# Comparison Between Conventional Methods and Copro-Antigen Detection for Diagnosis of *Giardia lamblia* in Human Fecal Samples

**Thesis**
**Submitted for partial fulfillment of**
**M.Sc. degree in Parasitology**

**By**
**Enas Mohamed Ali Mohamed Rizk**
**(*M.B.BCh*.)**

**Supervised By**

**Prof. Dr. Abdalla Michel Boghdadi**
**Professor of Parasitology**
**Faculty of Medicine, Cairo University**

**Prof. Dr. Azza Ibrahim El- Adawi**
**Professor of Parasitology**
**Faculty of Medicine, Cairo University**

**Dr. Azza Hasan Abbas**
**M.D of medical Parasitology and Immunology**
**National Hepatology and Tropical Medicine Research Institute**

**Faculty of Medicine**
**Cairo University**
**2009**

# Abstract

The present work constitutes a study on a total of 85 cases presenting with symptoms that might be suggestive of intestinal giardiasis as abdominal pain, abdominal distension and diarrhea. All fecal samples were examined using the direct wet smear and the formol-ether concentration techniques. Among 85 cases 42 cases were positive for *Giardia*, 30 cases were negative for *Giardia* and other parasites and 13 cases were negative for *Giardia* put positive for other parasites. Rapid immunochromatographic test (Ridaquick kit) and ELISA (Ridascreen kit) were used to detect *Giardia* antigen in all fecal samples and the results were compared to the results of microscopic examination, sensitivity of rapid immunochromatographic test was 95.2% while sensitivity of ELISA was found to be 97.6%.

Keywords: *Giardia*- ELISA – Coproantigen.

# Acknowledgment

I wish to express my gratitude and appreciation to **Prof. Dr. Hoda Helmy Al-Rahimy**, Head of Parasitology Department, Cairo University, for her continuous encouragement and support.

I feel grateful to **Prof. Dr.Abdalla Michel Boghdadi**, professor of Parasitology, Cairo University, for his great support and advice, I am proud to have him as my main supervisor,

I would like to express my deepest thanks and everlasting gratitude to **Prof. Dr. Azza Ibrahim El-Adawi**, professor of Parasitology, Cairo University, for her constructive advice. I am truly obliged for her kindness, maternal compassion, constant support and endless encouragement through out this work.

I owe special thanks and everlasting gratitude to **Prof. Dr. Azza Hassan Abbas,** Assist. Professor of parasitology, National Hepatology and Tropical Medicine Institute, for giving me the opportunity to carry out most of the practical work of this study and for her constant motivation and guidance.

I feel grateful to **Prof. Dr. Suzan Abd Elrhim Elnaghy**, Head of Pediatric Department, National Hepatology and Tropical Medicine Institute, for her help and care.

I am extremely obliged to **Dr. Fetouh Saad Hassanin ,**M.D of pediatrics, Assist. Professor of clinical pharmacy, Faculty of pharmacy Misr international university, for his generosity during this work.

I also thank all the staff members and colleagues of Parasitology department, Cairo University for their appreciated help and support during this work and also I owe special thanks to members of parasitology department, National Hepatology and Tropical Medicine Institute

I want to thank my guiding lights, **my father** and **my mother**, for their never-ending support and ever-lasting care. Without their support I would never made any achievement in my whole life.

Last but not least, I owe much to **my husband** and **my family** for their endless advice, help, care and support that I appreciate so much.

# Table of contents

# List of figures

# List of tables

# List of abbreviations

| | |
|---|---|
| Abd. Distension: | Abdominal distension. |
| Abd. Pain: | Abdominal pain. |
| AIDS: | Acquired immunodeficiency syndrome. |
| ANOVA: | Analysis of variants. |
| CM: | Cell membrane. |
| CRP: | Cysteine-rich protein. |
| DNA: | Deoxy ribonucleic acid. |
| dsRNA: | double-stranded ribonucleic acid. |
| EDTA: | Ethylenediamine tetra acetic acid. |
| EGF: | Epidermal growth factor. |
| *E.histolytica*: | *Entamoeba histolytica*. |
| EIA: | Enzyme immunoassay. |
| ELISA: | Enzyme-linked immunosorbent assay. |
| F: | Female. |
| GIT: | Gastrointestinal. |
| *G.duodenalis*: | *Giardia duodenalis*. |
| GLV: | *Giardia lamblia* virus. |
| *G.lamblia*: | *Giardia lamblia.* |
| *G.muris*: | *Giardia muris*. |
| gm: | Gram. |
| HSP: | Heat shock protein. |
| *H.nana*: | *Hymenolepis nana*. |
| IFA: | Indirect immunofluorescence assay. |
| IFN-γ: | Interferon gamma. |
| IgA: | Immunoglobulin A. |
| IgE: | Immunoglobulin E. |
| IgG: | Immunoglobulin G. |

| | |
|---|---|
| IgM: | Immunoglobulin M. |
| IHA: | Indirect haemagglutination assay. |
| IL: | Interleukin. |
| IMS-IFA: | Immunomagnetic separation coupled with immunofluorescence. |
| KDa: | Kilodalton. |
| M: | Male. |
| Max: | Maximum. |
| mg: | Milligram. |
| Min: | Minimum. |
| ml: | Milliliter. |
| *n*: | Total number. |
| NaCl: | Sodium chloride. |
| nm: | Nanometer. |
| NO: | Nitric oxide. |
| No.: | Number. |
| NPV: | Negative predictive value. |
| O&P: | Ova and parasite. |
| PCR: | Polymerase chain reaction. |
| PPV: | Positive predictive value. |
| RPM: | Round per minute. |
| S.D: | Standard deviation. |
| TMB: | Tetramethylbenzidine. |
| TNF: | Tumor necrosis factor. |
| UV: | Ultra-violet. |
| VSPs: | Variant surface proteins. |

| | |
|---|---|
| µl: | Micro liter. |
| µm: | Micro meter. |
| +ve: | Positive. |
| -ve: | Negative. |

# INTRODUCTION

# Introduction

Humans are hosts to nearly over 70 species of protozoa, some derived from our primate ancestors and some are acquired from the domesticated animals or animals that came in contact with us during our relatively short history on Earth. Thereafter, the history of human parasitology proceeded along two lines, the discovery of a parasite and its subsequent association with disease and / or the recognition of a disease and the subsequent discovery that it was caused by a parasite **(Cox, 2002).**

*Giardia lamblia* is a micro-aerophilic protist, which has long been considered as a model of ancient premitochondriate eukaryotes that causes diarrhea. It is a single cell protist with a motile trophozoite stage and immotile cyst stage (**Samuelson, 2002**).

*Giardia lamblia* is a parasite of public health importance as it can be transmitted through several routes including water and fresh food products (**Nichols, 2000**). In developed countries, *Giardia* is currently referred as a remerging infectious agent because of its increasing role in outbreaks of diarrhea in day care centers and water and foodborne outbreaks affecting the general population. However, in developing countries located in Asia, Africa and Latin America, approximately 200 million people per year experience symptomatic giardiasis (**Thompson et al., 2000**).

Most infected individuals show few or no signs of infection, they act as unaffected carrier, but in some, particularly children, there may be malabsorption, diarrhea, and abdominal pain (**Cox, 2002**).

Conventional microscopical diagnosis of giardiasis is time-consuming, and relies crucially on the microscopist's skills and experience. Furthermore, microscopical examination must be performed on three stool samples to increase sensitivity which leads to problems concerning patient compliance and delays in the final diagnosis. In an attempt to establish sensitive and cost-effective methods to diagnose intestinal infection with *Giardia*, a number of copro-antigen detection tests have been developed (**Johnston et al., 2003**).

# Aim of the work

# Aim of Work

This study aims to compare between conventional methods using lugol`s iodine stain, concentration technique and two immunological methods using ELISA, quick immunochromoatographic test for detection of *Giardia lamblia* antigen in stool samples, regarding ease of use, total hands on time, incubation and processing time, cost, sensitivity and specificity.