



Study Levels of Some Biochemical Parameters in Serum of Pancreatic Cancer Patients

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Abstract

This study included an estimation for the levels of some biochemical parameters in the serum of those pancreatic cancer patients, by collecting (40) blood samples from patients their ages ranged (30-70) years compared with (55) blood samples of healthy persons as control group. The parameters included Super oxide dismutase, Amylase, Ribonuclease (acidic and alkaline), Arylesterase, Alkaline phosphatase, Carcinoembryonic antigen, carbohydrate antigen 19-9, Total lipid and Bilirubin Results of the Statistical analysis indicated a significant decrease in the activity of Amylase and Super oxide dismutase patients in comparison with the control group. There was a significant increase in the activity of Ribonuclease (acidic and alkaline), Arylesterase, Alkaline phosphatase, Carcinoembryonic antigen, carbohydrate antigen 19-9, Total lipid and Bilirubin in patients in comparison with the control group.

Introduction

Cancer is a disease in which cells of the body form abnormal cells grow up and divided up without controlling in this division whereas the cancer on cells attack the nearby or adjacent tissues then spread through the blood or lymph vessels to other parts of the body[1]. Cancer is the second reason leading to death after the heart diseases. world Health Organization (WHO) attributed the reason of cancer to internal and external factors equally, whereas the internal factors may belong to hormones, immune weakness, hereditary mutations or genetic causes. But, the external factors result from several reason such as: smoking, alcohol, chemical and radiant substances, stomach creatures (bacteria and viruses). pancreatic cancer is considered one of the most dangerous kind of cancer that known as the silent cancer which is originated as a result of the irregular work of genes in tissues of the pancreas ,that produce odd and abnormal cells because of environmental or genetic factors; so it is the most serious and dangerous species because it is difficult to be diagnosis in its primary stages, also its symptoms are ambiguous that are unclear in the early stages whereas interfere, with symptoms of other diseases such as pancreatitis or gastroenteritis (inflammation of the stomach wall). Because the pancreas is situated behind the stomach; therefore it is difficult to

diagnose the disease in the primary stages, whereas the tumor grows up and spread before it diagnosis at an early stage, and in most cases it can be discovered when the cancer spread to an advanced stage , then in other cases it spread also to other organs of the body [3,2].

Such as any disease case it is noted the increase of the level of oxidative stress, whereas the proportion of the oxidative factors increase reactive oxygen species (ROS), which contribute to the increase in destruction and damage of the cells, then increasing the badness in the disease case [4]. Research emphasized existing of direct relationship between pancreatitis and cancer, whereas the acute pancreatitis to develop the chronic inflammation and it develops into cancer finally [5], the scientists did not discover the reason caused cancer of the pancreas; but they found several of the risk factors which make the person more susceptible to be caused by the disease and Some risk factors affect on DNA causing a mutation then originating the tumor one of these mutations be under the responsibility of the gene called K – ras, that leads to change the natural cell into cancerous one, alternatively the gene is frustrated TP 53, they are genes that inhibit the proliferation of cancer cells [6], also pancreatic cancer risk factors include smoking, alcohol, age, nutrition, obesity, diabetes, pancreatitis,

and genetic diseases [7], Symptoms of the pancreatic cancer differ and depend on the location, type and stage of the tumor. So one of the most prominent symptoms are jaundice, pain of the abdominal or back, weight loss because of the lack of appetite, gallbladder enlargement, nausea, vomiting and diarrhea or constipation in some cases [8].

Treatment of the pancreatic cancer depends on location of the tumor, history of its spreading, age and the health case. The only way of treatment the pancreatic cancer is the tumor eradication operation, but unfortunately this option is unavailable except for very little proportion of the patients whereas the tumor has reached its advanced stages, In this case, the chemotherapy and radiation is the alternative solution [9].

Materials and Methods

Samples:

for studying some biochemical parameters (40) blood samples from patients of pancreatic cancer were collected their ages ranged (30-70) years who admitted to Al-jumhuri Hospital and Atomic Medicine Hospital in Mosul with (55) blood samples from healthy persons who were not caused by any disease with the same age category. Blood samples were collected in clean and dry tubes and kept in water bath at (37) °C for (15) minutes after which the clotted part of the pure solution was separated using centrifuge at (3000 rpm) for (15) minutes then the serum stored in (-20) °C after separation directly.

Determination of Biochemical Parameters

The activity of Amylase was measured using Kit method of type from French Biolabo company. whereas the principle of the method depends on the E-PNPG7 method [10].

The activity of the Super oxide dismutase was measured using the modified known as riboflavin / nitro blue tetrazolium method [11].

Aryl esterase activity was measured by using method of Tomas *et.al.* [12], whereas the enzyme analyzes the phenyl acetate to phenol and acetic acid, the absorbability was measured at the wave length (270 nm).

Ribonuclease (Alkaline and Acidic) activity was measured by using the spectrophotometer method and RNA as a substrate [13], the Bardon *et.al.* were used to estimate the activity of enzyme with some modifications [14].

The activity of Alkaline phosphatase was measured using Kit method from France Bio Merieux. whereas the principled reaction depends on the Alkaline phosphatase for phenol production, which react with 4-amino antipyrine with potassium ferricyanide to produce the red quinone complex. The color intensity was directly proportional to the enzyme activity, the intensity of the complex at a wavelength of (510 nm) [15].

Estimation the concentration of the antigen of C19-9 and CEA is measured using Fluorescent Kit Method

of ST-AIA –PACK. the principle of method depends on the immunoenzyme reaction [16].

The color method was used in the estimation the concentration of the total lipid [17], the method involves heating small amount of the serum with concentrated sulfuric acid, then the mixture interacted with the reagent of the Phosphovaniline to give red – purple complex, the absorbance of the product was measured at (450 nm).

Bilirubin level in the serum was measured using Kit Method from France Biolabo SAS. [18], the principle of method depends on the reaction of Bilirubin and Sulfonic acid to produce Azobilirubin compound, which gave a color in the strong acidic or alkaline medium (19). Intensity of the product depends on the concentration of bilirubin. The absorbance was measured at wave length (550 nm).

Statistical Analysis

Results were analyzed statistically using T-test at the probability level of ($p \leq 0.05$) for comparison between group of the patients and the control. also, the biochemical parameters values were described using the mean and the standard error.

Results and Method

The results showed Table (1) a significant decrease in the activity of amylase in patients in comparison with the control group, the decrease in the activity of enzyme was attributed to the damage caused to the cells of pancreas producing the amylase, especially in the case of pancreatic fibrosis which damaged its cells [20].

The results showed a significant decrease in the activity of super oxide dismutase in patients compare with the control group Table (1) [21], this decrease may be attributed to the increase of free radical especially that the super oxide and hydrogen peroxide inhibit the enzyme and reduce its activity [22].

There was a significant increase in the activity of the arylesterase in the serum of the patients in comparison with control group Table (1), the activity of the enzyme decreased or increased according to the disease case, in this study, there was an increase in the activity of the enzyme because of taking several medicines which reduced fats, then having several antioxidant drugs or foods enriched in the antioxidant materials, such as vitamin E, C therefore the activity of enzyme increases [23].

There was also an increase in the activity of Ribonuclease (alkaline and acidic) in serum of patients compare to control group as shown in Table (1), Ribonuclease activity was measured with several diseases such as leukemia, pancreas, liver, ovary, cirrhosis and kidney disease, the increase in the level of the enzyme is useful to diagnose the patient with pancreatic cancer [24].

The activity of Alkaline phosphatase was increased in serum of patients in comparison with the control group as shown in the Table (1), the high activity of the enzyme is an evidence for the spread of the tumor its metastasis [25].

Result Showed an increase in the level of antigens C19-9 and CEA in patients compared with control group. C19-9 and CEA are used as markers for diagnosis of several conditions including pancreatic cancer, basic function of antigen CEA is to maintain the composition of tissue structure and to inhibit cell death or tissue deformation [26].

As shown in table (1), the increase in bilirubin level in patients was a results of the bile duct obstruction by the tumor [27].

It was also noted that their was a high level of fats in patients as shown in Table (1). The cancer cells characterized by accumulation of fats in them compared with the natural cells whereas increasing in fat oxidation and increasing in production the free radicals, one of the keys for treatment of pancreatic cancer was through arrangement action of the ATP to inhibit the growth of cancer cells by activating AMP-activated protein kinase, which in its turn activates the inhibitory gene P53 [28].

Table (1): The comparison of serum biochemical parameters between Patients and Control group(p≤0.05)

Parameters	Mean ± Standard error		
	Patients(40)	Control(55)	
Amylase (U/L)	52.739±10.344	70.318±4.28	
Super oxide dismutase (µmol/L)	0.0311±0.018	0.0958±0.0067	
Aryl esterase (U/ml)	8.774±0.189	2.718±0.15	
Ribonuclease(U/L)	Acidic	119.81x10 ³ ±15.13	38.97 x10 ³ ± 5.4
	Alkaline	45.52 x 10 ³ ±10.5	37.35 x 10 ³ ±5.41
Alkaline phosphatase(U/L)	302.198±40.703	44.884 ±3.493	
C19-9 (U/ml)	23.53±1.72	8.472±0.747	
CEA (ng/ml)	21.306±2.134	3.285±0.2701	
Bilirubine (µmol/L)	14.95±5.732	7.967±1.835	
Total Lipid (mg/ml)	1371.44±26.95	646.14±20.599	

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دراسة مستويات بعض المتغيرات الكيموحيوية في مصل دم المرضى المصابين بسرطان البنكرياس

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الملخص

تضمنت الدراسة تقدير مستوى بعض المتغيرات الكيموحيوية في مصل دم المرضى المصابين بسرطان البنكرياس, تم جمع (40) عينة دم من المرضى تراوحت أعمارهم بين (30-70) سنة وتمت مقارنة مع (55) عينة دم لأشخاص أصحاء بوصفهم مجموعة سيطرة. شملت المتغيرات المقاسة (إنزيم سوبر اوكسايد دسميوتيز, إنزيم الامايليز, إنزيم الالفا-1,3-غلوكوزيداز, إنزيم الالفا-1,4-غلوكوزيداز, إنزيم الفوسفاتيز القاعدي, المستضد السرطاني الجنيني CEA, المستضد الكربوهيدراتي السرطاني C19-9, الدهون الكلية والبيليبروبين). أشارت نتائج التحليل الإحصائي لوجود انخفاض معنوي في فعالية إنزيم الامايليز والسوبر اوكسايد دسميوتيز في مصل دم المرضى المصابين بسرطان البنكرياس مقارنة بمجموعة الأصحاء, كما لوحظ وجود ارتفاع معنوي في فعالية إنزيم الالفا-1,3-غلوكوزيداز, إنزيم الالفا-1,4-غلوكوزيداز, إنزيم الفوسفاتيز القاعدي, CEA, C19-9, الدهون الكلية و البيليبروبين في مصل دم المرضى المصابين بسرطان البنكرياس مقارنة بمجموعة الأصحاء.