ASSESSING CURRENT NUTRITIONAL STATUS OF PATIENTS WITH HCV RELATED CIRRHOSIS IN THE COMPENSATED STAGE

Thesis

Submitted for partial fulfillment of Master Degree In Internal Medicine

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2016

بسم الله الرحمن الرحيم

"يُؤْتِي الْحِكْمَةَ مَنْ يَشَاءُ وَمَنْ يُؤْتَ الْحِكْمَةَ فَقَدْ أُوتِيَ خَيْراً كَثِيراً وَمَا يَذَّكَّرُ إِلاَّ أُولُو الْأَلْبَابِ"

صدق الله العظيم

Acknowledgement

Before all and above all, thanks to **God** *for every thing*

Iam greatly honored to express my sincere gratitude, deepest appreciation to Dr. **Hoda Mahmoud Amin,** *for her outstanding guidance and kind support throughout the work.*

I would like to express my deepest gratitude and appreciation to Dr. **Fardous Hamed Soliman,** *for her generous help, guidance and faithful support.*

I would like to express my deepest gratitude and appreciation to Dr. **Rasha Mohamed Abdel Samie,** *for her generous help, guidance and faithful support*

I would like to express my deepest gratitude and appreciation to Dr, **Sayed Hammad,** *aspecialized dietitian in National Nutrition Institute for his help and guidance*

I would like to thank all patients who participated in this study and wish them a soon recovery.

I dedicate this work to my family who supported me all through this work.

May **Allah** *accept the work of all those and reward them for it.*

Abstract

Background Nutritional status of patients with liver cirrhosis have recently shown great diversity, some show protein energy malnutrition and others excessive nutrition and obesity. Many studies have investigated energy and protein metabolism in cirrhotic patients; however there are few studies regarding nutritional intake in patients with hepatitis C virus (HCV) - related liver cirrhosis (LC-C)**.**

Objective: The aim of our study is to assess the nutritional status among a group of Egyptian patients with Child's A liver cirrhosis and chronic hepatitis C patients without cirrhosis and comparing them with age- and sex- matched healthy volunteers.

Methods: A total of 120 subjects were recruited in the present study and included 40 patients with hepatitis C- related liver cirrhosis (Group I), 40 patients with chronic hepatitis C (Group II), and 40 age- and sex-matched healthy Egyptian volunteers (Group III).. Liver cirrhosis was diagnosed on the basis of clinical features, documented laboratory tests and/or abdominal ultrasound. Child-Turcotte Pugh (CTP) score was used to establish the severity of liver cirrhosis. All hepatitis C- related liver cirrhosis patients enrolled were in the compensated stage.

Different anthropometric methods were used for nutritional assessment as subjective global assessment(SGA),Body Mass Index(BMI), triceps skin fold thickness (TST),Mid Arm Cirrcumference(MAC),Mid Arm Muscle Circumference(MAMC), subscapular skin fold thickness) beside 24 – hour dietary recall.

Results: By SGA method , that there were highly significant statistical differences between the different studied groups as regard the different components of SGA including weight loss (p=0.008), dietary intake (p=0.013), functional capacity (p=0.008) and GIT symptoms (p=0.008).

The majority of the liver cirrhosis (25/40), chronic HCV(29/40) and healthy control groups (37/40) were well- nourished (Graded an 'A') on SGA rating and the rest of the subjects were mild to moderately malnourished (Graded a 'B') on SGA rating , although this did not reach statistical significance (p=0.958).

Regarding the dietary intake, the majority of the patients in the liver cirrhosis group had an average caloric intake while most of patients with chronic HCV and the healthy controls had an insufficient caloric intake.

Regarding the daily protein intake, most of the patients with chronic HCV had an average or an excessive protein intake. Most of the liver cirrhosis patients and the healthy controls showed an excessive protein intake. However, all these differences did not reach statistical significance.

In HCV-related cirrhosis group: There is a highly significant positive correlation of BMI with TST, MAC, MAMC and subscapular skin fold thickness with p values =0.000. BMI showed a non significant inverse correlation with the SGA.

In chronic hepatitis C patients group: There is a highly significant positive correlation of BMI with TST, sub-scapular skin fold thickness, MAMC and MAC parameters with p values =0.000, 0.000, 0.0351, 0.04 respectively. BMI showed a non significant inverse correlation with the SGA .

Conclusion: The SGA underestimated the diagnosis of malnutrition among the different studied groups, also it did not detect the severe degree of malnutrition among the different studied groups. % TST was a better measure diagnosis of malnutrition and the degree of severity of malnutrition. BMI correlates with different methods of nutritional assessment except SGA.

Keywords: Liver cirrhosis- Malnutrition- Compensated Stage - HCV.

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List of Abbreviations

Akt	**Activated serinethreonine-kinase**
2-AG	**2- arachidonoyl glycerol**
ALS	**Acid-labile subunit**
ALT	**Alanine transaminase**
AST	**Aspartate Transaminase**
BCAA	**Branched chain amino acids**
BCM	**Body cell mass**
BIA	**Bioelectrical impedance analysis**
BMI	**Body mass index**
(CB)1	**Cannabinoid Receptor 1**
CEE	**Contrast echocardiography**
CLD	**Chronic liver disease**
CT	**Computed tomography**
CTP	**Child –Turcotte-Pugh classification**
DEXA	**Dual energy X-ray absorptiometry**
DIC	**Disseminated intravascular coagulation**
ER	**Endoplasmic reticulum**
ESPEN	**European Society for Clinical Nutrition and Metabolism**
EVS	**Endoscopic vaso ligation**
FAS	**Fatty acid synthase**
FDA	**Food and Drug Administration**
FFA	**Free fatty acid**
FHF	**Fulminant hepatic failure**
GABA	**Gamma amino butyric acid**
GGT	**Gamma glutamyl transferase**
GH	**Growth hormone**
GHIGF-1	**Growth hormone/insulin-like growth factor-1**
GOV	**Gastro esophageal varices**
HBE	**Harris Benedict equation**

HBV	**Hepatitis B Virus**
HCC	**Hepatocellular Carcinoma**
HCV	**Hepatitis C Virus**
HE	**Hepatic encephalopathy**
HGO	**Human glucose output**
HIV	**Human Immune Deficiency Virus**
HNE	**Hydroxynonenal**
HOMA	**Homeostatic Model Assessment**
HPS	**Hepato pulmonary syndrome**
HRCT	**High resolution computed tomography**
HRS	**Hepatorenal syndrome**
IGF-1	**Insulin-like growth factor-1**
IGFBP-3	**IGF-binding protein-3**
INF	**Interferon**
IPVD	**Intra pulmonary vascular vasodilatation**
IR	**Insulin Resistance**
IRS-1	**Insulin Receptor Substrate 1**
IVNAA	**Deuterium oxide dilution in vivo neutron activation analysis**
LXRα	**Liver x receptor α**
MAC	**Mid arm circumference**
MAMC	**Mid-arm muscle circumference**
MDA	**Malondialdehyde**
MELD	**Model of end stage liver disease**
MI	**Myo inositol**
MRI	**Magnetic resonance imaging**
MRS	**Magnetic resonance spectroscopy**
mTOR	**mammalian target of rapamycin**
mTORC1	**mammalian target of rapamycin complex one**
MTP	**Microsomal triglyceride transfer protein**
NAA	**N –acetyl aspartate**
NAFLD	**Non Alcholic Fatty Liver disease**

NASH	**Non Alcholic Steato Hepatitis**
NGO	**Nongoverenmental Organization**
NHANES	**National Health and Nutrition Examination Survey**
NS5A	**Nonstructural protein 5 A**
OLT	**Orthotropic liver transplantation**
PCM	**Protein calorie malnutrition**
PDK1/2	**Phosphoinositide-dependant kinase**
PEG	**Per cutaneous endoscopic gastrostomy**
PELD	**Pediatric end stage liver disease**
PEM	**Protein energy malnutrition**
PH	**Pulmonary hypertension**
PHES	**Psychometric hepatic encephalopathy scor**
PI3K	**Phosphatidyl insositol-3-kinase**
PN	**Parenteral nutrition**
PoH	**Portal hypertension**
PPAR	**Peroxisome Proliferator-Activated Receptor**
PPH	**Porto pulmonary hypertension**
PSHE	**Porto systemic hepatic encephalopathy**
PST	**Performance status test**
RDA	**Recommended dietary allowance**
REE	**Resting Energy Expenditure**
RFA	**Radio Frequency Ablation**
RHC	**Right sided heart catheterization**
SAAG	**Serum to ascites albumin gradient.**
SBP	**Spontaneous bacterial peritonitis**
SCE	**Subclinical encephalopathy**
SGA	**Subjective global assessment**
SREBP1c	**Sterol regulatory element binding protein Ic**
T2DM	**Type 2 Diabetes Mellitus**
TBP	**Total body potassium counting**
Tc99-MMA	**Technetium macro aggregated albumin**

TGF-β	**Transforming growth factor β**
TIPSS	**Trans internal jugular portosystemic shunting**
TST	**Triceps skinfold thickness**
V/Q	**Ventilation perfusion**
VLDL	**Very-low-density lipoproteins**
WHO	**World Health Organization**

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INTRODUCTION

Nutritional status of patients with liver cirrhosis have recently shown great diversity, some show protein energy malnutrition and others excessive nutrition and obesity. Many studies have investigated energy and protein metabolism in cirrhotic patients; however there are few studies regarding nutritional intake in patients with hepatitis C virus (HCV)-related liver cirrhosis (LC-C) **(Yasutake et al., 2012).**

Nutritional status is considered a predictor of morbidity and mortality in patients with advanced hepatic disease. PEM in cirrhotic patients also has important implications in liver transplantation and it has been demonstrated that patients with a worse nutritional status before the transplant have increased postoperative complications and higher mortality rates **(Cheung et al., 2012 and Vanessa and Orlando, 2012)**

It has been reported that protein energy malnutrition (PEM) is a frequent finding in patients with liver cirrhosis (LC), and its onset and/or severity increases with the progression of liver dysfunction mainly in situations of metabolic stress associated with the presence of infection and/or hospitalization. Malnutrition has been found to be as common as 80% among cirrhotic patients **(Kalaitzakis et al.,2006)** even in patients classified as Child- Pugh class A, the prevalence of malnutrition was as high as 25 % **(Guglielmi et al.,2005).**