



ESOPHAGEAL VARICES; CORRELATION OF SERUM ALBUMIN LEVEL WITH THE DEGREE OF ESOPHAGEAL VARICES IN PATIENTS OF LIVER CIRRHOSIS DUE TO HEPATITIS B AND C.

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ABSTRACT... Objectives: To determine the correlation between serum albumin levels and the grades of esophageal varices in patients of liver cirrhosis due to hepatitis B and C. **Study Design:** Cross-sectional descriptive study. **Place and Duration of Study:** Unit I, Department of Medicine, Allied Hospital, Faisalabad from 29th June, 2014 to 28th December, 2014. **Methodology:** 95 patients of either sex between 20-70 years of age, with the diagnosis of liver cirrhosis due to hepatitis B and C were selected using non - probability consecutive sampling. The presence of esophageal varices was confirmed by endoscopy. **Results:** Out of a total of 95 patients, 59 (62.11%) were between the age group of 20-50 years while 36 (37.89%) were between 51-70 years of age. Mean + SD was calculated as 48.37 + 11.75 years. Gender distribution showed that 51 (53.68%) patients were males and 44 (46.32%) were females. Correlation between serum albumin level and the grade of esophageal varices in patients of liver cirrhosis due to hepatitis B & C showed that out of 26 cases with serum albumin level <2.8, 10 had Grade I and 16 had Grade II while out of 69 cases with ≥2.8 serum albumin level, 40 had grade I and 29 had grade II EV. r value was recorded to be -0.697 whereas p-value was calculated as 0.000. **Conclusion:** There is a significant negative correlation between serum albumin level and grade of esophageal varices in patients of liver cirrhosis due to hepatitis B and C.

Key words: Serum Albumin Level, Correlation, Liver Cirrhosis, Hepatitis B and C, Grade of Esophageal Varices.

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INTRODUCTION

Cirrhosis, which is a late stage of hepatic fibrosis and is generally irreversible in its advanced stages, is characterized by distortion of the liver parenchyma and regenerative nodules formation. The commonest cause of cirrhosis in the developing countries is HCV infection. According to WHO, HCV prevalence is estimated to be 2 - 3% globally, accounting to about 130 - 170 million people.¹ HCV is one of the major causes of liver transplantation in the industrialized countries and of hospital admissions in the developing countries. In many developed countries like Australia and many Western European countries, the burden of HCV is <2% that equals the estimated prevalence in the United States.² In Latin America, Eastern Europe, some African, South Asian and Middle Eastern countries, the infection rates with HCV are higher(≥3%).^{3,4}

The prevalence rate of Chronic HBV infection is reported to be as high as 16%⁵ in the Asian countries. HBV remains the major cause of morbidity and mortality owing to its complications like cirrhosis and development of hepatocellular carcinoma.

HCV is the second most common infection in Pakistan with a prevalence rate of 4.5% - 8%. The prevalence approaches 40% in studies carried out on small groups of chronic liver disease patients, blood donors, intravenous drug abusers and also healthcare professionals. According to a survey undertaken by the Pakistan Medical Research Council in 2007-2008, the combined prevalence of HBV and HCV in the Pakistani population was 7.3%, i.e., 2.5% and 4.8% of HBV and HCV respectively. This amounts to about 13 million chronic carriers of HBV and HCV.⁶ The major risk factors that account for the transmission of HCV

infection globally are intravenous drug abuse, unscreened blood transfusions from unhealthy donors, harmful therapeutic injections and certain other healthcare related procedures carried out by the hospitals.

The major complications of cirrhosis include the development of hepatic encephalopathy, hepatorenal and hepatopulmonary syndromes, spontaneous bacterial peritonitis, variceal hemorrhage and hepatocellular carcinoma. In the era prior to the use of current treatment options for bleeding varices, there was a 15- 20 % mortality associated with a single episode of bleeding varices.⁷ Bleeding from esophageal varices is a dramatic and common complication associated with liver cirrhosis⁸, and is lethal in patients with signs of clinical decompensation (i.e., upper gastrointestinal bleeding, ascites, encephalopathy or jaundice). The prevalence of esophageal varices in patients who have developed cirrhosis is between 60 to 80%, and a mortality rate of 17% to 57% with variceal bleeding. Bleeding recurrence may reach 60% of patients in two years.⁹ Mortality still remains high despite the use of modern therapeutic techniques for controlling variceal bleeding. If an early diagnosis of variceal bleed is made before the first bleeding episode, then there is an obvious reduction in the risk of variceal hemorrhage, from 50% to 15% for large esophageal varices, as reported by Gludd LL et al.¹⁰

Endoscopy is considered to be the most simple and effective investigation in patients who have had upper gastrointestinal bleeding secondary to esophageal varices. It aids diagnosis, yields information that helps in predicting outcome and most importantly allows treatment options that can stop bleeding and minimize the risk of re-bleeding.¹¹

With advancement, several non-invasive factors have been studied that have a clinical implication in diagnosing varices in cirrhotic patients. These factors include portal vein diameter, platelet counts, splenic size and aspartate aminotransferase (AST) / alanine aminotransferase (ALT) ratio¹² and another non- invasive technique, transient

elastography, which is effective in diagnosing portal hypertension and esophageal varices.¹³

Noninvasive tests such as serum albumin, prothrombin time and platelet count, and ultrasound findings of gall bladder wall thickness and right liver lobe diameter have also been used as simple tests to identify esophageal varices in various studies.¹⁴⁻¹⁶

Several studies conducted globally have shown serum albumin levels as a non-invasive predictor for the severity of esophageal varices. The standard range of serum albumin is 3.5 - 5.5 g/dl.¹⁷ A study conducted by Khan H et al showed a significant negative correlation between serum albumin levels and the grade of esophageal varices i.e., $r = -0.494$ (p-value < 0.05).¹⁸

Various classification systems have been developed over the years that predict the extent of liver damage and prognosis of patients using certain clinical and laboratory parameters. Child-Pugh-Turcotte (CPT) classification is a simple scoring system that not only determines the prognosis but also aids in deciding the various treatment options as well as the need for liver transplantation. The CPT score uses five clinical parameters of liver disease. Each parameter is scored 1–3, with 1 pointing out to the least and 3 specifying the worst derangement. The parameters used include serum albumin, total bilirubin, Prothrombin time, presence or absence of ascites and the grade of hepatic encephalopathy. One year survival for patients with liver cirrhosis in Class A, B or C is 100%, 81% and 45% respectively.¹⁹

Another scoring system, the Model for End-Stage Liver Disease, or MELD score is a prospectively developed and validated chronic liver disease severity scoring system that uses a patient's laboratory values for serum bilirubin, serum creatinine, and the international normalized ratio (INR) for prothrombin time to predict three-month survival. In patients with cirrhosis, an increasing MELD score is associated with increasing severity of hepatic dysfunction and increased three-month mortality risk.²⁰

MELD-Plus score is a 9 variable scoring system that predicts a 90-days mortality in patients who were admitted to the hospital due to a cirrhosis related complication. In addition to the 3 components of the Model for End-Stage Liver Disease (MELD)'s score, it also measures the levels of serum albumin, sodium, total cholesterol, white blood cell count in addition to patient's age and length of hospital stay.²¹

METHODOLOGY

This cross-sectional descriptive study was conducted in Unit I, Department of Medicine, Allied Hospital, Faisalabad, from 29th June, 2014 to 28th December, 2014. A sample size of 95 patients was taken using WHO sample size calculator for correlation, keeping correlation coefficient r as -0.494^6 and Confidence Level at 95%. Non-probability Consecutive Sampling Technique was applied. 95 patients of either sex between the age group of 20-70 years and a diagnosed case of liver cirrhosis due to HBV or HCV having esophageal varices on upper GI endoscopy were included in the study. Patients having history of sclerotherapy or band ligation for esophageal varices, those with history of receiving prophylactic treatment for portal hypertension and patients with hepatoma or portal vein thrombosis were excluded from the study. Also patients with history of albumin transfusion prior to endoscopy and patients with abnormalities that could directly affect albumin levels like malnutrition, nephrotic syndrome, renal failure, cardiac failure were also excluded from the study.

After getting approval from the Ethical Committee and taking informed consent from the patients, 95 patients with HBV or HCV related liver cirrhosis fulfilling the inclusion criteria were enrolled in the study. Screening upper GI endoscopy was done by a consultant Gastroenterologist. Demographic details like name, age and gender as well as grade of varices were noted. Then 5ml blood sample was obtained from each patient and sent to the main laboratory of the hospital for assessment of serum albumin level. All this information was entered in a predesigned proforma. The recorded data was entered and analyzed using statistical software SPSS version

16.0. Quantitative variables like age and serum albumin levels were presented as Mean \pm SD. Qualitative variables like gender and grade of varices were presented in the form of frequency and percentage. Spearman Rank correlation was used to calculate correlation coefficient between serum albumin level and grade of esophageal varices. Statistical significance was considered at a P-value ≤ 0.05 .

RESULTS

Out of a total of 95 patients enrolled in the study, 52 (53.68%) were males and 44 (46.32%) were females. 59 (62.11%) patients were between the age group of 20-50 years while 36 (37.89%) were between 51-70 years of age. Mean+SD for age was calculated as 48.37 ± 11.75 years. Distribution according to grade of esophageal varices showed that 50 (52.63%) patients had Grade I while 45 (47.37%) patients had Grade II esophageal varices.

Correlation was carried out between the levels of serum albumin and the grade of esophageal varices in patients of liver cirrhosis due to hepatitis B and C and it showed that out of 26 cases with serum albumin level <2.8 , 10 had Grade I and 16 had Grade II esophageal varices while out of 69 cases with serum albumin level ≥ 2.8 , 40 had grade I while 29 had grade II esophageal varices. r value was recorded to be -0.697 and p -value was calculated as 0.000 . The results clearly showed that higher serum albumin levels were associated with lower grade of esophageal varices thereby indicating that there is a significant negative correlation between the serum albumin levels and the grades of esophageal varices in patients of cirrhosis due to hepatitis B and C.

Age Distribution (Years):	
20-50 years	59 (62.11%)
51-70 years	36 (37.89%)
Mean \pm SD	48.37 ± 11.75
Gender Distribution:	
Males	51 (53.68%)
Females	44 (46.32%)
Grades of Varices:	
Grade I	50 (52.63%)
Grade II	45 (47.37%)

Table-I. Demographic characteristics of patients (n=95)

Serum Albumin Level	No. of Patients		Total No. of Patients
	Grade I	Grade II	
<2.8	10	16	26
≥2.8	40	29	69
Total	50	45	95

Table-II. Correlation between serum albumin level and grade of esophageal varices in patients of liver cirrhosis due to hepatitis B and C (n=95)
 $r = -0.697$ P- value= 0.000

DISCUSSION

According to the American Association for the Study of Liver Disease, whenever a diagnosis of cirrhosis is made, screening endoscopy must be carried out to look for the presence and grade of esophageal varices.

Worldwide several studies have been conducted using serum albumin level as a non-invasive predictor for the severity of esophageal varices. Certain studies have used different values of serum albumin as a guide to the severity of esophageal varices. Sarwar et al and Schepis used albumin level <2.95 mg/dl whereas Khan et al kept serum albumin level at <3.5 mg/dl for their studies. Significant correlations were demonstrated in all these studies.^{18,22,23} Keeping albumin level <4 mg/dl, Bressler et al proved low albumin level as an independent risk factor for esophageal varices with Odds Ratio of 6.02.²⁴ A study conducted by Khan et al demonstrated that with advancing age, there was a higher frequency of hypoalbuminemia (27.4%) suggesting that albumin levels worsen with age.¹⁸

Sarwar et al kept albumin at <2.95 mg/dl, platelet count <88 x10³ and portal vein diameter > 11mm and proved that all these parameters were significantly associated with the severity of esophageal varices.²² Without keeping the etiology of liver cirrhosis into consideration, serum albumin levels can still be used as an independent marker for gauging the severity of esophageal varices. Being simple and cost effective, serum albumin levels can be helpful in identifying the patients at high risk for variceal bleeding.

CONCLUSION

It was concluded that higher the serum albumin

levels, lower the grade of esophageal varices as detected on upper GI endoscopy in patients with liver cirrhosis due to hepatitis B and C. The correlation coefficient of $r = -0.697$ and p-value of 0.000 showed a significant negative correlation.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Nadia Ijaz	NI conceived designed the study did data collection.	
2	Tazeen Nazar	TN did statistical analysis and manuscript writing.	
3	Bilal Aziz	BA edited, reviewed and gave final approval of the manuscript.	