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Ischemia Modified Albumin in Ascitic Cirrhotic Patients With and Without Spontaneous Bacterial Peritonitis

Study submitted for partial fulfillment of Master Degree in internal medicine

by

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

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LIST OF ABBREVIATIONS

AASLD	American Association for the Study of Liver Diseases
Ab	Anti-Body
ACBT	Albumin Cobalt Binding Test
ACLF	Acute-on-Chronic Liver Failure
AFIMA	Ascitic Fluid Ischemia Modified Albumin
AFP	Alpha Feto-Protein
AKI	Acute Kidney Injury
AKIN	Acute Kidney Injury Network
ALD	Alcoholic Liver Disease
ALK-P	Alkaline Phosphatase
ALT	Alanine Transaminase
APRI	AST Platelet Ration Index
AST	Aspartate Transaminase
ATN	Acute Tubular Necrosis
ATB	Antibiotic
AUC	Area Under the Curve
BactDNA	Bacterial Deoxyribonucleic Acid
BCLC	Barcelona Clinic Liver Cancer
BP	Blood Pressure
bpm	Beats per Minute
BT	Bacterial Translocation
BUN	Blood Urea Nitrogen
CA	Community acquired
CAID	Cirrhosis Associated Immune Dysfunction
CANONIC	CLIF Acute-on-Chronic Liver Failure in Cirrhosis
CART	Classification And Regression Tree
CBC	Complete Blood Count
CLD	Chronic Liver Disease
CLIF	Chronic Liver Failure
CLT	Cadaveric Liver Transplantation
CNNA	Culture Negative-Neutrocytic Ascites
CRF	Chronic Renal Failure
CRP	C-Reactive Protein
CSPH	Clinically Significant Portal Hypertension
CT	Computed Tomography
CTP	Child-Tarcotte-Pugh
Cu	Copper
CVS	Cardiovascular System
DAA	Direct Acting Antiviral
DALYs	Disability Adjusted Life Years
DAMP	Damage-Associated Molecular Pattern
DIC	Disseminated Intravascular Coagulation
DILI	Drug Induced Liver Injury

DM	Diabetes Mellitus
DST	Direct Susceptibility Testing
EASL	European Association for the Study of the Liver
ECOG	Eastern Cooperative Oncology Group
EDTA	Ethylenediaminetetracetic Acid
ELISA	Enzyme-Linked Immunosorbent Assay
EP.	Eppendorf
ESBL	Extended-Spectrum β -Lactamase
FiO₂	Fractional Inspired Oxygen
fl	Femtoliter
GCS	Glasgow Coma Scale
GFR	Glomerular Filtration Rate
GGT	Gamma-Glutamyl Transferase
GIT	Gastro-Intestinal Tract
GNB	Gram-Negative Bacteria
GPC	Gram Positive Cocci
H₂O₂	Hydrogen Peroxide
HbA1c	Glycated Hemoglobin
HBV	Hepatitis B Virus
HCA	Health Care Associated
HCC	Hepatocellular Carcinoma
HCS	Hyperdynamic Circulatory State
HCV	Hepatitis C Virus
HE	Hepatic Encephalopathy
HEV	Hepatitis E Virus
HLA-DR	Human Leukocyte Antigen- antigen D Related
HMA	Human Mercaptalbumin
HNA	Human Nonmercaptalbumin
HPS	Hepatopulmonary Syndrome
HR	Heart Rate
HRP	Horseradish Peroxidase
HRS	Hepato-Renal Syndrome
HSA	Human Serum Albumin
HVPG	Hepatic Venous Pressure Gradient
IBD	Inflammatory Bowel Disease
ICAM-1	Intercellular Adhesion Molecule 1
ICU	Intensive Care Unit
IFN	Interferon
IL	Interleukin
IMA	Ischemia Modified Albumin
IMAr	Ischemia Modified Albumin ratio
INR	International Normalized Ratio
IP-10	Induced Protein-10
IVDU	Intra-Venous Drug Users
K	Potassium
kDa	Kilo Dalton
LDH	Lactic Dehydrogenase

LDLT	Living Donor Liver Transplantation
LPS	Lipopolysaccharide
LT	Liver transplantation
MALDI-TOF	Matrix Assisted Laser Desorption Ionization-Time of Light
MAMP	Microbial-Associated Molecular Pattern
MAP	Mean Arterial Pressure
MCP-1	Monocyte Chemotactic Protein-1
MELD	Model for End Stage Liver Disease
MHE	Minimal Hepatic Encephalopathy
MIP-1β	Macrophage Inflammatory Protein-1 Beta
MLN	Mesenteric Lymph Nodes
MPV	Mean Platelet Volume
MR	Multiple Resistant
MRSA	methicillin-resistant Staphylococcus aureus
MRI	Magnetic Resonance Imaging
Na	Sodium
NADPH	Nicotinamide Adenine Dinucleotide Phosphate reduced with Hydrogen ion
NAFLD	Nonalcoholic Fatty Liver Disease
NASH	Non-alcoholic steatohepatitis
NF-κB	Nuclear Factor kappa-light-chain-enhancer of activated B cells
NK	Natural Killer
NLR	NOD-Like Receptor
NOD	Nucleotide-binding Oligomerization Domain
NPV	Negative Predictive Value
NSAID	Non-Steroidal Anti-Inflammatory Drug
NSBB	Non-Selective Beta Blocker
OD	Optical Density
OPTN	Organ Procurement and Transplantation Network
OS	Overall Survival time
PaO₂	Arterial Oxygen Partial Pressure
PaCO₂	Arterial carbon dioxide partial pressure
PCR	Polymerase Chain Reaction
PCT	Procalcitonin
PDW	Platelet Distribution Width
PEI	Percutaneous Ethanol Injection
PELD	Pediatric end-stage liver disease
PH	Portal Hypertension
PIMA	Plasma Ischemia Modified Albumin
PMNs	Polymorphonuclear Leukocytes
POCT	Point-Of-Care Test
PPI	Proton Pump Inhibitor
PPV	Positive Predictive Value
PRR	Pattern Recognition Receptor
PS	Performance Status
PSS	Porto-Systemic Shunts
PT	Prothrombin Time

RAI	Relative Adrenal Insufficiency
RBS	Random Blood Sugar
RFA	Radio-frequency Ablation
RNA	Ribonucleic acid
ROC	Receiver Operating Characteristic
ROS	Reactive Oxygen Species
RNS	Reactive Nitrogenous Species
RR	Respiratory Rate
SAAG	Serum- Ascites Albumin Gradient
SBP	Spontaneous Bacterial Peritonitis
SIBO	Small-Intestinal Bacterial Overgrowth
SIRS	Systemic Inflammatory Response Syndrome
SOFA	Sequential Organ Failure Assessment
spO₂	Peripheral Capillary Oxygen Saturation
TACE	Trans-arterial chemo-embolization
Tc-cell	Cytotoxic T cell
TGC	Third Generation Cephalosporins
Th-cell	T Helper cell
TIPS	Transjugular Intrahepatic Portosystemic Shunt
TLR	Toll-Like Receptor
TLC	Total Leukocytic Count
TNF	Tumor Necrosis Factor
TREM-1	Triggering Receptors Expressed on Myeloid cells-1
US	Ultra-Sound
UTI	Urinary Tract Infection
VRE	vancomycin-resistant enterococci
VSE	vancomycin-susceptible enterococci
WBCs	White Blood Cells
WHO	World Health Organization

INTRODUCTION

The word cirrhosis derived from the Greek word 'scirrhus', which means orange yellow or tawny surface of the liver seen at autopsy (Arey et al., 1962). Laennec gave cirrhosis its name in 1819 in a brief annotation to his treatise De l'auscultation mediate (Duffin, 1987).

The definition of cirrhosis remains morphological, described by a working party for the World Health Organization (WHO) in 1978 as: "a diffuse process characterized by fibrosis and the conversion of normal liver architecture into structurally abnormal nodules" (Anthony et al., 1978).

Cirrhosis stands as an end process of various chronic liver diseases and its complications represent considerable reasons of death worldwide. Cirrhotic liver diseases are extremely costly in the term of human suffering, providing health services, and premature loss of productivity (EASL, the international liver congress; Amsterdam, 2017).

Work Objectives

The aim of the present study is to measure ischemia modified albumin in plasma and ascitic fluid in decompensated cirrhotic patients with and without spontaneous bacterial peritonitis in order to:

- * Calculate its validity in establishing diagnosis of spontaneous bacterial peritonitis in compared to gold standard method of diagnosis among this population.
- * Measure correlation between ischemia modified albumin levels and different prognostic indices (Child-Pugh, MELD, and CLIF-SOFA) in patients with decompensated liver cirrhosis.