### Improving the Diagnosis of Celiac Disease in at risk populations through Resident Education
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#### What is Celiac Disease?
- **Autoimmune disorder**
  - HLA-DQ2, HLA-DQ8 (90% of patients with CD express)\(^1\)
  - The enemy: gluten
  - Gliadin—a protein found in wheat, barley, and rye\(^1\)
  - Screening test: tissue transglutaminase (tTG-IgA)
  - Diagnosis by biopsy
  - Can present with or without gastrointestinal symptoms\(^1\)
  - "Classical" or "Atypical" presentation
  - Atypical presentation makes diagnosis difficult

#### Who has Celiac Disease?
1. **1 in 100 Americans with Celiac Disease**\(^6\)
2. As many as 83% undiagnosed or misdiagnosed\(^2\)
3. **3 million Americans** are currently diagnosed with Celiac Disease\(^7\)

#### Associated Conditions of Celiac Disease
- Celiac Disease shares an HLA family (HLA-DQ2, HLA-DQ8) with various autoimmune disorders\(^6,8\):
  - Autoimmune thyroiditis (Graves, Hashimoto’s)
  - Autoimmune Hepatitis
  - Type 1 Diabetes
  - Dermatitis Herpetiformis
  - Sjogren’s Syndrome
  - Psoriasis
  - Down Syndrome
  - Addison’s Disease

- **Increased risk for various carcinomas**:
  - Non-Hodgkin’s Lymphoma
  - Esophageal Carcinoma
  - Multiple Myeloma
  - Papillary Thyroid Cancer

- **Risk for various carcinomas**:
  - Melanoma
  - Papillary Thyroid Cancer
  - Esophageal Carcinoma
  - Addison’s Disease
  - Psoriasis
  - Dermatitis Herpetiformis
  - Autoimmune Hepatitis
  - Autoimmune thyroiditis (Graves, Hashimotos)
  - Autoimmune disorder

- 83% undiagnosed or misdiagnosed

#### Celiac Disease in the United States
- Diagnosed
- Undiagnosed or Misdiagnosed

- **Stage 1: Administer Pre-Education Questionnaire**
  - The pre-education questionnaire has been administered to both internal medicine and family medicine residents from Loma Linda University Medical Center and the Riverside University Hospital System
  - The questionnaire consists of information regarding celiac disease symptomatology, associated diseases, diagnostic information, and recommended screening criteria
  - 26 questionnaires have been completed thus far

- **Stage 2: Education Program**
  - The education program will consist of a grand round presentation on CD
  - The post-education questionnaire will be used to evaluate efficacy of the education program and will test content similar to that of the pre-education questionnaire

#### Results
- **Pre-Education Questionnaire Results**
  - 39%
  - Knowledgeable
  - 9%
  - Not Confident
  - 57%
  - Not knowledgeable

- **Resident Comfort in Recognizing and Diagnosing Celiac Disease**
  - 56%
  - Somewhat Confident
  - 33%
  - Neutral
  - 11%
  - Not Confident

#### Discussion
- **Results from our pre-education questionnaire indicate a low level of knowledge about the clinical presentation of celiac disease, symptoms, associated diseases and complications, diagnosis, treatment, and screening criteria**
  - Most of the residents surveyed scored less than 66% and 9 residents scored less than 33%
  - Most residents were unable to correctly identify:
    - Non-Hodgkin’s Lymphoma, esophageal carcinoma, melanoma, and papillary thyroid cancer as potentially fatal complications of untreated celiac disease
    - The basic screening test used for patients suspected of having celiac disease
    - Screening criteria for CD as recommended by the American College of Gastroenterology
  - Conclusions:
    - There is a severe deficit in resident knowledge about celiac disease
    - We hope that after our educational program, residents will be better equiped in treating patients with CD

#### Future Directions
- **We are currently performing a prospective and longitudinal analysis at RUHS with the aim of identifying individuals at risk for CD and conducting second level blood screening in accordance with ACG guidelines**
  - Phase 1: administer Celiac Disease symptom checklist to patients in clinic
  - Phase 2: screen high risk patients as defined by ACG

#### Acknowledgments
Special thanks to the Riverside University Hospital System (RUHS), especially the endocrinology department, as well as the residents participating in our educational program.

#### References