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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНИТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНИТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman** (**Кириллица**), для текста на грузинском языке следует использовать **AcadNusx.** Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - http://www.spinesurgery.ru/files/publish.pdf и http://www.nlm.nih.gov/bsd/uniform_requirements.html
В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректура авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or compu-ter-printed on a single side of standard typing paper, with the left margin of **3** centimeters width, and **1.5** spacing between the lines, typeface - **Times New Roman** (**Cyrillic**), print size - **12** (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf
In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

Articles that Fail to Meet the Aforementioned Requirements are not Assigned to be Reviewed.

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე,დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx.** შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შეღებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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THE STUDY OUTCOMES OF THE NEGATIVE IMPACT OF HEXACHLOROCYCLOHEXANE ON VEGETOVASCULAR REGULATION OF NEWBORNS' CARDIAC RHYTHM

Abuova Zh.Zh[1], Buleshov M.A[1], Zhaksybergenov A.M[1], Assilbekova G[2], Mailykaraeva A.A[2].

[1]*Akhmet Yassawi International Kazakh-Turkish University, Kazakhstan.*

[2]*South Kazakhstan Medical Academy, Kazakhstan.*

Abstract.

Introduction: One of the most adverse chemical factors of the outdoor environment is pesticides entering the organism of newborns via mother's breast milk, and also receive a pesticide load through a polluted environment. The heavy demonstration of pesticides impact on the brain is violation of autonomic regulation mechanisms of newborns' cardiac rhythm.

The purpose of the study is early detection of violation of autonomic regulation mechanisms of cardiac function of children with perinatal hypoxia in the region of hexachlorocyclohexane use in cotton planting.

Material and methods: The hygienic state of the environment of the cotton planting region has been studied by means of measurement of pollution level of the atmospheric air, water and soil with pesticide hexachlorocyclohexane, the concentration of which was in 7,55-9,38 more than their maximum permissible concentration (MPC). 148 children took part in the study who were treated in neonatal center of Turkestan Regional Children's Clinical Hospital in Shymkent city. 30 infants without any signs of hypoxic-ischemic syndrome were assigned to the comparison group (I group). 118 children with signs of hypoxic-ischemic central nervous system injury were included in the study group and were divided into 1 and 2 subgroups. Among them 85 children with detected hypoxic-ischemic central nervous system injury of I-II degree were included in the 1st subgroup, and 33 children with cerebral hypoxic-haemorrhagic central nervous system damage of III degree in the 2nd subgroup. The study has been carried out by means of Holter monitoring using instrumental-software system "Kardiotechnika-4000" within 15-38 days of infants' lives.

Results: Advanced complex of QRS prevails in infants who underwent a heavy perinatal hypoxia. Changes in this electrocardiogram are one of the most unfavorable heart changes and is indicative of bioelectric myocardium instability. Using a program to compare short records of cardiac rhythm, the average daily value of the indicator was calculated. The use of such method enables elimination of such impact of long-term malignant causes in the spectrum. The analysis of heart vegetative reaction conducted among infants of 15-22-day age demonstrated decrease of parasympathetic impact on heart rate of I group infants, and activity of sympathetic segment of vegetative nervous system was unchanged. So, the decrease of parasympathetic impact on heart rate of infants in the study groups was observed in the result of Holter monitoring, but the absence of changes of sympathetic effect in general. It was reflected by the increase of the value of vagosympathetic index (LF/HF), similarly to this disease suggesting low evidence of respiratory sinusal arrhythmia.

Key words. Pesticides, parasympathetic nervous system, Holter monitoring, vagosympathetic index, cardiac rhythm regulation.

Introduction.

The large-scale application of organochlorine pesticides (OCP) and organophosphorus pesticides in agriculture resulted in serious health consequences of the whole population and particularly children. It is in the Central Asian states and in the Republic of Kazakhstan, where pesticides are widely used for cotton plants processing, children are under pressure of pesticide loads as well as adults, however their susceptibility to this environmental factor is much higher. Children receive pesticide load in several ways. Pesticides affect children in the form of genetic burden fixed in heredity. Pesticides pass from mother to a child through breast milk. Finally, pesticides are accrued in children through the polluted environment [1-3]. Pesticides accumulation in women organism even on levels of background concentrations can be dangerous for a newborn due to their bioconcentration in breast milk. Children continue to administer pesticides and their toxic impact not through placenta but through milk. This is confirmed by the fact that predominance of metabolites typical for breast milk was found in blood of newborns [4-7]. Studying children's state of health in the area of special intense application of OCP, where excess in the number of OCP entering the organism above the sanitary-hygienic standards achieved 7,7 times, the effect of pesticides on state of health was established for children of all age groups. It is demonstrated to the fullest extent possible in the age from 1 year old and during the period of their pubertal development (11-14 years old) [8-12]. The problem of perinatal hypoxia is extremely important over a period of many decades and attract attention of physiologists and clinicians with regard to development mechanisms of various pathological conditions [13-19].

Various changes of the cardiovascular system hold special place, which are frequently cause of violation of post-natal adaptation and results in development of severe pathological conditions. The range of cardiovascular pathology of children who underwent perinatal hypoxia, mainly includes persistence of fetal circulation, pulmonary hypertension, post-hypoxic cardiopathy, heart rhythm and cardiac conduction disorders [20-25]. Many neurological disorders can be prevented, particularly, preventable is 25% of joint load of hypoxic-ischemic encephalopathy [26-30]. In view of the aforesaid, we tried to establish earlier abnormalities in vegetovascular regulation of cardiac function rhythm for their timely therapeutic prevention.

The purpose of the scientific study is early detection of violation of heart rate rhythm and autonomic regulation mechanisms of cardiac function of children with perinatal hypoxia in the region of hexachlorocyclohexane use in cotton planting.

Materials and Methods.

148 children took part in the study who were treated in neonatal center of Regional Children's Clinical Hospital. 30 infants without any signs of hypoxic-ischemic syndrome were assigned to the I group, who meet the following criteria: course of this pregnancy of mothers is without pathological findings; delivery at term of 38-40 weeks, physical, Apgar score on 1st and 5th minute is not lower than 8 scores, normotrophic physical development. Children were of satisfactory psychomotor development and according to the results of clinical imaging the newborns were characterized as healthy. 118 children who were born with prenatal hypoxic-ischemic injury from women who suffered harmful action of hexachlorocyclohexane were divided into 2 subgroups (1-2 subgroups).

85 infants who were born from mothers with malignant environmental causes of prenatal perinatal chronic hypoxia were assigned to the 1st subgroup. The clinical characteristics of this group included Apgar score at least 7 scores at 1 minute; decrease of arterialization (p0;<56 mm Hg) and the tendency to acid intoxication in cord blood (pH<7,2); meconium amniotic fluid; respiratory distress syndrome; signs of morphofunctional dismaturity; autonomic dysfunction and persistent vascular spasm. The detected violations allowed verification of mild and medium hypoxia in this group of children. 33 children with cerebral hypoxic-haemorrhagic central nervous system damage of III degree in neonatal period were assigned to the 2nd subgroup.

Clinical anamnestic, instrumental inspection methods were considered as the study methods. Including electrocardiography, Holter monitoring using instrumental-software system "Kardiotechnika-4000" within 15-38 days of infants' lives of both groups.

We had studied the hygienic characteristics of the territory of environmentally unfriendly Maktaral district where raw cotton is intensively grown (Tables 1).

Concentration of pesticide hexachlorocyclohexane was established in the atmospheric air, water and soil on the basic residential area 7,55-9,38 times higher than the maximum permissible concentration (MPC). High concentration of pesticides in the natural environments causes adverse health effect of newborn and resulted in the emergence of hypoxic-ischemic encephalopathy of various severity. To assess correctness of this situation, we established degree of correlation between environmental pollution of the region with pesticides and severity of hypoxic-ischemic encephalopathy (Table 2).

It should be noted that environmental pollution of the cotton-growing region with hexachlorocyclohexane far exceeds their maximum permissible concentrations. Airborne levels are 1.2 times higher than MPC, pollution of open water sources are 19.9 times higher than MPC. Degree of correlation between

Table 1. *Annual average concentration level of pesticides in the atmospheric air, soil and water of cotton-growing region according to statistics from 2019 to 2021.*

Concentration level of chemical microelements in the natural environments	**Number of samples**	**Maximum permissible concentration (MPC)**	**Maximum concentration of pesticide**	**Average annual concentration of pesticide**	**Excess level of MPC of chemicals in the environment during processing of cotton fields using pesticides**
Air, mg/dm^3	34	6,25	18,27	1,56	7,55
Water, mg/l	42	0,002	0,024	0,0036	8,52
Soil, mg/kg	25	0,47	4,62	0,00097	9,38

Table 2. *Degree of correlation between environmental pollution with hexachlorocyclohexane (HCH) and severity of hypoxic-ischemic encephalopathy of newborns.*

Polluted natural environments	**Concentration level of hexachlorocyclohexane in the natural environments**	**Exceeding the level of the maximum permissible concentration of hexachlorocyclohexane in the natural environments (times)**	**Correlation index between pesticide level and hypoxic-ischemic encephalopathy (-R-)**	**Degree of correlation between pesticide level and hypoxic-ischemic encephalopathy**	**Severity of hypoxic-ischemic encephalopathy**
Air pollution level with hexachlorocyclohexane (mg/m^3)	7,55±0,69	1,208	0,28	Low	Light
Open water supplies pollution level with hexachlorocyclohexane (mg/l)	0,085±0,0071	42,60	0,92	Ultra high	Severe
Soil pollution level with hexachlorocyclohexane (mg/kg)	938±82,42	19,957	0,68	Average	Average

atmospheric air pollution with HCH and severity of newborns abnormalities with hypoxic-ischemic encephalopathy was R = 0,28, with pollution of open water sources R=0,92, and with soil pollution level R=0,68 scores.

Injury of autonomic regulation mechanism makes its contribution to heart rhythm disorders [18]. In this regard prematurity and perinatal pathology shall be considered as one of manifestations of cause of heartbeat rhythm disturbance. The study showed that there is a close correlation between the indicators of cardiac function and signs of perinatal disorder of newborns. It was proved that there is a correlation between a heartbeat rhythm disturbance and clinical syndrome of perinatal affection of the central nervous system. However, changes of heartbeat rhythm in autonomic regulation mechanism of newborns who suffered perinatal hypoxia have not been studied to a full degree.

The study outcomes.

In the studied subgroups (1 - 2 subgroups), infants did not have a significant difference in gestational age (38,96±0,277 and 38,95±0,319, P>0,05). The syndrome of mild hypoxic central nervous system damage of infants of the 1st subgroup had been manifested by the increased nervous-reflex excitability. And intracranial hypertension and muscular hypotonia are rarely found. Intraventricular and subarachnoidal hemorrhage, myotony syndrome, mixture of two syndromes, hypertensive syndrome and locomotor system injury syndrome are found in children of 2nd subgroup. Clinical signs not typical to this system are also observed during assessment of cardiovascular system activity. They constricted skin of a child and gave it an appearance of "marble" color. Tachycardia and brachycardia were found in children, and heartbeat sound was muffled. Systolic murmur of low tension is listened between 2 and 3 ribs on the left from the breast. Volume of liver is increased and tissues edema is noted. Signs of ischemic changes of infants of the 1st subgroup were detected on the standard electrocardiogram. Decreases and elevation of ST, as well as depression of T wave are fixed on images of precordial leads. Actual (P<0,05) extension of repolarization time of ventricles accompanied by prolongation of Q-T interval is noted in infants of the 1st subgroup. A presentation typical for violation of pulse cardiac conduction in form of increase in the average duration of QRS complex is observed in both subgroups, such changes were not noted in infants in the comparison group. Repolarisation abnormality in electrocardiography was in various areas and characterized by polymorphism. T-wave inversion was established in electrocardiography of infants of the 1st subgroup who suffered severe perinatal hypoxia: positivity of T wave in samples V2-6 and intensity of T wave in V1 samples. Extra large changes of heartbeat rhythm were not detected during the Holter monitoring of children of both groups. However, extrasystole was detected in 5 infants of the 1st subgroup. Extrasystole was observed for the first time in 4 among these infants during the Holter monitoring. So, although changes in ECG detected during the daily Holter monitoring of the examined infants were not unusually significant, however, their number was well above than in children who suffered perinatal hypoxia. It was detected that number of extrasystoles in infants in both subgroups detected during the day was actually higher than in children in control group, and that number of daily heartbeat arrests was higher than in control group due to 2nd degree of II type of sinuauricular obstruction of children during waking hours (Table 1). Ischemic changes were detected during the Holter monitoring in 5,88% of infants of I group (P>0,05). Prevalence rate of ischemic changes was 12,12% (P>0,05) among the infants who were assigned to the 1st subgroup of the basic group.

The signs of this abnormality were presented by long elevation of ST part to 350 μV at average and low frequency of cardiac beat of the examined infants while sleeping and during waking hours. The elevation of part ST was observed on monitor images V6 and Y.

According to data of the Holter monitoring arrhythmic changes were registered in 5 infants who were assigned to the 1st subgroup. A distance of QRS complex was narrow in 4 infants with extrasystole. Obvious circadian growth is observed on two their records. Frequency of extrasystole was equal to 24-1575 times per hour during waking hours of a child and 30-1781 times per hour while sleeping. Visit frequency with wide QRS complex of extrasystole during waking hours of one child was determined 31 times per hour and visit frequency with wide QRS complex of extrasystole while sleeping was 19 times per hour (Tables 3 and 4).

The method of Holter monitoring was used for detection of autonomic regulation of cardiac function of infants who suffered perinatal hypoxia and performed an expert examination of daily vegetovascular regulation of infants of I group and 1st subgroup of the basic group. The time and spectral analyses were carried out during assessment of autonomic regulation of cardiac function. Temporary examination of the infants did not detect differences in the studied groups and indicator HF was far below (P<0,05) the level of such indicator of infants of control group during the spectral analysis of infants of the 1st group. The indicator HF was detected in exactly the same way in infants of the 1st subgroup and compared to the indicator of infants of the control group (P<0,05). This led to the increase of vagosympathetic index of inter-sympathetic resistance (P<0,001 and P<0,01) of infants of I group and 1st subgroup.

Classic clinical and physiological understanding of HF indicator demonstrates the degree of manifestation of respiratory sinusal arrhythmia and high degree of parasympathetic effect in regulation of heartbeat rhythm.

A decrease of parasympathetic impact on infants' heartbeat rhythm in the studied groups was observed in the result of the Holter monitoring, but the absence of changes of sympathetic effect in general. It affected an increase of LF/HF indexes, as was the case on the side.

Discussion.

The Holter monitoring among infants who suffered perinatal hypoxia demonstrated that authentically higher than the average number of changes formed among infants in the comparison group was observed among them. It was established that there was an extended QRS complex and extrasystoles in both groups of sleeping and wakeful infants. Such changes in the electrocardiogram are among the most unpleasant changes of

Table 3. *. Daily average number of changes in ECG detected in the result of Holter monitoring of newborns (X± Sx).*

Indicators	**Comparison group (I), n=30**	**Basic group, 1st subgroup n=85**	**Basic group, 2nd subgroup $n = 33$**	**P value**
QRS complex was formed by narrow extrasystoles on ECG record	during the waking period	0,9±0,19	4,9±1,13 $P^1 < 0,05$	2,7±0,74 $P_2 0,05$; $P_3 < 0,5$
	At rest period	0,3±0,10	4,2±0,63 $P_1 < 0,001$	3,9±1,23 $P_2 < 0,02$; $P_3 > 0,5$
Supraventricular pair extrasystole on ECG (MPCE)		0,2±0,07	0,46±0,09 $P_1 < 0,1$	0,4±0,16 $P_2 < 0,5$; $P_3 > 0,5$
Extrasystole determined by QRS complex extended in ECG records	during waking hours	0	0,3±0,09 $P_1 < 0,5$	0,5±0,18 $P_2 < 0,02$; $P_3 < 0,5$
	At rest period	0	0,3±0,06 $P_1 < 0,5$	0,7±0,19 $P_2 < 0,01$; $P_3 < 0,02$
2 kinds of sinoatrial suppression (CAT) detected in ECG records	during waking hours	2,9±0,24	5,2±0,60 $P_1 < 0,05$	5,8±1,25 $P_2 < 0,05$; $P_3 > 0,5$
	At rest period	7,6±0,71	7,3±1,02 $P_1 > 0,5$	7,2±1,81 $P_2 > 0,5$; $P_3 > 0,5$
PPmax, ms at sinoatrial suppression (CAT) in ECG record		621±16,2	730,5±15,2 $P_1 < 0,001$	812,5±17,7 $P_2 < 0,001$; $P_3 < 0,001$
I degree of atrioventricular suppression (AVS)		0	0,04±0,022 $P_1 < 0,5$	0,03±0,030 $P_2 < 0,5$; $P_3 > 0,5$

Note: hereinafter, X - sample average; s1 - standard error of the mean; P - sample average compared to use of T - Student criterion, P1 – compared to indicators of control and 1st subgroup; P2 - compared to indicators of control and 2nd subgroup; PJ - compared to indicators of 1st and 2nd subgroups; MPCE – extrasystoles over ventricle of the heart; suppression – maximum value of suppression time; AVS – atrioventricular suppression.

Table 4. *Indicators expert evaluation of spectral vegetovascular response in groups of the examined infants (x±SX).*

Values of vegetovascular response (VSR)	**Comparison group I group n=30**	**Basic group, 1st subgroup, n=85**	**Basic group, 2nd subgroup, n=33**
VLF, $ms2$	381,72 ±9,12	378,24±11,98 $P_1 > 0,5$	374,38±18,42 $P_2 > 0,5; P_3 > 0,5$
LF, ms^2	86,59±3,92	92,47±5,69 $P_1 > 0,5$	98,82 ±7,93 $P_2 > 0,5; P_3 > 0,5$
HF, ms^2	26,09±1,84	17,62±1,33 $P_1 > 0,05$	18,07 ±3,42 $P_2 > 0,2; P_3 > 0,5$
LF/HF	3,32±0,23	5,24±0,29 $P_1 > 0,001$	5,46 ±0,28 $P_2 > 001; P_3 > 0,2$

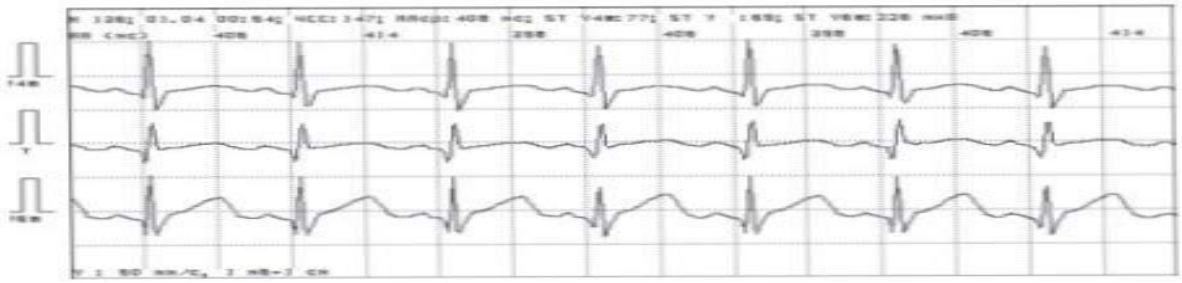

Figure 1. *Diagnosis: hypoxic myocardial ischemia.*

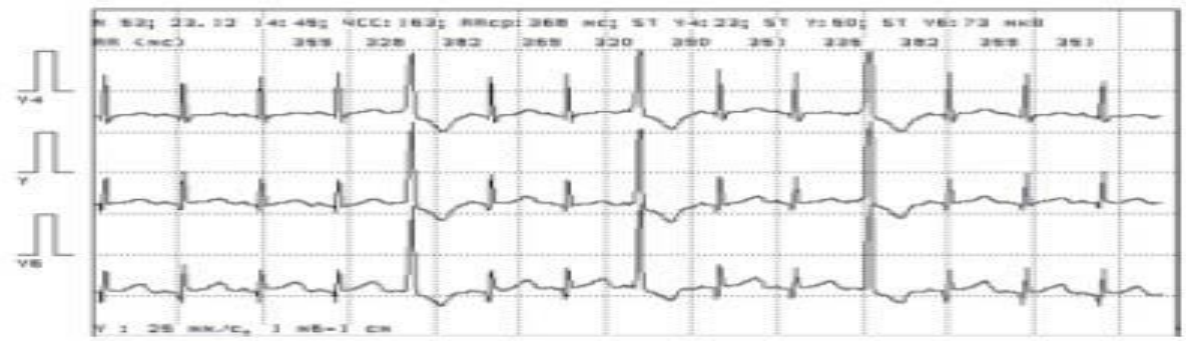

Figure 2. *Separate monomorphic extrasystoles formed by wide complex of QRS, and appearance of bonds on equal distances. Trigeminy short record.*

Figure 3. *Diagnosis of sick infant K.: separate polymorphous (a, b) ventricular arrhythmia according to data of the Holter monitoring including number of extrasystoles' alternations (c).*

heart and indicate bioelectrical instability of the myocardium. The frequency of extrasystoles achieved 20 times per hour in 5 children during the Holter monitoring of infants of group I. Taking into account these changes, it cannot be considered that such changes in the heart extrasystole are typical for infants who suffered perinatal hypoxia. But it can be summarized that the role of lethality mechanism of myocardium cells carrying sinusal impulses after perinatal hypoxia is high in genesis of heartbeat rhythm change. The spectral assessment method of the average daily indicators of vegetovascular response during the Holter monitoring turned out to be very sensitive to the effects of many unaccounted malignant causes (breastfeeding, swaddling, medical treatment, disorder of an infant). Mentioned causes are additional body burden of a child. An average cardiac rhythm is increased, and variability is reduced. Harmful effect of these causes on infants is also can be reduced at hospital. Using a comparator of short records of cardiac rhythm, then an average daily value of the indicator was calculated. The use of such method lays the groundwork for elimination of impact of long-term malignant causes in the spectrum. The analysis of the heart vegetative reaction conducted among infants of 15-22-days old demonstrated reduction of parasympathetic impact on heart rate rhythm of infants of I group, and activity of sympathetic unit of vegetative nervous system was unchanged. So, reduction of parasympathetic impact on heart rate rhythm of infants in the studied groups in the result of the Holter monitoring, and the absence of sympathetic effect in general. It was reflected by increase of indicator of vagosympathetic index (LF/HF) similarly to this disease suggesting low evidence of respiratory sinusal arrhythmia. Development of vegetative system in such direction in later neonatal period has been noted in the result of many scientific studies. Signs of vegetative disturbances of children of II group expressed in decrease of vascular response indicates the capability of occurrence of hypoxic-ischemic central nervous system injury of children of this group. Reduction of PVR occurs due to effect of anti-seizure medications used for arrest of intraventricular hemorrhage, ischemic injury of brain tissue and myotony syndrome to which children of this group are exposed. Although vegetovascular reaction is aimed at reduction of evidences of respiratory arrhythmia of general development, injury presentation of vegetative regulatory mechanism of separate patients was another. Most of infants at the age of 15-22 days of II group who suffered severe hypoxic-ischemic and haemorrhagic central nervous system damages were on the side of withdrawal from the severe respiratory embarrassment and medical depression. The conducted therapy (nootropics, anti-seizure medications) and localization of the central nervous system damage (CNS) will affect functional impairment of the heart. As a result, activity of a baby plays an important role.

Conclusion.

Electric instability of the heart myocardium was established during the Holter monitoring using standard electrocardiogram among newborns who suffered pesticide intrauterine hypoxic-ischemic injury of the organism. This means the actual establishment of heartbeat arrhythmia due to reduced effect of parasympathetic nervous system on heartbeat rhythm and on preservation of effect of sympathetic unit.

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РЕЗУЛЬТАТЫ ИССЛЕДОВАНИЯ НЕГАТИВНОГО ВЛИЯНИЯ ГЕКСАХЛОРЦИКЛОГЕКСАНА НА ВЕГЕТО-СОСУДИСТУЮ РЕГУЛЯЦИЮ СЕРДЕЧНОГО РИТМА НОВОРОЖДЕННЫХ

Абуова Ж.Ж[1], Булешов М.А[1], Жаксыбергенов А.М[1], Асылбекова Г[2], Майлыкараева А.А[2].

[1]Международный казахско-турецкий университет имени АхмедЯсави.

[2]Южно-Казахстанская медицинская академия.

Одним из наиболее неблагоприятных химических факторов внешней среды являются пестициды, попадающие в организм новорожденных через грудное молоко матери, а также получающие пестицидную нагрузку через загрязненную окружающую среду. Тяжелым проявлением воздействия пестицидов на мозг является нарушение вегетативных механизмов регуляции сердечного ритма новорожденных. Цель исследования - раннее выявление нарушений механизмов вегетативной регуляции сердечной деятельности у детей с перинатальной гипоксией в зоне применения гексахлорциклогексана при посадке хлопчатника.

Материал и методы. Гигиеническое состояние окружающей среды района выращивания хлопчатника было изучено путем измерения уровня загрязнения атмосферного воздуха, воды и почвы пестицидом гексахлорциклогексаном, концентрация которого в 7,55-9,38 раза превышала их предельно допустимую концентрацию

(ПДК). В исследовании приняли участие 148 детей, которые были госпитализированы в тяжелом состоянии. проходили лечение в неонатальном центре Туркестанской областной детской клинической больницы в городе Шымкент. В группу сравнения (I группа) были включены 30 младенцев без каких-либо признаков гипоксически-ишемического синдрома. В основную группу были включены 118 детей с признаками гипоксически-ишемического поражения центральной нервной системы, которые были разделены на 1-ю и 2-ю подгруппы. Из них 85 детей с выявленным гипоксически-ишемическим поражением центральной нервной системы I-II степени были включены в 1-ю подгруппу, а 33 ребенка с церебральным гипоксически-геморрагическим поражением центральной нервной системы III степени - во 2-ю подгруппу.. Исследование проводилось методом холтеровского мониторирования с использованием инструментально-программного комплекса “Кардиотехника-4000” в течение 15-38 дней жизни младенцев.

Результаты. Развитый комплекс QRS преобладает у младенцев, перенесших тяжелую перинатальную гипоксию. Изменения на этой электрокардиограмме являются одним из наиболее неблагоприятных изменений сердца и свидетельствуют о биоэлектрической нестабильности миокарда. С помощью программы для сравнения коротких записей сердечного ритма было рассчитано среднесуточное значение показателя. Использование такого метода позволяет исключить влияние отдаленных злокачественных причин в спектре. Анализ вегетативной реакции сердца, проведенный у детей 15-22-дневного возраста, показал снижение парасимпатического влияния на частоту сердечных сокращений у детей I группы, а активность симпатического отдела вегетативной нервной системы не изменилась. Таким образом, в результате холтеровского мониторирования наблюдалось снижение парасимпатического влияния на частоту сердечных сокращений у младенцев в исследуемых группах, но отсутствие изменений симпатического влияния в целом. Это отражалось в увеличении значения вагосимпатического индекса (LF/HF), что, как и при этом заболевании, свидетельствует о низкой выраженности дыхательной синусовой аритмии.

Ключевые слова. Пестициды, парасимпатическая нервная система, холтеровское мониторирование, вагосимпатический индекс, регуляция сердечного ритма.

რეზიუმე

ახალშობილთა გულისცემის ვეგეტატიურ-სისხლძარღვოვან რეგულაციაზე ჰექსაქლოროციკლოჰექსანის უარყოფითი ეფექტის შესწავლის შედეგები

Abuova Zh. Zh[1], Buleshov M.A[1], Zhaksybergenov A.M[1], Assilbekova G[2], Mailykaraeva A.A[2].

[1]აჰმადიასავის საერთაშორისო ყაზახურ-თურქული უნივერსიტეტი. სამხრეთ ყაზახეთის მე.

[2]სამედიცინო აკადემია

ერთ-ერთი ყველაზე არახელსაყრელი ქიმიური გარემო ფაქტორია პესტიციდები, რომლებიც ახალშობილთა სხეულში დედის რძის საშუალებით შედიან, ასევე პესტიციდების დატვირთვას იღებენ დაბინძურებული გარემოს საშუალებით. თავის ტვინზე პესტიციდების ზემოქმედების მძიმე გამოვლინებაა ახალშობილთა გულისცემის რეგულირების ავტონომიური მექანიზმების დარღვევა. კვლევის მიზანი იყო პერინატალური ჰიპოქსიის მქონე ბავშვებში გულის აქტივობის ავტონომიური რეგულირების მექანიზმების დარღვევების ადრეული გამოვლენა ბამბის დარგვის დროს ჰექსაქლოროციკლოჰექსანის გამოყენების სფეროში.

მასალა და მეთოდები. ბამბის მზარდი ტერიტორიის გარემოს ჰიგიენური მდგომარეობა შეისწავლეს ატმოსფერული ჰაერის, წყლისა და ნიადაგის დაბინძურების დონის გაზომვით პესტიციდით ჰექსაქლოროციკლოჰექსანით, რომლის კონცენტრაცია 7.55-9.38-ჯერ აღემატებოდა მათ მაქსიმალურ დასაშვებ კონცენტრაციას (MPC). კვლევაში მონაწილეობდა 148 ბავშვი, რომლებიც მძიმე მდგომარეობაში საავადმყოფოში გადაიყვანეს. ისინი მკურნალობდნენ შიმკენტის თურქეთის რეგიონული ბავშვთა კლინიკური საავადმყოფოს ახალშობილთა ცენტრში. შედარების ჯგუფში (i ჯგუფი) შედიოდა 30 ჩვილი ჰიპოქსიურ-იშემიური სინდრომის ნიშნების გარეშე. ძირითად ჯგუფში შედიოდა 118 ბავშვი ცენტრალური ნერვული სისტემის ჰიპოქსიურ-იშემიური დაზიანების ნიშნებით, რომლებიც იყოფოდნენ 1-ლი და მე-2 ქვეჯგუფებად. აქედან i-II ხარისხის ცენტრალური ნერვული სისტემის გამოვლენილი ჰიპოქსიურ-იშემიური დაზიანების მქონე 85 ბავშვი შედიოდა 1 ქვეჯგუფში, ხოლო iii ხარისხის ცენტრალური ნერვული სისტემის ცერებრალური ჰიპოქსიურ-ჰემორაგიული დაზიანების მქონე 33 ბავშვი შედიოდა მე-2 ქვეჯგუფში.. კვლევა ჰოლტერ მონიტორინგმა ჩაატარა ინსტრუმენტული პროგრამული კომპლექსის "კარდიოტექნიკა-4000" გამოყენებით ჩვილ ბავშვთა ცხოვრების 15-38 დღის განმავლობაში.

შედეგები. განვითარებული QRS კომპლექსი ჭარბობს ჩვილებში, რომლებმაც განიცადეს მძიმე პერინატალური ჰიპოქსია. ამ ელექტროკარდიოგრამის ცვლილებები ერთ-ერთი ყველაზე არახელსაყრელი ცვლილებაა გულში და მიუთითებს მიოკარდიუმის ბიოელექტრულ არასტაბილურობაზე. მოკლე გულისცემის ჩანაწერების შედარების პროგრამის გამოყენებით გამოითვლება ინდიკატორის საშუალო დღიური მნიშვნელობა. ამ მეთოდის გამოყენება შესაძლებელს ხდის გამორიცხოს სპექტრში შორეული ავთვისებიანი მიზეზების გავლენა. გულის ავტონომიური რეაქციის ანალიზმა, რომელიც ჩატარდა 15-22 დღის ასაკის ბავშვებში, აჩვენა I ჯგუფის ბავშვებში გულისცემის პარასიმპათიკური ეფექტის შემცირება და ავტონომიური ნერვული სისტემის სიმპათიური განყოფილების აქტივობა არ შეცვლილა. ამრიგად, ჰოლტერის მონიტორინგის შედეგად, კვლევის ჯგუფებში ჩვილებში გულისცემის პარასიმპათიკური ეფექტის შემცირება მოხდა, მაგრამ ზოგადად სიმპათიური გავლენის ცვლილებები არ მომხდარა. ეს აისახა ვაგოსიმპათიური ინდექსის (LF/HF)

ღირებულების ზრდაში, რაც, როგორც ამ დაავადების შემთხვევაში, მიუთითებს რესპირატორული სინუსური არითმიის დაბალ სიმძიმეზე.

საკვანძო სიტყვები. პესტიციდები, პარასიმპათიკური ნერვული სისტემა, ჰოლტერის მონიტორინგი, ვაგოსიმპათიკური ინდექსი, გულის რითმის რეგულირება.