A Study of Neuron-Specific Enclase in Some Cases with Chronic Obstructive Pulmonary Diseases

Thesis

Submitted for Partial Fulfillment of Master Degree in Chest Diseases

Ву

Ashraf Adel Gomaa Ali M.B., B.Ch.

Supervised By

Professor Doctor

MOHAMED AWAD TAG-ELDIN

Professor of Chest Diseases & Vice President of Ain Shams University

> Professor Doctor HUSSEIN ALY HUSSEIN

Professor of Chest Diseases
Faculty of Medicine, Ain Shams University

Professor Doctor ALI KHALIFA ALI

Professor of Biochemistry
Faculty of Medicine, Ain Shams University

FACULTY OF MEDICINE 1997 AIN SHAMS UNIVERSITY











بنير إلله التحمز النجيئم

﴿ وَقُلِ آعْمَلُواْ فَسَيَرَى ٱللهُ عَمَلَكُ مُ

ورَسَهُ ولهُ وَالْمُؤْمِنُونَ وَسَتُرَدُّونَ إِلَى عَلِمِ

ٱلْغَيْبِ وَٱلشَهَادَةَ فَيُنبِئُّكُمُ بِمَا كُنتُمْ تَعْمَلُونَ ﴾

صدق الله العظيم ﴿ التوبة (١٠٥) ﴾





ACKNOWLEDGEMENT

First and foremost thanks to GOD, the most beneficent and merciful.

No words could express my sincere appreciation and deepest gratitude to Professor Dr. Mohamed Awad Tag-El Din, Professor of Chest Diseases, Faculty of Medicine, and Vice President of Ain Shams University, for his fatherly guidance, kind supervision, valuable criticism and continuous encouragement throughout the whole research. With his most creative and instructive ideas this work came to a conclusion.

I am very much obliged to the kindness and great help of Professor Dr. Hussein Aly Hussein, Professor of Chest Diseases, Faculty of Medicine, Ain Shams University, for his overwhelming kindness, supervision, sincere encouragement and stimulating suggestions throughout this work. The words will never be enough to express my thanks to his unlimited efforts. To him I am specially indebted.

My cardinal thanks and sincere gratitude to Professor Dr. Ali Khalifa Ali, Professor of Biochemistry and Head of Oncology Diagnostic Unit, Faculty of Medicine, Ain Shams University, for his expertise supervision, fruitful advice and generous guidance. He has been, as he always is, most helpful to me throughout the hole work. His continual watchfullness and his invaluable inselling were great factors in concluding this work.

My special thanks to Dr. Mahmoud Abd El-Wahab from Oncology Diagnostic Unit, Faculty of Medicine, Ain Shams University, for his kind help and support which facilitated the performance of the work.

I would like to express my deepest gratitude to all staff members of Chest Department, Faculty of Medicine, Ain Shams University.

CONTENTS

Introduction and Aim of the Work	
Review of Literature	5
Chronic Obstructive Pulmonary Disease	5
Definitions	5
Epidemiology	9
Risk Factors	10
Pathology	13
Pathophysiology	14
Clinical Picture	15
Investigations	17
Staging and Assessment of Prognosis	23
Natural History	24
Modifications of Risk Factors	28
End-stage of C.O.P.D.	29
The Effects of Hypoxia and Hypercapnia	30
Serum enzymes, Electrolytes and some	
Metabolic Byproducts	34
Tumour Markers	37
Neuron-Specific Enolase	42
Subjects and Methods	54
Results	64
Discussion and Recommendations	81
Summary and Conclusion	90
References	
Appendix.	
4 11 6	

Arabic Summary





LIST OF ABBREVIATIONS

% pred. Percent of parameter to its predicted value.

ALT Alanine aminoTransferase.

AP Alkaline Phosphatase.

APUD Amine Precursor uptake decarboxylation.

AST Aspartate aminotransferase.

ATS American Thoracic Society.

ATT Alpha₁ - antitrypsin.

BAL Bronchoalveolar lavage.

C.O.P.D. Chronic Obstructive Pulmonary Disease.

CA Cancer antigen.

Ch.E Choline estrase.

CNS Central Nervous System.

CSF Cerebrospinol Fluid.

CT Computed Tomography.

ECG Electrocardiography.

EEG Electroencephalography

EIA Enzyme Immuno Assay

FEF₂₅₋₇₅ % Maximum mid-expiratory flow rate.

FEV₁ Forced Expiratory Volume in one Second.

FRC Functional Residual Capacity.

FRC Functional Residual Capacity.

FVC Forced Vital Capacity.

RP Gastrin Releasing Peptide.

IV Human Immunodeficiency Virus.

List of Abbreviations (contd.)

IPF Interstitial pulmonary fibrosis

KCO Transfer Coefficient.

KD Kilo Dalten.

Min. Minutes.

N.S.C.L.C. Non-Small Cell Lung Cancer.

NNE Non-Neural Enolase.

NSE Neuron-Specific Enclase.

PaCO₂ Arterial Carbon Dioxide Tension.

PaO₂ Arterial Oxygen Tension.

PAP Prostatic acid phosphatase.

PE Max Maximum Expiratory Pressure.

PEF Peak Expiratory Flow

pH Negative log. of the Hydrogen ion concentration.

PI Max Maximum Inspiratory Pressure.

PSA Prostatic specific antigen.

REM Rapid Eye Movement

RV Residual Volume.

SaO₂ Arterial Oxygen Saturation.

SCLC Small Cell Lung Cancer.

SGOT Serum Glutamic Oxaloacetic Transaminase.

SGPT Serum Glutamic Pyruvic Transaminase.

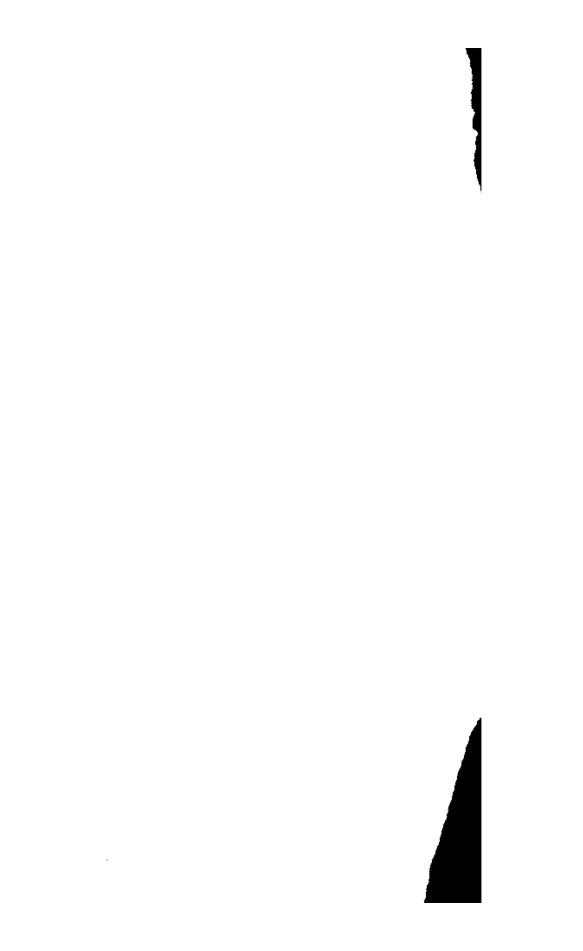
TLC Total lung Capacity.

TMB Tetra Methyl Benzidine.

VC Vital Capacity.

LIST OF FIGURES

		Page
1.	Scheme of chronic obstructive pulmonary disease.	8
2.	Relationship of FEV ₁ , age and smoking.	26
3	Epolase catalyzed glycolytic reaction	42



LIST OF TABLES

		Page
1	Comparison between normal control group (group I) and non-hypoxic C.O.P.D. group (group II) as regard spirometric parameters, arterial blood gas parameters and NSE level.	84
2	Comparison between normal control group and hypoxic C.O.P.D. group (before treatment) as regard spirometric parameters, arterial blood gas parameters and NSE level.	85
3	Comparison between non-hypoxic C.O.P.D. group and hypoxic C.O.P.D. group (before treatment) as regard spirometric parameters, arterial blood gas parameters and NSE level.	86
4	Statistical difference between different parameters in hypoxic C.O.P.D. group before and after treatment.	87
5	The correlation between changes of NSE levels and different physiological parameters of hypoxic C.O.P.D. group (before treatment), using correlation coefficient (r).	88

List of Tables (continued):

The following tables are located in the Appendix.

- 6 Data of normal control group showing age, smoking index, clinical presentations, spirometric parameters, arterial blood gas parameters, SGOT, SGPT, serum creatinine and NSE levels.
- 7 Data of non-hypoxic C.O.P.D. group showing age, smoking index, clinical presentations, spirometric parameters, arterial blood gas parameters, SGOT, SGPT, serum creatinine and NSE levels.
- 8 (a) Data of hypoxic C.O.P.D. group showing age, smoking index, clinical presentation, SGOT, SGPT, and serum creatinine.
- 8 (b) Data of hypoxic C.O.P.D. group showing spirometric parameters before and after treatment.
- 8 (c) Data of hypoxic C.O.P.D. group showing arterial blood gas parameters before and after treatment.
 - 9 NSE levels (ng/ml) in normal control group.
 - 10 NSE levels (ng/ml) in non-hypoxic C.O.P.D. group.
 - 11 NSE levels (ng/ml) in hypoxic C.O.P.D. group before and after treatment.