ASSESSESSMENT OF THE SERUM ALBUMIN LEVEL IN PATIENTS WITH DECOMPENSATED LIVER DISEASE

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ABSTRACT

Objective: Decompensated cirrhosis is a frequent reason for emergency admittance, and such patients are more likely of in-hospital mortality. It is characterized by ascites, jaundice, hepatic encephalopathy, hepato-renal disorder or hemorrhage from varices. Albumin has a significant value in the treatment of cirrhotic patients. Therefore, this study was intended to assess the serum albumin level as predictive marker in patients with decompensated liver disease.

Methodology: This cross sectional study was performed in medicine unit at Khyber Teaching Hospital Peshawar, using non-probability convenient sampling technique. The duration of the study was about 6 months from September 2020 to February 2021. The ethical approval was obtained from "Hospital Ethical Committee". A total of 100 patients diagnosed with DCLD having age between 20-80 years of both genders were included in the study. Laboratory parameters such as hepatitis type and PT/aPTT, LFTs, serum albumin and CRP were assessed. Variable such as age was documented as Mean±SD. Frequencies and percentages were reported for gender, age and sreum albumin level.

Results: The study findings revealed that out of 100patients, 54(54.0%) patients were males and 46(46.0%) were females with their observed mean age was 54.38 ±10.60 years. Most of the patients 50(50.0%) had hypoalbuminemia were in the age between 40-59 years. Additionally, hypoalbuminemia in the range of 2.1-2.5 gm/dl was observed in 42(42.0%) cases. It was also revealed that maximum frequency of male patients 27(64.2%) and female patients 15(64.2%) had hypoalbuminemia in the range of 2.1-2.5 gm/dl.Additionally, only 5(5.0%) male patients and 8(8.0%) female patients revealed normal albumin level 3.1-3.5 gm/dl.

Conclusion: This study concluded that serum albumin level is a prognostic indicator of decompensated liver disease. Most of the patients had hypoalbuminemia with male preponderance reflecting poor prognosis. Furthermore, middle and older aged individuals were more affected by decompensated liver disease.

Keywords: Decompensated Cirrhosis, Serum albumin level, prognostic indicator, age, gender

INTRODUCTION

Globally, approximately 2 million deaths annually occur due to the Cirrhosis that is the 11th leading cause of death all over the world [1]. Demographic factors and geographical location have an influence on disease encumbrance and underlying causes of disease [2]. Approximately, above half of the deaths occur per year due to Cirrhosis in Asia Pacific region [3]. In Pakistan, disease burden is greatly high and viral hepatitis such as B & C is the commoncausative underlying factor that is accounted for above 70% of Cirrhosis related expiries[3].Presently, it is the 4th primary cause of death in the US amongst adults 45 to 64 years old. National Vital Statistics Report published in 2017 from the Center for Disease Control and Prevention in the US stated,about 4.5 million adults were affected from cirrhosis and chronic liver disease; which reflects 1.8% of the adult people [4]. It has been predicted that mortality rate due to chronic liver disease and cirrhosis was 12.8 expiriesfor every 100,000 population [5].Decompensated cirrhosis is described as an acute decline in liver function and is characteristically recognized by ascites, jaundice, hepatic encephalopathy, hepatorenal syndrome or haemorrhage from varices. [6]

Typically, hepatic decompensation is caused by infections, gastrointestinal (GI) hemorrhage, high alcoholism / hepatitis related to alcohol or liver injury due to drug whileapproximately 50% of cases revealed no definite cause [6].Furthermore, additional causative factors are constipation, dryness, ischemia, portal vein thrombosis and hepatocellular carcinoma [7]. Other risk factors for chronic liver disease are extreme alcoholism, hepatitis B and C, fatness, diabetes mellitus, and other metabolic disorders [8].

In chronic liver disease, inflammation and devastation of hepatocytes stimulate the discharge of aspartate aminotransferase (AST) and alanine aminotransferase (ALT), consequently elevate the level of these indicators in blood. Additionally, further parameters such as alkalinephosphatase (ALP) and gamma-glutamyl transferase (GGT) also increases in cholestatic

conditions like Primary biliary cirrhosis (PBC). Liver enzymes such as AST and ALT are generallytwo to three folds increased from normal limit, however normal levels of these indicators do not exclude cirrhosis.[9]

The identification of chronic liver disease relies on the etiological factor and its associated complications. As in cirrhosis, hepatocellular insufficiency leads to decline in albumin level, and elevates ammonia level, initiating ascites and hepatic encephalopathy. Hepatic encephalopathy develops due to elevated ammonia level, tryptophan metabolites, short-chain fatty acids, mercaptans, octopamine, augmented oxidative stress, and raised intracellular osmolality[10].Decompensated cirrhosis is a multifariousdisease that affects many systems and consequently needs to manage with systematic approach. Therefore, British Society of Gastroenterology recommended a 'care bundle', that proposed guidelines to manage the patients with decompensated cirrhosis for the initial 24 hours [11,12].

Decompensated chronic liver disease is treated by implementing particular supportive and etiological interventions. It has been evidently supported by few researches that appropriate nutritionalong with exercise interventions can enhance the quality of life by improving the physical weakness in patients with chronic liver disease[13, 14]. Additionally, alcohol abstaining is also beneficial in order to recompensation of liver disease in numerous cases and has been reported positive results to halt further clinical deterioration of liver.[15,16] The most operationaltreatment approach is psychosocial interventions in combination with pharmacological remedy, however the existing drug choices are significantlyinadequate in decompensated cirrhosis due to altered liver metabolism is main concern and possibility of hepatic encephalopathy [17].

A pharmacologicalapproachcan modify the disease by inhibiting the development of complications, consequentlyenhancing existence, quality of life and healthcare expenseswhich is still essential requirement in the treatment of decompensated cirrhotic patients[18]. In this perception, few researches revealed a positive impact on ascites associated with decompensated cirrhotic patients following prolonged use of albumin[19]. Besides, two randomized clinical trials and one observational analysis currently assessed the effects of continual albumin administration in their settings[20-22]. In Pakistan, there is a little data available regarding knowledge about albumin management in cirrhotic patients. Therefore, this study was intended

to assess the albumin level in blood as prognostic indicator in patients with decompensated liver disease.

METHODOLOGY

This cross-sectional study was conducted in medicine unit at Khyber Teaching Hospital Peshawar, using non-probability convenient sampling technique. The duration of the study was about 6 months from September 2020 to February 2021. The ethical approval was obtained from "Hospital Ethical Committee". A total of 100 patients diagnosed with DCLD having age between 20-80 years of both genders were included in the study whereas patients having less than 20 years of age, acute hepatitis, sprue, weight loss and kidney disease were excluded from the study.

History was recorded from every patient on designed Performa. Clinically, patients were inspected for signs of decompensated chronic liver disease. Essential investigations such as abdominal ultrasound and liver function test were done for confirmation of chronic liver disease. Significant investigation coherent to objective was completed for its laboratory findings such as hepatitis type and PT/aPTT, LFTs, serum albumin and CRP. Co-morbidities were documented by patient history and their previous records. Age and gender were established by Computerized National Identity Card and their physical appearances. All findings were documented on a structured performa comprising demographics of the patients.

Collected data was analyzed using statistical package for social sciences (SPSS) Version 20.0. Variable such as age was documented as Mean±SD. Frequencies and percentages were reported for gender, age and sreum albumin level.

RESULT

A total of 100 patients diagnosed with decompensated chronic liver disease wherein 54(54.0%) patients were males and 46(46.0%) were females with their observed mean age was 54.38 ±10.60 years. Age distribution revealed that 10(10.0%) patients had hypoalbuminemia were in the age between 20-39 years, 50(50.0%) patients had hypoalbuminemia were in the age between 40-59 years and 40(40.0%) patients were in the age between 60-80 years. Normalserum albumin level in the range of 3.1-3.5 gm/dl was observed in 13(13.0%) cases, albumin level in the range of 2.6-3.0 gm/dl was observed in 17(17.0%) cases, hypoalbuminemia in the range of 2.1-2.5 gm/dl was observed in 42(42.0%) cases, hypoalbuminemia in the range of 1.6-2.0 gm/dl was

observed in 23(23.0%) cases and 1.0-1.5 gm/dl was found in 5(5.0%) cases, as depicted in Table I.

Frequency of hypoalbuminemia with respect to gender revealed that 3(3.0%) males showed hypoalbuminemia in the range of 1.0-1.5 gm/dl, 10(10.0%) males reported 1.6-2.0 gm/dl, it was also revealed that maximum frequency of male patients 27(64.2%) had hypoalbuminemia in the range of 2.1-2.5 gm/dl. Furthermore, 9(9.0%) male patients reported 2.6-3.0 gm/dl range of albumin. Additionally, only 5(5.0%) male patients revealed normal albumin level 3.1-3.5 gm/dl. On the other hand, 2(3.0%) females showed hypoalbuminemia in the range of 1-1.5 gm/dl, 13(13.0%) females reported 1.6-2.0 gm/dl, it was also revealed that female patients 15(64.2%) had hypoalbuminemia in the range of 2.1-2.5 gm/dl. Furthermore, 8(8.0%) female patients reported 2.6-3.0 gm/dl range of albumin. Additionally, only8(8.0%) female patients reported normal albumin level 3.1-3.5 gm/dl, as depicted in Table II.

Table I: Demographic details of patients with decompensated chronic liver disease (n=100).

Variable		**n (%)**
Gender	**Male**	54(54.0%)
	Female	46(46.0%)
Age (Years)	**20-39**	10(10.0%)
	40-59	50(50.0%)
	60-80	40(40.0%)
Serum Albumin level (gm/dl)	**1-1.5 gm/dl**	5(5.0%)
	1.6-2 gm/dl	23(23.0%)
	2.1-2.5 gm/dl	42(42.0%)
	2.6-3 gm/dl	17(17.0%)
	3.1-3.5 gm/dl	13(13.0%)

Tab II: Frequency of hypoalbuminemia with respect to gender of the patients.

		Serum Albumin level					Total
		1-1.5 gm/dl	1.6-2 gm/dl	2.1-2.5 gm/dl	2.6-3 gm/dl	3.1-3.5 gm/dl	
Gender	Male	3(3.0%)	10(10.0%)	27(27.0%)	9(9.0%)	5(5.0%)	**54(54.0%)**
	Female	2(2.0%)	13(13.0%)	15(15.0%)	8(8.0%)	8(8.0%)	**46(46.0%)**
Total		5(5.0%)	23(23.0%)	42(42.0%)	17(17.0%)	13(13.0%)	**100(100.0%)**

DISCUSSION

DCLD is a late stage liver disease with permanentdestruction and poor prospects[5]. The present study demonstrated the low albumin level as the prognostic indicator in patients with decompensated liver disease.

Interestingly, it has been reported by one research conducted in US, incirrhotic liver hospitalized patients, females had lowerincidence of hepatic decompensating episodes and greaterfrequency of non-hepatic comorbidities and infections, causinglesser in-hospital mortality [23]. The present study corroborated with above mentioned research and showed males 54(54.0%) were more suffered from decompensated liver disease.

Cirrhotic liver patients show absolute hypoalbuminemia that has been basically attributed to areduced synthetic ability,[24]however it is thought to be involvement of multiple factors.[25] In liver dysfunction, albumin production is reducedcause by liver dysfunction and abnormal portal blood circulation.[26,27] The reduction in effective intravascular blood volume normally observed in cirrhosis develops compensatory stimulation of the renin-angiotensin system and sympathetic nervous system, andraises discharge of antidiuretic hormone resulting sodium and water retention along with decreases renal perfusion and glomerular filtration rate.[28] The present study revealed the hypoalbuminemia in most of the patients with DCLD indicating the poor prognosis.

Similarly, one meta-analysis by Vincent et al.,[29] assessed acutely ill patients of cirrhosis and revealed low serum albumin level was an autonomous, dose-dependent prognosticator of poor outcome. Standard level of serum albumin is 3.5–5 g/dl. It was also observed that each 1 g/dl reduction in serum albumin raised the mortality rate by 137% and increased morbidity rate by 89%. However, patient's nutritional and systemic inflammatory status does not affect albumin level and mortality association [29]. These finding were consistent with the present research and showed that most of patients reported albumin level below normal range resulting a poor outcome.

Likewise, another research assessed albumin level in DCLD patients wherein hypoalbuminemia was observed to be related with nocturia and urinary incontinence. They reported average serum albumin level was 3.85 ± 0.63 g/dL that was lesser as compared to general populace.[30] Unfortunately, another current research reported impaired functional capability of albumin in cirrhotic patients [31]. As albumin is produced entirely in the liver consequently liver cirrhosis may cause hypoalbuminemia. Hence, serum albumin levels droppedowing to impaired functional activity of the liver reduced with deteriorating cirrhosis. Therefore, levels of serum albumin can be considered to assess the severity of cirrhosis. In medically fit people, human serum albumin comprises of 50% of the plasma proteins. The operational features of albumin are plasma oncotic pressure, solubility, transport and involves in metabolic reaction, act as an antioxidants, immunomodulation, involves in capillary permeability, maintains hemostatic effects and endothelial balance [27,32].The present study supported the above mentioned researches and revealed that most of the patients were had low albumin level in blood indicating severe condition of patients with DCLD. Furthermore, the present study did not discussed the causative factor of DCLD.

This study had few limitations that the etiological and risk factors of decompensated liver disease were not observed and therefore, its association to severity and consequences cannot be evaluated. Moreover, complications and mortality rate associated with DCLD were also not assessed. Regardless of these limitations, the present study magnifies upon the contemporaryawareness of gender differences in DCLD patients.

CONCLUSION

This study concluded that serum albumin level is a prognostic indicator of decompensated liver disease. Most of the patients had hypoalbuminemiawith male preponderance and reflecting poor prognosis. Furthermore, middle and older aged individuals were more affected by decompensated liver disease. Therefore, it is recommended to deliver appropriate management of decompensated liver disease by correcting albumin level to prevent further complications with progression of age.

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