



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم



MONA MAGHRABY



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم



شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



MONA MAGHRABY



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغييرات



يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار



MONA MAGHRABY



HANDGRIP STRENGTH IN PREDICTION OF SARCOPENIA IN CHRONIC HCV PATIENT

Thesis

Submitted for partial fulfillment of MD degree in internal medicine

Presented by

Ayman Samwel Zaky

(M.B., B.Ch) M.Sc, (Internal Medicine)

Supervised by

Prof. Dr. Essam Mohammed Bayoumi

Professor of Internal Medicine

Faculty of Medicine, Ain Shams University

Dr. Moataz Mohammed Sayed

Assistant Professor of Internal Medicine

Faculty of Medicine, Ain Shams University

Dr. Samia Ahmed Abdul-Rahman

Assistant Professor of Geriatrics and Gerontology

Faculty of Medicine, Ain Shams University

Dr. Shereen Abo Baker Saleh

Assistant Professor of Internal Medicine

Faculty of Medicine, Ain Shams University

Dr. Mohammed Magdy Mohammed

Lecturer of Internal Medicine

Faculty of Medicine – Ain Shams University

Faculty of Medicine

Ain Shams University

2020



دراسة شاملة عن قوة قبضة اليد في توقع الوهن العضلي لمرضى الالتهاب الفيروسي المزمن سى

رسالة

توطئة للحصول علي درجة الدكتوراة في أمراض الباطنة العامة
مقدمة من

الطبيب / أيمن صموئيل زكى

بكالوريوس الطب و الجراحة- ماجستير أمراض الباطنة العامة

تحت إشراف

أ.د/ عصام محمد بيومي

أستاذ أمراض الباطنة العامة

كلية الطب- جامعة عين شمس

د/ معتز محمد سيد

أستاذ مساعد أمراض الباطنة العامة

كلية الطب- جامعة عين شمس

د/ سامية احمد عبد الرحمن

أستاذ مساعد طب المسنين

كلية الطب- جامعة عين شمس

د/ شيرين ابو بكر صالح

أستاذ مساعد أمراض الباطنة العامة

كلية الطب- جامعة عين شمس

د/ محمد مجدى محمد

مدرس أمراض الباطنة العامة

كلية الطب- جامعة عين شمس

كلية الطب

جامعة عين شمس

٢٠٢٠

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

لسببنا انك لا تعلم لنا
إلا ما علمتنا إنك أنت
العليم العظيم

صدق الله العظيم

سورة البقرة الآية: ٣٢



Acknowledgement

*First and foremost thanks to **ALLAH**, the Most Merciful.*

*I wish to express my deep appreciation and sincere gratitude to **Prof. Dr. Essam Mohammed Bayoumi**, Professor of Internal Medicine, Ain Shams University, for his close supervision, valuable instructions, continuous help, patience, advices and guidance. He has generously devoted much of his time and effort for planning and supervision of this study. It was a great honor to me to work under his direct supervision.*

*I wish to express my great thanks and gratitude **Dr. Moataz Mohammed Sayed**, Assisstant Professor of Internal Medicine, Ain Shams University, for his kind supervision, indispensable advice and great help in this work.*

*I wish to express my great thanks and gratitude to **Dr. Samia Ahmed Abdul-Rahman**, Assisstant Professor of Geriatrics and Gerontology, Ain Shams University, for her kind supervision, indispensable advice and great help in this work.*

*I wish to express my great thanks and gratitude to **Dr. Shereen Abo Baker Saleh**, Assisstant Professor of Internal Medicine, Ain Shams University, for her kind supervision, indispensable advice and great help in this work.*

*I wish to express my great thanks and gratitude to **Dr. Mohammed Magdy Mohammed**, Lecturer of Internal Medicine, Ain Shams University, for his kind supervision, indispensable advice and great help in this work.*

Last and not least, I want to thank all my family, my colleagues,, for their valuable help and support.

Finally I would present all my appreciations to my patients without them, this work could not have been completed.

CONTENTS

Title	Page
• List of Abbreviations	I
• List of Table	III
• List of Figures.....	V
• Introduction	1
• Aim of the work.....	4
• Review of literature.....	
Chapter (1): Liver Cirrhosis.....	5
Chapter (2): Nutritional problems in Chronic HCV patients	31
Chapter (3): Sarcopenia in Chronic HCV patients	43
Chapter (4): Mangement of nutritional problem.....	66
• Patients and methods	76
• Results	89
• Discussion.....	120
• Summary.....	127
• Conclusions	130
• Recommendations	131
• References	132
• الملخص العربي	-

LIST OF ABBREVIATIONS

AA	Amino Acid
ACLF	Acute on top of chronic liver failure
ALT	Alanine aminotransferase
AST	Aspartate aminotransferase
AVP	Arginine vasopressin
BIA	Bioimpedance Analysis
BMD	Bone and Muscle Disease
BMI	Body mass index
BW	Body weight
CBC	Complete blood picture
CEA	Carcinoembryonic antigen
CLD	liver diseases
CRP	C- reactive protein
CSPH	Clinically significant portal hypertension
CT	Computed tomography
DAA	Directly acting anti-viral
DEXA	Dual-Energy X-Ray Absorptiometry
ECM	Extracellular matrix
ESLD	End stage liver disease
ESPEN	European Society for Clinical Nutrition and Metabolism
GI	Gastrointestinal
HBE	Harris Benedict equation
HGB	Hemoglobin
HBV	Hepatitis B virus
HCC	Hepatocellular carcinoma
HCV	Hepatitis C virus
HE	Hepatic encephalopathy
HGS	Hand grip strength
HSCs	Hepatic stellate cells
HVPG	Hepatic vein pressure gradient
HWR	Hip- waist ratio
INR	International normalized ratio

List of Abbreviations

LC	Liver cirrhosis
MAC	Mid arm circumference
MELD	Model of end stage liver disease
MUAMC	Mid upper arm muscle circumference
NASH	Nonalcoholic steatohepatitis
NE	Norepinephrine
NICE	National Institute for Health and linical Excellence
PLT	Platelet
PRA	plasma renin activity
PT	Prothrombin time
REE	Resting energy expenditure
SAAG	Serum-ascites albumin gradient
SBP	Spontaneous bacterial perotinitis
SGA	Subjective Global Assessment
SMI	Skeletal muscle index
SVR	Systemic vascular resistance
TGF	Tissue growth factor
TIPS	Transjugular intrahepatic portosystemic shunt
TLC	Total leucocytes count
TNF	Tumor necrosis factor
TSF	Triceps skin fold
US	Ultrasound
WC	waist circumference

LIST OF TABLE

Table No	Subjects	Page
Table (1):	Precipitating factors for overt HE by decrease in frequency of episodic recurrent	27
Table (2):	Recommendations for HCC surveillance: Categories of adult.....	30
Table (3):	Causes of malnutrition in chronic liver disease.....	34
Table (4):	Features of subjective global assessment (SGA).....	49
Table (5):	Nutritional assessment techniques in patients with liver cirrhosis	52
Table (6):	Anthropometric techniques: Benefits and limitations	56
Table (7):	Demographic characteristics of patients of HCV related cirrhosis and controls.....	90
Table (8):	Comparison of demographic characteristics of the three subgroups.....	90
Table (9):	Multivariable binary logistic regression analysis for prediction of sarcopenia in patients of HCV related cirrhosis.	91
Table (10):	Prevalence of sarcopenia in Patients of HCV related cirrhosis and controls	92
Table (11):	Comparison of Chronic HCV related cirrhosis with or without sarcopenia: Categorical variables	93
Table (12):	Prevalence of sarcopenia in the three subgroups.....	94
Table (13):	Comparison of HCV cirrhotic patients with or without sarcopenia: Numerical variables	96
Table (14):	Result of DEXA scan in the three subgroups	98
Table (15):	Comparison of DEXA scan in Patients of HCV related cirrhosis and controls.....	100
Table (16):	Relation between hand grip strength and other variables.....	102

List of Table

Table No	Subjects	Page
Table (17):	Comparison of hand grip strength in the three subgroups	117
Table (18):	Receiver-operating characteristic (ROC) curve analysis for discrimination between HCV related cirrhosis patients with or without sarcopenia using hand grip strength	118

LIST OF FIGURES

Figure No	Subjects	Page
Figure (1):	Causes of liver cirrhosis.....	7
Figure (2):	Extracellular matrix accumulation in subendothelial space	10
Figure (3):	Pathophysiology of portal hypertension in cirrhosis.....	16
Figure (4):	Contributing factors toward pathophysiology of HE.....	24
Figure (5):	Mechanisms specific to sarcopenia in liver cirrhosis (key mechanisms contributing to sarcopenia in liver cirrhosis are highlighted in red).....	45
Figure (6):	(A) Handgrip dynamometer; (B) Reference values for handgrip strength.....	58
Figure (7):	Dual energy X ray absorptiometry (GE Part number:.....	84
Figure (8):	CAMRY Digital Hand Dynamometer. Model : EH101.....	85
Figure (9):	Prevalence of sarcopenia in Patients of HCV related cirrhosis and controls.....	92
Figure (10):	Child class in patients of HCV related cirrhosis with or without sarcopenia.....	93
Figure (11):	Prevalence of sarcopenia in the three study groups.....	94
Figure (12):	Liver function in patients of HCV related cirrhosis with or without sarcopenia.....	95
Figure (13):	Result of DEXA scan in cases of HCV related cirrhosis with or without sarcopenia.....	97
Figure (14):	Result of DEXA scan in the three study subgroups.....	98
Figure (15):	Mean age in patients of HCV related cirrhosis.....	99

Figure No	Subjects	Page
Figure (16):	Result of DEXA scan in Patients of HCV related cirrhosis group and control group.....	100
Figure (17):	Mean hand grip strength in patients of HCV related cirrhosis group and control group. Error bars represent the standard error (SE). Dots represent individual observation.	101
Figure (18):	Mean hand grip strength inpatients of HCV related cirrhosis with or without sarcopenia. Error bars represent the standard error (SE). Dots represent individual observation.	101
Figure (19):	Box plot illustrating hand grip strength in male or female patients of HCV related cirrhosis.....	103
Figure (20):	Box plot illustrating hand grip strength in patients of HCV related cirrhosis with or without sarcopenia.....	104
Figure (21):	Box plot illustrating hand grip strength in patients of HCV related cirrhosis classified as Child A or Child C. Box represents the interquartile range.....	105
Figure (22):	Box plot illustrating hand grip strength in patients of HCVrelated cirrhosis with compensated or decompensated liver function.....	106
Figure (23):	Box plot illustrating hand grip strength in patients of HCV related cirrhosis with normal DEXA scan, osteopenia or osteoporosis.....	107
Figure (24):	Scatter plot illustrating the correlation between MUAC and hand grip strength of HCV related cirrhotics. Dots represent individual observations.....	108
Figure (25):	Scatter plot illustrating the correlation between MAC and hand grip strength of HCV related cirrhotics.....	109

Figure No	Subjects	Page
Figure (26):	Scatter plot illustrating the correlation between hemoglobin level and hand grip strength of HCV related cirrhotics.....	110
Figure (27):	Scatter plot illustrating the correlation between serum albumin and hand grip strength of HCV related cirrhotics. Dots represent individual observations..	111
Figure (28):	Scatter plot illustrating the correlation between total bilirubin and hand grip strength of HCV related cirrhotics. Dots represent individual observations.....	112
Figure (29):	Scatter plot illustrating the correlation between conjugated bilirubin and hand grip strength of HCV related cirrhotics. Dots represent individual observations. Fitted line represents the correlation line.....	113
Figure (30):	Scatter plot illustrating the correlation between PT and hand grip strength of HCV related cirrhotics. Dots represent individual observations.....	114
Figure (31):	Scatter plot illustrating the correlation between PC and hand grip strength of HCV related cirrhotics. Dots represent individual observations.	115
Figure (32):	Scatter plot illustrating the correlation between INR and hand grip strength of HCV related cirrhotics.	116
Figure (33):	Mean hand grip strength in the three study subgroups. Error bars represent the standard error (SE). Dots represent individual observation.....	117
Figure (34):	Receiver-operating characteristic (ROC) curve for discrimination between HCV related cirrhosis patients with or without sarcopenia using hand grip strength.	119
