

**FEVER WITH COMA: ETIOLOGY AND OUTCOME. A 2-
YEAR RETROSPECTIVE STUDY OF THE CASES ADMITTED
TO THE FEVER HOSPITAL (1993-1994)**

Thesis

**Submitted in Partial Fulfilment for Requirement of the
Master Degree in Pediatrics**

PRESENTED BY

618.92849

A. A

Dr. Amany Abdel Azziz Hassan

M.B.B.Ch. (1990), Ain Shams University

56254

SUPERVISED BY

Prof. Dr. Gilane Abd El-Hamid Osman

Professor of Pediatrics - Faculty of Medicine

Ain Shams University

Handwritten signature

Dr. Hanan Mostafa El-Shakankiry

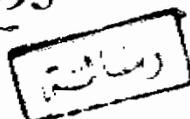
Lecturer of Pediatrics - Faculty of Medicine

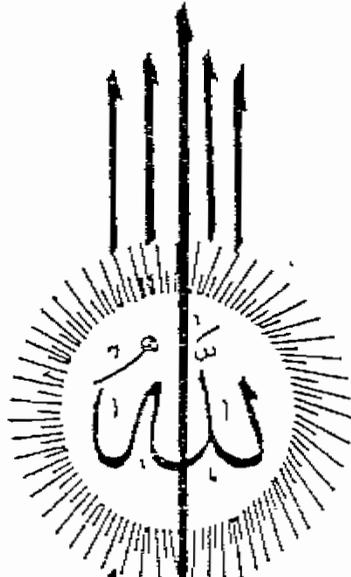
Ain Shams University

Handwritten signature

Handwritten signature

1995





بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ
سُبْحَانَكَ

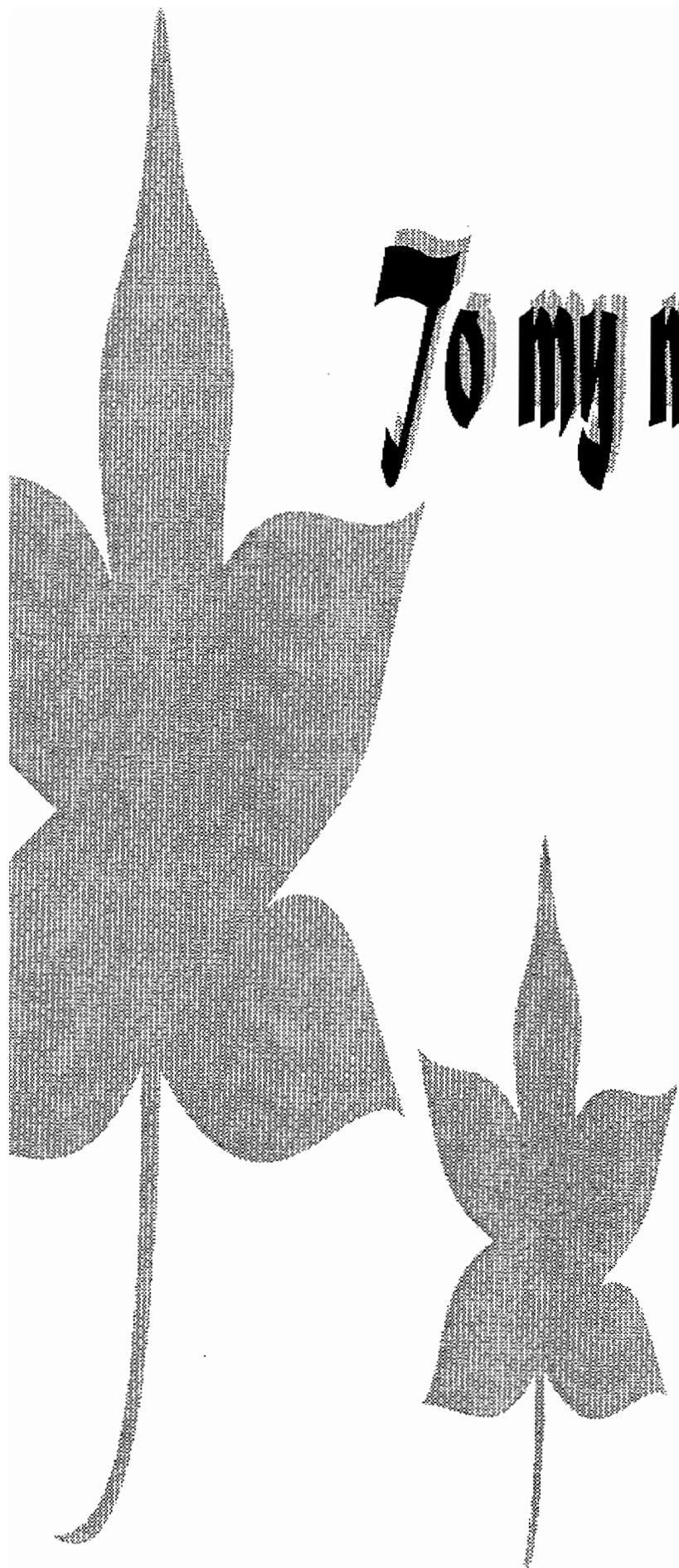
لَا إِلَهَ إِلَّا أَنْتَ أَعْلَمُ نَسَاءً لَمَّا عَلِمْنَا أَنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ

صَلَّى اللَّهُ عَلَيْكَ

سورة البقرة آية ٢٥



To my mother



ACKNOWLEDGMENT

First, thanks are all to God for blessing this study until it has reached its end as a little part of his generous help throughout my life.

*I find no words by which I can express my extreme thankfulness, appreciation and profound gratitude to my Prof. Dr. **Gilane Abd El Hamid Osman** Professor of Pediatrics and Head of the Pediatrics Department Faculty of Medicine, Ain Shams University, for her generous help, guidance, kind encouragement and great fruitful advice during supervision of this work.*

*I am greatly honoured to express my sincere thanks to Dr. **Hanan Mostafa El Shakankiry** Lecturer of Pediatrics- Faculty of Medicine, Ain Shams University, by whom I was very much impressed for her sincere guidance, noble characters, generous attitude, sympathy, and great help. She spent a lot of her valuable time in revising this thesis. No words can be sufficient to express my gratitude and indebtedness.*

Finally I wish to express my deep thanks to all my colleagues in Abbassia Fever Hospital for their kind encouragement.

Amany Abde Azziz Hassan.

CONTENTS

	Page
INTRODUCTION AND AIM OF THE WORK	1
REVIEW OF LITERATURE	3
FEVER	3
COMA	13
FEVER WITH COMA	33
MENINGITIS	33
ENCEPHALITIS	62
CEREBRAL MALARIA	71
HEAT STROKE	77
INTRACRANIAL HEMORRHAGE	81
HEPATIC COMA	82
REYE SYNDROME	91
DIABETIC COMA	94
ATROPINE POISONING	97
OTHER CAUSES OF FEVER WITH COMA	99
DEHYDRATION AND ELECTROLYTE DISTURBANCES	99
HEMORRHAGIC SHOCK AND ENCEPHALOPATHY SYNDROME	100
POST- EPILEPTIC COMA	101
FAMILIAL MIGRAINE COMA	101
SUBJECTS AND METHODS	102
RESULTS	104
DISCUSSION	144
SUMMARY	164
CONCLUSIONS AND RECOMMENDATIONS.....	167
REFERENCES	169
ARABIC SUMMARY	

LIST OF ABBREVIATIONS

AIDS	: Acquired Immune Deficiency Syndrome.
AV	: Arteriovenous
BBB	: Blood brain barrier
BUN	: Blood urea nitrogen
CBF	: Cerebral blood flow
CMV	: Cytomegalovirus
CNS	: Central nervous system
CSF	: Cerebrospinal fluid
CT	: Computed tomography
DIC:	Disseminated intravascular coagulation
DKA	: Diabetic ketoacidosis
E. coli	: Escherichia coli
EBV	: Epstein Barr virus
e.g.	: For example
EEG	: Electroencephalogram
FHF	: Fulminant hepatic failure
Fig	: Figure
GIT	: Gastrointestinal tract
H. influenzae	: Haemophilus influenzae
Hge.	: Hemorrhage
HIV	: Human immunodeficiency virus
hr.	:Hour
HSV	: Herpes simplex virus
ICP	: Intracranial pressure

IgA	: Immunoglobulin A
IgG	: Immunoglobulin G
IgM	: Immunoglobulin M
IL	: Interleukin
IM	: Intramuscularly
IV	: Intravenously
Kg	: Kilogram
L	: Liter
Lab.	: Laboratory
LP	: Lumbar puncture
Max	: Maximum
MEQ	: Milliequivalent
Mg	: Milligram
ML	: Milliliter
Mmol	: Millimol
Mo	: Month
MRI	: Magnetic resonance imaging
N. Meningitidis	: Neisseria meningitidis.
NO	: Nitric oxide
No	: Number
NPO	: No per os
NS	: Normal saline
P. aeruginosa	: Pseudomonas aeruginosa
PG	: Prostaglandin
PGE2	: Prostaglandin E2
PMN Cells	: Polymorphonuclear cells

PO : Per os
PRBCs : Parasitized red blood cells
Q.i.d : Four times per day
RBC : Red blood cells
REM : Rapid eye movement
S. pneumoniae : Streptococcus pneumoniae
SC : Subcutaneous
SGOT : Serum glutamic oxaloacetic transaminase
SGPT : Serum glutamic pyruvic transaminase
SIADH : Syndrome of inappropriate secretion of antidiuretic hormone
T.i.d. : Three times per day
TNF : Tumor necrosis factor
U : Unit
VZV : Varicella zoster virus
WBC : White blood cells

LIST OF TABLES

	Page
Table (1): Age break points for special possibilities as causes of fever in children..	7
Table (2): Risk factors for serious disease in the child with fever	8
Table (3): High risk febrile patients	8
Table (4): Etiologic classification of coma	16
Table (5): Important points in the differential diagnosis of the common causes of coma	19
Table (6): General examination of comatose patients	25
Table (7): Anatomic stages of coma	26
Table (8): Glasgow Coma Scale	27
Table (9): Normal CSF pressure (mmH ₂ O).....	28
Table (10): Normal values for CSF white blood cell counts (WBC/ mm ³)	28
Table (11): Normal range for CSF protein and glucose	28
Table (12): Cerebrospinal fluid findings in various central nervous system disorders associated with fever	29
Table (13): Pathogenetic sequence of bacterial neurotropism	36
Table (14): Organisms that cause meningitis in selected groups	40
Table (15): Frequency of selected findings in children with bacterial meningitis..	44
Table (16): Clinical findings related to pathophysiology.	44
Table (17): Characteristic CSF changes in acute bacterial meningitis	46
Table (18): Advantages and disadvantages of immunodiagnosis of acute bacterial meningitis.	46
Table (19): Progression of signs of brain swelling	48
Table (20): Initial antibiotic treatment of bacterial meningitis in selected groups..	50
Table (21): Antibiotic therapy for initial treatment of patients with acute	

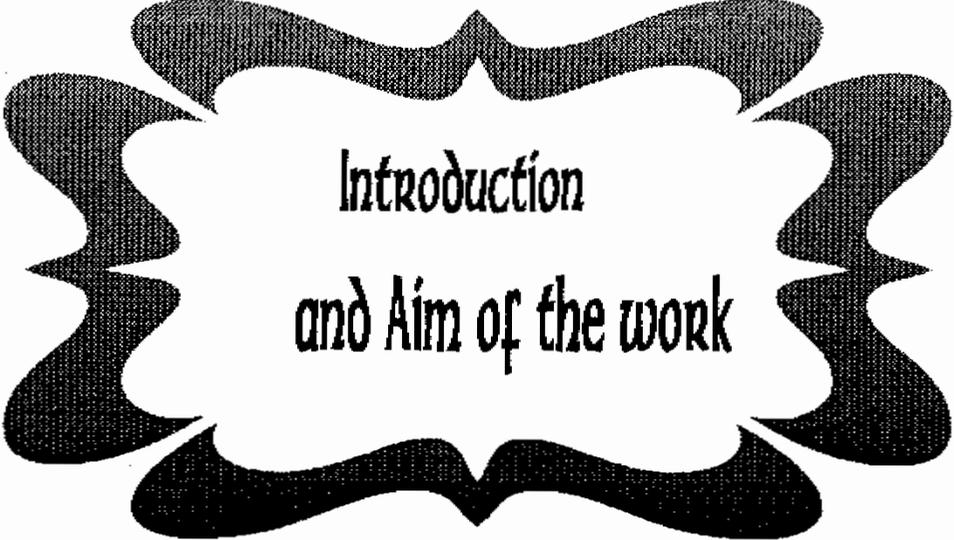
bacterial meningitis.....	50
Table (22): Potential therapeutic modalities directed to various pathophysiologic targets in bacterial meningitis	52
Table (23): Etiologic agents, factors and diseases associated with aseptic meningitis.	54
Table (24): Common causes of chronic meningitis in the otherwise normal host	57
Table (25): Antituberculous drugs useful in treatment of tuberculous meningitis.....	60
Table (26): Treatment of fungal meningitis	61
Table (27): Classification of encephalitis by etiology and source	63
Table (28): Signs and symptoms of acute encephalitis	65
Table (29): Historical clues to the etiology of viral encephalitis	66
Table (30): Manifestations of severe malaria	73
Table (31): Recommended chemotherapy for severe falciparum malaria in children	76
Table(32): Major differences between classic and exertional heat stroke	78
Table(33): Factors in hepatic encephalopathy	82
Table(34): Etiology of fulminant hepatic failure	83
Table (35): Common precipitants of hepatic encephalopathy.....	84
Table (36): Hepatic encephalopathy proposed pathogenetic mechanisms	85
Table(37): Stages of hepatic encephalopathy	86
Table(38): Management of hepatic encephalopathy.....	88
Table(39): Management of other complications of FHF.	89
Table(40): Protocol for treating DKA.	96
Table(41): Percentage of all cases of fever with coma from total admissions to Abbassia Fever Hospital through the years 1993- 1994	105

Table(42): Percentage of cases of fever with coma under 18 years from all cases of fever with coma	105
Table(43): Distribution of cases of fever with coma in the years 1993-1994	107
Table(44): Sex distribution in patients presented by fever with coma in relation to diagnosis	108
Table(45): Frequency of distribution of age in studied cases	108
Table(46): Gender distribution according to age group	109
Table(47): Distribution of different causes of fever with coma according to age	109
Table(48): Case fatality rate in studied cases	110
Table(49): Monthly distribution in cases with meningitis	115
Table(50): Distribution of causative organisms in cases with meningitis	116
Table(51): Clinical presentation of cases of meningitis in different age groups in relation to causative organisms	117
Table(52): CSF findings in cases with meningitis	121
Table(53): Mortality rate in cases with meningitis in different age groups	121
Table (54): Mortality rate in cases with meningitis in relation of causative organisms.....	122
Table(55): Cause of death in cases with meningitis	122
Table(56): Cause of death in cases with meningitis in relation to causative organism	123
Table(57): Morbidity in cases with meningitis	123
Table(58): Morbidity in cases with meningitis in relation to causative organism	124
Table(59): Clinical presentation of cases with encephalitis	131
Table(60): CSF picture in cases with encephalitis	134

Table(61): Comparison between cases with meningitis to those with encephalitis as regards the CSF picture.....	134
Table(62): Outcome of cases with encephalitis in different age groups	135
Table(63): Mortality in cases with encephalitis in different age groups	135
Table(64): Causes of death in cases with encephalitis	136
Table(65): Age distribution of cases with hepatic coma	138
Table(66): Clinical presentation of cases with hepatic coma	138
Table(67): Laboratory findings of cases with hepatic coma	139
Table(68): Cause of death in hepatic coma	139
Table(69): Laboratory findings of cases with diabetic coma	141
Table(70): Age distribution of cases with intracranial hemorrhage	142
Table(71): Clinical presentation of cases with intracranial hemorrhage	142
Table(72): CSF picture in cases with intracranial hemorrhage	143

LIST OF FIGURES

Figure(1): Circadian variation in temperature, sleep, growth hormone and cortisol	4
Figure(2): New concepts in the pathogenesis of fever	6
Figure(3): Approach to evaluation of the febrile child	12
Figure(4): Management of coma.....	32
Figure(5): Pathophysiologic events during bacterial meningitis.....	39
Figure(6): A schematic representation of current view on the pathogenesis of cerebral malaria	72
Figure(7): Cases of fever with coma under the age of 18 years in contrast with all admitted ages	106
Figure(8): Classification of the cases of fever with coma under the age of 18 years in 1993 and 1994.....	111
Figure(9): Sex distribution in the different causes of fever with coma	112
Figure(10): Gender difference in the studied age groups	113
Figure(11): Case fatality in relation to diagnosis	114
Figure(12): Mean monthly rate of cases with meningitis in the studied age groups (1993-1994).....	125
Figure(13): Case fatality of meningitis according to age group	126
Figure(14): Prevalence of different causative organisms in the studied cases with meningitis	127
Figure(15): Case fatality in patients with meningitis in relation to causative organisms	128
Figure(16): Cause of death in studied cases with meningitis	129
Figure(17): Residual sequelae following meningitis	130
Figure(18): Cause of death in the studied cases with encephalitis	137
Figure(19): Cause of death in the studied cases with hepatic coma	140



*Introduction
and Aim of the work*
