EVALUATION OF BUFFY-COAT SMEAR● EXAMINATION IN THE EARLY DIAGNOSIS OF NEONATAL INFECTIONS

THESIS

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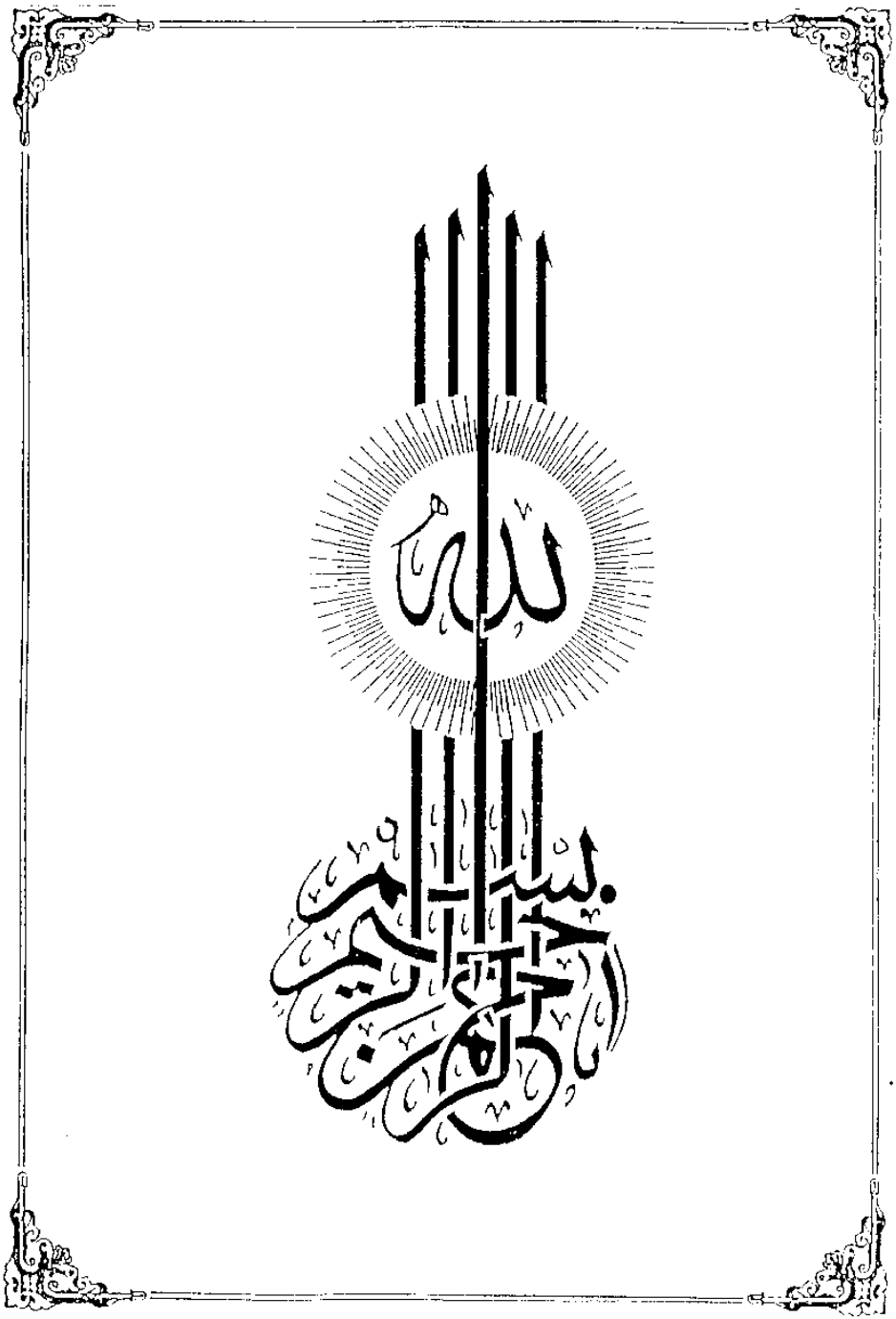

LIST OF ABBREVIATION

B / T	= band form to total neutrophil ratio
C.S.	= caeserean section
D.I.C.	= disseminated intravascular coagulopathy
E.coli	= Escherichia coli
F.U.O.	= fever of unknown origin
G.E.	= gastro-enteritis
Hb.	= hemoglobin
H.influenza	= Haemophilus influenza
I.D.M.	= infant of diabetic mother
P.R.M.	= premature rupture of membranes

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INTRODUCTION
AND
AIM OF THE WORK

The newborn is usually susceptible to generalized, sometimes, overwhelming infections. The symptoms may be deceptively mild until the infection is far advanced, making early recognition and treatment more difficult. The presenting symptoms tend to be vague and non-specific. Therefore, a group of tests was studied to assess their usefulness, either singly or in combination, in predicting neonatal sepsis. Philip and Hewitt [1980] recommended five tests for diagnosing neonatal sepsis and used them as a sepsis screen.

On the other hand, Faden [1976] recommended the use of buffy-coat smear examination for the more accurate diagnosis of neonatal bacteremia. The buffy-coat smear was made according to the technique described by Brooks and associates [1973]. When the blood was centrifuged in a Wintrobe tube, a thin buffy-coat layer forms between the sedimenting r. b. cs. and the plasma.

The present study is a trial to determine the usefulness of buffy-coat smear in the diagnosis of neonatal bacteremia.

NEONATAL INFECTION

General consideration:

The newborn presents an interesting paradox in regard to susceptibility and immunity to infection. It is commonly stated that he is particularly prone to infections and at the same time, demonstrates less ability to localize them, as his reaction to them differs from that of the older child and adult. This is in spite of that, he appears to be immune to few diseases for several months after birth by the passive antibodies derived from the mother *[McIntosh, 1984]*.

Characters of neonatal infections:

1. The etiologic agents include a variety of organisms as bacteria, viruses, fungiprotozoa, chlamydia and mycoplasma.
2. The host resistance mechanism -present in the newborn infant- may be immature and easily overcome by invading micro-organisms.
3. The presenting clinical features may be subtle and non-specific and so, diagnosis of infection is often missed or delayed.
4. The routine laboratory tests for diagnosis of infection are unprecise and do not provide the rapid results needed .

5. The causative organisms may be relatively resistant to antibiotics particularly gram negative bacilli and the dose of antibiotics that can be safely used is limited by toxic side effects.

[Lowell and James, 1979].

CHANGES IN THE INCIDENCE AND SPECTRUM OF NEONATAL INFECTION

According to *Bennet et al., (1985)*, over a period of 15 years, the incidence of neonatal septicemia had increased both per 1000 live births and per 100 admitted neonates . The spectrum of causative organisms had changed towards more gram positive organisms and fewer gram negative organisms. In the initial antibiotic treatment, an aminoglycoside and ampicillin derivative will still be needed to give full coverage.

Tollner et al., (1977) , stated that knowledge of the commonest causative organism was important for selecting initial antibiotic treatment when septicemia is suspected. They suggested that early treatment is essential and empiric therapy should be instituted before the causative organism is known.

Chow and Leake (1974) recognized anaerobic pathogens with increasing frequency in clinical infections. They demonstrated 23 newborn infants with anaerobic bacteremia during a period of 3½ years, an incidence of 1.8 cases per 1000 live births and 26% of all cases of neonatal bacteremia.

PERINATL RISK FACTORS AND INFECTION

The majority of infants with septicemia had one or more perinatal risk factors. *[Berqvist et al., 1979].*

According to *Bada and Andrews, [1979],* premature rupture of membranes and its relation to later infection was probably the factor that had received most attention in number of studies.

Prolonged rupture of membranes [>24 hours], increased the risk of septicemia.

Knudsen and steinrud [1976], found that, the increased risk of infection was also demonstrated in low birth weight and in the presence of neonatal asphyxia.

A properly managed conservative approach is recommended when conditions are unfavourable for induction of labour. *[Kappy, 1979]* .

Nosocomial infection means any infection in a hospitalized patient, it constitutes a growing problem in neonatal intensive care units today. *[Goldmann et al., 1981].*

Townsed and Wensel, [1981] reported that 5-25% of infants, caredfor in intensive care nurseries, suffered from a significant nosocomial infection. A systemic infection was reported in about 5% of infants. These nosocomial infections contributed significantly to mortality, morbidity, and length of stay in the nursery. *[Eriksson et al., 1982].*

After initial colonization of the newborn by flora of low pathogenicity, a long stay in the intensive care nursery led to a greater number of colonizations with potentially pathogenic organisms such as staph. aureus and Klebsiella Enterobacter. *[Sprunt et al., 1978].*

It had been suggested that frequent use of antibiotics in these units led to the selection of such gram negative organisms. *[Goldmann et al., 1978].*

Gooch and Britt, [1978] reported that neonates who developed systemic infections had always proved to be colonized beforehand with the flora that led to septicemia. Outbreaks of infection, however, had not been related to colonization per se.

According to *Sarff and McCracken [1975]*, development of infection depends not only on the condition of the body, but also on the extent of colonization and the virulence of the colonizing organism.

CAUSATIVE AGENTS

Over the past decades, there had been several shifts in the predominant organisms responsible for neonatal infection and meningitis. *[Freedman et al., 1981].*

In the 1930s and 1940s, the group A β-hemolytic streptococci were the major organisms isolated from septic newborns, the coliform bacilli primarily Escherichia coli, became established as frequent pathogen starting in 1950s.

From 1957 to 1962, nosocomial outbreaks due to penicillin-resistant staphylococcus aureus occurred in many nurseries. The predominant agents in 1960s were once again the coliform bacilli together with Klebsiella Enterobacter group and Pseudomonas playing increasingly important roles. Sporadic cases of group B β-hemolytic streptococcal sepsis were reported during this period, but it was not until the 1970s that this organism became the most common pathogen causing neonatal disease. *[McCracken and Nelson, 1982].*

In addition to aerobic organisms, anaerobic bacteria are increasingly recognised as causative agents of neonatal septicemia. [Chow and Leake, 1974 ; Dunkle et al., 1976].