



Case Report

Eye contact in a month in a toddler with autism spectrum disorder

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ABSTRACT

Autism is characterized by deficits in verbal and nonverbal communication and repetitive behaviors. There is a lack of data available regarding pharmacological treatment in autism spectrum disorders. A 2.8-year-old boy, diagnosed with autism spectrum disorder and CARS score 36, was given omega3 fatty acid supplementation. At the end of 4 weeks, he demonstrated significant improvement in eye contact, which is a marker of social competence and adjustment. After 4 months, CARS II score was found to be 34. We propose that the DHA in omega 3 aids in learning and cognition by enhancing synaptic plasticity. We may need controlled trials with high-dose omega 3 supplementations for proving this therapeutic benefit.

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1. Summary

Autism is characterized by deficits in verbal and nonverbal communication and repetitive behaviors. There is a lack of data available regarding pharmacological treatment in autism spectrum disorders. A 2.8-year-old boy, diagnosed with autism spectrum disorder and CARS score 36, was given omega3 fatty acid supplementation. At the end of 4 weeks, he demonstrated significant improvement in eye contact, which is a marker of social competence and adjustment. After 4 months, CARS II score was found to be 34. We propose that the DHA in omega 3 aids in learning and cognition by enhancing synaptic plasticity. We may need controlled trials with high dose omega 3 supplementations for proving this therapeutic benefit.

2. Background

DSM V defines autism spectrum disorder as pervasive deficits in social communication and social interaction with restrictive or repetitive behaviors, interests, and activities. Characteristically, nonverbal communication like

eye contact, facial expressions, etc. are reduced, or absent.¹ They are often accompanied by cognitive and psychiatric comorbidities like language deficits, intellectual disability, and ADHD.² The prevalence of Autism Spectrum Disorder in India in the age group of 1 to 10 years of age is estimated to be 0.15%.³ Although early intensive behavioral intervention is the current treatment of choice,⁴ it could be prolonged and not always feasible. There has been increasing research on nutritional therapy for the improvement of symptoms associated with autism.⁵ Polyunsaturated fatty acid Omega -3 supplementation has been speculated to show potential benefits.^{5,6}

3. Case Presentation

A 2.8-year-old boy, born out of non-consanguineous marriage at full term, by cesarean section in view of premature rupture of membranes. He had normal antenatal and perinatal events and had a birth weight of 2.75 kg. He came to our observation at 20 months of age with complaints of delayed speech, lack of interest in the surroundings, and unresponsiveness to commands. There was a restricted social interaction with parents and peers. He had difficulty maintaining eye contact and could only establish it for a

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fraction of seconds. He had intermittent aggressive episodes without any inciting factor. He started walking at the age of 15 months. The speech was limited to irrelevant monosyllables. Motor milestones like a social smile, head holding crawling, sitting, and walking were age-appropriate. The child had toe walking and repetitive flapping of his hand. There was no similar history in the family. There was a history of using a mobile screen for entertaining the child many hours a day. On examination head circumference was 46 cm, there was a lack of facial expressions, paucity of nonverbal communication, and gestures were noted during the examination. There was no dysmorphism or neurocutaneous markers. The child was assessed by a developmental pediatrician using standard assessment tools of CARS II and INCLIN diagnostic tools for autism. He was certified as Level III autism satisfying DSM V criteria. Childhood Autism Rating Scale showed a total of 36 at baseline which suggests moderate autism. No neurological deficits were found on examination. Hearing evaluation using BERA and eyesight evaluation was normal. Genetic studies have been ordered and were normal. The patient had received occupational therapy for 2 months without any improvements. Due to COVID -19 and the nationwide lockdown, therapy could not be continued. The child was started on Omega3 with a dosage of 30 mg/kg/day of DHA twice a day at the age of 20 months, in view of no other treatment being available and is ongoing.

After 3 to 4 weeks, the father of the child (MD obstetrician) observed significant improvement in nonverbal communications, gestures, usage of meaningless words persisted but had progressed to bi syllables. Surprisingly, at the end of 4 weeks of medicines, the child had good eye contact with two family members and started giving attention to commands. Over the next few months, the child started using various gestures, pointing at objects while talking about them, and in general, showed more interest in his surroundings. Eye contact could be maintained for around 10-15 seconds by the end of 3 months of nutrient therapy. The parents also observed the use of facial expressions to convey emotions. Before starting omega-3, the child would find it difficult to interact with peers and play with them but now has shown significant participation in that aspect in 4 months. The repetitive flapping of hand and toe walking was reduced to some extent. The CARS showed (value 34) improvement in the following items: relating to people, body use, communication skills both verbal and nonverbal, and general impression. No other pharmacological or behavioral intervention was carried out during this treatment with Omega3. There have been no side effects or relapses seen on the current treatment.

4. Discussion

Many nutrients, drugs, and therapies have been used randomly by parents and specialists in the past considering

the ambiguity around etiology diagnosis treatment, and the cure of symptoms of the autism spectrum. Combined Omega 3 supplementation is one of them.

The learning experience and cognitive functions like language are associated with the modification of synapses and myelin sheaths.⁷ Although the precise cause of autism is unknown, studies suggest alterations in synaptic structure and function and neural circuits are the basic mechanism behind it.⁸ MRI studies suggest reduced corpus callosum and superior long fasciculus mass in patients with ASD.⁹ Omega 3 fatty acid contains essential docosahexaenoic acid and eicosapentanoic acid. Docosahexaenoic acid is highly concentrated in neuronal phospholipids, which is required for neurogenesis, neuronal survival, and neurotransmission.^{10,11} DHA enhances synaptic alterations and prevents neuronal death by increasing Brain-derived Neurotrophic factor, which is found to be lower in children with ASD.^{12,13} It also helps in the recovery of damaged myelin sheaths.¹⁴

Omega 3 supplementation aids in myelin formation, as well as repair of myelin by the anti-inflammatory process.¹⁵ Eicosapentanoic acid is required for cellular pathways.¹⁶ A study showed that during pregnancy, mothers who consumed a diet low in omega 3 had an increased risk of having children with lower verbal IQ and suboptimal social behavior, communication, and social development compared to mothers who consumed high omega 3.¹⁷

Autistic infants show more attention to inanimate stimuli and fail to focus on socially revealing parts of the face like eyes. Thus, eye contact is a marker of social competence and adjustment.¹⁸ A small double-blind randomized control trial showed reduced stereotypy and hyperactivity in children with ASD after 6 weeks of omega 3 therapy.¹⁹ Open labeled studies have shown significant improvement in social awareness and attention after 12 weeks of supplementation⁶⁻²⁰ but no significant changes could be deduced from other blind trials.^{21,22} Some case studies have reported improvement in the core symptoms of asd on supplementation for an extended period of time.²³

There is no conclusive data regarding the use and dosage of omega-3 supplementation. The doses used in the past were in very small doses which may have not given convincing results. This case report suggests the potential benefits of DHA of 60 mg/kg/day may be a factor behind the recovery of symptoms in this case. It could be hypothesized that DHA potentially helps in enhancing learning and cognitive functions by aiding in synaptic plasticity. None of the studies have shown any serious side effects

4.1. Learning points/take home messages

1. It could be hypothesized that DHA potentially helps in enhancing learning and cognitive functions by aiding in synaptic plasticity.

2. The possibility of high dose DHA in developing eye contact in 1 month as an early recovery sign of symptomatic improvement in autism should be considered
3. We need more controlled trials for conclusive data on the use of this supplement

5. Source of Funding

None.

6. Conflict of Interest

None.

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