DETERMINATION OF IMMUNOGLOBULIN "G" AND ITS SUBCLASSES IN EGYPTIAN CHILDREN WITH RECURRENT INFECTION

Thesis
Submitted for Partial Fulfillment of
Master Degree in Pediatrics

Presented by
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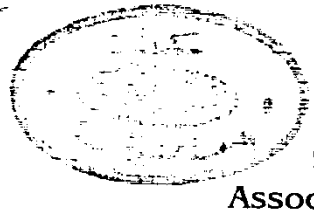

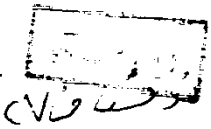

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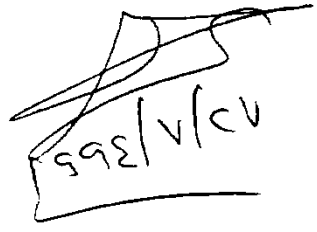

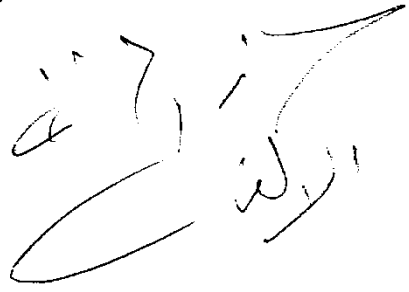

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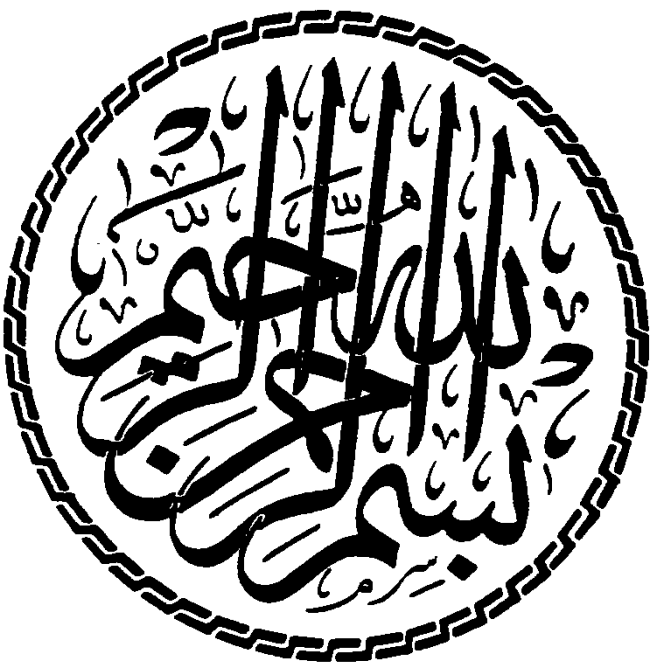

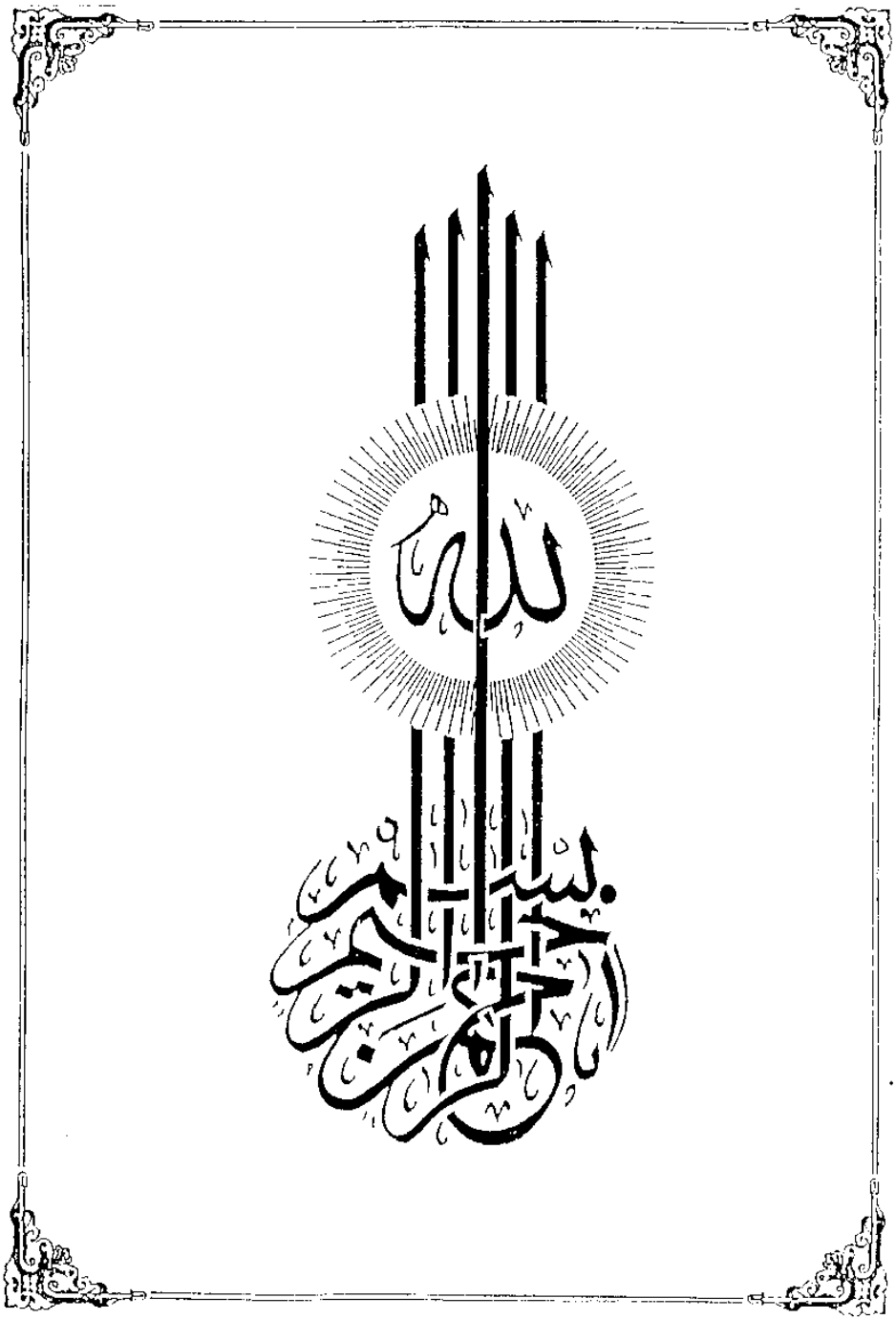

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Last but not least, I am very grateful to the patients and their parents for their cooperation.

CONTENTS

LIST OF ABBREVIATIONS

Ag	: Antigen
C	: Complement
Fab	: Fragment Ag. binding
Fc	: Fragment crystallizable
Hib	: Haemophilus influenzae type b.
Ig.	: Immunoglobulin
Igs.	: Immunoglobulins
LTA_4	: Leukotriene A_4
LTB_4	: Leukotriene B_4
MP	: Mononuclear phagocytes
PMN	: Polymorphonuclear
SC	: Secretory components
sIgA	: Secretory immunoglobulin A
TIBC	: Total iron binding capacity
WBC	: White blood cells
WHO	: World Health Organization

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INTRODUCTION AND AIM OF THE WORK

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Lower respiratory tract infections are a significant cause of morbidity and mortality in infancy. The latest survey carried out in Egypt in 1991, showed that acute respiratory tract infections represent 31.5% of all causes of morbidity in pre-school children and that pneumonia represents 14-18% of all acute respiratory infection cases in upper and lower Egypt ***(Khallaf, 1994)***.

According to World Health Organization's latest global estimate of causes of death in young children, acute respiratory tract infections killed 4.3 million aged under 5 years in 1990, and so they are considered as the main killer under 5 years ***(Campbell, 1992)***.

Recurrent upper and lower respiratory infections, sinusitis and otitis media have been related to IgG subclasses deficiency ***(Jiang et al., 1991)***. ***Moss et al., (1992)*** stated that IgG_4 deficiency could possibly be a marker for immune system abnormalities.

AIM OF THE WORK

The aim of this study is to clarify the alterations in immunoglobulin "G" and its subclasses in recurrent respiratory tract infections as an example of recurrent infections. This study may have its repercussions on the management strategies of such prevalent problems in childhood.

REVIEW OF LITERATURE

IMMUNOGLOBULINS

The immunoglobulins (Igs) are a family of proteins found in vertebrates which express antibody activity. Each antibody molecule is essentially bifunctional. Most importantly, antibodies represent the humoral arm of the immune response and the second function is to induce one or more of the so called "effector functions" as complement cascade, phagocytosis by macrophages and other cells, extracellular mechanisms and immediate type I allergic reactions ***(Natvig and Turner, 1993)***.

In human beings, the immunoglobulin exists as five classes or isotypes, each has a characteristic structural features and particular activities. They are defined as IgG, IgA, IgM, IgE and IgD ***(Linton and Dick, 1990)***. Each immunoglobulin is formed of four polypeptide chains, 2 heavy chains [H] and 2 light chains [L] ***(Natvig and Turner, 1993)***.

The Fc portion of immunoglobulins can be bound by specific receptors on the plasma membranes of many cells. This interaction has consequences

for phagocytosis of target organisms or for the destruction of cellular targets ***(Linton and Dick, 1990)***. The Fc portion is also related to the secretory capability of Ig molecules following synthesis and also passage of IgG molecules across placenta ***(Coleman et al., 1992)***.

IMMUNOGLOBULINS CLASSES

IgM:

About 10% of normal Igs consists of IgM. It exists as a pentameric structure with a molecular weight of 900 KD. IgM remains in the serum exclusively and is not usually found extravascularly in the body spaces or secretions. IgM is important as an Ag receptor where it occurs in monomeric form on early B-cells ***(Coleman et al., 1992)***.

IgM is the principal component of the primary humoral response as its level rises in about 4-7 days following initial Ag challenge. IgM is efficient in both opsonization and complement fixation ***(Linton and Dick, 1990)***. It is

also an efficient agglutinator of particular antigens such as bacteria and red blood corpuscles ***(Bellanti and Kadlec, 1985)***.

IgA:

Most IgA in serum is monomeric, but about 10-15% occurs as dimers. In the external secretions practically all IgA is found as dimers. Each molecule of secretory IgA is associated with one J-chain and one SC (Secretory Component). The function of the J-chain is apparently to bind the two IgA monomers.

Local production of IgA is particularly seen in association with the gut associated lymphoid tissue where cells synthesizing IgA are as much as 25 times more common than those synthesizing IgG ***(Natvig and Turner, 1993)***.

There are two subclasses for IgA: IgA_1, IgA_2 distinguished by their distribution and by arrangement of disulphide bonds. IgA_1 constitutes 80-90% of the total IgA ***(Roitt, 1987)***.