Celiac Disease

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Objectives

• Provide information about Celiac Disease
• Help give an understanding of how dietitians can help patients with Celiac Disease
• Provide references
Overview

• Establishing a foundation of knowledge about Celiac Disease
• Discuss current guidelines for treatment and diagnosis
• Explain the effects of celiac disease on patients and facilities
• Give a review by presenting a case study
What is Celiac Disease?

- Autoimmune disorder
- Sensitivity to certain amino acid sequences found in wheat, barley, and rye
- Also known as: celiac sprue, gluten-sensitive enteropathy, non-tropical sprue, coeliac disease
What happens?

- Inflammation$^{1-4}$
- Villous atrophy $^{1-4}$
  - Reduces absorptive surface
  - Malabsorption
- Mucus barrier altered$^5$
  - Intestinal permeability to macromolecules
Normal Villi

Damaged Villi
What happens?

- Inflammation\textsuperscript{1-4}
- Villous atrophy \textsuperscript{1-4}
  - Reduces absorptive surface
  - Malabsorption
- Mucus barrier altered\textsuperscript{5}
  - Intestinal permeability to macromolecules
Common Signs & Symptoms

- GI symptoms (diarrhea, vomiting, flatulence, abdominal pain)\(^1,2,6\)
- Fatigue\(^1,2\)
- Joint and body pain\(^1,2\)
- Skin rash\(^1,2\)
Secondary Signs & Symptoms

- Iron-deficiency anemia¹,⁶
- Osteoporosis¹,⁴,⁶
- Unexplained failure to thrive¹
- Repeated fetal loss or infertility¹
Who is at Increased Risk?

- Type I diabetes\(^1\)
- Other autoimmune disorders\(^1,6\)
- 1\(^{st}\) and 2\(^{nd}\) degree relatives with Celiac Disease\(^1\)
- Turner, Down, or Williams Syndrome\(^1\)
How is it Diagnosed?

- Biopsy of small intestine
- Serological test\(^1,4,7,8\)
Possible Comorbidities

- **Malabsorption**
  - Osteoporosis$^{1,6}$
  - Iron deficiency/anemia$^{1,4,6}$

- **Cancer**
  - Non-Hodgkin’s lymphoma$^9$
How is it Treated?

- Gluten-Free diet (GF)
  - Does not contain prolamines from wheat, barley, or rye

- Oats???\(^1,10,11\)
Grains to Avoid - Wheat

- All varieties
  - Einkorn, emmer, spelt, kamut\(^1\)

- All forms
  - wheat starch, wheat bran, wheat germ, cracked wheat, hydrolyzed wheat protein\(^1\)

- Watch for other terms
  - Farina, durum, semolina, graham\(^1\)
Grains to Avoid - Wheat cont’d

• Ingredients derived from wheat
  – Dextrin, carmel color, modified food starch, maltodextrin

• Any food item that contains any form of wheat must list it on the label
Grains to Avoid - Barley

- Beer, ale, stout, other fermented beverages (unless GF variety)¹
- Malt
  - Malt, malt syrup, malt extract, malt beverages, malted milk, malt vinegar
    - If malt other than barley, should be declared, such as “extract of malted corn”
    - Nonmalt vinegar (cider, wine, distilled) are GF¹
Grains to Avoid - Rye

- Rye
- Crossbred varieties
  - Triticale = cross between wheat and rye
Grains to include

- Rice, corn, amaranth, quinoa, teff, millet, finger millet, sorghum, Indian rice grass, arrowroot, buckwheat, flax, Job’s tears, sago, potato, soy, legumes, mesquite, tapioca, wild rice, cassava, yucca, nuts, seeds
Does Gluten-Free Help?

• Within weeks to months\textsuperscript{6,12}
• Villous improves\textsuperscript{1,2,4,6,9}
• Increased vit B12, D, folic acid\textsuperscript{4}
• Increased bone mineral density (BMD)\textsuperscript{4}
• Decrease in symptoms\textsuperscript{2,6}
What is the Threshold?

- Codex (developed by WHO and FAO) defines GF as no more than “20ppm gluten”\(^1,^{12}\)
  - 500 g of food containing 20ppm
- Some can tolerate less, some more\(^6,^{12}\)
What may be Deficient?

- Before GF treatment
  - Calcium, vitamin D, iron, folate\textsuperscript{1,6}

- While on GF treatment
  - Fiber, thiamine, riboflavin, niacin, folate, iron, calcium\textsuperscript{1,3}
How to Assess

• 24-hour recall\(^1\)
• Food diaries\(^1\)

Keep in mind:

− Do they know how to identify gluten?\(^1,12\)
− Are they eating enough of potentially deficient nutrients?\(^1,3\)
− Have symptoms resolved?\(^1,2,4\)
Common Diagnosis

- NI 5.7.3 Less than optimal intake of types of proteins or amino acids (gluten)
- NI 5.9.1 Inadequate mineral intake (iron)
- NI 5.10.1 Inadequate mineral intake
- NI 5.8.5 Inadequate fiber intake
Sample PES statement

- Inadequate mineral intake (iron) related to decreased fortified grain consumption as evidenced by review of labels of products consumed.¹
Common Interventions

- Put patient on GF diet
- Recommend multivitamin (MVI) to help correct deficiencies\(^1\)
- Suggest consumption of at least 3 servings of non-gluten containing grains\(^3\)
Counseling Goals & Suggestions

- List common foods that contain gluten
- List grains that are allowed for GF lifestyle
- Help client read a food label and know how to identify sources of gluten
Monitoring & Evaluation

- Watch for vit/min deficiencies to resolve
- Monitor weight gain/fluctuation
- Check for continuous or reoccurring symptoms
  - If having problems, may need to identify possible “hidden” gluten
- 24 hour recall
- Monitor those eating oats
Challenges for the Client

• Increased cost of food associated with GF foods\(^3\)
• Hard to maintain GF when not accustomed to it or food aversions\(^1\)
• Difficulty of finding foods when eating out\(^1\)
• Getting enough grains that do not have gluten \(^1,3\)
Challenges for Food Service

• Need to know ingredients of foods
  – Standardized recipes

• Some (ex colleges) are required to provide GF food at every meal

• Avoid cross contamination
  – Grills, toasters, bakery, knowledge of staff

• “Hidden” Gluten
  – Spices, pre-seasoned foods
A9 Identified Allergen Project

- The top eight food allergens (eggs, dairy, shellfish, fish, tree nuts, peanuts, soy, wheat) and gluten are identified and clearly labeled on all foods served in the dining centers.
- Gluten-free breads, bagels, and cereals are available in the dining centers, and The Bakery creates and serves a variety of gluten-free baked goods.
- Retail and grab-n-go outlets offer gluten-free items and also label all prepared food for allergens.
Areas for Quality Improvement

- Develop a program that identifies gluten as well as possible cross-contamination
- Educate culinary team on importance of using standardized recipes
- Evaluate possible areas for cross contamination
  - Consider creating gluten-free prep areas
Areas for Data Collection

- Do clients know how to identify gluten on a label?
- What local stores or restaurants provide GF items?
- Do clients eat oats? Does it affect them?
Funding - Clients

- Celiac Disease is fairly common
  - About 1 in 133 people in the US\(^1\)
  - About 0.5-1% worldwide\(^3,12\)
- Few “funding” for people affected
- Many companies offer coupons
  - Rudi’s, Udi’s, Crunchmaster, Betty Crocker, General Mills
Funding - Jennifer’s Way

• Provide funding for 3 areas
1. Awareness Initiative
2. Research
3. Advocacy Programs

Jennifersway.org/foundation
Funding - Research Specific

- National Institutes of Health: Office of Extramural Research
  - grants.nih.gov/grants/oer.htm

- American Gastroenterological Association: Award in Celiac Disease Research
  - gastro.org/aga-foundation/grants/agaaferring-research-institute-award-in-celiac-disease-research
University of Chicago Disease Center

www.cureceliacdisease.org/who-we-are/pioneer-programs

- **Gluten-free care package**
  - Delivers nationwide
- **Celiac Preceptorship Program**
  - For medical professionals
- **Celiac Disease Answer Bank**
- **Celiac Disease Research Program**
- **Annual Free Blood Screening**
Additional Sites for Support

- National Foundation for Celiac Awareness
  - Celiaccentral.org
- Celiac Sprue Association
  - Csaceliacs.info
- Celiac Disease Awareness Campaign
  - NIH, US Department of Health and Human Services
  - Celiac.nih.gov
Review - Case Study

- KF
- Female
- 16 yo
- Recently diagnosed with Celiac Disease
- 1st visit with her
- Mother and sister also just diagnosed
Patient: KF

Referred for: Celiac Disease

**NUTRITION ASSESSMENT**

**Food and Nutrition Related History:**
Reports of normal diet. Over past year, increased diarrhea, stomach pain, fatigue. Loves breads and pasta.

**Anthropometric Measurements** (based on an average 16 yo female, with a lower BMI due to weight loss)

<table>
<thead>
<tr>
<th>Age: 16</th>
<th>Gender: F</th>
<th>Ht: 5’4”</th>
<th>Wt: 100#</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Wt Hx: lost 10 pounds over last 2 months d/t worsening GI problems</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>% Wt change: 10%</td>
</tr>
<tr>
<td>BMI: 17.2</td>
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</tr>
</tbody>
</table>

**Biomedical Data, Medical Tests & Procedures** (stated what the trend would be)

<table>
<thead>
<tr>
<th>Labs/Date</th>
<th>Albumin</th>
<th>Glucose</th>
<th>HbA1C</th>
<th>BUN</th>
<th>Creat</th>
<th>Na+</th>
<th>K+</th>
<th>Hgb</th>
<th>Hct</th>
<th>MC V</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Record</td>
<td>Low</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Iron: Low</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ferritin: Low</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Low (&lt;120)</td>
<td></td>
<td></td>
<td>IgG-AGA: elevated</td>
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<td></td>
<td></td>
<td></td>
<td>IgG-EmA: elevated</td>
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<td></td>
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<td></td>
<td></td>
<td>IgG-tTG: elevated</td>
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</table>

**Medical Diagnosis/PMH/Relevant Conditions:**
Celiac Disease confirmed by biopsy of small intestine

**Pertinent Medications**
None

**Skin status:**  X Intact  □ Pressure Ulcer/Non-healing wound; Comments: *list out measurements
**Physical Assessment:**

**Estimated Nutritional Needs Based on Comparative Standards:** calories: $160.3-30.8 \times \text{age(y)} + PA \times (10 \times \text{wt [kg]} + 934 \times \text{height [m]})$ with $PA=1.3-1.4$ (active); protein $.85-.95 \text{ g/kg/d}; \text{ fluid }=1\text{ mL/1 kcal}$

<table>
<thead>
<tr>
<th>Calories 2202-2398 kcal/d</th>
<th>Protein: $.85-.95 \text{ g/kg/d}; 39-43 \text{ g/d}</th>
<th>Fluid: 2202-2398 mL/d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diet Order</td>
<td>Feeding Ability</td>
<td>Oral Problems</td>
</tr>
<tr>
<td>Begin gluten-free diet</td>
<td>X Independent</td>
<td>X None of the Above</td>
</tr>
<tr>
<td></td>
<td>□ Limited Assistance</td>
<td>□ Chewing Problem</td>
</tr>
<tr>
<td></td>
<td>□ Extensive/Total Assistance</td>
<td>□ Swallowing Problem</td>
</tr>
<tr>
<td></td>
<td>□ N/A</td>
<td>□ Mouth Pain</td>
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</tbody>
</table>

☐ No Nutritional Diagnosis at this time  X Proceed to Nutrition Diagnosis Below
<table>
<thead>
<tr>
<th>Problem</th>
<th>Etiology</th>
<th>Signs &amp; Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>P (problem) inadequate mineral intake (iron) related to:</td>
<td>E (Etiology) poor absorption of nutrients as evidenced by:</td>
<td>S (Signs &amp; Symptoms) low levels of iron and ferritin</td>
</tr>
<tr>
<td>P (problem) inadequate mineral intake (calcium) related to:</td>
<td>E (Etiology) poor absorption of nutrients and decreased transit time as evidenced by:</td>
<td>S (Signs &amp; Symptoms) diarrhea (stools &gt;3 times/d) and low BMD.</td>
</tr>
</tbody>
</table>

**INTERVENTION**

Nutrition Prescription: 2202-2398 kcal/d, 39-43 g protein/d provided by a gluten-free diet

<table>
<thead>
<tr>
<th>Food or Nutrient Delivery</th>
<th>Education</th>
<th>Coordination of Care</th>
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<tbody>
<tr>
<td>GF meals and snacks, including 3 servings of non-gluten grains a day</td>
<td>Nutrition education: teach how to read food label and recognize gluten; provide with a list of grains that do not have gluten</td>
<td>Coordination of Care (refer to): primary care physician</td>
</tr>
<tr>
<td>Nutrition Counseling: provide with brochures and websites to visit</td>
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<td>Coordinated Care (refer to): primary care physician</td>
</tr>
</tbody>
</table>

**Goal(s):** Patient should eliminate all gluten (wheat, rye, barley) from diet, including oat.

**MONITORING & EVALUATION**

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Criteria</th>
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<tbody>
<tr>
<td>Modified diet</td>
<td>Gluten-free diet</td>
</tr>
</tbody>
</table>
References