RAPID DIAGNOSIS OF THE HUMAN CYTOMEGALOVIRUS

THESIS

SUBMITTED FOR PARITIAL FULFILLMENT OF M.D. DEGREE

IN
CLINICAL PATHOLOGY

BY

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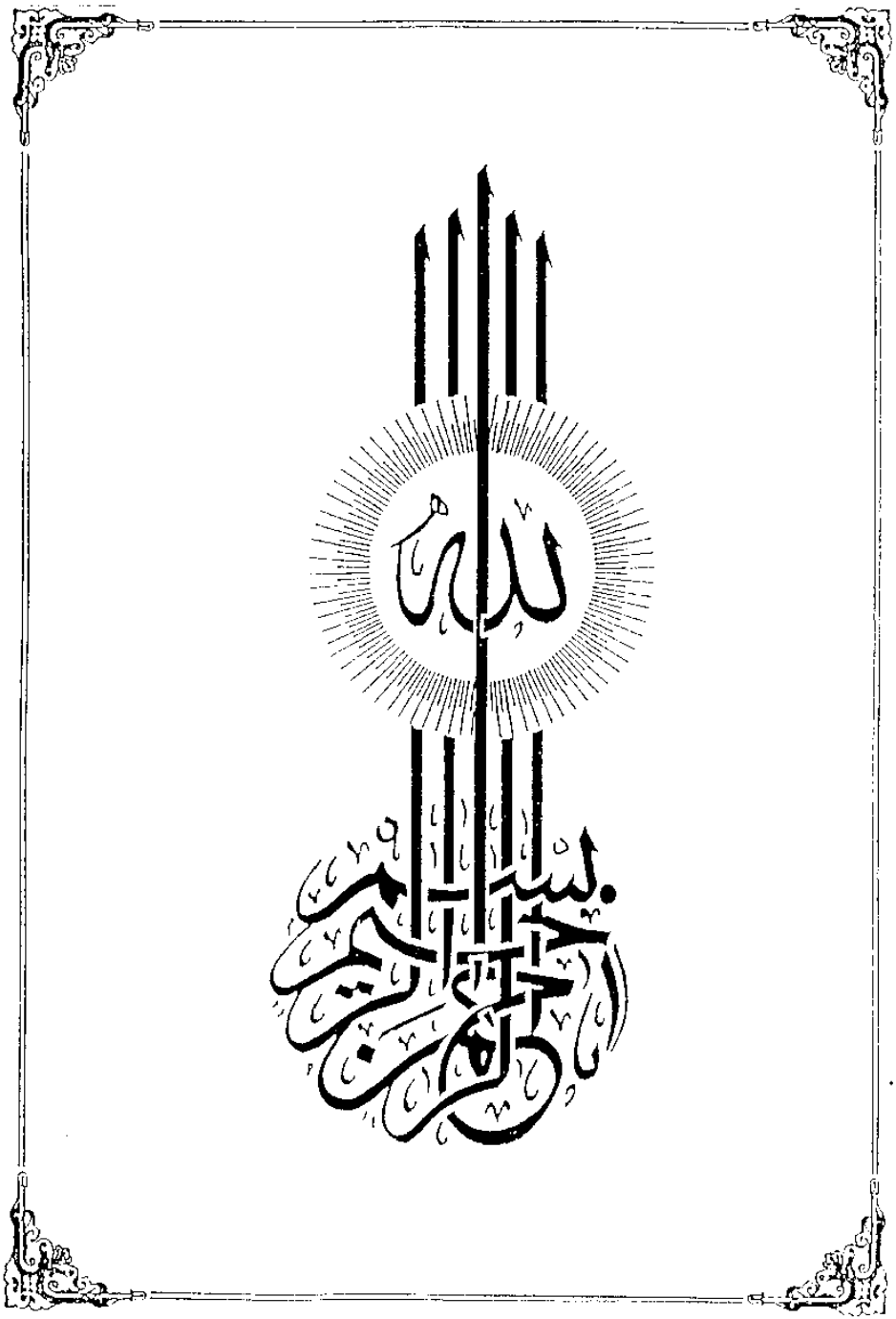
1995

بسم الله الرحمن الرحيم

" سُبْحَانَكَ لاعِلْمَ لنَا إلاّ ماعلّمْتَنَا
إنّكَ أنْتَ العَلِيمُ الحَكِيمْ "

صدق الله العظيم

سورة البقرة، آية "٣٢"



To My Husband

Dr. Mohamed Sherif Sabri ELWAN

and My Children
Hany & Hesham

ACKNOWLEDGEMENT

First and foremost thanks are due to **ALLAH**.

I would like to express my deepest thanks, gratitude and appreciation to Prof. Dr. **IBRAHIM KHALIL ALI**, *Professor of Clinical Pathology, Ain Shams University, for his sincere supervision, helpful suggestions and constructive criticism. Without him the bringing of this work to existence would have not been possible. to him I shall always be indebted.*

My deepest thanks and special regards are due to Dr. **NEVINE NABIL KASEM**, *Lecturer of Clinical Pathology, Ain Shams University, for her generous help and continuous encouragement. She provided me with invaluable comments and enthusiastically revised the thesis.*

I am very grateful to Dr. **MALAKA ZAKARIA AMER**, *for her help in making the broad lines of this thesis.*

I am also extending my gratitude to all the members of the Medical Sector of the French Embassy in Cairo, Egypt, especially Dr. **GEORGES SALINES**, *for funding the practical part of this work.*

Special thanks are also due to Prof. Dr. **F. MORINET,** *Madame le Dr.* **CATHERINE CIEUX** *and Madame* **SOLANGE SEBAOUN** *and all the working staff in the CMV laboratory of the Virology Unit, Hospital Saint Louis in Paris, for their generous help and training I gratefully received while I was working with them. They saved no effort in following up the progress of this work.*

I should pass a word of gratitude to Mr. **XAVIER LERY,** *Virology specialist in the Faculty of Agriculture, Cairo University for his help in supplying me with some of his specialized papers on the CMV diagnosis.*

I would like to thank also Dr. **MOUSTAFA EL NASHAAR,** *Associate Professor of ENT, Ain Shams University, for assisting me with different knowledge related to the subject.*

I would like to pay special regards to all the staff members of the Microbiology Unit, Department of Clinical Pathology in Ain Shams University Specialized Hospital (ASUSH), especially Dr. **MERVAT SHETTA,** *M.D. Clinical Pathology in ASUSH for their generous help and support.*

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INTRODUCTION

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The cytomegalovirus (CMV) is a DNA virus and a member of the family Herpesviridae, characterized by lacking the thymidine kinase enzyme which results in its resistance to the antiherpetic nucleosides thymidine kinase dependent (Huraux and Agut, 1989).

In most of the cases infection with CMV passes unnoticed except in some cases as with the immunocompromised patients where it can lead to interstitial pneumopathies which usually complicate bone marrow grafts (Meyers et al., 1983).

Infection with the CMV can be either perinatal (Pass et al., 1982) or infection in immunocompromised patients. It can also be a part of mixed infection of bacterial, fungal, and protozoal origin (Rinaldo et al., 1980).

Infection with this leucotropic virus is intimately related to the immune system so that the infection is enhanced by the immune deficiency state leading to its further deterioration (Ho, 1981).

The laboratory diagnosis of the CMV could be either direct or indirect. The direct technique is by culturing the CMV on human diploid fibroblast (HDF) which takes about 1-2 weeks or longer to show the cytopathic effect (Jawetz et al., 1970).

The availability of high quality monoclonal antibodies to CMV has stimulated the development of rapid tests for direct diagnosis after amplification in cell culture. Thus, the CMV could now be detected after 48 hours from inoculation of the cell culture due to the presence of the immediate early viral antigen detector (Howard et al., 1987).

As regards the indirect techniques there are neutralization test but it is very fastidious. The complement fixation test but is less sensitive with more false positive results. So, it is better to use a combination of the passive hemagglutination and the radioimmunoassay or the ELISA (Huraux et al., 1989).

AIM OF THE WORK

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To evaluate the rapid method of detection of CMV in comparison with the available serological techniques with emphasis on its cost-benefit.

REVIEW OF LITERATURE

HISTORICAL PERSPECTIVE

The human cytomegalovirus (HCMV) is a member of the herpes virus groups (Baskar et al., 1987). It derives its name from the characteristic cytopathic effect of the infected cells leading to its enlargement and its transformation to a giant cell with intranuclear oesinophilic inclusions (Maurin, 1985).

The human cytomegalovirus can be defined also as follows:

Beta herpes virinae

Species: Cytmegalovirus D/2: 54-92: 5/5: V/O

Type: Human cytomegalovirus

Cryptogram: D/2: 641/* : 5/5: V/O (Ardo in, 1983).

Historical Background:

Human CMV-induced "cytomegalic inclusion disease" was described and documented since 1904 by Jesionek and Kislemoglou. They observed it in the kidney, liver and lungs of a stillborn infant who was regarded as syphilitic. In the same year, Ribbert reported identical large cells occurring in the kidneys of a newborn infant, and also in the parotid glands of two older infants. Three years later, Lowenstein (1907) noted the occurrence of such cells in the ducts of