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Tremor and Other Hyperkinetic Movements

Case Report

Further Evidence for Celiac Disease-associated Chorea?

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Abstract

Background: A number of neurological conditions have been reported to be associated with gluten sensitivity, including ataxia, peripheral neuropathy, epilepsy, and occasionally, chorea. The pathogenic role of anti-gliadin antibodies has been questioned, and pathophysiology remains controversial.

Case Report: I report chorea in a patient with celiac disease, which responded to a gluten-restricted diet. The response of the movement disorder to change in diet strongly suggests a functional role for anti-gliadin antibodies in the generation of chorea, probably involving basal ganglia targets.

Discussion: Gluten sensitivity may be a treatable cause of chorea.

Keywords: Chorea, celiac disease, anti-gliadin antibodies, gluten sensitivity

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Introduction

Chorea has a large number of causes, including metabolic, structural, pharmacologic, genetic, and autoimmune factors. Despite extensive investigations, many patients remain undiagnosed. The onset of chorea in adulthood, without family history or associated features suggestive of a neurodegenerative process, such as dementia, seizures, or psychiatric disease, may limit the differential diagnoses to be considered. The presence of a medical comorbidity, particularly one associated with autoantibodies, may suggest the diagnosis.

Although still controversial, and challenging to prove, celiac disease has been reported to be associated with a number of neurologic conditions,[1,2] which are postulated to be due to the action of anti-gliadin antibodies upon neuronal targets.

Case Report

A 59-year-old Caucasian male was referred for evaluation of generalized chorea, which had been present for 1.5 years. All neurologic evaluations were performed by the author at the James J. Peters Veterans Affairs Medical Center. There was no relevant family history. As a child he had been diagnosed with celiac disease and underwent colonoscopy, but did not recall jejunoscopy. He followed a gluten-free diet as a child, which controlled his symptoms, but as an adult returned to a normal diet without problems. In recent months, he reported recurrence of abdominal pain and diarrhea. He has a long history of psychiatric disease with possible schizotypal personality disorder, depression, anxiety, and past alcohol dependence. He had received phenobarbital for "nerves" for a few months, but had never been hospitalized for psychiatric reasons.

Twelve years prior to evaluation he was treated with trazodone (100 mg/day) and sertraline (maximum dose unknown), which was switched to nefazodone (300 mg/day). Five years prior to presentation treatment was started with risperidone (1 mg/day), for paranoid ideation. For 3 years prior to neurological evaluation he was on stable doses of trazodone (100 mg/day), venlafaxine (375 mg/day) and mirtazapine (15 mg/day). Involuntary movements were first noted by his psychiatrist 1 year prior to referral. Six months prior to the current evaluation risperidone was switched to quetiapine 100 mg/day with no change in his involuntary movements. Doses of his antidepressants were unchanged. The movements remained unchanged when he was first seen by the author.

On examination he had generalized chorea with dystonic facial movements and right hand posturing (video segment 1). On the motor portion of the United Huntington's Disease Rating Scale (UHDRS) he scored 9.

Laboratory evaluations including blood chemistry, peripheral blood smear, creatine kinase, liver enzymes, thyroid function tests, ceruloplasmin, and Huntington's disease gene, were unremarkable. There was a mild microcytic anaemia, and ferritin was low, but no ferritin mutations were detected. Anti-gliadin antibodies were IgG = 139 U (normal range 0–20 U), IgA = 72 U (normal range 0–20 U).

Non-contrast brain MRI showed mild–moderate cerebral atrophy, microvascular changes in the periventricular white matter and pons, old hemorrhage in the posterior right subinsular region and a chronic infarct at the left frontoparietal junction.

Treatment was started with levetiracetam 500 mg twice a day with benefit, but then the potential role of celiac disease was recognized, and he was advised to adhere to a gluten-free diet. He stopped taking levetiracetam shortly thereafter. Three months later his involuntary movements were significantly reduced (video segment 2), scoring 2 on the UHDRS, and his gastrointestinal symptoms improved. Anti-gliadin antibodies showed IgG=15 U (normal range 0–9 U) and IgA=10 U (normal range 0–4 U). (Unfortunately, the laboratory had changed the reference values between the two tests. However, IgG decreased from 3.6 to 1.67 × the upper limit of normal (ULN), and IgA from 6.95 to 2.5 × ULN.)

Discussion

The main evidence suggesting celiac disease as the etiology of this patient's chorea is the improvement seen with a gluten-restricted diet, supported by the reduction in anti-gliadin antibodies. Case reports of the benefit to neurological symptoms of a gluten-free diet are inconsistent, but the only systematic controlled study of the effect of a gluten-free diet did show neurological improvement.[3] In that study, 26 subjects of a cohort of 43 patients with ataxia attributed to celiac disease adhered to a gluten-free diet, confirmed by reduction in anti-gliadin antibodies. Quantitative testing of cerebellar function demonstrated a striking improvement in these subjects, as compared with a control cohort who did not adhere to the diet.

Four cases of chorea attributed to celiac disease have been previously reported.[2] These were all women, aged 48–77, with no significant family history of the disease, in whom an extensive investigation excluded other apparent causes of chorea. The three patients who adhered to a gluten-free diet showed a marked reduction in chorea. A reduction of anti-gliadin antibodies was found in the one subject in whom this test was repeated.[2]

Neurological complications of celiac disease are believed to be due to autoantibodies, possibly anti-gliadin antibodies, cross-reacting with a neuronal target.[4,5] The reason for the variability in neurological complications between patients is not known. Lack of benefit of a gluten-free diet in some patients may be due to permanent neuronal damage—for example, of Purkinje cells in ataxic patients.[4,5] As chorea was reversible in this patient, I hypothesize that anti-basal ganglia antibodies interfered with basal ganglia function, as in Sydenham's chorea. However, the basal ganglia were not labeled in immunohistochemical studies using the serum of patients with celiac disease and ataxia,[5] and the precise antigenic targets of these antibodies have not been determined.

Video 1. Segment 1. Moderate chorea of the patient's trunk, neck, and limbs, and dystonic facial movements, but no limb ataxia. **Segment 2.** On a reduced-gluten diet, chorea is markedly reduced, although some facial movements are visible, and mild upper limb dystonia is present.

Patients with various neurological conditions may have anti-gliadin antibodies, but the significance of these, and whether they truly reflect a pathological autoimmune response and gluten sensitivity, remains unclear.[6,7] Possibly, this patient's chorea had an independent cause, and the response to his change in diet was coincidental. Of particular note, I cannot exclude a diagnosis of tardive dyskinesia due to risperidone. However, the distribution of the movements (affecting the trunk and face, but not the mouth or tongue) was atypical for this diagnosis, as was the improvement of symptoms while on a stable dose of quetiapine.

Although not conclusive, this case provides further evidence supporting celiac disease as a potentially reversible cause of chorea, especially in those who are non-adherent to a gluten-free diet. Detection of the presence of anti-gliadin antibodies is a useful mechanism for determining dietary compliance. Determination of gluten sensitivity should be considered in patients with chorea of undetermined etiology, particularly if there are concurrent gastrointestinal symptoms.

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