

The Role of Serum Ornithine Carbamoyl-transferase And Ammonia in Both Cirrhotic Patients with And without Hepatic Encephalopathy

Thesis

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رَفَعُ وِرْجَاتِ مَنْ نَشَأُ
وَفَوْقَ كُلِّ ذِي عِلْمٍ عَلِيمٌ

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LIST OF ABBREVIATIONS

<u>AAT</u>	Alanine Aminotransferase
<u>ACGH</u>	Array Comparative Genomic Hybridization
<u>ADHD</u>	Attention Deficit Hyperactivity Disorder
<u>ALC</u>	Acetyl-L-Carnitine
<u>ALD</u>	Argininosuccinate Lyase Deficiency
<u>ALF</u>	Acute Liver Failure
<u>ALP</u>	Alkaline Phosphatase
<u>ALT</u>	Alanine Aminotranseferase
<u>AN</u>	Autonomic Neuropathy
<u>ASD</u>	Argininosuccinate Synthetase Deficiency
<u>AST</u>	Aspartate Aminotranseferase
<u>BBB</u>	Blood Brain Barrier
<u>BCAA</u>	Branched Chain Amino Acids
<u>BUN</u>	Blood Urea Nitrogen
<u>CBC</u>	Complete Blood Count
<u>CH</u>	Chronic Hepatitis
<u>CHF</u>	Congestive Heart Failure
<u>CIT</u>	Citrulline
<u>CP</u>	Carbamoyl Phosphate
<u>CSF</u>	Cerebrospinal Fluid
<u>CT</u>	Compeuterized Tomography
<u>CTP</u>	Child-Turcotte-Pugh
<u>D.BIL.</u>	Direct Bilirubin
<u>EEG</u>	Electroencephalography
<u>GABA</u>	Gamma Amino Buteric Acid
<u>GDH</u>	Glutamate Dehydrogenase
<u>GGT</u>	Gamma Glutamyl Transferase.
<u>GIT</u>	Gastrointestinal Tract
<u>GLN</u>	Glutamine
<u>GRC</u>	Gaba Receptor Complex
<u>GRC</u>	Gaba Receptor Complex
<u>GS</u>	Glutamine Synthase
<u>H.PYLORI</u>	Helicobacter Pylori
<u>HB</u>	Hemoglobin
<u>HCC</u>	Hepatocellular Carcinoma
<u>HCT</u>	Hematocrit

List of Abbreviations

<u>HE</u>	Hepatic Encephalopathy
<u>HRQOL</u>	Health-Related Quality Of Life
<u>ICP</u>	Intra Cranial Pressure
<u>IEM</u>	Inborn Errors Of Metabolism.
<u>IHA</u>	Idiopathic Hyperammonemia
<u>INR</u>	International Normalized Ratio
<u>IV</u>	Intravenous
<u>L.L</u>	Lower Limb
<u>M</u>	Mean
<u>MARS</u>	Molecular Adsorbents Recirculating System
<u>MHE</u>	Minimal Hepatic Encephalopathy
<u>MRI</u>	Magnetic Resonance Imaging
<u>MRS</u>	Magnetic Resonance Spectroscopy
<u>N</u>	Number
<u>NADS</u>	Non-Absorbable Disaccharides
<u>NH₃</u>	Ammonia
<u>NH₄[±]</u>	Ammonium
<u>NS</u>	Non Significant
<u>NSAID</u>	Non-Steroidal Anti-Inflammatory Drugs
<u>ORN</u>	Ornithine
<u>OTC</u>	Ornithine Carbamoyl Transferase = Ornithine Transcarbamoylase
<u>OTCD</u>	Ornithine Carbamoyl Transferase Deficiency
<u>PBC</u>	Primary Biliary Cirrhosis
<u>PCS</u>	Porto-Caval Shunts
<u>PCS</u>	Portacaval Shunt
<u>PET</u>	Positron Emission Tomography
<u>PHES</u>	Psychometric Hepatic Encephalopathy Score
<u>P.HTN</u>	Portal hypertension
<u>P_I</u>	Phosphate
<u>PLT</u>	Platelets
<u>PNH₃</u>	Partial Pressure Of Ammonia
<u>PSE</u>	Portal-Systemic Encephalopathy
<u>PT</u>	Prothrombine Time
<u>PTT</u>	Partial Thromboplastin Time
<u>PVT</u>	Portal Vein Thrombosis
<u>RAAS</u>	Renin-Angiotensin-Aldosterone-System
<u>RDCRN</u>	Rare Disease Clinical Research Network

List of Abbreviations

<u>SBP</u>	Spontaneous Bacterial Peritonitis
<u>SD</u>	Standard Deviation
<u>SIRS</u>	Systemic Inflammatory Response Syndrome
<u>SPECT</u>	Single Photon Emission Computed Tomography
<u>TAA</u>	Thioacetamide
<u>TH</u>	Therapeutic Hypothermia
<u>TIPSS</u>	Trans-Jugular Intrahepatic Porto-Systemic Shunt
<u>TPN</u>	Total Parenteral Nutrition
<u>U/S</u>	Ultrasound
<u>UCDC</u>	Urea Cycle Disorders Consortium
<u>UCDS</u>	Urea Cycle Disorders
<u>US</u>	United States

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INTRODUCTION

Hepatic encephalopathy (HE) may be defined as a disturbance of the central nervous system (CNS) function secondary to porto –systemic shunting . It represents a wide spectrum of neuropsychiatric abnormalities seen in patients with liver dysfunction after exclusion of other known neurological diseases. (*Ayman , 2010*).

The main consequence of decreased liver function is failure of ammonia detoxification. Hyperammonemia seems to be the chief culprit in patients with HE. Ammonia can affect central nervous system function directly as neurotoxic agent and indirectly due to several mechanisms . (*Nikolaos ,et al.,2010*).

Astrocytes are the only cells in the brain that can metabolize ammonia. The enzyme glutamine synthetase (present in the endoplasmic reticulum of astrocytes) is responsible for the conversion of equimolar concentrations of glutamate and ammonia to glutamine. (*Olde ,et al.,2009*).

Intracellular levels of glutamine, therefore, increase enormously as the ambient ammonia concentrations rise owing to liver failure, as glutamine is an osmolyte, water moves inside the astrocyte causing it to swell. This swelling leads to cerebral edema and intracranial hypertension. (*Haussinger ,et al.,2000*)

Ornithine carbamoyltransferase is expressed almost exclusively in hepatocellular mitochondria and regarded as a liver-specific marker. The serum level of this enzyme was shown to be increased in patients with hepatic disorders including hepatitis, cirrhosis and cancer. (*Hiroshi ,et al.,2006*).