SLIME PRODUCTION AND ANTIBIOTIC RESISTANCE AS VIRULENCE FACTORS IN NOSOCOMIAL COAGULASE NEGATIVE STAPHYLOCOCCAL INFECTIONS

THESIS

SUBMITTED FOR PARTIAL FULFILLMENT OF THE MASTER DEGREE IN BASIC MEDICAL SCIENCE (BACTERIOLOGY)

BY

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M.B., B.CH.

UNDER SUPERVISION OF

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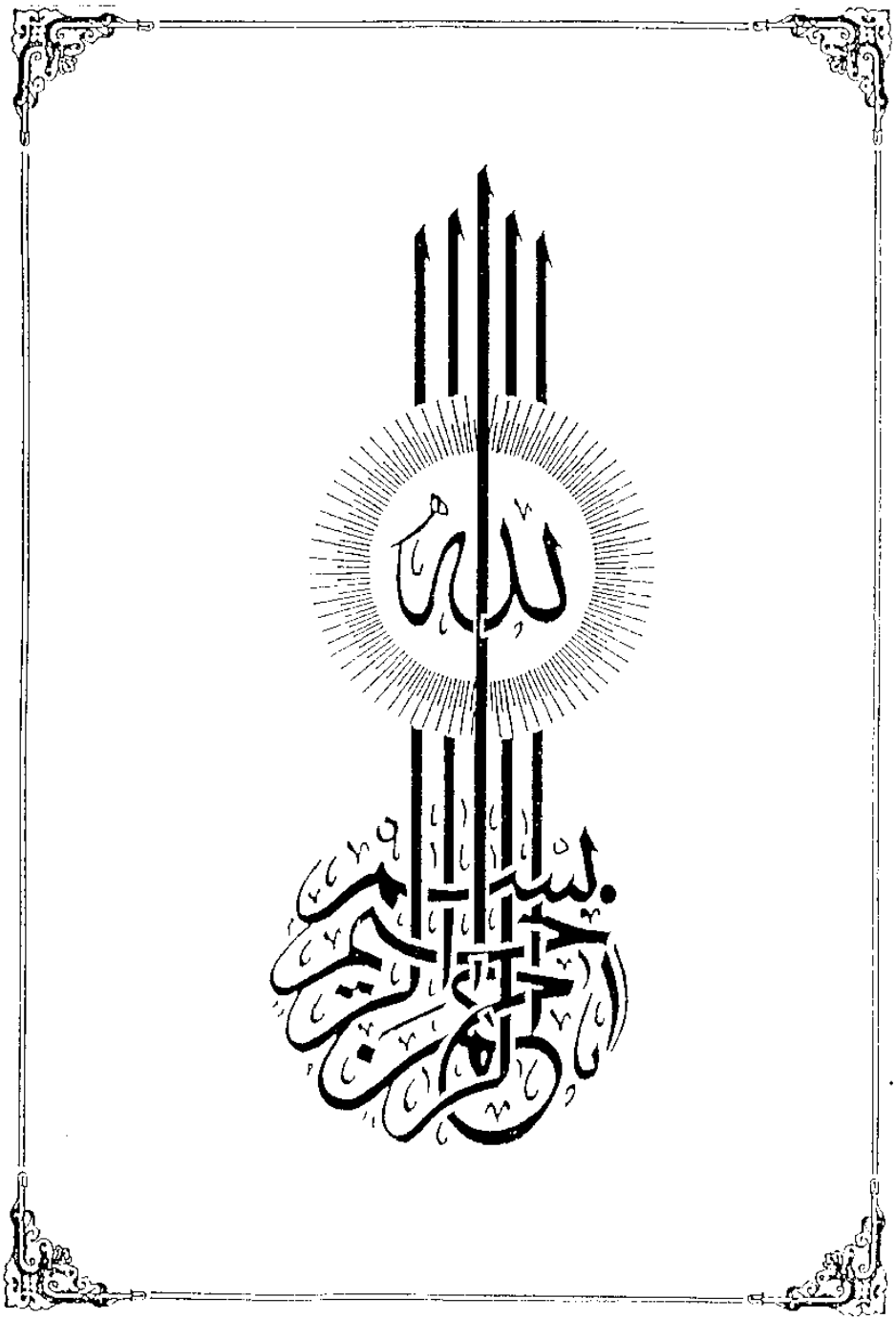

TO MY HUSBAND AND MY DAUGHTER,
THEY ARE MY LIFE

TO MY MOTHER, FATHER AND BROTHERS
FOR THEIR KIND HELPS

TO EVERY BODY WILL READ
THANK YOU

ACKNOWLEDGMENT

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MAHA HAMDY

LIST OF ABBREVIATION

CNS	Coagulase negative staphylococci
RTI	Respiratory tract infection
UTI	Urinary tract infection
AMP	Ampicillin
MET	Methicillin
KF	Cephalothin
NV	Novobiocin
CTX	Cefotaxim
OFX	Ofloxacin
TE	Tetracyclin
K	Kanamycin
CN	Gentamycin
S. Epi	Staphylococcus Epidermidis
S. Sapro.	Staphylococcus Saprophyticus
S. Haemo	Staphylococcus Haemolyticus
S. & W.S	Skin and Wound Sepsis
M.D	Medical Devices

CONTENTS

INTRODUCTION

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Coagulase negative staphylococci are among the most commonly isolated organisms in the clinical microbiology laboratory.

The frequent isolation of coagulase negative staphylococci from blood, other normally sterile body fluids, intravenous catheters, peritoneal dialysates, the various tissues presents a recurring interpretive challenge to both clinical microbiologists and clinicians. Due to their low virulence, coagulase negative staphylococci have been considered to be clinically significant contaminants when isolated from clinical specimens **(Christensen, et al, 1983).**

However in recent years coagulase negative staphylococci have become increasingly recognized as important agents of nosocomial infections **(Christensen, et al, 1982)**, their role as a significant pathogen following ophthalmologic **(Baum, 1978)**, neurologic **(Diaz-Mitoma, et al, 1987)**, and cardiothoracic surgery **(Archer and Armstrong, 1983),** in immunocompromised patients **(Hamory, and Parisi, 1987)** and in patients with prosthetic devices **(Archer, 1987)** has been well established.

The postulated reasons for current prevalence and clinical importance of these organisms include their great numbers on the skin, their selection as a result of wide spread usage of broad spectrum antibiotics in the hospital, their ability to adhere to and form slime on the surfaces of vascular catheters and other medical devices, their low nutritional requirements and multiple antimicrobial resistance.

It has become increasingly important to distinguish between infective and non-infective isolates of coagulase negative staphylococci. Non-infective isolates due to contamination or to transient skin flora bacteremia in a patient

would be expected to have different phenotypic markers indicative of different randomly selected strains of coagulase negative staphylococci.

Several different phenotyping systems (Biotyping, phage typing, serotyping, antibiotic susceptibility profiling and plasmid pattern analysis) have been used in an attempt to identify identical strains from the same patient **(Archer, et al, 1984).** and **(Christensen, et al, 1983).**

There is still a need, however for a simple, rapid, and cost effective method of distinguishing true pathogens from simple contaminants. It has been suggested that testing isolates for slime positivity either alone or in conjunction with other phenotypic markers may fulfill this task.

AIM OF THE WORK:

This work aims at the elucidation of the incidence of coagulase negative staphylococcal infection among high risk group hospitalized patients and to test for slime production and antibiotic resistance as virulence factors.

REVIEW OF LITERATURES

NOSOCOMIAL INFECTION

The term nosocomial infection (hospital acquired infection) is applied to any clinical infection ,i.e., infection causing illness that was neither present nor in its incubation period when the subject entered hospital.

It includes not only incidents in which a single microorganism spreads from person to person (cross infection) or from a common source in the hospital, but also single and apparently unconnected infections **(Allen and Bartzokas, et al., 1978).**

I-Classification:-

The following categories should be considered in determining the extent of hospital infection.

- Infections contracted and developing outside the hospital and requires patient admission (e.g. pneumonia)
- Infections contracted and developing within hospital (e.g. post operative wound infection).
- Infections contracted in hospital but not becoming clinically apparent until after the patient has been discharged (e.g. breast abscess).
- Infections contracted by hospital stuff as a consequence of their work, whether, or not this involve direct contact with patients (e.g., hepatitis B).

On average 5-10% of all hospital patients will develop an infections as a result of their stay in hospital. The most common are urinary, respiratory and wound infections. **(Anderton, 1986).**

II- Factors that influence infection:

Nosocomial infection may be exogenous or endogenous in origin. The exogenous source may be another person in the hospital service (environmental infection)..

Endogenous or self infection is that infection caused by an organism being derived from the patient's own skin, gastro-intestinal or upper respiratory flora.

Most infections acquired in hospital are caused by microorganisms that are commonly present in the general population, in whom they cause disease less often and usually in a milder form than in hospital patients. Thus contact with microorganisms associated with various risk factors influence. The frequency and nature of hospital infection **(Ayliffe, et al., 1990).**

III - Susceptibility to infection:

Natural resistance to infection is lower in elderly and infants who often comprise the majority of hospital patients.

Pre-existing disease, such as diabetes, or other conditions for which the patient was admitted to hospital and the treatment including immuno-suppressive drugs, radiotherapy or splenectomy may also reduce the patient's natural resistance to disease Moreover, the natural defense mechanisms of the body surfaces may be bypassed either by injury or by procedures such as surgery, insertion of an indwelling catheter, tracheotomy or ventilatory support. **(Maurer, 1985).**