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GROUP B BETA HAEMOLYTIC STREPTOCOCCAL
INFECTIONS IN THE NEWBORN

AN ESSAY

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

« وكان فضل الله عليك عظيما »

(صدق الله العظيم)



TO MY PARENTS

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THE CANDIDATE

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CHAPTER I

INTRODUCTION & AIM OF THE ESSAY

INTRODUCTION AND AIM OF THE
ESSAY

Group B streptococci have been recognized in recent year as a major neonatal pathogen and are associated with a high morbidity and mortality./

In Egypt, Metway, (1983) reported that streptococci have a role in developing septicemia in the newborn.

During the last 25 years there have been several reports from Europe, United States of America and Great Britain documenting the increasing role of GBS in neonatal morbidity and mortality (Hoogkamp et al., 1982).

'Two different syndromes can be recognized: an early-onset one characterized by pneumonia and septicemia, and a late onset one in which meningitis is common.' The latter form is seen 10 days to three months after delivery and has not been related to maternal complications. Conversely, in the babies who develop early-onset group B streptococcal infections, maternal complications are common and the infection becomes apparent within five days of age.

Mothers of these infants have been found to be colonised with the same serotypes as those isolated from their infected babies, indicating a maternal fetal transfer. (Swenson, 1979).

In the group of late-onset cases, representing about one third of the total number of neonatal infections caused by this species, there seems to be no relation between colonisation of the mother and infection of the newborn, indicating transfer of the germ from an outside source. (Horn et al., 1974).

Since there has been no change in the incidence of neonatal infection associated with E.coli and other maternally acquired microorganisms, the appearance of GBS infections has contributed to an overall absolute increase in serious neonatal bacterial infection in such centres -(Baker et al., 1977).

AIM OF THE ESSAY :

The aim of the essay is to review the subject of group B-Beta haemolytic streptococcal infections in the newborn.

The essay will include :

- Epidemiology.
- Clinical manifestation.
- Investigations.
- Prevention.
- Treatment.

CHAPTER II

" BACTERIOLOGY OF GBS "

THE STREPTOCOCCI

Cocci which occur in chains are known as streptococci. The chains are due to the fact that the successive divisions of cocci occur in the same plane and that after division the organisms tend to adhere together. Chains are produced best in fluid media. Streptococci are gram positive, non motile and do not form spores.

Classification of the streptococci :

Sherman, (1937), tried to classify the streptococci according to the biochemical and physiological tests, and the ability to grow under certain conditions of temperature or PH or in the presence of certain chemical substances is often of more general significance.

According to Sherman (1937) the most widely accepted general classification was put recognizing four main divisions. Firstly the pyogenic streptococci which are usually beta haemolytic and have a polysaccharide group antigen, are not heat resistant and do not grow at extremes of temperature or PH, do not have strong reducing activities and usually hydrolyse arginine. Secondly the enterococci which are variable in haemolysis, have the group D antigen, are somewhat heat resistant and grow over a wide range of temperature and PH, are strongly reducing and hydrolysis arginine. Thirdly the lactic streptococci which grow at a low temperature, but rather

less tolerant to other extreme environmental conditions. Fourthly the viridans streptococci which are alpha haemolytic and grow at 45°C but do not hydrolyse arginine. Another classification is based upon oxygen requirement into aerobic streptococci which need oxygen for their growth but also facultatively anaerobic, and the strictly anaerobic streptococci.

Type antigens of the streptococcus agalactiae :

Lancefield (1938) classified Beta haemolytic streptococci into 15 groups called A,B,C to "O" according to the presence of specific carbohydrate "C antigen" in the cell wall of the organism. Extracts of C carbohydrate for grouping of streptococci may be prepared by extraction of centrifuged culture with hot hydrochloric acid, nitrous acid, or formamide, by enzymatic lysis of streptococcal cells with pepsin or trypsin; or by autoclaving of cell suspensions.

As regards the group B streptococci, four serotypes were defined also by lancefield according to four polysaccharides antigens, Ia,Ib, II and III. Ia and Ib had a minor factor in common.

Wilkinson and Eagon (1971) described a protein antigen, Ic. This Ic protein was found in nearly all strains with the Ib polysaccharide, but in only some

with Ia polysaccharide. The matter was further complicated when it was shown by (Jelinkova, 1977), that the Ic protein was sometimes present with polysaccharide II or III or in the absence of a polysaccharide type antigen. Two other protein antigens occur commonly in group " B " streptococci : "R" which is identical with the R 28 antigens of streptococcus pyogenes and "X" antigens. Antisera for types Ia, Ib, and II conferred type specific immunity on mice. Type III strains are not sufficiently virulent for mice to be used in protection test, but type specific immunity against them can be demonstrated in the chick embryo (Tieffenberge et al., 1978).

Lancefield and Freimer (1966) found that the type II antigen gave rise to two immunologically distinct antibodies. Extracts with hot acid reacted with one of these and extracts with trichloroacetic with both. The component present in both extracts consisted of galactose glucose, glucosamine. But the trichloroacetic acid extract contained in addition a heat labile component which was found in the other type polysaccharides & was shown to be sialic acid. (Wilkinson 1975; Baker et al., 1976).

Washing the cells with neutral buffer or digesting them with streptomyces enzyme releases the antigen almost entirely in its native form which contains sialic acid and is of high molecular weight. The antibody against the "native" but not the "core" antigen gives protection against serious infection in man. (Tai, and, Gotschlich, 1979).

The core antigen of type III cross reacts with the pneumococcus type 14 capsular polysaccharide. The polysaccharide inhibit phagocytosis. This effect is reversed in the presence of antibody and complement. (Mathews et al., 1974; Hemming et al., 1976).

Morphology :

They are more or less spherical in shape or ovoid arranged in chains or pairs. Growth occurs by elongation on the axis parallel to the chain and division is at right angles to this often giving rise to an appearance of pairing within the chain. Chains do not elongate indefinitely, this is because they produce a de-chaining enzyme, but this may be inhibited by the union of surface antigen with specific antibody. Group B streptococci stain readily with the ordinary dyes and are almost always frankly gram positive, non motile, non sporing.