



شبكة المعلومات الجامعية

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



شبكة المعلومات الجامعية
@ ASUNET



شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد أعدت دون أية تغيرات



يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

To be Kept away from Dust in Dry Cool place of
15-25- c and relative humidity 20-40%

بعض الوثائق الأصلية تالفة

بالرسالة صفحات لم ترد بالاصل

FACULTY OF MEDICINE
MENOUIFYA UNIVERSITY

616, 01



**THE RENIN – ANGIOTENSIN – ALDOSTERONE
SYSTEM IN HEPATORENAL SYNDROME.**

THESIS
SUBMITTED FOR PARTIAL FULFILLMENT OF M.D. DEGREE
IN CLINICAL BIOCHEMISTRY

By
Soha Zaky El-Shennawy
M.B., B.Ch. and M.Sc degree in clinical biochemistry

Supervised By

Prof. Dr. Ahmed Abbas Raouf,
Chairman of Biochemistry Department
National Liver Institute – Menoufiya university

Prof. Dr. Imam Abd El-Latif Waked
Professor of Internal Medicine Department
and Vice Dean of Environmental Affairs
National Liver Institute – Menoufiya University.

Prof. Dr. Naglaa Mohamed Ghanayem
Assistant Professor and acting chairman
of Biochemistry Department
Faculty of Medicine – Menoufiya University.

Dr. Hala Hany Mohamed El-Said
Assistant Professor of Biochemistry
National Liver Institute - Menoufiya University.

2004

ACKNOWLEDGEMENT

Before all, I should express my deep thanks to GOD, without HIS great blessing, I would never accomplish my work

*I also feel deeply thankful to **Prof. Dr. Ahmed Abbas Raouf**, Professor and chairman of Biochemistry Department, National Liver Institute, Menoufiya University, with his critical mind brought out the final points of my research and opened new paths of thoughts which were formerly closed. His contribution is without doubt, great.*

*I am also grateful to **Prof. Dr. Imam Abd El-Latif Waked**, Professor of Internal Medicine Department and Vice Dean of Enviromental Affairs , National Liver Institute, Menoufiya University, for his expert guidance, illuminating remarks and for his sympathetic attitude.*

*I am deeply grateful to **Prof. Dr. Naglaa Mohamed Ghanayem**, Assistant Professor and acting chairman of Medical Biochemistry Department, Faculty of Medicine, Menoufiya University for her continuous encouragement, endless support and precious advice.*

*Deep gratitude to **Dr. Hala Hany Mohamed El-Said**, Assistant Professor of Biochemistry, National Liver Institute, Menoufiya University, for her great support and tremendous effort she has done in the meticulous revision of the whole work.*

List of Figures

<i>Fig. (1):</i> Components of nephron	7
<i>Fig. (2):</i> The renin-angiotensin-aldosterone system	9
<i>Fig. (3):</i> Microscopic liver architecture	20
<i>Fig. (4):</i> The forward theory of ascites formation	42
<i>Fig. (5):</i> Proposed mechanism of increased water retention in cirrhosis	51
<i>Fig. (6):</i> The neurohumoral effects of RAAS and AVP on systemic circulation and renal function in cirrhosis with ascites	54
<i>Fig. (7):</i> Altered renal autoregulation in HRS	58
<i>Fig. (8):</i> Pathogenesis of HRS as proposed by the arterial vasodilation hypothesis	60
<i>Fig. (9):</i> Probability of survival of patients with type-1HRS	74
<i>Fig. (10):</i> Proposed pathogenesis of change of type-2 HRS to type-1 HRS	77
<i>Fig. (11):</i> Different therapeutic approaches used in the management of HRS	85
<i>Fig. (12):</i> Generated angiotensin-1 standard curve	96
<i>Fig. (13):</i> Angiotensin II standard curve	98
<i>Fig. (14):</i> Aldosterone standard curve	102
<i>Fig. (15):</i> Distribution of studied groups according to age	106
<i>Fig. (16):</i> Distribution of studied groups according to gender	107
<i>Fig. (17):</i> Comparison of liver enzymes profile among the studied groups	110
<i>Fig. (18):</i> Comparison of liver function profile among the studied groups	111
<i>Fig. (19):</i> Comparison of kidney function profile among the studied groups	114
<i>Fig. (20):</i> Comparison of urine analysis data among the studied groups	115
<i>Fig. (21):</i> Comparison of renin, angiotensin II and aldosterone among the studied groups	118

List of Abbreviations

ACE	Angiotensin converting enzyme
ADH	Antidiuretic hormone
AI	Angiotensin I
AII	Angiotensin II
AIII	Angiotensin III
Alb	Albumin
ALP	Alkaline phosphatase
ALT	Alanine aminotransferase
AST	Aspartate aminotransferase
ATN	Acute tubular necrosis
AVP	Arginine vasopressin
BUN	Blood urea nitrogen
D. Bil.	Direct bilirubin
ET-1	Endothelin-1
FHF	Fulminant hepatic failure
GFR	Glomerular filtration rate
GGT	Gamma glutamyl transferase
LFTs	Liver function tests
HRS	Hepatorenal syndrome
NO	Nitric oxide
PGE	Prostaglandin E
PGs	Prostaglandins
PRA	Plasma renin activity
PSE	Portosystemic encephalopathy
RAAS	Renin-angiotensin aldosterone system
SBP	Spontaneous bacterial peritonitis
SNS	Sympathetic nervous system
T. Bil.	Total bilirubin
TIPS	Transjugular intrahepatic portosystemic shunt.
TP	Total protein

TABLE OF CONTENTS

<i>Topic</i>	<i>Page</i>
Introduction	1
Aim of the work	4
Review of Literature	5
• <i>The renin-angiotensin-aldosterone system</i>	5
• <i>Advanced liver disease</i>	18
• <i>Ascites</i>	39
• <i>Hepatorenal syndrome</i>	55
Subjects and Methods	87
Results	105
Discussion	126
Conclusion	143
Recommendations	144
Summary	145
References	148
Appendix	181
Arabic Summary	

List of Tables

<i>Table</i>	<i>Page</i>
<i>Table (1):</i> The most common causes of cirrhosis	24
<i>Table (2):</i> Child Pugh classification	25
<i>Table (3):</i> Grades of portosystemic encephalopathy	35
<i>Table (4):</i> Vasoactive factors involved in HRS	62
<i>Table (5):</i> International Ascites Club's diagnostic criteria of HRS	79
<i>Table (6):</i> Differential diagnosis of renal failure in cirrhosis	82
<i>Table (7):</i> The age of studied groups	106
<i>Table (8):</i> The gender of studied groups	107
<i>Table (9):</i> Statistical comparison of liver function profile among the studied groups	108
<i>Table (10):</i> Statistical comparison of liver function profile among the patients groups	109
<i>Table (11):</i> Statistical comparison of kidney function profile and urine analysis data among the studied groups	112
<i>Table (12):</i> Statistical comparison of kidney function profile and urine analysis data among the patients groups	113
<i>Table (13):</i> Statistical comparison of renin, angiotensin II and aldosterone among the studied groups	116
<i>Table (14):</i> Statistical comparison of renin, angiotensin II and aldosterone among the patients groups	
<i>Table (15):</i> Correlation coefficient (r) between urea and each of serum renin, angiotensin II and aldosterone in each group	119
<i>Table (16):</i> Correlation coefficient (r) between creatinine and each of serum renin, angiotensin II and aldosterone in each group	120
<i>Table (17):</i> Correlation coefficient (r) between serum Na and each of serum renin, angiotensin II and aldosterone in each group	121
<i>Table (18):</i> Correlation coefficient (r) between serum K and each of serum renin, angiotensin II and aldosterone in each group	122
<i>Table (19):</i> Correlation coefficient (r) between urine Na and each of serum renin, angiotensin II and aldosterone in each group	123
<i>Table (20):</i> Correlation coefficient (r) between urine TP and each of serum renin, angiotensin II and aldosterone in each group	124
<i>Table (21):</i> Correlation coefficient (r) between urine volume and each of serum renin, angiotensin II and aldosterone in each group	125

INTRODUCTION

1. The first part of the document discusses the importance of maintaining accurate records of all transactions and activities. It emphasizes that proper record-keeping is essential for transparency and accountability, particularly in financial matters. The text outlines various methods for organizing and storing data, including digital databases and physical filing systems. It also mentions the need for regular audits and reviews to ensure the integrity of the information.

2. The second section focuses on the role of communication in achieving organizational goals. It highlights the importance of clear and concise communication, both internally and externally. The text provides examples of effective communication strategies, such as regular team meetings, open-door policies, and the use of various communication channels like email, phone, and face-to-face interactions. It also discusses the importance of listening and understanding the needs and concerns of all stakeholders.

3. The third part of the document addresses the challenges of managing a large and diverse workforce. It discusses the importance of providing ongoing training and development opportunities to ensure that employees have the skills and knowledge needed to perform their jobs effectively. The text also touches on the importance of fostering a positive work environment and promoting diversity and inclusion. It mentions the need for strong leadership and the ability to motivate and inspire employees.

4. The final section discusses the importance of innovation and creativity in driving organizational success. It encourages employees to think outside the box and come up with new ideas and solutions. The text mentions the importance of providing a supportive environment for innovation, including access to resources and the freedom to experiment. It also discusses the importance of recognizing and rewarding innovative ideas and efforts.