Value of Vascular Endothelial Growth Factor (VEGF) in Differentiation Between Malignant and Non-Malignant Pleural Effusions

Thesis submitted for partial fulfillment of M.Sc Degree of Chest Diseases and Tuberculosis

 $\mathbf{B}\mathbf{y}$

Ramy Rizk Shaker
M.B.B.CH
Ain Shams University

Supervisors

Professor: Laila Ashour Helala

Professor of Chest Diseases Faculty of Medicine Ain Shams University

Professor: Aya M. Abdel Dayem

Professor of Chest diseases Faculty of Medicine Ain Shams University

Dr: Manal Louis Louka

Lecturer of Medical Biochemistry & Molecular Biology Faculty of Medicine Ain Shams University

Chest Department

Faculty of Medicine

Ain Shams University 2014

Acknowledgement

I thank GOD who granted me the ability to complete the work of this study.

I would like to express my supreme gratitude to *Prof. Laila Ashour Helala*, professor of chest diseases, Faculty of medicine, Ain Shams University, for her continuous guidance, her close supervision and valuable instructions throughout this study.

It is pleasure to express my gratitude and great appreciation to *Prof. Aya M. Abdel Dayem*, Professor of chest diseases, Faculty of medicine, Ain Shams University, for her continuous guidance, helpful supervision and encouragement throughout this study.

I would like also to express my deep thanks and my gratitude to *Dr. Manal Louis Louka*, Lecturer of Medical Biochemistry & Molecular Biology, Faculty of medicine, Ain Shams University, for her time and effort she devoted to the supervision of the present work.

Finally, I would like to express my thanks to my family, colleagues and friends who shared me in many ways to get this work in good form.

Ramy Rizk 2014

<u>Abstract</u>

The purpose of this study was to evaluate the value of vascular endothelial growth factor (VEGF) as a marker for differentiation between malignant and non malignant pleural effusion.

This study was conducted on 40 patients with pleural effusion:

- 10 patients with primary malignant pleural effusion.
- 10 patients with secondary malignant pleural effusion.
- 10 patients with inflammatory pleural effusion.
- 10 patients with transudative pleural effusion.

The level of VEGF in pleural effusion found to be significantly higher in malignant pleural effusion groups than in non malignant pleural effusion groups.

List of abbreviations

ADA	Adenosine deaminase
AIDS	Acquired immune deficiency syndrome
ANA	Anti nuclear antibody
CEA	Carcinoembryonic antigen
CHF	Congestive heart failure
CT	Computed tomography
CXR	Chest X-ray
EIA	Enzyme immunoassay
ESR	Erthrocyte sedimentation rate
F	Female
Fig.	Figure
FLT	Fms-like tyrosine kinase
FVC	Forced vital capacity
IFN-	Interferon gamma
IL	Interleukin
LDH	Lactic dehydrogenase
LE	Lupus erythematosis
M	Male
MPE	Malignant pleural effusion
N	Number
NRP	Neuropilin
PCO2	Partial pressure of carbon dioxide
PDGF	Platelet derived growth factor
PΕ	Pleural effusion
PLGF	Placenta growth factor
PMN	Polymorphonuclear leukocytes
RPM	Revolutions per minute
SD	Standard deviation

T.B.	Tuberculous
TLC	Total leukocytic count
TLC	Total lung capacity
TNF-α	Tumor necrosis factor alpha
U/S	Ultrasonography
VATS	Video-assisted thoracic surgery
VEGF	Vascular endothelial growth factor
VPF	Vascular permeability factor
VVOs	Vesiculo vascular organelles

List of tables

Table N.	Title	Page
Table 1	Normal composition of pleural fluid.	10
Table 2	Demographic characteristics of the	78
	studied groups.	
Table 3	Comparison between the studied groups	79
	as regards clinical manifestation.	
Table 4	Comparison between the studied groups	80
	as regards extent and distribution of the	
	pleural effusion in chest x-ray.	
Table 5	Comparison between the studied groups	85
	as regards serum total leukocytes count.	
Table 6	Comparison between the studied groups	86
	as regards serum erythrocyte	
	sedimentation rate (ESR) in 1st hour.	
Table 7	Comparison between the studied groups	87
	as regards serum erythrocyte	
	sedimentation rate (ESR) in 2nd hour.	
Table 8	Comparison between the studied groups	88
	as regards serum lactate dehydrogenase	
	(LDH).	
Table 9	Comparison between the studied groups	90
	as regards serum vascular endothelial	
	growth factor (VEGF).	
Table 10	Comparison between the malignant	92
	pleural effusion group (A) and non-	
	malignant pleural effusion group (B) as	
	regards to serum vascular endothelial	
	growth factor (VEGF).	

Table 11	Comparison between the studied groups as regards pleural effusion protein level.	93
Table 12	Comparison between the studied groups	95
	as regards pleural effusion lactate	
	dehydrogenase (LDH) level.	
Table 13	Comparison between the studied groups	97
	as regards pleural effusion adenosine	
	deaminase level.	
Table 14	Comparison between the studied groups	99
	as regards pleural effusion vascular	
	endothelial growth factor (VEGF).	
Table 15	Comparison between the malignant	101
	pleural effusion group (A) and non-	
	malignant pleural effusion group (B) as	
	regard pleural effusion vascular	
	endothelial growth factor (VEGF).	

List of Figures

Figure N.	Title	Page
Fig. 1	VEGF standard curve.	75
Fig. 2	Pie chart showing extent of the pleural effusion in primary malignant pleural effusion group (AA).	81
Fig. 3	Pie chart showing extent of the pleural effusion in secondary malignant pleural effusion group (AB).	82
Fig. 4	Pie chart showing extent of the pleural effusion in inflammatory pleural effusion group (BA).	83
Fig. 5	Pie chart showing extent of the pleural effusion in transudate pleural effusion group (BB).	84
Fig. 6	Histogram shows that mean difference between serum LDH in studied groups.	89
Fig. 7	Histogram show that no mean difference between studied groups as regard to serum VEGF.	91
Fig. 8	Histogram show that no mean difference between malignant and non malignant pleural effusion serum VEGF.	92
Fig. 9	Histogram shows the high mean difference between exudate and transudate pleural effusion as regard to pleural effusion protein level.	94
Fig. 10	Histogram shows the high mean difference between malignant and non	96

	malignant pleural effusion as regard to	
	pleural effusion LDH level.	
Fig. 11	Histogram shows the high mean	98
	difference between inflammatory	
	pleural effusion group and malignant	
	pleural effusion group and transudate	
	pleural effusion group as regard to	
	pleural effusion ADA level.	
Fig. 12	Histogram shows the high mean	100
	difference between pleural effusion	
	VEGF in studied groups.	
Fig. 13	Histogram shows the high mean	102
	difference between pleural effusion	
	VEGF in malignant pleural effusion	
	groups more than the non malignant	
	pleural effusion groups.	

List of Contents:

I.	Introduction	1
II.	Aim of the work	3
III.	Review of literature:	4
	1. Anatomy of the pleura	4
	2. Physiology of the pleural space	6
	3. Etiology of pleural effusion	11
	4. Diagnosis of pleural effusion	38
	5. Vascular endothelial growth factor	60
IV.	Patients and methods	69
V.	Results	77
VI.	Discussion	103
VII.	Summary	114
VIII.	Conclusion	118
IX.	Recommendations	119
X.	References	120
XI.	Arabic summary	1

Introduction

Aim of the work

Review of literature

Patients and methods

Results