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*O.S. Khukhlina, A.A. Antoniv, Y.I. Voytkovich***THE INFLUENCE OF FACTORS OF THE HEMOSTASIS, FIBRINOLYSIS AND PROTEOLYSIS SYSTEMS UPON THE DEVELOPMENT AND PROGRESSING OF SOMATOFORM VEGETATIVE DYSFUNCTION AND ESSENTIAL HYPERTENSION IN PATIENTS WITH CHRONIC ACALCULOUS CHOLECYSTITIS**

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Abstract. The article presents the data concerning various chains of the blood coagulative system, anticoagulative blood activity, fibrinolysis and systemic plasma proteolysis in correlation with hemorheological parameters with comorbid chronic acalculous cholecystitis (CAC) and somatoform vegetative dysfunction (SVD) or essential hypertension (EH). The objective of the work is to deter-

mine reliable mechanisms of progressing these diseases and elaborate the ways to correct disorders found.

Key words: chronic acalculous cholecystitis, somatoform vegetative dysfunction, essential hypertension, fibrinolysis, proteolysis.

Introduction. Essential hypertension (EH) remains the main health problem in the majority of the world countries due to its influence upon mortality and morbidity rates, considerably decreasing ability of the population to work [2, 5]. Occurrence of EH increases with age and constitutes about 44 % in individuals of 40-60 years, and practically 60 % among those older than 70 [1]. At the same time, the number of young people with EH has increased substantially lately [4]. Considering the aforementioned, the problem of learning and supplementing pathogenesis of EH against accompanying pathology, detecting new, previously unknown links and mechanisms of its progressing remains always topical.

Premorbid period of EH is more frequently realized through somatoform vegetative dysfunction (SVD) being one of the links of the "cardio-vascular continuum" [2, 3], stipulating the necessity to study the conditions of its occurrence, causes of formation and progression.

The diagnosis of SVD assumes vegetative dysfunction of the gastrointestinal tract (GIT), development of various types of gallbladder dysfunction (GD) and bile ducts dysfunction (BDD) in particular, which are widely spread functional diseases of the biliary tract and found among the population with the frequency from 5 to 20 %, at the same time being predictors of the development of chronic acalculous cholecystitis (CAC) and cholecystolithiasis (CCL) [7, 8, 9].

Objective. to study the peculiarities of links of the blood coagulative system, anticoagulative blood activity, fibrinolysis and systemic plasma proteolysis with comorbid course of CAC and SVD or EH, and to find possible mechanisms of progressing these diseases.

Materials and methods. To realize these tasks 138 patients with CAC and comorbid SVD were examined. Depending on the variant of SVD all the patients with CAC were divided into three groups: the 1st group – 31 patients with CAC and SVD by hypertensive type (hyperTT); the 2nd group – 35 patients with CAC and SVD by hypotensive type (hypoTT) and the 3rd one – 22 patients

with CAC and cardiac neurosis (CN). The 4th group included 40 individuals with II stage EH. The control group contained 30 practically healthy individuals of a corresponding age.

Blood for biochemical tests was taken from the ulnar vein in the morning on empty stomach. To study the regulation system of blood aggregative condition it was collected into silicon tubes using 3,8 % sodium citrate solution as a stabilizer in the ration of 1:9. General coagulative blood potential was determined by prothrombin time index (PTI), fibrinolytic plasma activity (FPA), potential plasminogen activity, fibrinogen content in the blood plasma, antithrombin III activity, factor XIII activity were detected by means of the sets of reagents of the „DanushLtd” (Lviv) according to N.Tits methods. With the use of reagents of this firm the condition of enzymatic and non-enzymatic fibrinolysis, proteolytic activity of blood plasma was studied using nitroalbumin (intensity of nitroalbumin lysis), nitrocasein (intensity of nitrocasein lysis), nitrocol (intensity of nitrocol lysis). The material was processed statistically by means of parametric and non-parametric methods of variational statistics.

Results. The analysis of the examination of the coagulative hemostasis 2nd phase showed that PTI of the second group patients (Table 1) was 21,9 % lower than that of practically healthy individuals ($p < 0,05$). At the same time, PTI in patients of the 1st, 3rd and 4th groups was characterized by the tendency to increasing which was indicative of the risk of hypercoagulative syndrome formation ($p > 0,05$). Examination of the 3rd phase of coagulative hemostasis by the content of fibrinogen in the blood is indicative of the fact that this index was reliably low in all the groups: patients of the 1st group – on 34,4%, 2nd group – on 48,8 %, 3rd – on 26,6 % ($p_{1-3} < 0,05$), except the 4th group where it increased on 31,3 % ($p < 0,05$) and reliably differed in comparison between groups ($p < 0,05$). Increased content of fibrinogen in patients with CAC and EH is indicative of the formation of hypercoagulative syndrome. Decreased fibrinogen content in the blood of patients with CAC and SVD

is indicative either of insufficient synthesis of I sedimentation blood factor in the liver (although, the liver functional state in the patients examined was within the norm), or activation of the hemostasis system in response to inflammation promoting the development of condition of hypercoagulation, formation of minute clots on the walls, and involvement of a considerable amount of fibrinogen in the process.

Analysis of the blood anticoagulative potential found decreased activity of AT-III in the 1st, 3rd and 4th groups with maximal reduction in the 3rd and 4th groups – on 21,3 % and 29,7 % respectively ($p < 0,05$) as compared with the group of practically healthy people. But reduced activity of AT-III in the 1st group was not reliable ($p > 0,05$), and in the 2nd group this index was the tendency to increasing ($p > 0,05$). AT-III is a component of the anticoagulative system and the factor inhibiting proteolysis and fibrinolysis. Total enzymatic activity (TEA) of the blood plasma in patients from the 1st and 3rd groups was reliably lower than those control indices: in the 1st group – on 13,5 %, in the 3rd group – on 31,8 % ($p < 0,05$). In the second group of patients TEA of the blood plasma was not considerable – on 11,2 % ($p < 0,05$), which is indicative of the activation of the balance maintaining compensatory mechanisms in the hemostasis system of this group of patients. TEA inhibition in the 1st, 3rd and 4th groups of patients occurred due to enzymatic fibrinolytic activity (EFA) of the blood plasma decrease: in comparison with the control group this index was reliably lower in the 1st group of patients – on 32,5 %, in the third group – on 66,7 %, in the 4th one – on 48,3 %, while in the 2nd group insufficient reliable inhibition of EFA was found – on 16,7 % ($p_{1-4} < 0,05$). At the same time, non-enzymatic fibrinolytic activity (NEFA) of the blood plasma in all the groups of patients increased as NEFA parameters in all the groups were higher as compared with the group of practically healthy individuals in 1,4, 1,9 and 1,6, 1,6 times respectively ($p_{1-4} < 0,05$). That is, in the second group of patients NEFA achieved a compensatory maximal intensity ($p < 0,05$). At the same time, Hagemann-dependant fibrinolysis reliable decrease was found: in the 1st group – in 1,6 times, in the 2nd one – in 1,2 times, in the 3rd and 4th groups it was twice lower ($p_{1-4} < 0,05$) as compared with the group of practically healthy individuals and reliable difference between the 2nd and 3rd, 2nd and 4th groups ($p < 0,05$). This fact is indicative of one of the causes of EFA inhibition in all the groups. At the same time, the analysis of potential plasminogen activity (PPA) index reflects the mechanisms of increasing NEFA in the patients examined: thus, PPA in patients of the 1st group changed unreliably, but in the patients of the 2nd and 3rd groups PPA increased reliably on 19,7 % and 16,9 % respectively ($p < 0,05$) (Table 1).

Fibrin-stabilizing factor activity in the 1st and 2nd groups of patients changes unreliably, and in the 3rd and 4th groups – decreased on 24,8 % and 33,7 % respectively ($p < 0,05$) (Table 1), which is indicative of disorders of blood sedimentation post-coagulative

phase. Results of examination of factors of coagulative hemostasis, anticoagulative and fibrinolytic systems in patients with CAC with SVD against HyperTT and CN, and comorbidity between CAC and EH is indicative of the tendency to the formation of hypercoagulative syndrome due to insufficiency of factors of the anticoagulative system and fibrinolytic system.

Analysis of examination of the processes of plasma proteolysis and collagenolysis are indicative of the fact that increased intensity of low molecular proteins lysis was found in all the patients with CAC ($p < 0,05$) (Table 2), at the same time, in the 1st group of patients ILAA was in 1,5 times higher than in practically healthy people, in the 2nd group – in 1,7 times, in the 3rd group – in 1,4 times, in the 4th one – in 1,5 times ($p_{1-4} < 0,05$) with reliable difference between all the groups, except the 1st and 3rd ones ($p > 0,05$). Maximal activation indices of the systemic proteolysis were registered in patients with CAC accompanied by SVD by HypoTT (Table 2), minimal ones were found in patients with CAC with CN. At the same time, patients with CAC accompanied by SVD demonstrated more considerable increase of intensity of high molecular proteins unlimited proteolysis as compared with practically healthy people – in 1,8, 2,2, 1,6 and 1,8 times respectively in the groups 1, 2, 3, 4 ($p_{1-4} < 0,05$) with reliable difference between the 2nd group and the groups 1 and 3 ($p < 0,05$) (Table 2). Changes of intensity of azocolysis were also registered: in patients of the 1st and 4th groups the index increased unreliably as compared with practically healthy people, in the 3rd group – 16,7% increase was found, and in the 2nd group a maximal intensity of collagenolysis was found – increase on 53,6 % as compared with practically healthy individuals (PHI) ($p_{2,3} < 0,05$). Thus, intensity of collagen proteolytic degradation in the blood of patients with HypoTT was found to be in 1,5 times higher ($p < 0,05$) than in patients with HyperTT SVD.

Conclusion

Results of examination of the factors of blood coagulative system, anticoagulative blood activity, fibrinolysis and systemic plasma proteolysis with comorbid course of CAC and SVD with HyperTT and CN as well as with comorbid EH are indicative of a tendency to the formation of hypercoagulative syndrome due to insufficient factors of anticoagulative and fibrinolytic systems. In patients with CAC and SVD with HypoTT a deficiency of fibrinogen circulating pool was found due to activation of the fibrinolysis. Peculiarities of proteolytic blood activity disorders in patients with CAC with comorbid SVD of all the forms and EH are increased intensity of lysis of low and high molecular proteins and collagenolytic blood activity, maximally revealed in patients with HypoTT SVD.

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ВЛИЯНИЕ ФАКТОРОВ ГЕМОСТАЗА, ФИБРИНОЛИЗА И ПРОТЕОЛИТИЧЕСКОЙ СИСТЕМЫ НА ВОЗНИКНОВЕНИЕ И ПРОГРЕССИРОВАНИЕ СОМАТОФОРМНОЙ ВЕГЕТАТИВНОЙ ДИСФУНКЦИИ И ЭССЕНЦИАЛЬНОЙ ГИПЕРТЕНЗИИ У ПАЦИЕНТОВ С ХРОНИЧЕСКИМ НЕКАЛЬКУЛЬОЗНЫМ ХОЛЕЦИСТИТОМ

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Резюме. В статье наведены данные об анализе различных звеньев системы свертывания крови, противосвертывающей активности крови, фибринолиза и системного плазменного протеолиза в соотношении с гемореологическими параметрами при совместном течении хронического некалькулезного холецистита (ХБХ) и соматоформной вегетативной дисфункции (СВД) или гипертонической болезни (ГБ). Цель работы – установить вероятные механизмы прогрессирования этих заболеваний и в дальнейшем разработать пути коррекции выявленных нарушений.

Ключевые слова: хронический некалькулезный холецистит, соматоформная вегетативная дисфункция, эссенциальная гипертензия, фибринолиз, протеолиз.

ВПЛИВ ФАКТОРІВ ГЕМОСТАЗУ, ФІБРИНОЛІЗУ ТА ПРОТЕОЛІТИЧНОЇ СИСТЕМИ У ВИНИКНЕННІ ТА ПРОГРЕСУВАННІ ВЕГЕТАТИВНОЇ СОМАТОФОРМНОЇ ВЕГЕТАТИВНОЇ ДИСФУНКЦІЇ ТА ЕСЕНЦІЙНОЇ ГІПЕРТЕНЗІЇ У ПАЦІЄНТІВ ІЗ ХРОНІЧНИМ НЕКАЛЬКУЛЬОЗНИМ ХОЛЕЦИСТИТОМ

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Резюме. У статті наведені дані про аналіз різних ланок системи згортання крові, протизгортальної активності крові, фібринолізу та системного плазмового протеолізу в співвідношенні з гемореологічними параметрами при поєднаному перебігу хронічного некалькулезного холециститу (ХНХ) та соматоформної вегетативної дисфункції (СВД) або гіпертонічної хвороби (ГХ). Мета роботи – встановити ймовірні механізми прогресування цих захворювань і в подальшому розробити шляхи корекції виявлених порушень.

Ключові слова: хронічний некалькулезний холецистит, соматоформна вегетативна дисфункція, есенційна гіпертензія, фібриноліз, протеоліз.

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