

Using a Gluten-Free Diet in Integrated Therapy of Autism Spectrum Disorders in Children: A Clinical Case

Irina A. Bavykina¹, Alexander A. Zvyagin², *Olga A. Panina³, Dmitry V. Bavykin⁴, Aleksandr V. Pochivalov⁵, Sofia A. Maschenko⁶

¹Candidate of Medical Sciences, Senior Researcher at the Research Institute of Experimental Biology and Medicine of the Federal State Budgetary Educational Institution of Higher Education "Voronezh State Medical University named after N.N. Burdenko" of the Ministry of Health of the Russian Federation, Voronezh, Russia.

²Doctor of Medical Sciences, Professor of the Department of Hospital and Polyclinic Pediatrics of the Federal State Budgetary Educational Institution of Higher Education "Voronezh State Medical University named after N.N. Burdenko" of the Ministry of Health of the Russian Federation Voronezh, Russia.

³Candidate of Medical Sciences, Assistant of the Department of Organization of Nursing Care of the Federal State Budgetary Educational Institution of Higher Education "Voronezh State Medical University named after NN Burdenko" of the Ministry of Health of the Russian Federation, Voronezh, Russia.

⁴Candidate of Medical Sciences, Assistant of the Department of Forensic Medicine and Law of the Federal State Budgetary Educational Institution of Higher Education "Voronezh State Medical University named after NN Burdenko" of the Ministry of Health of the Russian Federation, Voronezh, Russia.

⁵Doctor of Medical Sciences, Professor of the Department of Hospital and Polyclinic Pediatrics of the Federal State Budgetary Educational Institution of Higher Education "Voronezh State Medical University named after NN Burdenko" of the Ministry of Health of the Russian Federation, Voronezh, Russia.

⁶Student of Pediatric Department of the Federal State Budgetary Educational Institution of Higher Education "Voronezh State Medical University named after NN Burdenko" of the Ministry of Health of the Russian Federation, Voronezh, Russia.

Abstract

Currently, many studies show the effectiveness of elimination (gluten-free and case-free) diets in correcting not only the symptoms of gastrointestinal disorders in patients with autism but also in correcting behavioral indicators. The results of the inclusion of gluten and case free diets were analyzed in the complex of therapeutic measures in a child with autism spectrum disorders. The clinical efficacy of adherence was revealed to a strict gluten-free diet for 2 years in a child with autism spectrum disorders with gluten sensitivity. An individual approach is necessary to the appointment of a gluten-free diet for children with autism spectrum disorders, it is required to survey before it begins to exclude various forms of gluten intolerance.

Key Words: Autism Spectrum Disorders, Children, Gluten intolerance, Gluten-free diet.

*Please cite this article as: Bavykina IA, Zvyagin AA, Panina OA, Bavykin DV, Pochivalov AV, Maschenko SA. Using a Gluten-Free Diet in Integrated Therapy of Autism Spectrum Disorders in Children: A Clinical Case. Int J Pediatr 2020; 8(7): 11645-649. DOI: [10.22038/ijp.2020.44813.3841](https://doi.org/10.22038/ijp.2020.44813.3841)

*Corresponding Author:

Olga A. Panina, Department of organization of nursing care, Voronezh State Medical University, 394000, Voronezh, Studencheskaya Street, 10, Russia.

Email: media01@list.ru

Received date: Jan.28, 2020; Accepted date: Apr.22, 2020

1- INTRODUCTION

One of the controversial issues in the treatment of autism spectrum disorders (ASD) in children is using a gluten-free diet while opposing points of view are expressed. Elimination diets gluten-free (BHD), and casein-free (BCD) are not included in the international protocols for managing patients with ASD. However, several studies have confirmed the effectiveness of these diets in correcting both symptoms of gastrointestinal disorders in patients with autism and behavioral indicators. In addition, these data are incredibly contradictory (1-4).

The effectiveness of the inclusion of diet therapy for ASD children is clearly demonstrated by Ghalichi et al. (2016) (5). The study involved 80 children with ASD. After the appointment of the gluten-free diet for 6 weeks to 40 patients, the frequency of gastrointestinal symptoms decreased from 40.57% to 17.10% ($p < 0.05$), and in the control group (40 people) without observing gluten-free diet, the frequency of symptoms remained virtually unchanged [42.45% before and 44.05% after ($p > 0.05$)].

An essential result of diet therapy was a decrease in behavioral disorders in children: from 80.03 ± 14.07 to 75.82 ± 15.37 ($p < 0.05$); while no such dynamics were observed in the control group (79.92 ± 15 , 49 before and 80.92 ± 16.24 after gluten-free diet). Harris and Card obtained similar results in 2012 (6): 7 out of 13 children followed elimination diets, after which the parents of all 7 children confirmed the fact that they improved their behavior and reduced the clinical manifestations of symptoms of digestive disorders. Scientists conclude the need to continue research on the role of diet in ASD. In addition, several studies that refute the effectiveness of diet therapy for this pathology. Buie (2013) (7) concluded that there is currently insufficient evidence to support the inclusion of a gluten-free

diet in autism treatment protocols. Furthermore, there is a sub-group of patients for whom adherence to the gluten-free diet brings a therapeutic result, but the diagnostic sign by which patients were selected into a subgroup for the introduction of diet therapy remains unclear and it is evidence of a higher incidence of celiac disease in children with ASD compared to population (8).

Pusponegoro et al. (2015) (9), found that the therapeutic effect is not observed as a result of a randomized controlled double-blind study involving 74 children with ASD by a weekly course of elimination diets. In this case, the question arises: is the duration of the weekly course of diet therapy sufficient to conclude that the diet is ineffective? Despite the disagreements, all scientists involved in the study of the effectiveness of diet therapy in the complex of therapeutic measures for autism concluded that further studies are needed that will finally be able to justify the exclusion of gluten and casein from children's nutrition or to prove the lack of therapeutic effect of diets (10, 11). We give our clinical observation on this issue.

2- CASE REPORT

A 7 year- old boy entered the children's clinical hospital of the Voronezh State Medical University. N.N. Burdenko, in February 2017 for a survey on stunting (SDS growth of -2.27). Complaints upon receipt of a decrease in growth rates, poor appetite, hyperactivity, disinhibition, headaches. From the anamnesis, it is known that a child from 3 pregnancies, which was uneventful, has 3 urgent births. Two previous pregnancies ended in urgent delivery without complications, the children are healthy. In the first year, he grew and developed per age. Preventive vaccinations were carried out on an individual calendar for up to 3 years. Parents, sisters are somatically and mentally healthy. After a year, the child

began to lag behind peers in growth. Of the features of the neuropsychiatric status, the mother noted a lack of a smile, a delay in speech development was established in 1.5, later on, she began to watch the cars for a long time, choose the same routes, did not contact with others, there was practically no active and understandable speech. After consulting a child psychiatrist, at 2.5 years old, a diagnosis of ASD was established.

The psychiatrist did not give recommendations on the inclusion of a gluten-free diet, casein-free diet in the course of therapeutic support of the child. Mom, after independently studying various autism therapy methods, 6 months after the diagnosis was established, she added diet therapy to the medications prescribed by the child psychiatrist. Almost immediately, according to mother, a positive effect was noticeable for 2 weeks, which was as follows: the boy began to show interest in the environment and more contact with relatives, sisters, his sleep improved. He was on a diet for about six months with slow positive dynamics.

At 3.5 years old, they turned to a gastroenterologist to clarify the need for compliance with the gluten-free diet. Following the consultation, the doctor cancelled diet therapy due to "the lack of convincing data on the presence of celiac disease". After refusing to follow diet therapy, deterioration began to be noted after 1-2 months and was progressive in nature. According to the mother, the child was "intoxicated", learning was impossible due to the lack of concentration in the child. The boy ceased to understand the speech addressed to him, very selectively ate mainly milk, refused other products.

Due to the deterioration of the general condition and the increase in neuropsychiatric symptoms, at the age of 5 years, mother again limited the boy's nutrition, excluding not only gluten but also casein from the diet. Parents noted a

positive result from the repeated use of diet therapy 6 months after it began. In particular, the boy began to understand the speech addressed to him, his own vocabulary expanded, social adaptation increased, including the child began to contact with peers, especially sisters, there was a concentration of attention, which entailed a significant positive dynamics in the child's learning. They again turned to a pediatric gastroenterologist at the age of 5 years 9 months, prof. A.A. Zvyagin, it is recommended to continue strict adherence to diet therapy, given its effectiveness.

Currently, the duration of strict diet therapy is more than 2 years. The boy has been visiting the hockey section for about 2 years, his parents note an excellent memory, he knows many poems, goes to a kindergarten of a compensating type, attends training in the 1st grade of a comprehensive school. During hospitalization, when examined, height is 111.5 cm, body weight 20 kg, body mass index 16.13. The skin is pale pink, hyperpigmentation in the inguinal region, knee joints, there are local areas of hyperemia with itching, and subcutaneous tissue is developed moderately, evenly.

The musculoskeletal system is developed correctly. Respiratory organs without features. The cardiovascular system without pathology, not a rough systolic murmur is heard. The abdomen is soft, painless, the liver is not enlarged. Stool, urination not disturbed. The child underwent a comprehensive examination, including general clinical, hormonal, instrumental studies, determination of bone age. Based on the results of hospitalization, the child was diagnosed with Hypopituitarism. Short stature (SDS - 2.27). Secondary hypercorticism, subclinical form. Diffuse non-toxic goiter 0-1 degree, euthyroidism. Atopic dermatitis, infant form, limited, exacerbation. Structural

3- DISCUSSION

Subsequently, the child was included in the study under a grant from the President of the Russian Federation, a survey was conducted and the following results were obtained: genetic typing for the presence of HLA-DQ2, and HLA-DQ8: haplotypes of predisposition to celiac disease have not been identified;

- Antibodies to deamidated peptides of gliadin - 4.73 U / ml (reference value: 0 - 10 U / ml);
- Immunoglobulin A - 3.61 mg / ml (reference value: 0.7 - 4.5 mg / ml);
- Antibodies to gliadin Ig G - 0.73 U / ml (normal 0 - 25 U / ml).

The presented observation shows the importance of an individual approach to the prescription of gluten-free diet for children with ASD, the need for testing before it is started to exclude various forms of gluten intolerance and to increase the level of knowledge of gastroenterologists and psychiatrists on the issues of gluten-free diet and ASD. In families where there is a child with ASD, the socio-psychological difficulties associated with the disease are supplemented by challenges in observing the gluten-free diet, which can sometimes be the reason for refusing a diet.

This, of course, along with eating disorders, has an impact on food preferences, which in turn affects the composition and properties of the intestinal microbiota, which, ultimately, can affect the state of nutritional status, physical development, and physical health. Of the difficulties in observing the gluten-free diet, the mother of a 7 year- old boy noted the same that there is a celiac disease: the additional psychological burden on the child/family; the inability to diversify the diet of the child; inaccessibility of gluten-free products (10-12).

4- CONCLUSION

Thus, the survey allowed us to exclude celiac disease with a high probability (95-98%), confirmed the high quality of compliance with strict gluten-free diet; and suggest gluten sensitivity as a possible mechanism for the clinical effectiveness of the gluten-free diet.

5- ACKNOWLEDGMENT

Source of funding: Co-author of the article (I. Bavykina) is a scholarship holder of the President of the Russian Federation for 2019-2021 for young scientists and graduate students engaged in advanced research and development in priority areas of modernization of the Russian economy.

6- CONFLICT OF INTEREST: None.

7- REFERENCES

1. Bavykina I.A., Zvyagin A.A., Bavykin D.V., Panina O.A., Pochivalov A.V. Digestive disorders and autism spectrum disorders. *Indo American Journal of Pharmaceutical Sciences*. 2019; 6(5): 10288-91.
2. Marí-Bauset S., Llopis-González A., Zazpe I. Nutritional Impact of a Gluten-Free Casein-Free Diet in Children with Autism Spectrum Disorder. *J Autism Dev Disord*, 2016; 46(2): 673-84.
3. Lange K.W., Hauser J., Reissmann A. Gluten-free and casein-free diets in the therapy of autism. *Curr Opin Clin Nutr Metab Care*. 2015; 8(6): 572-5
4. Bavykina I.A., Zvyagin A.A., Nastaushcheva T.L., Bavykin D.V. Serologic and genetic markers of gluten intolerance in autism spectrum disorders. *Research Journal of Pharmaceutical, Biological and Chemical Sciences*. 2018; 9(2): 38-42.
5. Ghalichi F., Ghaemmaghami J., Malek A., Ostadrahimi A. Effect of gluten free diet on gastrointestinal and behavioral indices for children with autism spectrum disorders: a randomized clinical trial. *World J Pediatr*. 2016; 12(4): 436-42.

6. Harris C., Card B. A pilot study to evaluate nutritional influences on gastrointestinal symptoms and behavior patterns in children with Autism Spectrum Disorder. *Complement Ther Med.* 2012; 20(6): 437-40.
7. Buie T. The relationship of autism and gluten. *Clin Ther.* 2013; 35(5): 578-83.
8. Eufemia R., Celli M., Finocchiaro R. Abnormal intestinal permeability in children with autism. *Acta Paediatr.* 1996; 85:1076.
9. Pusponogoro H.D., Ismael S., Firmansyah A. Gluten and casein supplementation does not increase symptoms in children with autism spectrum disorder. *Acta Paediatr.* 2015; 104(11): 500-5.
10. Whiteley P., Haracopos D., Knivsberg A.M. The ScanBrit randomised, controlled, single-blind study of a gluten- and casein-free dietary intervention for children with autism spectrum disorders. *Nutr Neurosci.* 2010; 13(2): 87-100.
11. Pennesi C.M., Klein L.C. Effectiveness of the gluten-free, casein-free diet for children diagnosed with autism spectrum disorder: based on parental report. *Nutr Neurosci.* 2012; 15(2): 85-91.
12. Zvyagin A.A., Bavykina I.A., Zharkova I.M., Miroshnichenko L.A. Potential of amaranth flour as a gluten-free product. *Questions of children's nutrition.* 2015; 13(2): 46-51.