

Prevalence of Celiac Disease in Adult Patients with Iron Deficiency Anemia of Obscure Origin

Thesis

Submitted for Partial Fulfilment of Master Degree in Internal Medicine

By

Eman Abd Elmonem Ebraheem

M.B., B.Ch., Faculty of Medicine, Ain Shams University

Under supervision of

Prof. Dr. Mohamed Nazmy Farris

Professor of Internal Medicine, Allergy and Clinical Immunology Faculty of Medicine - Ain Shams University

Assist. Prof. Dr. Rasha Youssef Shaheen

Assistant Professor of Internal Medicine, Allergy and Clinical Immunology Faculty of Medicine - Ain Shams University

Dr. Mai Ahmed Youssef El-Deeb

Lecturer of Internal Medicine, Allergy and Clinical Immunology Faculty of Medicine - Ain Shams University

Faculty of Medicine
Ain Shams University
2019



سورة البقرة الآية: ٣٢

Acknowledgment

First and Foremost thanks to Allah, the most merciful and gracious.

I wish to express my deep appreciation and sincere gratitude to **Prof. Dr. Mohamed Mazmy Farres**, Professor of Internal Medicine, Clinical Immunology and Allergy Department, Ain Shams University, for planning, supervising this study and for his valuable instructions and continuous help.

My deepest gratitude to Assist. Prof. Dr Rasha Youssef Shaheen, Lecturer of Internal Medicine, Allergy and Immunology Department, Faculty of Medicine, Ain Shams University for her eminent guidance, encouragement and revision throughout the work.

I am deeply grateful to **Dr. Mai Ahmed Youssef El-Deeb**, Lecturer of Internal Medicine, Allergy and
Immunology Department, Faculty of Medicine, Ain Shams
University, who generously supervised my work in a supportive
and educational way

Last, but not least, I want to thank all my Professors, colleagues and patients that without their help this work could not have been completed.

List of Contents

Title	Page No.
List of Tables	Error! Bookmark not defined.
List of Figures	Error! Bookmark not defined.
List of Abbreviations	Error! Bookmark not defined.
Introduction	1
Aim of the Work	20
Review of Literature	
Celiac Disease	21
 Iron Deficiency Anemia 	84
Subjects and Methods	133
Results	138
Discussion	151
Summary	158
Conclusion and Recommendat	ions160
References	162
Arabic Summary	

List of Tables

Table No.	Title	Page No.
Table (1):	Modified marsh classification	71
Table (2):	Clinical Characteristics of the who population	ŭ
Table (3):	Laboratory parameters of study group	o 139
Table (4):	AntiTTG results of the study group	140
Table (5):	Marsh classification of duodenal biops	sies 142
Table (6):	Diagnosis of celiac, non-celiac and celiac disease	-
Table (7):	Comparison of non-celiac, potential coceliac groups as regards categorical da	
Table (8):	Comparison of non-celiac disease potential celiac disease and celiac as numerical variables	regards
Table (9):	Comparison of anti-TTG level in patie celiac disease, potential celiac an without celiac disease	d those
Table (10):	Correlation between serum anti-Tand other numerical variables	

List of Figures

Fig. No.	Title	Page No.
Figure (1):	The role of HLA in diagnosis of disease	
Figure (2):	The binding of the negatively glutamate and positively charged puthe HLA molecule	ocket of
Figure (3):	The immune response to gluten ing	gestion41
Figure (4):	The mechanism of activation of An	ti-ttG42
Figure (5):	Showed an integrative model of dysregulation in celiac disease	
Figure (6):	Histological biobsy marsh 3 accommarsh claafication	
Figure (7):	Summary of investigation in diag celiac disease	
Figure (8):	Summary of investigations management of celiac disease	
Figure (9):	World wide prevalence of anem severity of anemia	
Figure (10):	Pathophysiology of iron abstransport and storage	
Figure (11):	Showed the role of hepcidin in about of iron Causes of iron deficiency an	-
Figure (12):	The causes of iron deficiency anema	ia102
Figure (13):	Hypochromic cells	111
Figure (14):	Showed steps of investigation in iron deficiency anemia	
Figure (15):	Proportion of patients with pos	

List of Figures Cont...

Fig. No.	Title	Page No.
Figure (16):	Box plot illustrating Distribution TTG level in the whole study por Box represents the interquartile ra	pulation.
Figure (17):	Result of duodenal biopsy among with positive Anti-TTG	
Figure (18):	Proportion of patients ul diagnosed as Celiac disease or No disease or potential celiac	on-Celiac
Figure (19):	Frequency of abdominal symp patients with or without celiac dispotential celiac disease.	ease and
Figure (20):	Box plot illustrating anti-TTG patients with or without celiac dipotential celiac group.	isease or
Figure (21):	Scatter plot illustrating the as between anti-TTG level and age	
Figure (22):	Box plot illustrating the as between anti-TTG level and duration.	disease
Figure (23):	Scatter plot illustrating the cobetween anti-TTG level and TIBC.	
Figure (24):	Box plot illustrating the as between anti-TTG level and Marsh	

List of Abbreviations

Abb.	Full term
AGA	. The antigliadin
AN-PEP	. Aspergillus niger prolyl-endoprotease
APCs	. Antigen-Presenting Cells
AT-1001	. Zonulin inhibitor larazotide
CBC	. Complete blood count
CD	. Coeliac disease
CHF	. Chronic heart failure
CKD	. Chronic kidney disease
CRC	. Colorectal cancer
CTVC	. Computed tomography virtual colonoscopy
DMT1	. Divalent metal transporter
EATL	. Enteropathy-associated lymphoma
ELISA	. Enzyme-linked immunosorbent assay
EMA	. endomesial antibodies
EPO	. Erythroid progenitors to erythropoietin
	. Faecal immunochemical testing
FOBt	. Faecal occult blood testing
GALT	. Gut-associated lymphoid tissue
GFD	. Gluten-free diet
GI	. Gastrointestinal
GWAS	. Genome-wide association studies
Hb	. Hemoglobin
HLA	. Human leukocyte antigen
HMWID	. High-molecular-weight iron dextran
IBD	. Inflammatory bowel disease
IDA	. Iron deficiency anemia
IELs	. Intraepithelial lymphocytes
IFN-γ	. Interferon-γ
IgA	. Immunoglobulin A
IRIDA	. Iron-refractory iron deficiency anemia

List of Abbreviations Cont...

Abb.	Full term
IV	. Intravenous iron
MAdCAM-1	. Mucosal vascular addressin cell 1
MCHC	. Mean corpuscular hemoglobin concentration
MCV	. Mean corpuscular volume
MHC	. Major histocompatibility complex
MRI	. Magnetic resonance imaging
MTP 1	. The metal transporter 1
NBS	. Nijmegen biomedical studies
NCGS	Non-celiac gluten sensitivity
NHANES	National Health and Nutrition Examination
	Survey
NHL	. Non-Hodgkin lymphoma
NK	. Natural killer
NRCD	Non-responsive celiac disease
PCD	. Potential celiac disease
PT	. The prothrombin time
RBC	. Red blood cell
RCD	. Refractory coeliac disease
RDW	. Red blood cell distribution width
RLS	. Restless leg syndrome
ROCK	. Rho kinase
siRNA	. Small interfering RNA
T1DM	Type 1 diabetes mellitus
TH1 cells	. T-Helper cells
TIBC	. Total iron-binding capacity
TNF-α	. Tumor necrosis factor alpha
TTG	. Tissue transglutaminase
US	. United States
WBC	. White blood cell
WHO	. World Health Organization





Introduction



Aim of the Work



Review of Literature

Chapter (1)



Celiac Disease



Chapter (2)



Iron Deficiency Anemia





Subjects and Methods