# SOME BIOCHEMICAL AND IMMUNOLOGICAL PARAMETERS IN SOME CHRONIC LIVER DISEASES IN CHILDREN

**Thesis**

**Submitted for fulfillment of Ph.D. Degree In Childhood Studies**


**By**

Laila Mohamed Labib Soliman
M.B.; B. Ch. & M.Sc. (Pediatrics)
Research Assistant
National Research Center

**Supervised By**

Prof. Dr. Yehia Shaker
Professor of Clinical Biochemistry
Head of Genetic Engineering
and Biotechnology Division
National Research Center

Prof. Dr. Tawhida Abd El-Ghaffar
Professor of Pediatrics
Ain Shams University

Prof. Dr. Khalid Hussein Taman
Assistant Professor of Pediatrics
Institute of Postgraduate Childhood Studies
Ain Shams University

Institute of Postgraduate Childhood Studies
Medical Department
Ain Shams University

1999

# SOME BIOCHEMICAL AND IMMUNOLOGICAL PARAMETERS IN SOME CHRONIC LIVER DISEASES IN CHILDREN

**Thesis**

**Submitted for fulfillment of Ph.D. Degree In Childhood Studies**


**By**

Laila Mohamed Labib Soliman
M.B.; B. Ch. & M.Sc. (Pediatrics)
Research Assistant
National Research Center

**Supervised By**

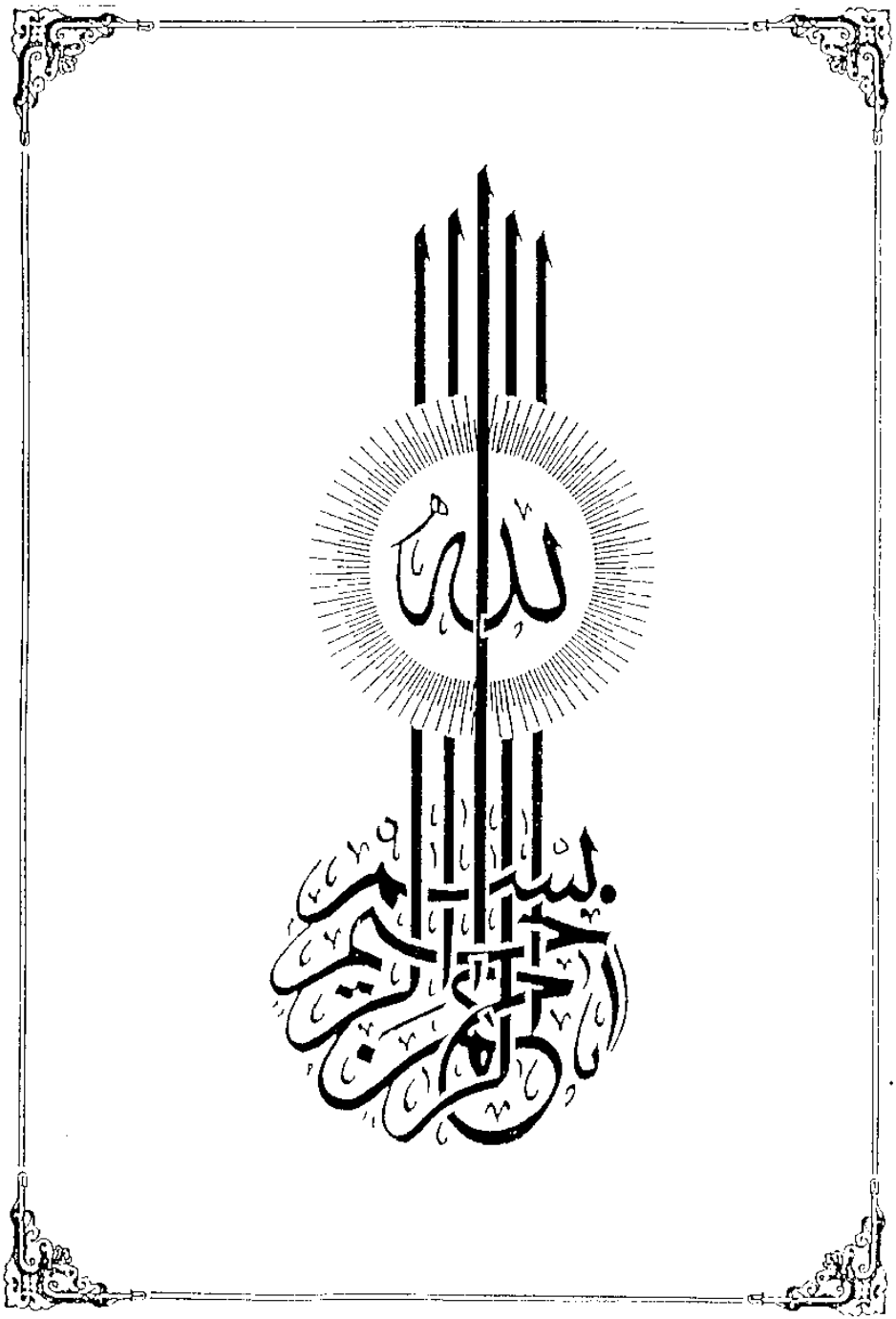
Prof. Dr. Yehia Shaker
Professor of Clinical Biochemistry
Head of Genetic Engineering
and Biotechnology Division
National Research Center

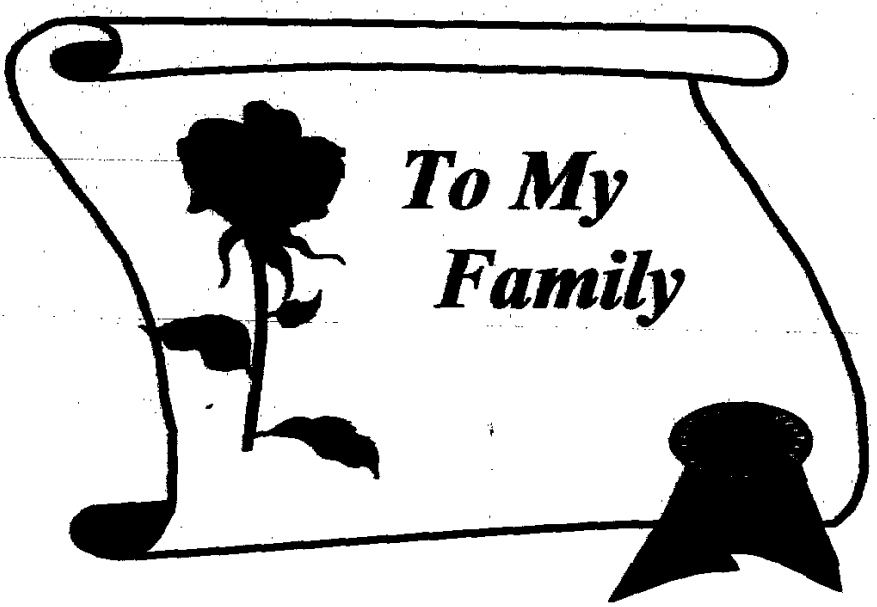
Prof. Dr. Tawhida Abd El-Ghaffar
Professor of Pediatrics
Ain Shams University

Prof. Dr. Khalid Hussein Taman
Assistant Professor of Pediatrics
Institute of Postgraduate Childhood Studies
Ain Shams University

Institute of Postgraduate Childhood Studies
Medical Department
Ain Shams University


1999





## Acknowledgment

First thanks **God** for blessing this work until it has reached its end as a little part of his generous help throughout our life.

I would like to express my sincere gratitude to ***Prof. Dr. Tawhida Y. Abd El – Ghaffar*** **Professor of Pediatrics, Faculty of Medicine, Ain Shams University** for her great help, support and encouragement that she gave me throughout the whole work under her guidance and supervision.

I hardly can find adequate words to express my cardinal considerations and my deep appreciation to show my deepest obligation to ***Prof. Dr. Yehia Shaker*****, Professor and Head of Genetic** Engineering and Biotechnology Division, National Research Center, for his unlimited help, constructive suggestions and comments along the way.

I would like to express my deepest gratitude and thanks to ***Dr Khalid H. Taman.*** **Assistant Prof. of Pediatrics, Institute of Postgraduate Childhood Studies , Ain Shams University** , For his valuable cooperation , support, his great interest , encouragement and his push in performing this work..

Also I am deeply grateful to ***Dr. Essmat Ashour*** **Assistant Prof, of Biochemistry,** ***Dr. Olfat M. Fawzy*** **,** ***Dr. Mie Afify and Dr Menha Swelium*** **Researchers of Biochemistry, National Research Center** for their interest and valuable cooperation and help.

I wish to thanks all the staff of **Hepatology Outpatient Clinics , of Pediatric department of Ain Shams , Ain Shams University and Pediatric department of Abou El Rish , Cairo University**, for their splendid Co-operation in the work I have had the honor to describe.

I cannot forget to deeply thanks ***Dr. Mostafa Mahmoud*** **Rechearcher of Central Lab. For Expert Systems** for his great help in performing this thesis on computer and his valuable guidance on Internet.

**Lastly**, I would like to thanks my Family members especially my ***husband and my kids*** for their emotional support they have given me throughout the years of work in my thesis.

# Abstract

## Some Biochemical and Immunological Parameters in Some Chronic Liver Diseases in Children

**Laila Mohammed Labib Soliman Morsi**
**Department of Biochemistry , National Research Center, Dokki, Cairo, Egypt.**

This study was conducted on 78 patients confirmed by liver biopsy as cirrhosis, hepatitis and cholestasis. Their ages ranged between 2-18 year. While the 12 septiceamic neonates were confirmed by blood cultures. Their ages ranged between 2-23 days. Forty apparently healthy person (15 children , 15 adolescents, and 10 neonates were served as control groups.

**The aim of the study** was to assess the value of serum level of ALP ,LDH, and their isoenzymes, immunoglobulins (IgA, IgM, IgG), and immune complexes in some chronic liver diseases in comparison to healthy controls.

Results revealed a significant increase in T.LDH level in all studied groups compared to their control groups. This increment was mainly due to LD5 in cirrhotic children and adolescent groups, but it was due to LD4 , LD5 in hepatitis, and cholestasis groups. This could be a useful marker for parenchymal damage.

Also there was significant increase in T.ALP in all studied children and adolescent groups , but no statistical significant difference was found in septiceamic neonates compared to their control group. These increments were mainly due to increased activity in L.ALP isoenzyme. While intestinal ALP appear in some cases of both cirrhotic children and adolescent groups. ϒ-GT shows the same increase as ALP in all studied groups and it could be used as confirmatory test. These enzymes can be used as marker to reflect impairment of bile flow.

On the other hand, AST and ALT were significantly increased in all studied groups except in septiceamia compared to their control group. They can serve as indicators to the activity of the disease and cellular damage.

Study of immunoglobulins showed non significant variation in IgA in all studied groups. While IgM showed, significant increase in both cirrhotic children and adolescent groups. Also IgG, showed significant increase in cirrhotic adolescent, in hepatitis, and in septiceamia compared to their control groups. Persistence of

hypergammaglobulineamia have suggested the presence of chronic liver diseases.

Lastly, circulating immune complexes **(CICs)** were very highly significantly increased in all studied groups compared to their control groups. It can give an idea about phagocytic function during infection and hepatocellular injury.

**Conclusion:**

The study showed that some biochemical marker of the liver **(AST, ALT, γ-GT, ALP, and LDH)** gave sensitive and clear picture of liver affection. On the other hand, **ALP, LDH isoenzymes** gave more clear picture of the involved organ than the total activity of these enzymes.

On the other hand, **immunoglobulins** can suggest the presence of chronic liver diseases. While circulating **immune complexes** can give a picture to the function of the phagocytic system and the hepatocellular damage.

**Key Words:**

ϒ-GT; Gamma-glutamyl transferase . T.ALP; Total alkaline phosphatase. T.LDH; Total lactate dehydrogenase, LD4 ,LD5 ; Lactate dehydrogenase isoenzymes. PAGE;Polyacrylamide gel electrophoresis. AST; Aspartame aminotransferase. ALT; Alanine aminotransferase. IgA; IgM; IgG; Immunoglobulins A,M, G. CICs; Circulating immune complexes.

## CONTENTS

## LIST OF ABBREVIATIONS

| | |
|---|---|
| Y-GT,GGT | Gamma – Glutamyl Transferase |
| Ai CAH | Autoimmune Chronic Active Hepatitis |
| ALP | Alkaline Phosphatase |
| ALT | Alanine aminotransferase |
| AST | Aspartate aminotranferase |
| B-cell | Bursal lymphocyte |
| Bil | Bilirubin |
| C3a, C5a, C3b, C3e | Complement fragment |
| $C_1q$ | First Complement component |
| CD | Cluster of differentiation |
| Fab | Fragment – antigen - binding |
| Fc | Fragment crystallizable |
| CAH | Chronic Active Hepatitis |
| Cm | Centimeter |
| CPH | Chronic Persistent Hepatitis |
| CRP | C- Reactive Protein |
| CSF | Colony Stimulating Factor |
| ECG | Electocardiogram |
| ECM | Extracellular matrix |
| ECM | Extracellular Matrix Component |
| EDAT | Ethylene –Diamine Tetracetic acid |
| Fig | Figure |
| H | Heart |
| H.S | Highly significant |
| HBD | Alpha- hydroxy butyrate dehdrogenase |
| HbsAg | Hepatitis B surface antigen |
| HBV | Hepatitis B virus |
| HCV | Hepatitis C antigen |
| HLA | Histocomptibility antigen |
| HLAB8DR | Histocomptibility antigen B8DR |
| I.ALP | Intestinal Alkaline Phosphatase |
| I.C.U | Intensive Care Unit |
| IgA | Immunoglobulin A |
| IgD | Immunoglobulin D |
| IgE | Immunoglobulin E |
| IgG | Immunoglobulin G |
| IgM | Immunoglobulin M |
| IL1 | Interlukin 1 |
| LD | Lactate Dehydrogenase enzyme |
| LDH | Lactate Dehydrogenase enzyme |

| | |
|---|---|
| L KM | Liver and Kidney Micosomal antigen |
| L S P | Liver Specific Protein |
| M | Muscle |
| m RNA | Messenger Ribonucleic Acid |
| MAC | Membrane attack complex |
| N | Normal |
| NIC | Neonatal Intensive Care |
| N.S | Non significant |
| P | Pyruvate |
| P.A | Postro- anterior |
| P.ALP | Placental alkaline phosphatase |
| PBC | Primary Biliary cirrhosis |
| RNA | Ribonucleic acid |
| S | Sedimentation co- efficient |
| SD | Standard Deviation |
| SE | Standard Error |
| SIgA | Secretory immoglobulin A |
| SLA | Soluble liver antigen |
| SLE | Systemic Lupus erythematosus |
| SPILBD | Syndromatic portal interlobular bile duct |
| T- cell | Thymus lymphocyte |
| TGFB1 | Transforming growth factor B1 |
| TNFα | Tumour necrosis alpha |
| TORCH | Tatanus, Ophthalmia neonatorum, Rubella,cytomegalovirus, Herpes virus |
| V.H.S | Very High Significant |
| VH | Variable heavy chain |
| VL | Variable light chain |
| Vs | Versus |

# LIST OF TABLES