AMERICAN JOURNALS
Open Access, Peer Reviewed Journals

American Journal of Pedagogical and Educational Research
ISSN (E): 2832-9791| Volume 27, | August - 2024

FATTY ACID COMPOSITION OF BLOOD SERUM IN CHILDREN WITH VITAMIN D-DEFICIENCY RICKETIS

Ibatova Sh. M.
Rakhmonov Yu. A.
Samarkand State Medical University, Uzbekistan

A B S T R A C T

Rickets still occupies an important place in the structure of morbidity in young children and remains an urgent problem in pediatrics. The disease has a negative impact on the reactivity of the body, the course and outcome of somatic diseases. The purpose of the study was to study lipid metabolism in children with rickets. We examined 47 patients receiving traditional therapy. Of these, 11 children had rickets, 15 children had rickets due to pneumonia, and 21 children had rickets due to pneumonia and malnutrition. In children suffering from rickets due to pneumonia and malnutrition, after the traditional method of treatment, there was no normalization of phosphorus-calcium metabolism and some indicators of lipid metabolism. Along with clinical recovery, total blood and fecal lipids retained increased alkaline phosphatase activity, and calcium and phosphorus levels were below normal, which indicates "incomplete recovery" and, apparently, requires further correction of biochemical parameters.

K E Y W O R D S

Rickets, vitamin D, patients, fatty acids, lipid metabolism, treatment.

Introduction

Rickets plays an important role in the structure of morbidity in young children and is a pressing problem in pediatrics [1,3,5,11]. This problem requires special attention to the problem of rickets, which has a negative impact on the reactivity of the organism, the course and outcome of somatic diseases, especially in children of the first year of life [2,7,8,10,14,18].

It is clear that the basis of any complex method of treating rickets is the use of vitamin D preparations. However, the data accumulated in the literature [4,12] indicate that in some children, course treatment with vitamin D preparations is not effective enough.

These data in the wider world reflect the experience of domestic and world practice, indicating that a number of manifestations of this disease are persistent and insufficiently correctable when treated with vitamin D preparations [13,17].

The schemes proposed by a number of authors [16,18] using various dosage forms and dosages of vitamin D, as a rule, do not lead to complete recovery by the end of the course of treatment and, at the same time, in some cases it is accompanied by the occurrence of complications - manifestations of hypervitaminosis D [6,9].

The traditional treatment complex for rickets, along with drugs with a specific effect (group D vitamins), includes pharmacological agents for pathogenetic and symptomatic therapy (group B vitamins, ascorbic acid, calcium gluconate, and others) against the background of the mandatory widespread use of a complex of nonspecific measures that provide optimal conditions for harmonious development child's body. This is a properly organized regime, strict observance of sanitary and hygienic standards for child care, rational nutrition [18-23].

Specific therapy for rickets, against the background of the described complex of non-specific measures, was carried out with a 0.5% alcohol solution of vitamin D.

With rickets of the I degree of severity, taking into account the nature of the course of the disease, patients receive 400-600 thousand IU of vitamin D per course. With rickets of the II degree of severity, the course dose of vitamin D increased to 600-800 thousand IU, which the children received in the acute course of 15-20 days, and in the subacute course of 45-60 days. In none of the observed cases, we noted increased sensitivity to vitamin D preparations, side effects and phenomena of D-vitamin intoxication.

PURPOSE OF THE STUDY

To study clinical and biochemical parallels in children through a comparative analysis of the clinical features of the course of the disease and the dynamics of some indicators of lipid metabolism in children with rickets.

MATERIAL AND RESEARCH METHODS

We examined 47 patients who received traditional therapy. Of these, 11 children with rickets, 15 children with rickets aggravated pneumonia and 21 children with rickets aggravated pneumonia and malnutrition.

Analysis of fatty acids in blood serum was carried out by gas-liquid chromatography. Among the methods of chromatographic analysis, gas chromatography is promising due to its high separating power, sensitivity, and expressivity, becoming one of the most used methods in analytical chemistry [15].

We determined the qualitative and quantitative composition of fatty acids on a Tsvet-100 chromatograph, model 165 with a flame ionization detector, in the laboratory of the Department of General Chemistry of Samarkand State University.

The determination of total lipids in blood and feces, calcium, phosphorus and alkaline phosphatase was carried out using kits from Biolatest.

RESEARCH RESULTS

We analyzed the initial indicators of biochemical variants, which reflect the state of some indicators of lipid metabolism, as well as some features of their dynamics in children against the background of the traditional method of treatment. The results obtained are presented in the table and figure.

First, let us consider the dynamics of the studied indicators in the group of examined children. At the time of hospital admission, their total lipids were higher than control values (4.61 g/L) and amounted to 6.95 g/L total lipids ($P < 0.001$).

Table Some indicators of lipid metabolism in children with rickets

Indicators	Healthy M ± м	On admission M ± м	P	In the dynamics (for 5-7 days) M ± м	P	At discharge M ± м	P
Total lipids, g / l	4.61 ± 0.28	6.95 ± 0.30	< 0.001	6.61 ± 0.30	< 0.001	5.64 ± 0.20	<0.02
Total feces lipids, g / l	0.42 ± 0.05	0.85 ± 0.03	< 0.001	0.79 ± 0.03	< 0.001	0.71 ± 0.02	< 0.001
C(16:0)	28.17 ± 1.37	30.87 ± 1.53	> 0.2	29.50 ± 1.43	> 0.5	28.96 ± 0.43	< 0.01
C(16:1)	2.70 ± 0.22	1.32 ± 0.62	<0.05	1.45 ± 0.53	<0.05	1.62 ± 0.30	< 0.05
C(18:0)	26.13 ± 1.32	28.13 ± 1.04	> 0.2	27.88 ± 0.92	> 0.2	27.67 ± 0.82	> 0.2
C(18:1)	0.90 ± 0.13	0.60 ± 0.14	> 0.2	0.66 ± 0.11	> 0.2	1.76 ± 0.10	> 0.2
C(18:2)	33.32 ± 2.51	29.73 ± 2.34	> 0.5	30.10 ± 2.12	> 0.5	30.74 ± 2.10	> 0.5
C(18:3)	2.41 ± 0.45	2.56 ± 0.50	> 0.2	2.44 ± 0.48	> 0.2	2.11 ± 0.45	< 0.05
C(20:4)	3.56 ± 0.60	2.68 ± 0.60	> 0.2	2.32 ± 0.56	> 0.2	2.10 ± 0.51	< 0.05
UFAs	54.30 ± 2.69	59.00 ± 2.57	<0.05	57.38 ± 2.35	> 0.2	56.63 ± 2.10	> 0.2
EFAs	42.89 ± 3.91	36.93 ± 4.20	<0.05	36.98 ± 3.80	<0.05	37.33 ± 3.62	< 0.05
K=UFAs / EFAs	0.80	0.63		0.64		0.65	

P – significance of differences between indicators in the group of patients and healthy

When analyzing the fatty acid spectrum of the blood serum of the examined children upon admission to the hospital, it was revealed that almost all of its indicators are C (16:0), C (18: 0), C (18: 1), C (18: 2), C (18:3), C (20:4) had no significant differences compared with healthy children (P > 0.2), (P > 0.5) and only C (16:1) tended to decrease (P< 0.05).

The content of total lipids in the feces of healthy children was 0.42 ± 0.05 g/kg, and at the time of admission to the hospital in children this figure was 0.85 ± 0.03 g/kg, which was higher than in healthy children (P < 0.001)

When the children were re-examined, out of 5-7 days of their stay in the hospital, it was found that the level of total lipids in the blood serum became equal to an average of 6.95 ± 0.3 g/l (P < 0.001), the content of total fecal lipids (TLC) decreased and was equal to 0.79 ± 0.03% (P < 0.001).

The content of C(16:0) tended to decrease and amounted to 27.50±1.43% (P>0.5), while C(16:1) increased, it turned out to be 1.45±0.53% (P<0.05) .

The level of C (18:0) in the blood serum decreased and averaged 27.88 ± 0.92% (P > 0.2), while C (18:1) tended to increase and amounted to 0.66 ± 0.11% (P >0.2).

The content of C (18:2) also tended to increase 30.10 ± 2.12% (P>0.5), while C (18:3) decreased, averaging 2.44 ± 0.48% (P>0.2) .

The C(20:4) level averaged 2.32 ± 0.56% (P>0.2) i.e. tended to decrease.

Further studies were carried out by the time the children were discharged. As a result, by the time of discharge in children of this group, the studied parameters were: the content of OL was 5.64 ± 0.3% (P < 0.02), which was higher than in the control group. OLK decreased, the indicator corresponded to 0.71 ± 0.02% (P <0.001).

The concentration of C(16:0) at the time of discharge was 28.96±1.28% (P<0.001). C(16:1) was 1.62 ± 0.43% (P<0.01) and remained below the standard values.

C(18:1) content 0.76 ± 0.10% (P>0.2), i.e. lower than in healthy children. The C(18:2) level at discharge was 30.74 ± 2.10% (P>0.5), which also tended to decrease, and C(18:3) was 2.11 ± 0.45%

(P<0.05) i.e. lower than in healthy children. The content of C(20:4) was 2.10 ± 0.51 (P<0.05), also below the norm.

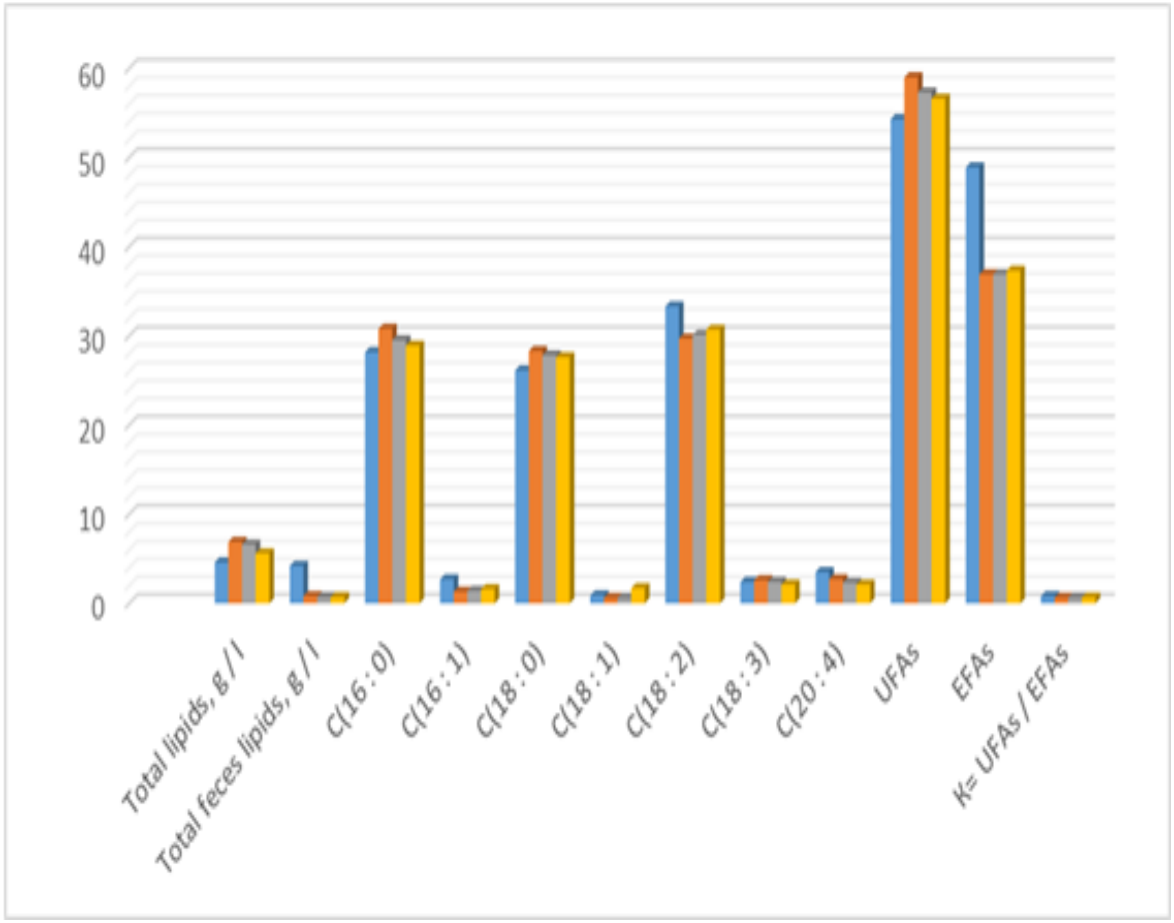

Figure. The dynamics of some indicators of lipid metabolism (spectrum of high fatty acids) in children with rickets, against the background of traditional therapy.

As can be seen from the table data, in children who received conventional treatment, along with a decrease in the clinical manifestations of the disease, there was a tendency to reduce the violations of some indicators of lipid metabolism, which is retained in sick children, despite the treatment.

Figure clearly demonstrates that the analyzed parameters changed quite differently, both qualitatively and quantitatively, even within the same link of lipid metabolism. The studies were carried out three times: upon admission to the hospital, on days 5-7 and at discharge from the hospital.

The stability of lipid dysmetabolism under the influence of the generally accepted complex of treatment is probably due to the fact that the effect of specific therapy in the body is primarily aimed at correcting phosphorus-calcium metabolism.

It can be assumed that the lack of noticeable positive dynamics of the fatty acid spectrum under the influence of generally accepted complex therapy makes it difficult to implement the action of vitamin D in the body, since it has been proven that under the influence of lipid dysmetabolism, there is a decrease in the level of 1,25-dioxycholecalciferol in plasma, which is one of the most active vitamin D metabolites [1,10].

This is probably due to a violation of its renal metabolism in terms of lipid dysmetabolism. The redistribution of 24,25-dioxycholecalciferol, which is important in the processes of osteogenesis, also changes in the tissues of the body.

DISCUSSION

Our clinical observations and biochemical studies have shown that the use of conventional therapy for rickets did not adequately normalize the studied parameters of lipid metabolism, which is probably due to the stability of lipid dysmetabolism in the examined children.

In all observed children, after a course of conventional complex therapy, the parameters of the fatty acid spectrum of blood serum, the content of inorganic phosphorus, calcium, alkaline phosphatase activity, total lipids of blood and feces were studied.

Case histories of observed children with rickets are given as clinical examples of the therapeutic and biochemical effectiveness of the traditional method of treatment.

We believed that such a presentation of the materials of our own observations should most effectively and adequately reflect the reliability of general conclusions, conclusions and practical recommendations.

An illustration of the influence of the conventional therapy of rickets on the dynamics of the symptoms of the disease, the studied indicators of lipid, phosphorus-calcium metabolism in the blood can be the following our observations:

The child Farhod D., aged 6 months, was under observation in the children's polyclinic N 1 in Samarkand. The boy was born full-term from the 4th pregnancy and childbirth. The mother's pregnancy proceeded with toxicosis of the first half, which was manifested by nausea, vomiting, loss of appetite. The mother received no treatment for this. The child's body weight at birth was 3400 g, height 50 cm. He was attached to the breast on the second day, sucked actively. The umbilical cord fell off on the 4th day and the child was discharged home in a satisfactory condition. From the age of 3 months, he was artificially fed. Specific prophylaxis of rickets was not carried out.

Complaints when examining a child for periodic anxiety for no apparent reason, sleep disturbance, excessive sweating, irritability, capriciousness, decreased appetite.

CONCLUSIONS

In children with rickets after the traditional method of treatment, there was no normalization of some indicators of lipid metabolism. Along with clinical recovery, the content of some indicators of lipid metabolism, total blood and fecal lipids, remained elevated, which requires further correction of biochemical indicators.

REFERENCES

1. Ibatova Sh.M. Optimization of treatment of rickets in children. // J. Infection, immunity and pharmacology. Tashkent. №5. 2015. P. 99-103.
2. Ibatova Sh.M. Evaluation of the effectiveness of apricot oil and Aevit in the complex treatment of children with rickets // J. Bulletin of the Association of Physicians of Uzbekistan. - 2015. No. 4. P.50-53.

3. Sh.M. Ibatova, F.Kh. Mamatkulova, N.B. Abdukadirova, H.M. Oblokulov, F.A. Achilova. The effectiveness of apricot oil in children with rickets. // Scientific and practical journal "Questions of science and education", Moscow, 2019, No. 27 (76), P.40-46.
4. Ibatova Sh. M., Mamatkulova F. Kh., Ruzikulov N.Y. The Clinical Picture of Acute Obstructive Bronchitis in Children and the Rationale for Immunomodulatory Therapy. International Journal of Current Research and Review. Vol 12 Issue 17. September 2020. P.152-155.
5. Ibatova Sh. M., F. Kh. Mamatkulova, N. B. Abdukadirova, Yu. A. Rakhmonov, M. M. Kodirova. Risk Factors for Development of Broncho-Ostructive Syndrome in Children. International Journal of Current Research and Review. Vol 12. Issue 23 December 2020. P. 3-6.
6. Ibatova Sh.M., Mamatkulova F.Kh., Rakhmonov Y.A., Shukurova D.B., Kodirova M.M. Assessment of the Effectiveness of Treatment of Rachit in Children by Gas-Liquid Chromatography. International Journal of Current Research and Review. Vol 13, Issue 06, 20 March 2021. P.64-66.
7. Sh.M. Ibatova, F.Kh. Mamatkulova, D.S. Islamova. Efficiency of combined application of apricot oil and aevit as a regulator of lipase activity of blood serum in children with vitamin D-deficiency rickets. Journal of Critical Reviews. // ISSN- 2394-5125. VOL 7, ISSUE 11, 2020. P.1266-1274.
8. Ibatova Sh.M., D. T. Rabbimova, E. S. Mamutova, N. B. Abdukadirova, M.M.Kadirova. Gas-chromatographic appraisal of aplication of apricot oil and aevit in complex therapy of vitamin D-deficiency rickets in children. International Scientific Journal Theoretical &Applied Science, 24.04.2019, Philadelphia, USA, P.333-336.
9. Sh.M. Ibatova, N.Q. Muhamadiev, Sh.O. Axmedov, S.N. Muhamadieva Improvement of Vitamin D-deficient rachitis treatment in children International Journal of Medicine & Health Research. - 2015. - V.1. N 1. P. 1-5.
10. Ibatova Sh. et al. (2018). Correction of some lipid metabolism in children with rickets by the combined use of apricot oil and aevita. " Proceedings of the XXXIV International Scientific and Practical Internet Conference "Trends and Prospects for the Development of Science and Education in the Context of Globalization". Collection of scientific papers Pereyaslav-Khmelnitsky, 2018. P.589-593.
11. Ibatova Sh. M., Mamatkulova F. Kh., Ruzikulov N.Y.The Clinical Picture of Acute Obstructive Bronchitis in Children and the Rationale for Immunomodulatory Therapy. International Journal of Current Research and Review. Vol 12 Issue 17. September 2020. P.152-155.
12. Ibatova Sh. M., F. Kh. Mamatkulova, N. B. Abdukadirova, Yu. A. Rakhmonov, M. M. Kodirova. Risk Factors for Development of Broncho-Ostructive Syndrome in Children. International Journal of Current Research and Review. Vol 12. Issue 23 December 2020. P. 3-6.
13. Ibatova Sh.M., Mamatkulova F.Kh., Rakhmonov Y.A., Shukurova D.B., Kodirova M.M. Assessment of the Effectiveness of Treatment of Rachit in Children by Gas-Liquid Chromatography. International Journal of Current Research and Review. Vol 13, Issue 06, 20 March 2021. P.64-66.
14. Sh.M. Ibatova, F.Kh. Mamatkulova, D.S. Islamova. Efficiency of combined application of apricot oil and aevit as a regulator of lipase activity of blood serum in children with vitamin D-deficiency rickets. Journal of Critical Reviews. // ISSN- 2394-5125. VOL 7, ISSUE 11, 2020. P.1266-1274.

15. Ibatova Sh.M., Baratova R.Sh., Mamatkulova F.Kh., Ergashev A.Kh. State of immunity in chronic obstructive pulmonary disease in children. Asian Journal of Multidimensional Research (AJMR). Vol.10, Issue 3, March, 2021. P. 132-136.
16. Sh.M. Ibatova, F.Kh. Mamatkulova, N.Y. Ruzikulov, Yu.A. Rakhmonov. Bronchoo structive syndrome in children: prevalence and difficulties of differential diagnostics. ACADEMICIA: An International Multidisciplinary Research Journal 2021, P. 87-92.
17. Lesina T.I., Kislyakovskaya V.T. Gas-liquid chromatography of fatty acids, lipids of blood fractions in children of 1 year of age. //Collection of scientific papers. Problems of physiology and pathology of metabolism in childhood. Moscow. 1970.
18. Mukhamadiev N.K., Ibatova Sh..M., Ergashov I.M. Gas-chromatographic graphical representation of fatty acids in blood juices of children sick with rickets // PRACI of the 2nd enviably Ukrainian symposium on adsorption and chromatography. - Lviv, 2000. P. 211-214.
19. Sh.M. Ibatova, F.Kh. Mamatkulova, S.F. Kuldoshev. STUDY OF LIPID AND PHOSPHORUS-CALCIUM METABOLISM IN CHILDREN WITH RICKETS RECEIVING TRADITIONAL TREATMENT. EURASIAN JOURNAL OF MEDICAL AND NATURAL SCIENCES. VOL. 3, No. 4. 2023. P. 253–261.
20. Ibatova Sh.M., Ruzikulov N.E., Islamova D.S. EVALUATION OF THE EFFECTIVENESS OF COMPLEX THERAPY OF VITAMIN D-DEFICIENT RICKETS WITH THE USE OF APRICOT OIL AND AEVIT IN CHILDREN. American Journal of Technology and Applied Sciences. Jan 5 2024. Volume 20, P.9-13.
21. Ibatova Shoira Mavlanovna, Ergashev Abdurashid Khursandovich, Mamatkulova Feruza Khamidovna, Rakhmonov Yusuf Abdullayevich, Turaeva N.Y. RISK FACTORS FOR THE DEVELOPMENT OF OBESITY IN CHILDREN. E3S Web of Conferences. **Volume** 491, 2024. P.1-5. 4 91 *ICECS'24*
22. Ibatova Sh.M., Ruzikulov N.E. EVALUATION OF THE EFFECTIVENESS OF THE USE OF CUMIN OIL IN RICKETS IN CHILDREN. EPRA International Journal of Research and Development (IJRD) Volume: 9 | Issue: 3 | March 2024. P.45-47.
23. Ibatova Sh. M. Mamatkulova D. Kh. RICKETIS IN CHILDREN: CAUSES, CLINICAL PICTURE, DIAGNOSIS, TREATMENT. American Journal of Research in Humanities and Social Sciences. Volume 27, August – 2024. P. 10-15.