

Interrelations of Neuro-Endocrinal Regulation and Intracranial Hemocirculation during Rheumatism in Adolescents

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Abstract

The present work was aimed to detect the correlation between cerebrovascular complications and noradrenergic-serotonergic regulation disbalance in adolescents during primary rheumatism. Total of 20 adolescents (average age $10,2\pm 1,3$) with the primary rheumatism and subjected to antibiotic and non-steroid anti-inflammatory treatment have been investigated using the method of fluorometry and Intra-cranial dopplerography. Have been detected, that during the primary rheumatism, complications are frequently presented by the chorea minor; Norepinephrine content is significantly reduced compared to the group of practically healthy children; Epinephrine concentration increases, resulting decrease in Norepinephrine/Epinephrine interrelations; Accumulation of dopamine in brain structure makes background for aggressiveness, chaotic movement, emotionality etc; Increased serotonin concentration and decreased Norepinephrine/Epinephrine interrelations points on alterations towards serotonergic regulation.

Keywords: *rheumatic disease, dopplerography, catecholamines, adolescents*

Introduction

Adequate modulation of immune response is determined by the multifactoral influence of organism's neuro-endocrine and immune systems [4.6]. Disorders of protective features of immune system, in which the leading role plays a neuro-hormonal regulation, are very important in autoimmune disease pathogenesis.

Nowadays, the biochemical aspects of cerebral dysfunction syndrome in adolescents during rheumatism are uncertain. That's why the aim of present work is detection of correlation between cerebrovascular complications and noradrenergic-serotonergic regulation disbalance in adolescents during primary rheumatism.

Materials and Methods

Total of 20 adolescents (average age $10,2\pm 1, 3$), with the diagnosis of primary rheumatism confirmed by the

case history and laboratory findings, were involved in the process of investigation. All of the patients were subjected to antibiotic and non-steroid anti-inflammatory course of treatment.

Decrease in liner speed of blood flow in intra-dural segment of vertebral artery and basilar artery was detected approximately in 10% of adolescents. As for control group, it was made up by the 10 practically healthy adolescents with the average age of $11,8\pm 2,3$ years.

Intra-cranial dopplerography was performed using the apparatus - PIONEER COMPANION, firm "Nicolet" Germany.

Along with the above-mentioned investigation, by the method of fluorometry, the level of biogenic amines and serotonin in blood were determined.

Obtained data were analyzed statistically using the method of correlative analysis. With the use of

computed programs STAT Soft, reliability of mean values by the t Student's criterion was assessed.

Results and Discussion

In case of primary rheumatism, complications are frequently presented by the chorea minor, during which the insufficiency of vertebro-basal system reveals itself as well.

Along with that, the following changes are detected: Norepinephrine content decreases by 16% and is significantly reduced compared to the group of

practically healthy children; in opposite, epinephrine content increases (*Tab.1*) resulting decrease in Norepinephrine/Epinephrine interrelations. These alterations in simpatico-adrenal regulation are worsened also by the decreased content of dopamine as a vasodilating mediator. It is expected, that decreased concentration of dopamine in blood could be expressed by its accumulation in brain structure becoming as a background of such symptoms of chorea minor as aggressiveness, chaotic movement, emotionality etc. [1,4-6]. Serotonin content increases and Norepinephrine/Epinephrine interrelations decreases correspondingly, pointing on alterations towards serotonergic regulation.

Indices	Control group	Basic group
Linear speed of blood flow in basilar artery cm/sec	48,0 ± 6,0	28,0 ± 4,0
Norepinephrine n.mol/ml	624,0 ± 36,0	457,0 ± 23,0
Epinephrine n.mol/ml	313,0 ± 33,0	414,0 ± 37,0
Dopamine n.mol/ml	508,0 ± 25,0	313,0 ± 32,0
Serotonin n.mol/ml	0,95 ± 0,11	1,06 ± 0,008

Tab.1 *Linear speed of blood flow in basilar artery and containment of catecholamines in adolescents.*

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Взаимосвязь между нейро-эндокринной регуляцией и интракраниальным кровотоком при ревматизме у подростков

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Р Е З Ю М Е

Целью работы являлось изучение взаимоотношений между цереброваскулярными осложнениями и норадренерго-серотонинергическим дисбалансом при первичном ревматизме у подростков. Методами интракраниальной доплерографии и флюорометрии. Обследовано 20 подростков (средний возраст $10,2 \pm 1,3$ лет) с первичным ревматизмом, которые принимали антибиотики и нестероидные противовоспалительные препараты. Установлено, что при первичном ревматизме осложнения проявляются в виде малой хореи. Содержание норадреналина значительно снижается в сравнении с практически здоровыми детьми. Увеличивается содержание адреналина, что вызывает ослабление норадреналин-адреналиновых взаимосвязей. Аккумуляция дофамина в мозговой структуре создает условия для развития агрессивности, хаотических движений, эмоциональности и т.д. Повышенный уровень серотонина и ослабленные норадреналино-адреналиновые взаимосвязи указывают на сдвиги в серотонинергическом направлении.

Ключевые слова: *ревматические болезни, доплерография, катехоламины, подросток*