Non-celiac gluten sensitivity is an emerging spectrum of gluten intolerance

Dr. Darla O'Dwyer , PhD, RDN, LD

Stephen F. Austin State University

Background

People following gluten free diets have become increasingly prevalent. Many people indicate that they feel better on a gluten free diet and that their symptoms return after eating gluten. This is occurring in the absence of celiac disease or a wheat allergy. This new clinical entity is called non-celiac gluten sensitivity (NCGS). Volta and colleagues (2014) cite several reasons for an increase in this condition: 1) farming practices have led to an increase in specific wheat variants that contain high amounts of gluten peptides that maybe toxic to susceptible individuals; 2) dough fermentation has significantly been shortened compared to the sourdough method used by traditional cultures. Shorter fermentation times results in higher levels of toxic gluten fractions; 3) high intake of gluten containing foods in general may play a role in triggering symptoms; and 4) media hype claims that gluten free diets are healthier, leading many people to believe that gluten is toxic.[1] Due to lack of serological and histological tests, the existence of NCGS has been considered controversial. The purpose of this review is to present recent evidence that indicates NCGS is an emerging spectrum of gluten intolerance.

Methods

Academic Search Complete was searched using the key words "non-celiac gluten sensitivity" and "non-celiac wheat sensitivity." The search was limited to peer-reviewed original research articles and review articles, published in English and from the years 2000 to 2016. Further references were utilized from the bibliography of the chosen articles.

Discussion

The term NCGS was established by the Second Expert Meeting in Munich in 2012.[2]

Symptoms

Symptoms of NCGS include gastrointestinal symptoms (similar to irritable bowel syndrome) and extra-intestinal symptoms.

Table I. Symptom prevalence of patients with non-celiac gluten sensitivity (NCGS) observed at the Department of Medical and Surgical Sciences of the University of Bologna over the last 12 months.

NCGS patients 84/2340 (3.5%); mean age 38 years (range 16-65 years); Female/Male: 3.7:1*			
Gastrointestinal symptoms	%	Extra-intestinal symptoms	%
Abdominal pain	84	Tiredness	78
Bloating	84	Headache	55
Diarrhea	55	Foggy Mind	40
Nausea or vomiting	50	Anxiety	38
Gastric Pain	48	Joint/muscle pain fibromyalgia like	30
Heartburn	45	Numbness (arms, legs, fingers)	30
Aerophagia	35	Skin rash/dermatitis	27
Aphthous stomatitis	30	Anemia	22
Gastro-esophageal reflux disease	30	Weight loss	10
Altered bowel habits	27	Rhinitis	9
Constipation	24	Asthma	5

Source: Volta and colleagues, 2014

Diagnostic Criteria

Biochemical markers to identify NCGS from celiac disease are associated with the activation of the innate immune system and in some cases, increased intestinal permeability.[3]

Discussion

Carroccio and collegues[5] found that a hallmark characteristic of NCGS was eosinophil (innate immune leukocytes) infiltration of the duodenal and colon mucosa.

Table II. Comparison between CD and NCGS features [23].

	Celiac disease	*Non-celiac gluten sensitivity*
Epidemiology	1%	To be defined (range 0.63%–6%)
Duration	Permanent	Unknown
Prevalent immune pathogenic mechanism	Adaptive immunity	Innate immunity
Onset	At any age	Adults (rare in pediatric age)
sex	Female/male ratio 2:1	Female/male ratio >3:1
Time interval between gluten ingestion and symptoms	Weeks to years	Hours or a few days
	Celiac disease	*Non-celiac gluten sensitivity*
Clinical picture	Intestinal and extraintestinal (systemic)	Intestinal and extra-intestinal (mainly neurological)
Biomarkers	tTGA, EmA, DGP	None (positivity for AGA in approximately 50% of cases but low specificity)
Genetics	HLA-DQ2 and -DQ8 linked	No known genetic link
Duodenal histology	From mild lesions to villous atrophy	Normal or less frequently mild lesions
Familiarity	3%–17% of first degree relatives are celiacs	Unknown, but more than 10% of NCGS pts have a relative with celiac disease
Autoimmune disorders	Frequent association (present in 10%–25% of celiac patients)	Unknown (a longer follow-up is needed)
Outcome (complications)	Refractory celiac disease, lymphoma, small-bowel carcinoma (rare (<1%) but with a poor prognosis)	Unknown (a longer follow-up is needed)

AGA- anti-gliadin antibodies; DGP- deamidated gliadin peptide antibodies; HLA- histocompatibility leukocyte antigen; NCGS- non-celiac gluten sensitivity; tTG-IgA- anti-tissue transglutaminase antibodies IgA

Source: Mocan and Dumitrascu, 2010

Components in Wheat that Cause Symptoms

Several components in wheat/gluten contribute to symptoms: 1) undigested gluten peptides-specifically gliadin peptides;[3] 2) α-amylase/trypsin inhibitors (ATIs)-low molecular weight proteins in wheat that stimulate the innate immune response;[5] 3) wheat lectin agglutinin (WGA)-a lectin found in wheat that has been shown to increase intestinal permeability and stimulate the immune system;[5] 4) and carbohydrate containing fructans and galactans (members of fermentable oligosaccharide, disaccharide, mono-saccharides, and polyols (FODMAPS).

Discussion

Products containing wheat and rye contain high amounts of fructans and galacto-oligosaccharides. Other grains, such as rice, oat, quinoa and corn contain very low levels.[5] Due to factors other than gluten, researchers suggest using the term non-celiac wheat sensitivity instead of non-celiac gluten sensitivity.[4]

Important Points

It is important to rule out celiac disease and wheat allergy prior to instituting a gluten free diet.[6] Markers to distinguish celiac disease from NCGS are actively being researched. Food challenge is still a useful tool. Experts recommend food challenge with wheat to be performed after at least 6 weeks of being on a gluten-free diet.[7] A subset of patients who have wheat sensitivity will also have multiple food hypersensitivities.[4]

Conclusion

Patient quality of life can be severely impacted by continuing to ingest gluten in the presence of NCGS. With the recent publications of high quality clinical research studies, it is clearly obvious that non-celiac gluten sensitivity is a valid condition. Nutrition professionals need to be aware of the current evidence supporting this condition.

References

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