

Health Manifestations of Celiac Disease (CD)

Section B: Signs, Symptoms, Associated Disorders and Complications

Affected System	Affected Organ	ID No.	Manifestation	Type*	Current Medical Information **	Deficient Nutrient
Nervous System	Brain, spinal cord, and peripheral nerves	203	Nervous System Disorders ^{1,180,181,182}	(AT) (AD) (C)	<p>[P] Neurologic disorders were found in 51.4% of CD patients.¹⁸⁰ Hard neurologic disorders were found in 10% of patients with CD.¹⁸¹ Perfusion abnormalities were found in 71% of patients with CD.¹⁸²</p> <p>[D] Nervous system disorders include both hard and soft disorders. Hard neurological disorders in CD include epilepsy, ataxia, myoclonus, internuclear ophthalmoplegia, multifocal leukoencephalopathy, dementia, and peripheral neuropathies.¹⁸¹</p> <p>Study screening children and young adults suggests that the variability of neurologic disorders that occur in CD is broader than previously reported and includes "softer" and more common neurologic disorders. Strong association in soft disorders includes hypotonia, developmental delay, learning disorders and ADHD, headache, and cerebellar ataxia. In most cases no significant increase in liability to develop soft neurologic disorders between patients with infantile-onset GI symptoms and patients with the late onset or asymptomatic CD could be shown. This differs from the trend to regard CD as gluten sensitivity, found in patients with neurologic disorder and atypical or subclinical CD.¹⁸⁰</p> <p>Study investigating the incidence of brain perfusion abnormalities, and whether gluten intake and associated autoimmune diseases may be considered risk factors in causing cerebral impairment, demonstrated that brain perfusion abnormalities seem common in CD.¹⁸²</p> <p>[M] Marked by neurological dysfunction.</p> <p>[C] Results from obscure mechanism but may be immunological or related to trace vitamin deficiencies.¹⁸¹</p> <p>[R] CD-related hard disorders respond poorly to gluten restriction except peripheral neuropathies.¹⁸¹ Brain perfusion may be improved by a GFD. Soft disorders improve or resolve on a GFD.</p>	B complex vitamins, Calcium, Copper, Folic acid, Iron, Magnesium, Omega-3 fatty acids, Potassium, Protein, Vitamin C, Vitamin E.
Nervous System	Brain: cerebellum	204	Ataxia, Gait Disturbance ^{1,49,183,184}	(AD)	<p>[P] Common neurological presentation in CD patients.¹⁸³</p> <p>[D] Gait ataxia is a cerebellar disorder characterized by defective muscular coordination of skeletal muscles used for locomotion. Manifestations can be a consequence of vitamin B₁₂, vitamin B₁, nicotinamide, vitamin D, or vitamin E deficiency.¹⁸⁴</p> <p>Study investigating the prevalence of gluten sensitivity in a large cohort of patients with various causes of ataxia demonstrated 100% of patients with gluten ataxia had gait ataxia.¹⁸³</p> <p>Study investigating the role of oxidative stress in CD demonstrated the level of markers for vitamin E were significantly lower in CD than in controls.⁴⁹</p> <p>[M] Marked by unsteady staggering walking movements and use of a wide base of support.</p> <p>[C] Results from vitamin E deficiency in CD.</p> <p>[R] Symptoms usually persist, but a GFD prevents further deterioration.</p>	Vitamin B ₁ , Vitamin B ₃ , Vitamin B ₁₂ , Vitamin E, Vitamin D.

* (S) = Classic sign/symptom; (AT) = Atypical sign/symptom; (AD) Associated Disorder; (C) = Complication.

** [P] = Prevalence; [D] = Description; [M] = Sign/symptom; [C] = CD related cause; [R] = Response to gluten Free diet (GFD).