

Correlations between trophological status and main characteristics of the disease in patients with chronic pancreatitis of biliary origin

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Key words: chronic pancreatitis, trophological status, correlation and regression analysis, anemia, shear wave elastography

Introduction. In the long course of chronic pancreatitis (CP), there is an imbalance between patient's intake of nutrients and her need in them. Trophological insufficiency (TI), which is the lack of nutrients of organic and inorganic origin that a human body needs to live, develops. [1, 2]. TI is polynutrient in its composition, i. e. lacking macro components (proteins, fats, carbohydrates) and micro components (vitamins and some chemical elements) in different ratios [1]. TI occurs because of both exogenous agents (inadequate intake of nutrients from food, caused by a sparing diet a patient has to follow due to pain syndrome, as well as irrational diet due to alcohol abuse, socio-economic reasons and low medical awareness) and endogenous agents (malutilization of nutrients in a patient's body) [3].

The objective is to evaluate correlations between indicators of trophological status and the main disease characteristics in patients with biliary genesis chronic pancreatitis.

Materials and methods. 115 patients with biliary genesis CP were examined comparable to etiological factor and socio-economic conditions and nutrition (normotrophic food per 5 times a day without aggressive food (fatty, spicy, sour, fried products)). Also excluded the effect of the alcohol factor. 20 young healthy people were included in the control group. Among patients with CP 75 were women and 40 were men, the average age of patients was (52.4 ± 3.2) years. The duration of the disease was (12.8 ± 3.1) years.

The diagnosis of CP was made based on a generally accepted classification in Ukraine suggested by the Research Institute of Medical Science of Ukraine, which corresponds to the Marseille-Cambridge classification according to the "Unified clinical protocols of primary, secondary (specialized) medical care and medical rehabilitation of patients with chronic pancreatitis", approved by the Act of Ministry of Healthcare of Ukraine as of 10.09.2014 under # 638).

Results and their discussions. We considered appropriate to analysing possible predatory impact of the following general clinical CP characteristics (age, duration of the CP course, level of fecal α -elastase), which would allow to reliably evaluate the functional ability of pancreas as enzyme laboratory of the organism, as well as the structural characteristics of pancreas based on ultrasound points system and by the method of shear wave

elastography and the TS parameters. In the table the results of the correlations between clinical laboratory parameters of TS and main clinical characteristics of the disease are presented.

Table 1
Correlation between trophological status indicators in patients with CP and the main characteristics of the disease

Pair in regression connection	Age of a patient, years	Duration of CP, years	Level of α -elastase, mg/g	Ultrasound, points	SWE, kPa
Red blood cells, $\times 10^{12}/l$	-0.670 n=115 p<0.05	-0.502 n=115 p<0.05	0.517 n=115 p<0.05	-0.357 n=115 p<0.05	-0.512 n=115 p<0.05
Hemoglobin, g/l	-0.502 n=115 p<0.05	-0.333 n=115 p<0.05	0.302 n=115 p<0.05	-0.330 n=115 p<0.05	-0.603 n=115 p<0.05
Sera iron, mmol/l	-0.613 n=115 p<0.05	-0.495 n=115 p<0.05	0.375 n=115 p<0.05	-0.289 n=115 p<0.05	-0.509 n=115 p<0.05
Transferrin, mg/dL	0.733 n=115 p<0.05	0.640 n=115 p<0.05	-0.535 n=115 p<0.05	0.434 n=115 p<0.05	0.598 n=115 p<0.05
Total protein, g/l	-0.569 n=115 p<0.05	-0.417 n=115 p<0.05	0.570 n=115 p<0.05	-0.307 n=115 p<0.05	-0.601 n=115 p<0.05
Ascorbic acid, mg/l	-0.449 n=115 p<0.05	-0.386 n=115 p<0.05	0.425 n=115 p<0.05	-0.317 n=115 p<0.05	-0.511 n=115 p<0.05
Retinol, mmol/l	-0.437 n=115 p<0.05	-0.429 n=115 p<0.05	0.420 n=115 p<0.05	-0.286 n=115 p<0.05	-0.612 n=115 p<0.05
Tocopherol, mmol/l	-0.536 n=115 p<0.05	-0.328 n=115 p<0.05	0.493 n=115 p<0.05	-0.305 n=115 p<0.05	-0.498 n=115 p<0.05

Note:

n – number of pairs in the correlation analysis;

p – degree of reliability of correlation.

According to the information received it has been found that there are direct correlation ties of moderate and strong intensity between anemic syndrome levels of total protein, vitamins and age, disease duration, fecal α -elastase indicators, ultrasound data in points and indicators of SWE. All examined trofological status parameters were direct correlation ties of moderate intensity between fecal α -elastase indicators. Found data are evidence significant predatory influence of age, CP duration, severeness of ESI of pancreas in terms of fecal α -elastase level and ultrasound points parameter on the onset and severeness of trofological violations.

Comparative relationships analysis between the structural state of the pancreas (according to the ultrasound in points and method ESI) and parameters of the TS showed the presence of strong ties with the ESI indicators, that demonstrated higher diagnostic value of this method.

Conclusions. According to the data of correlation and regression analysis, it has been proved that the age of patients, disease duration, functional ability of the pancreas in terms of fecal α -elastase and structural state of the pancreas by the criteria of ultrasound in points and by the method of SWE are predictors of the development and progression of anemia, hypoproteinemia and vitamin deficiencies for the patients with CP of biliary genesis. That should be considered in clinical practice to form the most effective medical complex.

References

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Our correlation and regression analysis has proved that the age of patients, disease duration, functional ability of the pancreas, determined by fecal α -elastase level and structural state of the pancreas according to ultrasound criteria points and by the method of shear wave elastography, are predictors of anemia, iron deficiency, immunodeficiency, hypoproteinemia, mineral and vitamin deficiencies development in patients with chronic pancreatitis of biliary origin.