Electrogastrographic Findings in Diabetic Patients (Both Insulin and Non-Insulin Dependent) With Delayed Gastric Emptying

Thesis

Submitted For Partial Fulfillment of Master Degree In

Internal Medicine

By

Marwa Mahmoud EL-Dahshan

(M.B,B.Ch)

Supervised By

Prof. Dr. Yehia Mohammed EL-Shazly

Professor of Internal Medicine
Faculty of Medicine-Ain Shams University

Dr. Khaled Hamdy Abd EL-Mageed

Assistant professor of Internal Medicine
Faculty of Medicine-Ain Shams University

Dr. Nanees Ahmed Abd EL-Mageed

Lecturer of Internal Medicine
Faculty of Medicine-Ain Shams University

Faculty of Medicine
Ain Shams University
2006

Acknowledgements

First and foremost, I feel always indebted to ***Allah****, the most beneficent and merciful*

I would like to express my sincere gratitude to ***Prof. Dr. Yehia Mohammed El-Shazly,*** *professor of Internal Medicine, Faculty of Medicine, Ain Shams University, whose guidance, moral support and follow up of the progress of this work were certainly the most real steps in accomplishing this work.*

Profound gratitude is expressed to ***Dr. Khaled Hamdy Abd El-Mageed,*** *assistant professor of Internal Medicine, Faculty of Medicine, Ain Shams University, for his continuous guidance, his fruitful criticism and generous advice throughout the whole work.*

Great indebtedness is offered to ***Dr. Nanees Ahmed Abd El-Mageed,*** *lecturer of Internal Medicine, Faculty of Medicine, Ain Shams University, for her generous efforts she made in the practical part of this work, and her support and advice throughout the whole work that without her assistance, this work could not be done.*

Special thanks to ***Dr. Hanan Badawy,*** *assistant professor of Internal Medicine, Faculty of Medicine, Ain Shams University, for her kind advice and support.*

And last but not least, I wish to dedicate this work to my family for their continuous encouragement and valuable support, without whom, this work would not have been possible.

Contents

List of Abbreviations

ALT	Alanine aminotransferase
AST	Aspartate aminotransferase
ASU	Ain Shams University
BUN	Blood urea nitrogen
CAN	Cardiovascular autonomic neuropathy
CNS	Central nervous system
CCK	Cholecystokinin
CBC	Complete blood count
CPM	Cycles per minute
CMV	Cytomegalovirus
DF	Dominant frequency
DM	Diabetes mellitus
DP	Dominant power
ECA	Electrical control activity
ERA	Electrical response activity
EGG	Electrogastrography
ENS	Enteric nervous system
EGD	Esophagogastroduodenoscopy
FFT	Fast Fourier Transform
FBG	Fasting blood glucose
FDA	Food and Drug Administration
FD	Functional dyspepsia
GERD	Gastroesophageal reflux disorders
GEA	Gastric electric activity

GES	Gastric electric stimulation
GE	Gastric emptying
GER	Gastric emptying rate
GI	Gastrointestinal
GCSI	Gastroparesis cardinal symptom index
HbA_{1C}	Glycosylated hemoglobin
H pylori	Helicobacter pylori
2hrs PPG	2 hours postprandial glucose
IC	Instability coefficient
IGF-I	Insulin-like growth factor-I
ICC	Interstitial cells of Cajal
IBS	Irritable bowel syndrome
MMC	Migrating motor complex
MRI	Magnetic resonance imaging
nNOS	Neuronal nitric oxide synthase
NO	Nitric oxide
NUD	Non-ulcer dyspepsia
PC	Personal computer
PR	Power ratio
PT	Prothrombin time
SW	Slow wave
IC-SM	Submucosal interstitial cells of Cajal
SD	Standard deviation
SCF	Stem cell factor
TPN	Total parenteral nutrition
U/S	Ultrasonography

List of Tables

List of Figures

Introduction & Aim of the Work

Introduction

Diabetic gastroparesis is a common and debilitating condition affecting millions of patients with diabetes mellitus worldwide. Gastroparesis affects both type I (Insulin dependent) and type II (Non-Insulin dependent) forms of diabetes. Diagnosis requires identifying the proper symptom complex, while excluding other entities (peptic ulcer disease, rheumatological diseases, medication effects) ***(Smith and Ferris, 2003)***.

Stacher et al., (2003) concluded that impaired gastric emptying and altered intragastric meal distribution in diabetes mellitus are related to autonomic neuropathy.

Hyperglycemia also impairs gastric motility and emptying in subjects with diabetes. Since the control of gastric emptying determines the rate of glucose delivery to the small intestine, glucose control may become erratic when gastric emptying is abnormal ***(Mathur et al., 2001)***.

Neuromuscular abnormalities of the stomach maybe assessed noninvasively with gastric emptying tests, electrogastrography, and ultrasound ***(Koch, 1999)***.

The use of standardized real-time ultrasonography to determine gastric antral cross-sectional area in a single section of the stomach is a valid method for estimating gastric emptying rate ***(Darwiche, 1999)***.

Electrogastrography is the non-invasive measurement of gastric electrical activity. It is a reliable and accurate technique for the assessment of gastric myoelectrical activity providing information about frequency and regularity of the gastric slow wave. Electrogastrography has a developing role in the assessment of gastric dysfunction and on the effect of medical treatment ***(Lawlor et al., 2001)***.

Abnormal gastric slow-wave frequencies have been observed in diabetic gastroparesis and are associated with impaired antral motor activity ***(Chang et al., 2001)***.

Aim of this Work

To evaluate electrogastrographic changes in both insulin and non-insulin dependent diabetic patients with and without delayed gastric emptying.

Review of Literature