic ulcer	36	3/8.3	4/11.1
Cholelithiasis	39	3/7.7	3/7.7
Chronic pancreatitis	41	0	1/2.4
Renal diseases	32	0	2/6.3
Endocrine diseases	34	0	1/2.9
Mental diseases	27	5/18.5	3/11.1

of the gallbladder in 1 patient, and cancer of the extrahepatic bile ducts in 2 patients (Table 2).

Hepatocellular cancer was diagnosed in 1 (2.5%) patient with liver cirrhosis, and lung cancer was detected in 1 (1.9%) patient in the group with acute and chronic pulmonary diseases. Within a year, 3 patients died in the group with mental diseases, 4 patients with peptic ulcer, and 11 with cirrhosis of the liver (Table 2). No malignant tumors or deaths occurred within a year in the other groups.

Mortality was the highest in patients with cirrhosis of the liver: 27.5% (1 of these patients died from hepatocellular cancer); other causes of death were diseases of the organs of circulation (13.2%), peptic ulcer (11.1%, one patient died from gastric cancer), and in mental patients all deaths (11.1%) were from cancer. High blood levels of CA-19-9 (>10-fold) or deviations in both CEA and AFP were observed in all patients who died, no matter whether from the underlying diseases (not cancer) and its complications or from tumor. Generally, if the disease ran an unfavorable course, the level of CA-19-9 increased. In 6 (10.2%) patients with chronic hepatitis the level of CA-19-9 was increasing, and they developed cirrhosis of the liver during the year, and 2 of them died during this period. In 7 out of 11

patients who died from cirrhosis of the liver the levels of CA-19-9, CEA, and AFP were increased and in 4 patients CA-19-9 and AFP levels were increased. General conditions of the other patients in this group with increased levels of more than one TM deteriorated.

Thus, an increase in blood CA-19-9 level in patients with gastrointestinal diseases (peptic ulcer and cholelithiasis) and elderly (over 70) subjects may serve as a marker of a malignant tumor. Tumor markers can be used as prognostic criteria in cirrhosis of the liver, chronic hepatitis, and cardiovascular diseases. An increase in blood CA-19-9 level or a simultaneous increase in CA-19-9 and CEA and CA-19-9 and AFP indicate a probable tumor or an unfavorable outcome of chronic disease within a year after the first detection of increased level of CA-19-9.

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