EVALUATION OF RAPID DIAGNOSTIC TESTS FOR BACTERIAL AND FUNGAL INFECTIONS IN FEVER OF UNKNOWN ORIGIN IN IMMUNOCOMPROMISED HOST

A THESIS

SUBMITTED TO THE

FACULTY OF MEDICINE

AIN SHAMS UNIVERSITY

FOR THE (Ph. D.) DEGREE

IN BASIC MEDICAL SCIENCE

(BACTERIOLOGY)

BY

AFAF SHABAN ABDEL RAHMAN AHMED

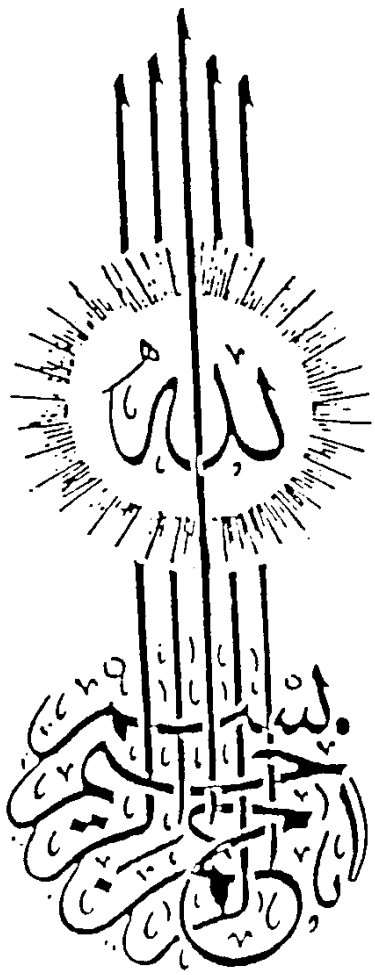
SUPERVISED BY

Prof. Dr. MOHAMED SADEK SABBOUR
Head of Medicine Departments
Faculty of Medicine
Ain Shams University

Prof. Dr. TAHANY ABDEL HAMEED
Prof of Microbiology & Immunology,
Faculty of Medicine
Ain Shams University

Faculty of Medicine
Ain Shams University

1988



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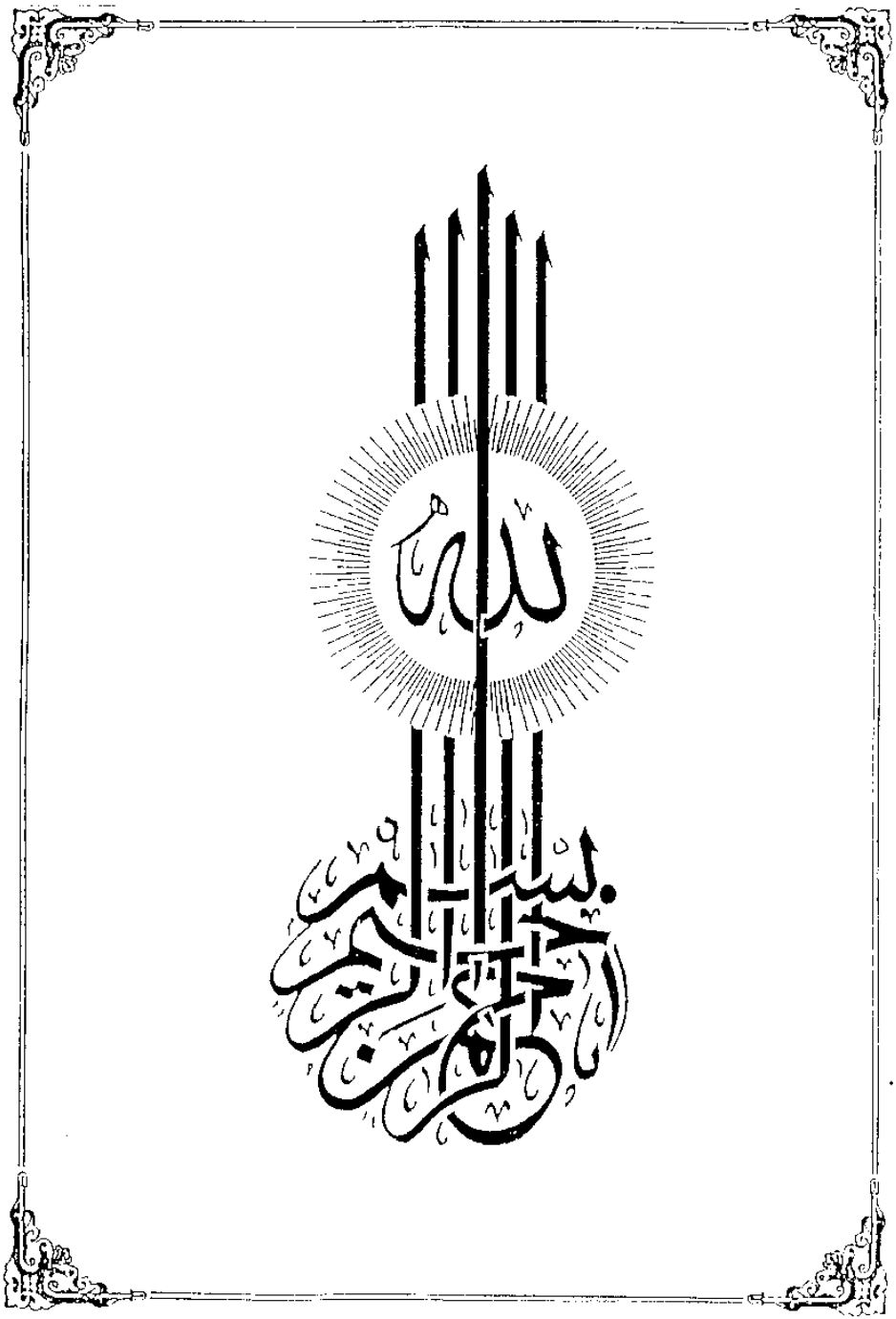

A C K N O W L E D G E M E N T

I wish to express my deep thanks and gratitude to our great professor Dr. ZEINAB HANEM MAGID , Professor of Microbiology and Immunology , Faculty of Medicine , Ain Shams University , for giving me the privilage of working , for her patience , and for her skilful guidance throughout the whole work.

I would like to acknowledge my indebtedness to professor Dr. MOHAMMED SADEK SABBOUR , Professor and Head of Internal Medicine Departments , Ain Shams University , for his initial advice , constant guidance and constructive criticism and stimulating interest in conducting this study.

I am also really thankful to professor Dr. TAHANI ABDEL HAMID , Professor of Microbiology and Immunology , Faculty of Medicine , Ain Shams University , for her earnest supervision throughout the course of the study . She liberally gave me of her time , patience and expertise.

I would like to thank also my colleagues , and every one gave a hand and helped this work to appear in its present form. I am really indebted to those patients who are included in this work for their cooperation.

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C O N T E N T S

Page

A B B R E V I A T I O N S

A.L.L.	- Acute lymphatic leukemia.
A.M.L.	- Acute myeloid leukemia.
Asp. flavus	= Aspergillus flavus.
Asp. fumigatus	= Aspergillus fumigatus.
Asp. niger	= Aspergillus niger.
B. catarrhalis	- Branhamella catarrhalis.
C. albicans	= Candida albicans.
C.L.L.	Chronic lymphatic leukemia.
C.M.L.	= Chronic myeloid leukemia.
Cl. perfringens	Clostridium perfringens.
C.I.E.P. = C.I.E.	= Counterimmunoelectrophoresis.
Crypt. laurentii	- Cryptococcus laurentii.
Crypt. neoformans	- Cryptococcus neoformans.
Crypt. urgiuttulatus	= Cryptococcus urgiuttulatus.
E.C.A.	= Enterobacteriaceae common antigen.
ELISA	= Enzyme linked immunosorbent assay.
E. coli	= Escherichiae coli.
H. influenzae	- Haemophilus influenzae.
Kleb. pneumoniae	- Klebsiella pneumoniae.
L. monocytogenes	= Listeria monocytogenes.
L. pneumophila	Legionella pneumophila.
M. avium	- Mycobacterium avium.
M. bovis	- Mycobacterium bovis.
M. fortuitum	- Mycobacterium fortuitum.
M. kansasii	= Mycobacterium kansasii.
M. tuberculosis	= Mycobacterium tuberculosis.
M. vaccae	- Mycobacterium vaccae.
N. lactamica	= Neisseria lactamica.
N. meningitidis	= Neisseria meningitidis.

Pr. morgani	= Proteus morgani.
Ps. aeruginosa	= Pseudomonas aeruginosa.
R.I.A.	= Radioimmunoassay.
Salm. agalactiae	= Salmonella agalactiae.
Salm. enteritidis	= Salmonella enteritidis.
Salm. typhi	= Salmonella typhi.
Shig. sonnei	= Shigella sonnei.
Staph. aureus	= Staphylococcus aureus.
S.C.T.	= Staphylococcal coagglutination test.
Strept. pneumoniae	= Streptococcus pneumoniae.
T. glabrata	= Torulopsis glabrata.
Lx. = L.A.	= Latex test.

INTRODUCTION AND AIM OF THE WORK

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Alterations in the defence mechanisms, whether congenital, spontaneously acquired, or iatrogenic are characterized by unusual susceptibility to infection. This alterations occurred in the course of many illnesses such as chronic debilitating diseases, neoplastic diseases, or patients under cytotoxic drugs, chemotherapy or irradiation.

Immunocompromised hosts refer to those patients whose underlying condition and/or therapy increases their susceptibility to infection. Organisms with little virulence for the normal human host become life threatening pathogens in those hosts.

The most common pathogens in those patients are : bacterial as E. coli, Ps. aeruginosa and Staph. aureus; fungal as Candida albicans, Aspergillus species, and Cryptococcus neoformans (Rotstein et al., 1985).

Opportunistic infections with yeasts and molds are increasingly demonstrated in patients with neoplastic diseases. Candida species, Aspergillus species and Cryptococcus neoformans remain the most common but other organisms are being encountered as pathogens. With the exception of cryptococcus most opportu-

nistic fungal infections are difficult to diagnose. Opportunistic fungal infections have become important causes of sickness and death in the immunosuppressed patients. They pose difficult problems of diagnosis and treatment. Other risk factors for those hosts include the excessive use of broad-spectrum antibiotics, high dose corticosteroids, indwelling venous catheter (as used for parenteral nutrition) and prosthetic devices (Fudenberg, 1980; and Kerr et al., 1983).

Cultural methods for detection of pathogens are time consuming in those hosts, so immunochemical detection of bacterial, fungal or viral antigens were tried to save time (Maccani, 1981).

Infection in immunocompromised host is life-threatening so specific antimicrobial therapy should be commenced as soon as possible. Recently the demonstration of bacterial antigens for serological methods had been shown to be of value in the etiological diagnosis of meningitis, septicemia and respiratory infection, when the specimens have failed to grow bacteria in culture (Leinonen, 1980).

Various methods exist for antigen detection, but not all are equally applicable since they vary in sensitivity, specificity, ease of performance and costs of analysis. Latex agglutination and staph. coagglutination tests were tried in the last few years, because these tests require little equipment and can be done rapidly, often within 10 or 15 minutes. They also

require a minimal amount of expertise (Bennet, 1983). They are also cheap and are as sensitive as counter immunoelectrophoresis and more sensitive than Gram stain and culture in diagnosing infections (White et al., 1981).

THE AIM OF WORK

(1) To asses what types of pathogens are most commonly encountered in the immunocompromised hosts in Egypt.

(2) To investigate the role of certain bacteria (E. coli, Staph. aureus and Ps. aeruginosa) and fungi (Candida albicans, Aspergillus niger, Asp. flavus, Asp. fumigatus, and Cryptococcus neoformans) in the immunocompromised host.

(3) To compare cultural and antigen detection techniques for blood, urine and other body fluids,(whenever possible) of those patients in order to find a simple, rapid and sensitive method for identifying the causative pathogen in the immunocompromised patients.

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REVIEW OF LITERATURE

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DEFINITION OF IMMUNOCOMPROMISED HOST :

Alterations in defence mechanisms occurred during the course of many illnesses (e.g. acute non lymphocytic leukemia, lymphomas, multiple myeloma, solid tumours, transplantation of bone marrow or kidney) (Ronald and Riben, 1981).
Aplastic anaemia, cytotoxic drugs, immunosuppressive therapy, excessive use of broad-spectrum antibiotics, high-dose corticosteroids and indwelling catheters (as used for parenteral nutrition and prosthetic devices) were other factors which compromised the host defences (Troungos et al., 1983).
The term "immunocompromised host or immunosupppressed" refers to those patients whose underlying condition and/or therapy increases their susceptibility to infection.
Immunodeficiency states whether congenital, spontaneously acquired, or iatrogenic are characterized by unusual susceptibility to infection (Harrison's, 1980).

CAUSES OF IMMUNOSUPPRESSION :

(A) Primary Immunosuppression :

Primary immunodeficiencies may be either congenital (e.g.