

# **DETERMINATION OF THE ABDOMINAL PRESSURE CHANGES IN RELATION TO VARIOUS ABDOMINAL WALL DISORDERS**

## ***Thesis***

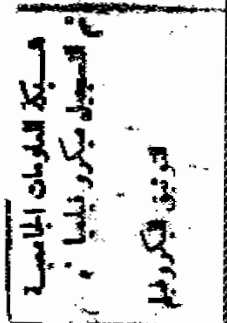
**SUBMITTED FOR THE PARTIAL  
FULFILLMENT OF THE M.Sc. DEGREE  
IN GENERAL SURGERY**



*Presented By*

***Bassem Soliman Hegab***

(M.B., B.Ch.)



617.55

B.S

*Supervisors*

**Prof. Dr. Abdel Moaty Hussein**

Professor of General Surgery  
Faculty of Medicine, Cairo University

Handwritten signature of Prof. Dr. Abdel Moaty Hussein.

57362

**Dr. Ibrahim Galal**

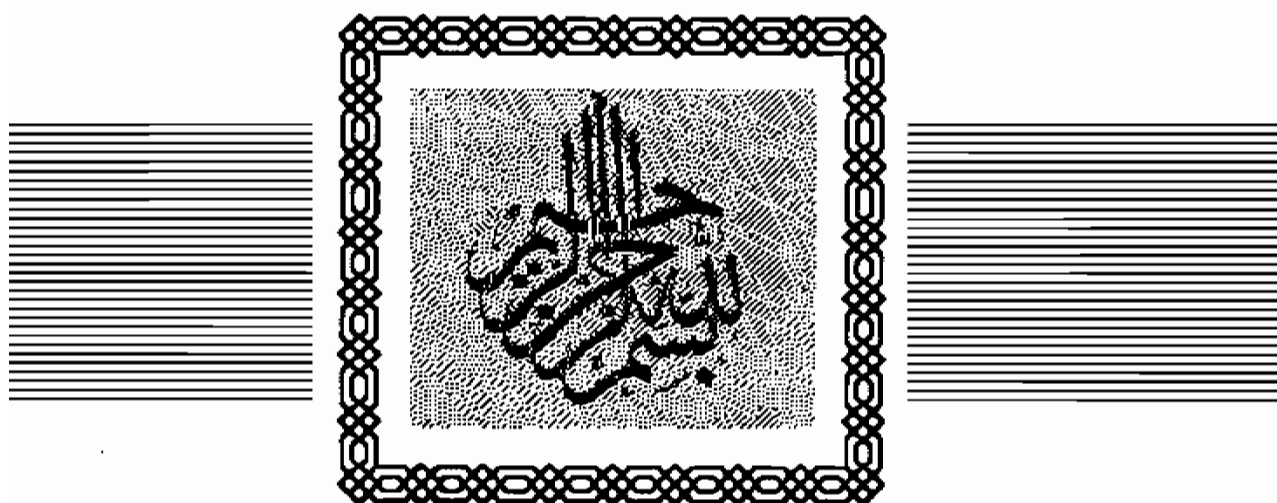
Assistant Professor of General and Plastic Surgery  
Faculty of Medicine, Cairo University

Handwritten signature of Dr. Ibrahim Galal.

**FACULTY OF MEDICINE  
CAIRO UNIVERSITY**

**1996**











*To my  
beloved family*



## Acknowledgment

*Thanks to God for helping me to start and finish this work.*

*I would like to express my sincere thanks and gratitude to **Prof. Dr. Abdel Moaty Hussein**, Professor of General Surgery, Cairo University. His continuous support and encouragement, his generous help, his tutorship and patience, all made the completion of this work possible.*

*I am deeply indebted to **Dr. Ibrahim Galal**, Assistant Professor of General and Plastic Surgery, Cairo University who helped me a lot during the preparation of the thesis, for his utmost help, continuous supervision and valuable contribution during the production of this study.*

*I would like to express my deepest appreciation to **Prof. Dr. Amr Helmy**, Professor and Chairman of Department of Surgery, Liver Institute, Menoufiya University for his fathery guidance, continuous encouragement and unfailing support.*

*I would like to express my deepest thanks and gratitude to all the **staff members** of Department of Surgery, Liver Institute, Menoufiya University for their help and advice.*

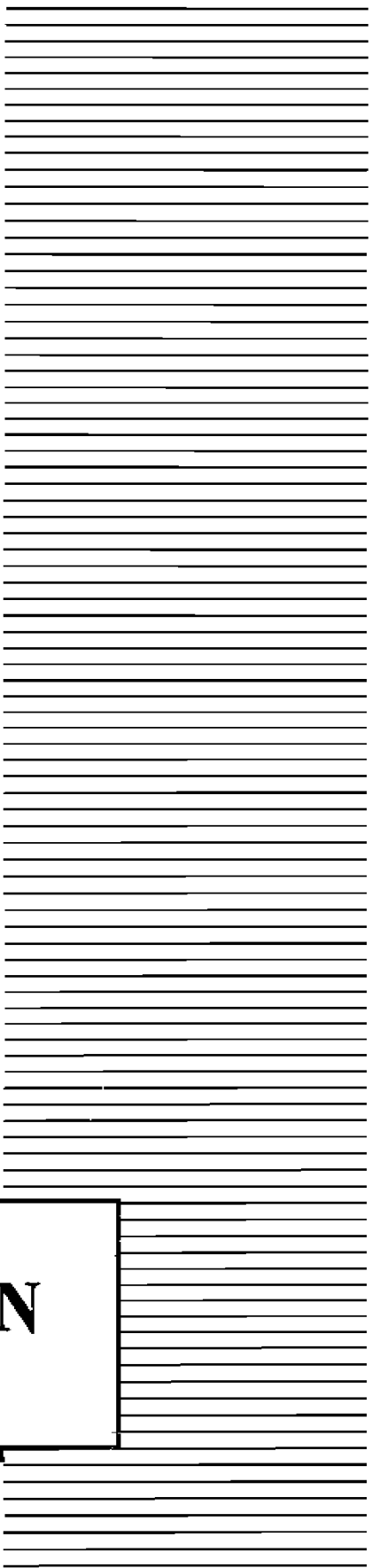
*Banem*



# CONTENTS

|                                          |     |
|------------------------------------------|-----|
| <b>Introduction</b>                      | 1   |
| <b>Aim of the work</b>                   | 3   |
| <b>Review of the literature</b>          | 3   |
| • Embryology of the abdominal wall       | 4   |
| • Surgical anatomy of the abdominal wall | 9   |
| • Surgical physiology                    | 33  |
| • Diseases of the abdominal wall         | 38  |
| • The measurement of pressure            | 53  |
| <b>Material and methods</b>              | 72  |
| <b>Results</b>                           | 76  |
| <b>Discussion</b>                        | 99  |
| <b>Summary</b>                           | 105 |
| <b>References</b>                        | 107 |
| <b>Arabic Summary</b>                    |     |





# INTRODUCTION



# INTRODUCTION

Increased intra-abdominal pressure has been contributed to be an aetiological factor in abdominal wall disorders, such as hernias of the abdominal wall, divarication of recti and abdominal distension.

The abdominal pressure is a hydrostatic one, which can be measured in the urinary bladder, rectum and stomach. In physiological conditions, the abdominal pressure is variable, with peaks as high as 100 to 200 mmHg at the time of defecation, cough. The increase in abdominal pressure acts directly on the thoracic compartment and modifies the circulation and ventilation (Carry et al., 1994).

It appears that transversus abdominis is the abdominal muscle whose activity is most consistently related to changes in intra-abdominal pressure (Cresswell et al., 1992).

Abdominal wall can be assessed clinically and by investigations. Investigations include sonar which assess the structure of the abdominal wall, EMG and pressure studies which assess abdominal wall function.

Recently, it was demonstrated that intra-bladder pressure (IBP) measured through a transurethral catheter accurately



reflects intra-abdominal pressure (IAP), which offers a safe, simple and highly accurate method for evaluating intra-abdominal pressure at the bedside (Nakayama et al., 1992).

Measurement of intra-abdominal pressure (IAP) via a naso-gastric tube with the previously validated technique of IAP measurement via a urinary bladder catheter showed that gastric pressure may be approximately 2.5 cm H<sub>2</sub>O above or below urinary bladder pressure. Manometric measurement of the gastric pressure via nasogastric tube provide a simple, reliable, non-invasive technique of IAP measurement (Collee et al., 1993).