Reflexology in the development of immunological reactivity in infants with perinatal damage to the nervous system in the first year of life

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RESUME

The white blood count peculiarities, the hematologycal indexis of immunologycal reactivity of infants with perinatal damage of the nervous system in the first year of life have been analyzed. Examination shoved significand difference in white blood count, immunological reactivity, mental development and morbidity in infants treated with course of reflexotherapy (RT) in the early reconvalescent period. Inclusion the RT in complex rehabilitation of the union "mother-baby" provides the optimization of the mental development and reduction of the morbidity in infants, connected with peculiarities of the immune status.

Keywords: reflexotherapy, infant, rehabilitation, white blood count, immunological reactivity, morbidity.

SUMMARY

The features of leukogram, hematological indices of immunological reactivity of infants with perinatal lesions of the nervous system in the first year of life have been analyzed. Significant differences were revealed in hematological parameters of leukogram, immunological reactivity, neuropsychic development and morbidity in infants who received a course of reflexology (RT) in the early recovery period. The inclusion of RT in the complex rehabilitation of the "mother-child" dyad ensures the optimization of neuropsychic development and a decrease in the incidence of children associated with the peculiarities of the immune status.

Key words: reflexology, infant, rehabilitation, leukogram,immunological reactivity, morbidity.

INTRODUCTION

Infancy is one of the critical periods in the development of a child's immune defense. At this time, the primary nature of the immune response to many antigens remains, the synthesis of IgM antibodies begins to switch to the formation of IgG antibodies, subclasses IgG1, IgG3 appear, however, the synthesis of IgG2 and IgG4 pools is delayed. The suppressive orientation of the immune system is replaced by the predominance of the helper function. The system of local resistance during this period is not developed, the incidence of respiratory viral infections is high [1]

Currently, it is believed that immune-mediated mechanisms play an important role in the pathogenesis of perinatal lesions of the nervous system and their consequences. The immune status of children who have undergone hypoxic-ischemic encephalopathy is accompanied by changes in the cellular link of immunity, which affects neuropsychic development and morbidity [2].

It is known that RT has an immunomodulatory effect and regulates the immunocompetent cellular composition of peripheral blood [3]. The regulation of the cellular composition of the blood, immunological reactivity in the neonatal period, which allows to promote the formation of the immune response and improve the condition in infancy, is a very promising area of perinatal rehabilitation.

The purpose of this study was a follow-up study of the formation of immunological reactivity and its role in physical and neuropsychic development, as well as in the incidence of infants in the first year of life with perinatal damage to the nervous system, depending on RT in the neonatal period.

MATERIALS METHODS

A follow-up analysis of the developmental histories of children with perinatal lesions of the nervous system who reached the age of 1 year and received RT in the late neonatal period was carried out. 65 children were under observation in the main group. Depending on the variant of reflex action in the neonatal period, 3 subgroups were formed. From the first subgroup, in which both mother and child were given RT against the background of drug treatment in the late neonatal period, the developmental histories of 24 children were analyzed; from the second subgroup, in which RT was performed only for mothers - 19 children; from 3 subgroups - a course of reflexology was carried out only for children - 22 infants. The control group was represented by 25 children who did not receive RT.

The technique of acupuncture (IRT) of inhibitory prescription according to F. Mann with the addition of a group Lo-point was used. The duration of the session is up to 60 minutes during the sleep of the newborn after the morning feeding. Disposable needles "SuJok Acupuncture Needles Stere-lised by Gamma-ray" from Subal were used. The course of acupuncture, both for the mother and the child, consisted of 5 sessions.

The study of peripheral blood was carried out using the standard method. A screening study of the quantitative indicators of the leukogram with tests of the first level was carried out. Calculation of the absolute number of leukocytes (109 / l). Study of phagocytic function by counting the relative and absolute number of phagocytes (neutrophils and monocytes). Study of the T-system of immunity by counting the total number of lymphocytes. Indicators of leukocyte indices of cellular reactivity - nuclear index (NI), leukocyte index of intoxication (LII) Kalf-Kalif, index of immunological reactivity (IRR), reflecting the state of regenerative shift, nonspecific immunity and reactivity [4].

The physical, neuropsychic development and morbidity of children was assessed at 12 months. Physical development was assessed according to anthropometric

indicators of mass, body length and chest circumference. Neuropsychic development according to the method of L.G. Golubeva [5]. Assessment of morbidity (according to ICD X) was carried out by retrospective analysis of the history of the child's development (registration form No. 112-y) [6].

Parametric and nonparametric methods of the Statistika 5.0 software package were used for statistical data processing. The critical level of statistical significance (p) was taken as 0.05. To compare samples by quantitative criteria, Student's and Yates's tests were used.

RESULTS

By the age of one year, children of the main group show significant differences in leukocyte indices and leukograms from those of infants in the comparison group. The values are within the reference values. The reliability of the difference in indicators is presented in table. 1.

Table 1

Indicators of immunological reactivity and leukogram of infants on first year of life (M ± m)

Показатели	Группа сравнения	1-я подгруппа	2-я подгруппа	3-я подгруппа
ЯИ, у.е.	0,060 ± 0,003	0,098 ± 0,004	0,127 ± 0,006*	0,099 ± 0,005*
ЛИИ, у.е.	0,466 ± 0,156	0,247 ± 0,11*	0,141 ± 0,05*	0,111 ± 0,02*
ИИР, у.е.	8,84 ± 1,63	11,5 ± 1,806*	9,43 ± 1,56*	9,09 ± 0,46
Лейкоциты, 109 /л	7,477 ± 0,661	7,536 ± 0,462	7,400 ± 0,435	7,050 ± 0,580
Палочкоядерные нейтрофилы, % (109 /л)	2,43 ± 0,72 181,6 ± 4,75	3,0 ± 0,71 226,1 ± 3,2	3,33 ± 0,88 246,4 ± 3,82	2,66 ± 1,67 187,5 ± 9,7
Сегментоядерные нейтрофилы, % (109 /л)	40,5 ± 1,10 3028,1 ± 7,2	30,4 ± 1,09* 2236,2 ± 5,03	26,3 ± 1,35* 1946,2± 5,8	27,00 ± 1,73* 1903,5 ± 10,03
Лимфоциты, % (109 /л)	45,8 ± 1,61 3424,5 ± 10,6	58,6 ± 1,40* 4416,1 ± 6,5	59,3 ± 1,93* 4388,2 ± 8,4	59,00 ± 1,31* 4159,5 ± 7,6
Моноциты, % (109 /л)	5,7 ± 1,31 403,7 ± 8,6	5,40 ± 1,01 406,9 ± 4,7	6,75 ± 1,11 499,5± 4,8	7,01 ± 1,12 494,4± 6,5
Эозинофилы, % (109 /л)	4,6 ± 1,09 343,9 ± 7,2	3,5 ± 1,44 263,7 ± 6,6	4,32 ± 0,46 319,7 ± 2,0	4,70 ± 0,56 337,3 ± 3,25

* – достоверность разницы показателей между подгруппами наблюдения и группой сравнения.

Children of the comparison group reveal the failure of the cellular link of both innate and adaptive immunity, hyporegenerative cellular shift, manifestations of physiological endotoxicosis with high intensity of nonspecific immunity with reduced immunological reactivity, significant depression of the immune status indices. In the main group, the values statistically significantly differ from the severity of similar indicators of newborns in the comparison group and characterize the process of active formation.

the cellular link of adaptive immunity.

In children of the main group, NI significantly increased (by 63.3%, 111.6% and 65.0%, respectively, for 1, 2 and 3 subgroups) in relation to the same indicator in children of the comparison group. When the ratio between neutrophils changes in favor of the old forms, there is a hyporegenerative nuclear shift to the right in the comparison group.

In children in the main subgroups, LII significantly decreased (by 1.8, 3.3 and 4.1 times, respectively, for 1, 2 and 3 subgroups), in relation to the index of children in the comparison group, indicating a high tension of nonspecific immunity of children the comparison group and the presence of physiological endotoxicosis with a good intensity of nonspecific immunity in the main one with insufficient control groups in children.

In the main group, RRI is significantly different (an increase of 30.1% - in subgroup 1, $p < 0.05$, by 6.7% - in subgroup 2, $p < 0.05$, and by 2.8% - in subgroup 3 , $p > 0.05$) from the comparison group. A decrease in RRI, indicating a decrease in the relative content of lymphocytes in the formation of adaptive immunity, expressed in the control group, is an unfavorable sign characterizing a low hyporeactive level of immunity.

There were no significant differences in the number of leukocytes in children of both groups.

The content of stab neutrophils also did not differ significantly from each other in the studied groups.

The content of segmented neutrophils was higher in children of the control group than in children of the main subgroups (by 33.2%, 53.9% and 50.0%, respectively), which indicates the tension of the nonspecific immunity of children in the comparison group.

The average level of lymphocytes is higher in the main subgroups (by 27.9%, 29.5%, 28.8%, respectively), and in children of the control subgroups had a significant dynamics of reduction, both in relative and in absolute numbers, which indicates the activity of the lymphocytic component of the immune status ($p < 0.05$) in children of the main group.

The relative level of monocytes in children in the control group did not significantly differ from children in the subgroups in the direction of decrease. Monocytes are the leading effectors of cell-mediated immune responses and nonspecific resistance. Their decrease in combination with a decrease in the content of young forms and the predominance of mature neutrophils indicates the suppression of primary immunity.

The content of eosinophils in children of 1, 2 and 3 subgroups was less than in children of the comparison group, but did not have significant differences.

The most pronounced changes were noted in infants of subgroup 1 who received a course of IRT together with their mother.

Previous studies revealed that by the age of one year, the physical development of children of the two groups did not differ significantly. The neuropsychic development of children undergoing IRT correction during the neonatal period significantly prevailed over the children of the comparison group by 12 months. Most

of infants of the main group (in subgroups 1 and 3, respectively - 58.3% and 68.2%) neuropsychic development was assessed as normal ($p < 0.05$), in contrast to the comparison group (24%). Among some children, there was an advance (8.3% and 9.1% of cases, respectively, for subgroups 1 and 3, $p > 0.05$). In the comparison group, the majority of children (68.0%) were delayed in development by 1 epicrisis period. By the age of one year, the children of the main group who are lagging behind in development are significantly less (29.2% and 18.2%, respectively, in subgroups 1 and 3) than in the control group. The development of children in subgroup 2 also differed from that in the comparison group, however, it was not statistically significant ($p > 0.05$). The incidence of children in the first year of life largely depended on the type of RTI. The overall incidence in the main group was lower than in the control group (by 69%, 10.2% and 42.3% in subgroups 1, 2 and 3, respectively). For certain classes of diseases among children of the main group, the incidence was several times less than among children in the comparison group. For blood diseases (anemia) - by 4.2 ($p < 0.05$), 1.4 and 3.8 ($p < 0.05$) times; skin diseases - 1.9, 1.01 and 1.8 times; respiratory organs - 2.6 ($p < 0.05$), 1.1 and 1.5 times, respectively, for 1, 2 and 3 subgroups. A significant part of the children of the main group never got sick in the first year of life. The health index, respectively, was 41.7% ($p < 0.05$), 5.3% and 31.8% ($p < 0.05$) among children of 1, 2 and 3 subgroups. Children of subgroup 2 had lower morbidity rates compared with children of the comparison group, but the differences were not significant [7].

DISCUSSION

The immune reactivity of infants who received RT during the neonatal period is characterized by the development of adaptive immunity, an increase in the quantitative composition of immunocompetent cells.

It is noted that polymorphonuclear neutrophils of patients with traumatic injury produce significantly more IL-10 and therefore can actively contribute to the development of immunosuppression, which is observed in children of the control group; however, they secrete less soluble receptors for IL-1 and more TNFa and IL-8 [8].

Infants who received RT have higher cognitive performance and lower morbidity rates. The best neuropsychic development in children of the main group presupposes the presence of a psychogenic influence of the mother already in the neonatal period. RT allows you to avoid the effect of psychological risk factors that have a negative impact on the early development of the child's psyche, regardless of the severity of his somatic condition [9]. Revealing the nature of intrafamily relations in the mother-child dyad states the psychogenic origin of violations of the somato-vegetative level, transforming into neuropathic disorders of constitutional genesis by the end of 1 year of life, which is manifested by disorders of the neuropsychic development of the infant. Harmonization of relations between mother and newborn, carried out at the early stages of ontogenesis,

Reducing the incidence of children confirms the immunotropic effect of RT with a long aftereffect. RT, possessing immunomodulatory properties, determines the development of diseases in infancy. In children with

perinatal lesions of the central nervous system were marked by violations of cellular energy metabolism in the population of lymphocytes with the formation of secondary mitochondrial insufficiency, an immunopathological state for a number of immunity factors [10]. Obviously, the inclusion of RT in the course of rehabilitation contributes to the restoration of immunological resistance and the normalization of immunological parameters, which is manifested by a decrease in morbidity in the first year of life.

A feature of the immune reactivity of infants with perinatal lesions of the nervous system, who received RT during the neonatal period, is the formation and dominance of the cellular composition of adaptive immunity with modulation of the regenerative shift of the immune response.

CONCLUSIONS

Thus, the inclusion of RT in the joint rehabilitation of the mother and the newborn at the second stage of nursing has a positive effect on the neuropsychic development of infants and reduces their morbidity during the first year of life. The participation of RT in the implementation of compensatory-adaptive reactions during the year is carried out through the immune system, which provides benefits in the health status of children who received RT with their mother.

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