

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

Thesis

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Medicine*

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بسم الله الرحمن الرحيم

"يُؤْتِي الْحِكْمَةَ مَنْ يَشَاءُ وَمَنْ يُؤْتَ الْحِكْمَةَ فَقَدْ

أُوتِيَ خَيْرًا كَثِيرًا وَمَا يَذَّكَّرُ إِلَّا أُولُو الْأَلْبَابِ"

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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 Alcoholic Fatty Liver disease

NASH	Non Alcoholic 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 1c
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).**