STUDY OF IMMUNE-COMPETENCE SYSTEM, IN INFANTS AND CHILDREN WITH HEART D I S E A S E S

Thesis

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BY

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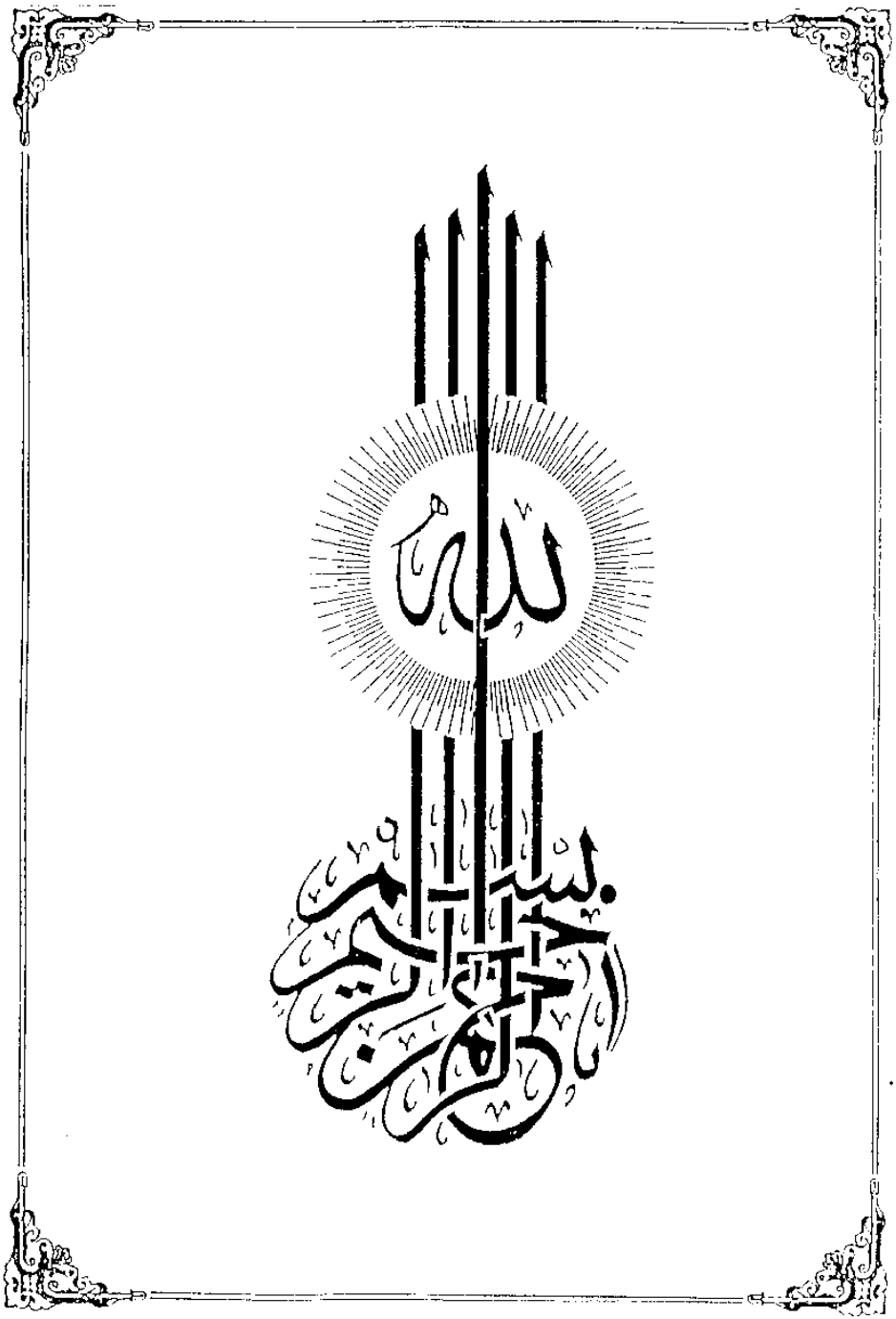
" TO MAY PARENTS "



C O N T E N T

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INTRODUCTION

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An accurate appraisal of the incidence of heart disease in infancy and childhood is difficult to achieve although a gradual accumulation of new data over years now permits a better understanding of the breadth of the problem.

An our knowledge of the complexities of the immune system has advanced, it becomes clear that the immunologic mechanisms critical for normal host defence can also play important roles in the pathogenesis of disease. (Inman, & Day, 1981).

In addition to their growth and social problems, infants and children with heart diseases are more prone to secondary infections i.e. chest infection, which is predisposed by a state of congestion and abnormal blood flow, also a defect in the immune defence mechanisms against the invasion by different offenders constitutes one of the most important predisposing factors.

Infective endocarditis still had a significant cause of morbidity and mortality among children despite advances in the management of the disease. It was found that circulating immuno-complexes are related to the incidence of endocardial infection and not to the mere

presence of endocardial defect or occurance of other pyrexial disease (Kauffman, et al. 1981).

Frequent infections are usually met in patients with congenital heart diseases, several factors help secondary infections to occur, alteration in the phagocytic activity of polymorpho-nuclear leukocytes may play an important role in this susceptibility (Stossel, 1974).

Cardiac involvement may be a feature of connective tissue diseases including, rheumatic fever, rheumatoid arthritis, systemic lupus erythematosis and scleroderma which are frequently associated with abnormal serological factors and immuno-pathological alterations, this may be the cause of hish susceptibility of those patients to secondary infection(Kaplan, 1963).

"AIM OF THE WORK"

AIM OF THE STUDY

Heart diseases are usually associated with alteration in the immunological responses, which may be the cause of high susceptibility of infants and children with heart diseases to repeated chest infection.

It was known that the predeliction of chest infection was mainly due to congestion and abnormal blood flow, but now a defect in the immune defence mechanisms is considered to be one of the most important predisposing factors.

The aim of this review is to study the aspects of immunity in those patients with cardiac lesions.

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"REVIEW OF LITERATURE"

REVIEW OF LITERATURE

IMMUNO-COMPETENCE SYSTEM

1. Organization :

Lymphocytes constitute the major cell type in the thymus, spleen, lymph nodes and peyer's patches of the gastro-intestinal tract, these organs serve as principle sites of proliferation and development of cells involved in immune response (Bierman, & Pearlaman, 1978).

1- Thymus :

It plays a strategic role in the development and maintenance of immunologic integrity, it develops between 7th and 10th week of gestation, immunologically competent lymphocytes and corticomedullary demarcation characteristic of the mature thymus are achieved by 10th to 12th weeks of fetal life, It is large at birth and with increasing age, thymic tissue decreases in amount.

2- Spleen :

It develops during, 5th week of gestation. It is organised so that lymphocyte-rich areas are located primarily close to small arterioles, this

so called "white pulp" is a cylinderical structure surrounding the central arteriole and constitutes a periarteriolar lymphocyte sheath (P.A.L.S.),this sheath is populated chiefly by thums derived lymphocytes while the follicles and germinal center adjacent to the P.A.L.S. represent the B-cell area of spleen.

3- Lymph Nodes :

They are situated along the path of collecting lymphatics, in the newborn period, lymph nodes are small and require antigenic stimulation before they take on their characteristic appearance.

Morphologically the node can be divided into cortical, paracortical and medullary areas. The cortex contains aggregates of lymphoid cells "follicles" which constitute the B-cell area of the node and are absent in congenital x-linked agammoglobulinemia,paracortical zone contain lymphocytes which are primarily T.cells and, medulla contains numerous plasma cells.

4- Gastro-intestinal tract :

The lymphoid components of the mature gastro intestinal tract consist of intraepithelial lymphocytes, payer's patches and plasma cells.

Peyer's patches are groups of subepithelial lymphoid follicle located in the mucosa of the small intestine, recognizable by 24th week of gastation, these accumulations of lymphoid cells are initially populated by T-cells, later B-lymphocytes increase in number.

Plasma cells are distributed homogenously throughout the lamina propria of the small gut,it contain all five classes of immunoglobulin but Ig-A containing cells predominate reflecting the role of Ig-A as the major immunoglobulin class in the secratory immune system.

5- Bone Marrow :

It is the principal source of lymphoid precursor cells in postnatal life, as stem cells within the marrow cavity have the capacity to differentiate into erythrocytes, granulocytes, megakaryocytes, monocytes and T- or B-lymphocytes.

The lymphocytes constitute 10-20% of all nucleated cells in bone marrow, with abundance of mature B-lymphocytes and fully-differentiated immuno-globulin secfeting plasma cells in the mature individual.

II- Cells Involved in the Immune Response :

1- Lymphoid cells :

The basis of the immune response resides in the ability of subpopulations of lymphoid cells to recognize and react in a specific manner to the wide variety of antigens normally encountered, these responses have been separated into :

1. reactions directly mediated by cells (cell mediated immunity), T-lymphocytes are responsible for these reactions.
2. responses mediated by antibody (humoral immunity), B-lymphocytes are the precursors of plasma cells that are responsible for the secretion of antibody.