CERTAIN BIOLOGICAL MARKERS IN SOME BENIGN LIVER DISEASES

Thesis
Submitted For The M.Sc Degree In Biochemistry

By

Nadia Hamdan Mahmoud

Under Supervision

Prof. Dr. Mohamed M. Abdel Fattah

Professor of Biochemistry

Faculty of Science, Ain Shams University

M. Aldel Fallet

574.192 N H Prof. Dr. Ali Khalifa Ali
Professor of Biochemistry
Head of Oncology Diagnostic Unit
Faculty of Medicine, Ain Shams University

Prof. Dr. Ibrahim H. Borai Tray
Professor of Biochemistry
Faculty of Science, Ain Shams University

Department of Biochemistry
Faculty of Science, Ain Shams University
1995





ACKNOWLEDGMENT

I wish to express my overlasting gratitude to **Prof. Dr.**Mohamed Mohamed Abdel Fattah, Professor of
Biochemistry, Faculty of Science, Ain Shams University.

For giving me the privilege of working under his supervision
as well as his kind attitudes and moral supports. No words
of appreciation are sufficient for his generous cooperation.

I am deeply grateful and appreciated to **Prof. Dr. Ali Khalifa Ali,** Professor of Biochemistry and Head of
Oncology Diagnostic Unit, Faculty of Medicine, Ain Shams
University. It was through his valuable advice, supervision,
constant support and encouragement, his revision of all
details and discussion of all results that made this work
possible.

My cordial thanks to **Prof. Dr. Ibrahim H. Borai**, Professor of Biochemistry, Faculty of Science, Ain Shams University. For his kind supervision, care and useful advice growing out of his deep experience in this work.

Finally I would like to express my thanks to **Dr. Hanaa El-Tayeb**, Assistant Professor of Biochemistry, Faculty of Medicine, Ain Shams University. It was through her constant support that made this work could be finally completed.

It is pleasure to acknowledge the help I have received from the members Staff of the Gastroenterology Department of Egypt Air Hospital, Ain Shams Tropical Medicine Department and National Cancer Institute.

CONTENTS

	Page
Introduction	1
Aim of the work	7
Review of literature	8
A- Alpha fetorptein (AFP)	8
-Chemical nature	8
•Site of AFP synthesis	8
•Physiological function of AFP	10
•Clinical usefulness of AFP	11
B-Carcinoembryonic antigen (CEA)	22
•Chemical nature	22
•Site of CEA synthesis	23
•Biological function of CEA	24
•Clinical usefulness of CEA	30
C- Alpha-1-antitrypsin (α-1-AT)	34
•Chemical nature	34
-Synthesis of α -1-AT	34

	Page
•Genetic aspects of α -1-AT	35
•Clinical usefulness of α-1-AT	37
Material and Methods	
• Material	40
 Methods 	44
• Quantitative determination of AFP in serum	44
• Quantitative determination of CEA in serum	47
• Quantitative determination of $(\alpha-1-AT)$	50
in serum	
• Liver function tests	52
1- Determination of total bilirubin	52
2- Determination of alkaline phosphatase	52
3- Determination of aspartate transaminase (AST)	53
4- Determination of alanine transminase (ALT)	54
5- Determination of albumin	54
6- Determination of serum total proteins	55
 Serum proteins electrophoresis using cellulose 	56
acetate membrane	
Results	60
Discussion	108
Summary	122
References	124
Arabic summary	

LIST OF TABLES

		Page
1:	Conditions in which CEA may be abnormal	2 7
2:	Serum biological markers in the control group	60
3:	Serum biological markers in patients with bilbara	zial
	hepatosplenomegaly	61
4:	Serum biological markers in the viral	62
	hepatitis B group	
5:	Serum biological markers in liver cirrhosis group	63
6:	Serum biological markers in the patients with	64
	hepatocellular carcinoma.	
7:	Serum AFP levels in the sudied goups	65
8:	Serum CEA levels in the sudied goups	68
9:	Serum α -1-AT in the studied groups	71
10:	Liver function tests in the control group	73
11:	Liver function tests in patients with	74
	hepatosplenomegaly	
12:	Liver function tests in patients with viral	75
	hepatitis	

		Page
13:		76
	cirrhosis	
14:	Liver function tests in patients with	77
	hepatocellular carcinoma.	
15:	Serum bilirubin in the studied groups	78
16:	Serum alkaline phosphatase in the studied	80
	groups	
17:	Serum aspartate transaminase level in the	82
	studied groups	
18:	Serum alanine transaminase levels in the	84
	studied groups	
19:	Serum total protein and its fractions	86
	of the control group	
20:	Serum total protein and its fractions	88
	of patients with hepatosplenomegaly	
21:	Serum total protein and its fractions	89
	of patients with viral hepatitis	
22:	Serum total protein and its fractions	90
	of patients with liver cirrhosis	
23:	Serum total protein and its fractions of	91
	patients with hepatocellular carcinoma.	

		Page
24:	Serum total protein levels in the studied groups	92
25:	Serum albumin levels in the studied groups	94
26:	Serum α -1-Globulin levels in the studied groups	96
27:	Serum a2-Globulin levels in the studied groups	98
28:	Serum β-Globulin levels in the studied groups	100
29:	Serum y-Globulin levels in the studied groups	102

LIST OF FIGURES

		Page
1-	Serum AFP levels in the studied groups	67
2-	Serum CEA levels in the studied groups	70
3-	Serum α-1-AT levels in the studied groups	72
4-	Serum bilirubin levels in the studied groups	79
5-	Serum ALP levels in the studied groups	81
6-	Serum AST levels in the studied groups	83
7-	Serum ALT levels in the studied groups	85
8-	Serum total protein levels in the studied	
	groups	93
9-	Serum albumin levels in the studied groups	95
10-	Serum α -1-globulin levels in the studied	
	groups	97
11-	Serum α -2-globulin levels in the studied	
	groups	99
12-	Serum β-globulin levels in the studied groups	101
13-	Serum y-globulin levels in the studied groups	103

		Page
14-	Scatterplot between serum AFP and α -1-AT in	
	pateints with hepatosplenomegaly	104
15-	Scatterplot between serum CEA and α -1-AT in	
	pateints with hepatosplenomegaly	104
16-	Scatterplot between serum AFP and CEA in	
	pateints with hepatosplenomegaly	104
17-	Scatterplot between serum AFP and CEA in	
	pateints with chronic hepatitis	105
18-	Scatterplot between serum CEA and α -1-AT in	
	pateints with chronic hepatitis	105
19-	Scatterplot between serum AFP and α -1-AT in	
	pateints with chronic hepatitis	105
20-	Scatterplot between serum AFP and CEA in	
	pateints with liver cirrhosis	106
21-	Scatterplot between serum AFP and α -1-AT in	
	pateints with liver cirrhosis	106
22-	Scatterplot between serum CEA and α-1-AT in	
	nateints with liver cirrhosis	106

		Page
23-	Scatterplot between serum AFP and CEA in	
	pateints with hepatocellular carcinoma.	107
24-	Scatterplot between serum CEA and α -1-AT in	
	pateints with hepatocellular carcinoma.	107
25-	Scatterplot between serum AFP and α -1-AT in	
	pateints with hepatocellular carcinoma.	107

LIST OF ABBREVIATIONS

 α -1-AT : Alpha-1-antitrypsin

AFP : Alpha fetoprotein

ALP : Alkaline phosphatase

ALT : Alanine transaminase

AST : Aspartate transaminase

CAH : Chronic active hepatitis

CEA : Carcinoembryonic antigen

CPH : Chronic persistent hepatitis

HBsAg : Hepatitis B surface antigen

HBV : Hepatitis B virus

HCC : Hepatocellular carcinoma

PHCC: Primary hepatocellular carcinoma.

-		
ŀ		

		· • - • • • • · · • • • • •

	***	· • • • • • • • • • • • • • • • • • • •

	1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	

		· · • • · · · - • · •
	INTRODUCTIO	
		7.1

		:::::::::::::::::::::::::::::::::::::::

		• • • • • • • • • • • • • • •

