Relation between Serum Zinc Level and Spontaneous Bacterial Peritonitis in Patients with Liver Cirrhosis and Ascites

Thesis

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By

Michel Aziz Zaki Hanna
(High Degree Diploma, in Internal Medicine)
Faculty of Medicine, Ain Shams University 2013

Under Supervision of

Prof.Dr. Mahmoud Abdel Meguid Osman
Professor of Internal Medicine and Gastroenterology
Faculty of Medicine, Ain Shams University

Dr. Ahmed Mohamed El Ghandour
Lecturer of Internal Medicine and Gastroenterology
Faculty of Medicine, Ain Shams University

Dr. Heba Hasan Ali
Lecturer of Clinical Pathology
Faculty of Medicine, Ain Shams University

Faculty of Medicine
Ain Shams University
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✍ **Michel Aziz Zaki Hanna**

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List of Abbreviations

Abbr.	Full-term
AASLD	: American Association for the Study of Liver Diseases
ACLF	: Acute-on-chronic liver failure
AFI	: Ascitic fluid infection
AKI	: Acute kidney injury
ALD	: Alcoholic Liver Disease
AMA	: Anti mitochondrial abs
ANA	: Anti nuclear abs
BMD	: bone mineral density
BSI	: Bloodstream infections
BT	: Bacterial Translocation
CAD	: Coronary Artery Diseases
CAID	: Cirrhosis associated immune dysfunction
CHB	: Chronic hepatitis B
CHC	: Chronic hepatitis C
CLD	: Chronic liver disease
CNNA	: Culture-negative neutrocytic ascites
CO	: Cardiac output
Cu	: Cupper
DAMP	: Damage associated molecular pattern
DCPs	: Decompensated cirrhotic patients
EASL	: European Association for the Study of the Liver
ECHOABNs	: Echocardiographic abnormalities
EH	: Emotional health
ESLD	: End-stage liver disease
FN	: Femur neck
FQ	: Fluoroquinolone
GAS	: Group A -hemolytic Streptococci
GI	: Gastrointestinal
H2RAs	: H2-receptor antagonists

HBsAg : Hepatitis B surface antigen
HBV : Hepatitis B virus
HCC : Hepatocellular carcinoma
HCV : Hepatitis C virus
HE : Hepatic encephalopathy
HPS : Hepatopulmonary syndrome
HRQoL : Health-related quality of life
HRS : Hepatorenal syndrome
hs-CRP : High Sensitive C-Reactive Protein
IBD : Inflammatory bowel disease
ICH : Intracranial hemorrhage
IFN-gamma : Interferone gamma
IL : Interleukine
ILD : Inflammatory lung disease
LC : Liver cirrhosis
LPS : Lipopolysaccharide
LS : Lumber spine
LT : Liver transplantation
MCP-1 : Monocyte chemotactic protein-1
MDR : Multi drug resistant
MELD : Model For End-Stage Liver Disease
Mg : Magnesium
MNB : Monomicrobial non-neutrocytic bacterascites
MRSA : Methicillin-resistant Staphylococcus aureus
NAFLD : Non alcoholic fatty liver disease
NASH : Non alcoholic steatohepatitis
NK : Natural killer
NO : Nitric oxide
NOS : NO synthase
PAMP : Pathogen associated molecular pattern
PBC : Primary biliary cirrhosis
PBCSS : Primary biliary cirrhosis- Sjogren syndrome
PHG : Portal hypertensive gastropathy
PHT : Portal hypertension

PI : Pulsatility index
PMNC : Polymorphonuclear cell
PPHTN : Portopulmonary hypertension
PPIs : Proton pump inhibitors
PROs : Patient-reported outcomes
PVT : Portal vein thrombosis
RF : Renal failure
RI : Resistive index
SBP : Spontaneous bacterial peritonitis
Se : Selenium
SIBO : Small intestinal bacterial overgrowth
SIRS : Systemic inflammatory response syndrome
SOFA : Scores Sepsis-related organ failure assessment score
SS : Sjogren syndrome
SVR : Systemic vascular resistance
Th1 : T helper 1
TNF-α : Tumour necrotic factor α
UGI : Upper gastro intestinal
UTI : Urinary tract infection
VRE : Vancomycin resistant enterococci
VSE : Vancomycin susceptible enterococci
WBC : White blood count
WP : Work productivity
Zn D : Zn deficiency
Zn : Zinc

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Abstract

Background: Among members of patients suffering from liver cirrhosis and ascites with spontaneous bacterial peritonitis, serum zinc level have attracted much attention as being markedly decreased in such patients. **Results:** The present study revealed that 95% of patients including both groups are suffering Hepatitis C infection. The study also showed that there is marked decrease in serum zinc level in group 2 suffering liver cirrhosis and ascites with spontaneous bacterial peritonitis. **Aim of the Work:** To study association between serum zinc level and spontaneous bacterial peritonitis in patients with liver cirrhosis and ascites. **Patients and Methods:** This descriptive analytic study will include all available data about patients selected from gastroenterology department – El Demerdash hospital. The study was conducted on 50 patients; all have liver cirrhosis and ascites and were divided as follows: **Group 1:** 25 patients without spontaneous bacterial peritonitis and **Group 2:** 25 patients diagnosed with spontaneous bacterial peritonitis. **Conclusion:** Zn deficiency was noticed in many studies to be decreased in subjects with many liver diseases specially those with hepatitis C-related liver disease when compared with other etiologies of cirrhosis. **Recommendations:** Future studies have to be concerned for the role of zinc in patients with cirrhosis and ascites for being an important factor modulating immune system and preventing occurance of spontaneous bacterial peritonitis.

Key words: serum zinc, spontaneous bacterial peritonitis, liver cirrhosis, ascites

Introduction

Cirrhosis results from different mechanisms of liver injury that lead to necroinflammation and fibrogenesis; histologically it is characterised by diffuse nodular regeneration surrounded by dens fibrotic septa with subsequent parenchymal extinction and collapse of liver structures ***(Tsochatzis et al., 2014).***

Regardless of aetiology, most of the morbidity and mortality from CLD (chronic liver diseases) occurs among individuals with cirrhosis, who are at risk of developing complications including ascites, hepatic encephalopathy, variceal haemorrhage and liver cancer ***(Valery et al., 2014).***

The most common complication to chronic liver failure is ascites. The formation of ascites in the cirrhotic patient is caused by a complex chain of pathophysiological events involving portal hypertension and progressive vascular dysfunction. Since ascites formation represents a hallmark in the natural history of chronic liver failure it predicts a poor outcome with a 50% mortality rate within 3 years. Patients with ascites are at high risk of developing complications such as spontaneous bacterial peritonitis, hyponatremia and progressive renal impairment ***(Pedersen et al., 2015).***

Spontaneous bacterial peritonitis (SBP) is defined as an infection of initially sterile ascitic fluid (AF) without a detectable, surgically treatable source of infection. It is a frequent and severe complication of cirrhotic ascites ***(Lata et al., 2009).***

Spontaneous bacterial peritonitis (SBP) is a very common bacterial infection in patients with cirrhosis and ascites requiring prompt recognition and treatment. All patients with cirrhosis and ascites are at risk of SBP and the prevalence of SBP in outpatients is 1.5-3.5% and about 10%-30% in hospitalized patients. Half of the episodes of SBP are present at the time of hospital admission while the rest are acquired during hospitalization ***(Oladimeji et al., 2013).***

Spontaneous bacterial peritonitis (SBP) in patients with cirrhosis is typically caused by gram-negative bacteria. However, the number of SBP cases due to gram-positive bacteria is steadily increasing. To date, little is known about the predictive factors involved in SBP infections ***(Kim et al., 2016).***

Zinc affects the monocytes/macrophages in several ways. Zinc is required for the development of monocytes/ macrophages and regulates their functions such as phagocytosis and proinflammatory cytokine production. Zinc deficiency has been reported in patients with liver disease; chronic alcoholism, malabsorption syndrome, chronic renal