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Case Report

A case report: celiac disease and pediatric stuttering

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ABSTRACT

Background. Celiac disease is an immune-mediated disorder known to manifest not only with gastrointestinal symptoms but also with a wide range of extraintestinal features, including neuropsychiatric conditions.

Case Presentation. We describe the case of a 4-year-old girl who presented with isolated stuttering. Serologic tests revealed elevated anti-tissue transglutaminase antibodies, and a diagnosis of celiac disease was confirmed by duodenal biopsy. A strict gluten-free diet was initiated. The patient's speech disorder began to improve by the sixth month of treatment and resolved completely by the twelfth month of dietary adherence.

Conclusion. This case highlights the importance of considering celiac disease in the differential diagnosis of speech disorders in pediatric patients, especially when no other underlying cause is identified.

Key words: celiac disease, stuttering, pediatric, gluten-free diet, neurological manifestation, case report.

Celiac disease is an enteropathy that occurs in genetically susceptible individuals as a result of an abnormal immune response to gluten—a protein found in wheat, barley, and rye—leading to small intestinal mucosal damage. It is well known that the disease may present not only with gastrointestinal symptoms but also with various extraintestinal manifestations including, dermatologic, musculoskeletal, and neurological involvement.[1]

Stuttering is a speech disorder characterized by involuntary repetitions, prolongations, or pauses that interrupt the normal flow of speech. In children, it can be developmental or associated with various factors, including neurological disorders, medications, and food allergies. Wheat has been suggested as one of the food triggers potentially associated with stuttering.[2]

To the best of our knowledge, similar case reports describing the association between celiac disease and stuttering are rare in the literature. This article presents the case of a 4-year-old girl diagnosed with celiac disease during evaluation for stuttering. The resolution of symptoms following initiation of a gluten-free diet is discussed in light of current literature.

Case Presentation

A 4-year-old girl was referred to the division of pediatric gastroenterology after serologic evaluation for suspected celiac disease revealed anti-tissue transglutaminase IgA and IgG levels above 200 IU/mL. The initial referral was made by a general pediatrician during assessment for persistent stuttering.

She was born at term via cesarean section, weighing 3300 grams, as the second child of

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a healthy 36-year-old mother and a healthy 37-year-old father. There was no prior history of growth retardation or health problems until the onset of stuttering around age 3. Psychosocial evaluation revealed a calm family environment, no exposure to preschool, and no identifiable stressors. No family history of stuttering or celiac disease was reported. Previous medical evaluations had found no organic pathology. Although brief psychotherapy was recommended, the family opted out after the diagnosis. There was no significant family history. Physical exam showed a weight of 14.2 kg (10th–25th percentile) and height of 102 cm (25th–50th percentile). Initial syllable repetitions were noted during speech. Other systems were normal. Laboratory findings: Hb 12.1 g/dL, WBC 6,000/mm^3, platelets 330,000/mm^3. Anti-tTG IgA and IgG >200 IU/mL. Vitamin A 385.6 μg/L (316-820), vitamin E 5.77 mg/L (6.6-14.3), vitamin C 2.38 mg/L (4-21), 25-hydroxy vitamin D 26.8 μg/L (30-100), folate 17.81 ng/mL (>5.38), ferritin 23.1 μg/L (13-232). Endoscopy showed atrophic changes in the duodenal and bulbar mucosa. Mucosal biopsies demonstrated Marsh type 3c lesions in the duodenal bulb and type 3a lesions in the second part of the duodenum.

She was diagnosed with celiac disease and started on a strict gluten-free diet. Speech began improving by month 6 and resolved completely by month 12.

Written informed consent was obtained from the patient's legal guardians for publication of this case.

Discussion

Celiac disease is known for its gastrointestinal and extraintestinal spectrum. In atypical forms, symptoms may be limited to anemia, growth failure, or neurological issues.[3] In recent years, despite the paucity of data in peer-reviewed literature, stuttering has been proposed as a possible extraintestinal manifestation of celiac disease.[4] Language and speech skills begin to develop early in childhood and are acquired through the coordinated function of multiple systems, including the neuromotor and auditory pathways, as well as visual input. Although some publications suggest psychological mechanisms, current evidence generally supports that stuttering originates from altered brain morphology and/or function due to underlying organic abnormalities in the brain.[2,4]

Celiac disease is a malabsorptive condition, and nutrient and vitamin deficiencies resulting from malabsorption are among the key contributors to its clinical manifestations. Based on this pathophysiological mechanism, neurological disorders such as epilepsy and migraine are known to occur more frequently in patients with celiac disease.[5-7] In addition, early cognitive dysfunction has been reported in children diagnosed with celiac disease.[8] In our patient, laboratory tests at the time of diagnosis revealed deficiencies in vitamin C, vitamin E, and 25-hydroxyvitamin D levels. These findings support previous research suggesting that functional nutrient deficiencies may lead to diverse neurological symptoms in affected individuals.

Approximately 5% of children begin to stutter around the age of 3 during the period of speech acquisition. However, about 75% of these cases resolve spontaneously without intervention before reaching adolescence.[9] The first reported case suggesting a link between gluten and speech disturbance involved a child who developed aphasia after being hospitalized for severe diarrhea and was subsequently diagnosed with celiac disease. The child had lost speech ability entirely at the time of diagnosis, but following the initiation of a gluten-free diet, both speech and normal bowel function were reported to return. Around the same period, publications also emerged reporting an association between celiac disease and epilepsy.[10] In our patient, stuttering improved after the introduction of a gluten-free diet and resolved completely within a year. Notably, speech fluency began to improve by approximately six months after starting the gluten-free diet and reached

complete resolution by twelve months, without the need for any additional speech therapy. This gradual, time-dependent improvement in the absence of other interventions strengthens the plausibility of a gluten-related mechanism, although spontaneous developmental recovery cannot be fully excluded. While this could certainly be part of the child's natural developmental trajectory, the timing of both the onset and resolution of symptoms following dietary intervention may support a possible link between stuttering and celiac disease. Although peer-reviewed medical literature lacks robust evidence on the relationship between stuttering and celiac disease, there are various anecdotal reports on online platforms suggesting a connection between stuttering and food allergies—particularly gluten. Conversely, other reports dismiss any such association.[4] Undoubtedly, many similar anecdotes can be found on the internet, but these should be critically evaluated and validated through scientific research. Ultimately, current scientific studies clearly demonstrate the association between celiac disease and various neurological disorders.[5] Given that stuttering is known to be associated with neurological abnormalities, it may plausibly arise as a manifestation of gluten-related neurological dysfunction.

Although gluten ataxia usually occurs in middle-aged adults with classical findings such as gait ataxia, dysarthria, and nystagmus, early or subtle cerebellar involvement cannot be completely excluded in pediatric cases.[7] In our patient, the marked improvement in fluency after starting a strict gluten-free diet raises the possibility—albeit speculative—that the stuttering may have reflected an early or atypical form of gluten-related cerebellar dysfunction. This hypothesis cannot be confirmed without neuroimaging or serological testing, but it highlights an area that may warrant further investigation in future studies.

Importantly, brain MRI and MR spectroscopy were not performed at the time of diagnosis, as the family declined an extensive neurological work-up for stuttering. This represents a limitation of our case and prevents definitive exclusion of structural or functional cerebellar pathology. However, the temporal improvement in fluency following the gluten-free diet suggests that gluten-related cerebellar dysfunction or early gluten ataxia cannot be ruled out. This observation remains hypothesis-generating and highlights the need for further research on isolated speech disturbances as potential early manifestations of gluten-related neurological involvement in children.

We believe that in pediatric patients presenting with speech disorders, it would be a prudent clinical approach to consider celiac disease as part of the differential diagnosis—or at the very least, to exclude its presence.

Ethical approval

Informed consent was obtained from the legal guardians.

Author contribution

The authors confirm contribution to the paper as follows: Study conception and design: BİA, NB; data collection: NB; analysis and interpretation of results: BİA, AÜ, NB; draft manuscript preparation: BİA, AÜ, NB. All authors reviewed the results and approved the final version of the manuscript.

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Conflict of interest

The authors declare that there is no conflict of interest.

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