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CHARACTERISTIC FEATURES IN THE SYSTEM OF HEMOSTASIS OF PATIENTS WITH ABNORMAL UTERINE BLEEDING AT PUBERTY

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Abstract. *The article is aimed at clarifying the features of the hemostasis system in patients with abnormal uterine bleeding (AUB) in adolescence. The features of the state of the blood coagulation system in patients with AUB which are not connected with blood diseases were identify. It was found that only in a small number of patients abnormalities in the hemostatic system do not detected. Most patients have defects in coagulation and anticoagulation systems.The greatest changes occur at the II and III phases of hemostasis. Some features, characteristic of patients from different clinical groups: dependence on the duration, the presence of concomitant somatic pathology, and the level of estrogen intenseness have been revealed in the study. With the rise in the bleeding duration the number of patients with hypercoagulation manifestations in the hemostatic system also increases. In adolescents with concomitant somatic pathology and hyperestrogenemia manifestations of increased blood coagulation have been registered more often already at the first phase of the coagulation process.*

Keywords: *abnormal uterine bleeding, adolescent girls, the system of hemostasis.*

Background and aims. The importance of health care problems concerning reproductive potential of children and adolescents as well as prevention and treatment of gynecological diseases in childhood does not lose its topicality, but it increases to a great extent. Abnormal uterine bleeding (AUB) is one of the most common gynecological diseases in adolescence, ranging from 20% to 45% of all gynecological pathologies [1,2,3]. Despite along-term period of studying the problem of UB in adolescent girls remains urgent and attracts attention of not only pediatric gynecologists, but of some other specialists as well. The study of uterine bleeding is not possible without considering the peculiarities in the state of blood coagulation system. Blood coagulation is an important protective mechanism, and its disorders can lead not only to severe health states, but even to the fatal outcome. In some cases,

hemostatic dysfunction is the first cause in the development of UB, in others it is a component of the general pathological process [4,5,6,7]. The data of special literature, describing the states of coagulation and anticoagulation systems of blood in adolescents with abnormal uterine bleeding (AUB), are controversial [8,9].

This study was designed to examine the state of peripheral blood in girls and teen-agers with abnormal uterine bleeding at puberty.

Materials and methods.

A clinical and hemostasiologic study was carried out in 182 patients, aged 11-18, who were treated for AUB.

Depending on the clinical course of the disease, our patients were divided into 3 groups. Gr.I included 81 girls with the first episode of bleeding, gr.II consisted of 31 adolescents with a remittent bleeding type (long-term, scanty bleeding with short "light" intervals), and 70 girls with a recurrent course of the disease constituted group III. Patients with verified diagnoses of blood diseases were not included in the study.

The state of the coagulation system was judged by determining the number of platelets, fibrinogen and fibrinogen B levels, plasma recalcification time, prothrombin index, and blood fibrinolytic activity.

Statistical processing of the results obtained was carried out using the statistics “Microsoft”, “StatgraphicPlus 3.0” and “SPSS Statistics 17.0” software packages. The reliability of distinctions between the parameters compared was assessed with Student’s **t**, Wilcoxon –Mann-Whitney **u**, and Fisher’s F- tests, as well as with χ^2.

All medical measures were performed in correspondence with the time-limit of examination of our patients on receipt of the informed consents. The data are saved in the case histories and in the computer database. The study participants and their parents are given out health medical records in accordance with the results of examination.

Results and discussion. We have analyzed the number of platelets in the peripheral blood of our patients, taking into account that in the study of blood coagulation system special attention is paid to thrombocytopoiesis, as platelets are the main supplier of thromboplastin which starts the process of blood coagulation. It

turned out that a serious thrombocytopenia (less than130 -150 * 109 / L) was not observed in our patients. A decreased number of thrombocytes (less than 180 * 109 / L) was revealed in almost 13% of the patients, and in patients with a remittent type of bleeding it occurred less often. Hemocoagulation or conditionally enzymatic blood coagulation process can be divided into three stages:1 - thromboplastin formation, 2 - thrombin formation, and 3-fibrin formation (Table 1).All these stages are closely connected.

Table 1.

Mean values of some in the system of homeostasis in adolescent girls with AUB

Blood parameters	Statistical index	Gr. I n=81	Gr. II n=31	Gr. III n=70	All patients n=182
Plasma recalcification, sec	M±SD Me	132,81± 48,37 125	131,52± 37,06 130	134,32± 41,44 127	133,17± 43,92 125
Prothrombin index, %	M±SD Me	101,24± 12,45 100	99,05± 14,06 95,0	98,85± 11,49 95,0	99,99± 12,35 100
Fibrinogen, g/L	M±SD Me	3,64± 1,87 3,1	3,13± 1,22 2,8	3,54± 1,60 2,9	3,52± 1,69 2.95
Fibrinolytic activity, sec	M±SD Me	251,67± 49,02 240,0	251,19± 43,51 242,5	245,0± 56,94 240,0	248,72± 51,12 240,0
Plasma tolerance to heparin, min	M±SD Me	7,78± 2,59 7,16	7,65± 2,2 7,0	7,72± 2,67 7,0	7,74± 2,55 7,0

The rate of thromboplastin complex formation can be judged by plasma recalcification time. The findings of the current study show that in all three groups most patients had disorders in thrombopastin complex formation (gr.I –72.0%; gr. II – 63.3%; and gr.III– 68.5%). Such disorders take place mainly due to an increased time of recalcification, indicating a slowdown of the blood coagulation process (Fig.1). At the second phase of hemostasis formation of an active proteolytic enzyme thrombin occurs from its inactive precursor prothrombin. In more than half of girls of all three groups prothrombin index was within the bounds of normative values (gr. I – 54.9%; gr. II – 46.7%; and gr.III– 52.1 %). An increase in this index has been registered almost in a third of our patients (gr. I – 37.8%; gr. II – 33.3%; and gr.III–

29.6 %) which testifies to a rise in blood coagulation properties, that is procoagulant effect.

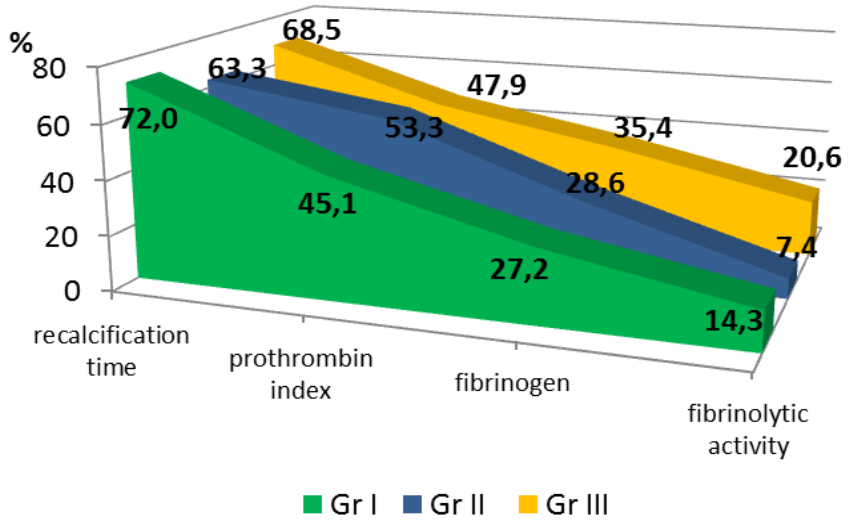

Fig.1. Proportion of patients with hemostatic defect

Moreover, in the overwhelming majority of patients a rise in prothrombin index occurs against an increased recalcification time, i.e. this process can be considered as a compensatory, adaptive response of the organism to the previous decrease in blood coagulation properties. It is well-known that platelet aggregation activity is dependent to some extent on blood fibrinogen concentration. In most patients it was within the physiological range. An increase in this parameter has been registered in 27.2 % (gr.I); 28.6% (gr.II); and 35.4% of the girls from gr.III, which is significantly more often than in gr.I and gr.II($p < 0.05$). In adolescents of these three groups fibrinogen B presence has been observed more frequently(gr.I– 51.8%, gr. II – 53.3%, and gr. III– 63.4%; $p_{1,2}<0.01$).The final stage of the hemostatic system functioning is fibrinolysis. In the period of bleeding fibrinolytic activity disorders have been registered in 14.3 % of the girls from gr. I, in 7.4 %from gr. II, and in 20.6%of patients from gr.III. Moreover, both inhibition of fibrinolysis and its activation took place in patients from gr. II and gr.III. Inhibition of fibrinolytic activity was prevailing (10.4 vs. 3.9 %, respectively, $p < 0.001$)in the girls from gr. I.

An increased fibrinolysis was recorded more often in the teenagers from gr.III. (9.5 vs. 3.9 % in gr.Iand3.7 % in gr. II, $p_{1.2}<0.01$).

With an increase in the duration of UB the number of adolescent girls with disorders in hemostasis grows significantly. The percentage of adolescents with normal prothrombin index and fibrinolytic activity findings reduces. The presence of extragenital pathology also affects the blood coagulation system: proportion of patients with manifestations of hypertcoagulation increases. Similar changes take place in UB on the background of hyperestrogenia.

Thus, we can make a conclusion about inappropriate dynamic equilibrium in the system of hemostasis in girls with AUB. The greatest changes occur at theII and III phases of hemostasis. Some features, characteristic of patients from different clinical groups: dependence on the duration, the presence of concomitant somatic pathology, and the level of estrogen intenseness have been revealed in the study. With the rise in the bleeding duration the number of patients with hypercoagulation manifestations in the hemostatic system also increases. In adolescents with concomitant somatic pathology and hyperestrogenemia manifestations of an increased blood coagulation have been registered more often already at the first phase of the coagulation process.

Conclusion. Detection of disorders in the system of hemostasis will ensure in due time differentiated and efficient use of medications, designed to stop uterine bleeding, and will contribute to its faster stopping.

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Особенности системы гемостаза у больных с аномальными маточными кровотечениями пубертатного пери ода

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Резюме. Статья посвячена изучению системы гемостаза у больных с аномальными маточными кровотечениями пубертатного периода. Выявлены особенности состояния свертывающей системы крови у пациенток с АМК, не связанные с заболеваниями крови. Выяснено что только у незначительного количества больных на фоне АМК не регистрируется отклонений в системе гемостаза, у большинства отмечаются дефекты в свертывающей и противосвертывающей системах. Наибольшие изменения происходят во II и III фазе гемостаза. Выявлены особенности характерные для больных разных клинических групп, зависимость от длительности кровотечения, наличия сопутствующей соматической патологии, уровня эстрогенной насыщенности. При увеличении длительности кровотечения возрастает количество больных с проявлениями гиперкоагуляции в системе гемостаза. У подростков с

сопутствующей соматической патологией и гиперэстрогенией чаще отмечались проявления повышения свертываемости уже в первой фазе коагуляционного процесса.

Ключевые слова: аномальные маточные кровотечения, девочки-подростки, система гемостаза.

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Особливості системи гемостазу у хворих з аномальними матковими кровотечами пубертатного періоду

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Резюме. Стаття присвячена вивченню системи гемостазу у хворих з аномальними матковими кровотечами пубертатного періоду. Виявлено особливості стану системи згортання крові у пацієнток з АМК, які не пов'язані із захворюваннями крові. З'ясовано, що тільки у незначної кількості хворих на тлі АМК не реєструється відхилень у системі гемостазу, у більшості відзначаються дефекти в системі згортання та протизгортання крові. Найбільші зміни відбуваються у II і III фазі гемостазу. Виявлено особливості характерні для хворих різних клінічних груп, залежність від тривалості кровотечі, наявності супутньої соматичної патології, рівня естрогенної насиченості. При збільшенні тривалості кровотечі зростає кількість хворих з проявами гіперкоагуляції в системі гемостазу. У підлітків із супутньою соматичною патологією та гіперестрогенією частіше відзначалися прояви підвищення згортання вже в першій фазі коагуляционного процесу.

Ключові слова: аномальні маткові кровотечі, дівчатка-підлітки, система гемостазу.

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