

Diagnostic Precision Serum of Albumin Level and its Correlation with the Esophageal Varices Among Patients of Chronic Liver Disease

Diagnostic Precision of Albumin in Chronic Liver Disease

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ABSTRACT

Objective: To determine the diagnostic precision of serum albumin as well as its correlation with the esophageal varices in different grades among patients of chronic liver disease.

Study Design: Cross sectional study

Place and Duration of Study: This study was conducted at the Department of Gastroenterology, Asian Institute of Medical Sciences (AIMS), Hyderabad. The study was carried out from February 2019 to July 2019.

Materials and Methods: Patients of age 25-60 years of either gender presented in outpatient department with history of chronic liver disease were included. Blood samples were collected for the analysis of serum albumin level while Endoscopy was performed for the confirmation and grading of esophageal varices. All information was collected using pre-tested questionnaire.

Results: Mean age of study participants was 49.87±12.58 years while majority 67.56% participants were male. Esophageal varices on serum albumin were found positive in 39 (41.1%) cases and EGD was found positive in 38.95% cases. The sensitivity of esophageal varices on serum albumin was 81.40% with specificity of 88.46%. The PPV value was 85.36%, NPV value was 85.18% and diagnostic accuracy of esophageal varices on serum albumin was 85.26%. A statistically significant correlation (p-value < 0.05) between serum albumin level and esophageal varices in different grades among chronic liver disease patients was determined.

Conclusion: Serum albumin is a useful prognosticator of esophageal varices among patients of chronic hepatic disorder.

Key Words: Esophagogastroduodenoscopy, Esophageal Varices, Serum Albumin, Chronic Liver Disease.

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INTRODUCTION

Esophageal Varices (EV) are abnormally enflamed veins in the distal esophageal end. It occurs when the normal blood circulation towards the liver is obstructed due to a scarred tissue or clot formed within hepatic parenchyma¹

The rupture of gastric varices (GV) causes variceal hemorrhage, a most fatal complication of cirrhosis. It has been demonstrated that >90% of cirrhotic patients develop EV out of which 30% may bleed.² The prevalence of EV among cirrhotic subjects is projected from 60.0% to 80.0% depending on the etiology and severity of hepatic disorders.³ According to the recent gastroenterological guidelines, all patients with liver cirrhosis should undergo endoscopic examination for diagnosis of EVs.⁴ Furthermore, for identifying the high risk patients with possibilities of bleeding can be benefitted from primary prophylaxis. This method put extra burden on the endoscopy units as well as the recurrent testing gradually can possibly have a negative impact on patient's compliance. Noninvasive detection of EVs cases at highest risk might limit exploration to those most likely to benefit. Upper gastrointestinal endoscopy is considered to be the benchmark against which all other assays are evaluated, however it has limitations.² Hypoalbuminemia is a reliable substitute indicator for the existence of EVs in Chronic liver disease (CLD) because of Hepatitis B and C viruses (HBV) and (HCV).⁵ It is reported that sensitivity and

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specificity of serum albumin for detection of EV is 66% and 80% respectively.⁶In agreement; a study reported the specificity and sensitivity of serum albumin level for detection of EV was 56% and 83.8% respectively.⁷ Another study reported that sensitivity and specificity of serum albumin level for detection of EV was 53.2% and 91% respectively.⁸Literature reports that some non-invasive methods are available which can detect presence of EVs. But in routine, these procedures are not adopted and patients have to undergo Esophagogastroduodenoscopy (EGD). EGD is an invasive procedure which also has side effects and repeated EGD is also risk for poor prognosis of patients in such critical condition which may lead to more severe outcome.⁹ Through this study intended to appraise the diagnostic accuracy of serum-albumin level, so that in future we can implement the results of this study as earlier reported accuracy of serum albumin is variable in the different studies. In routine, in tertiary care hospitals, physicians rely on EGD but in sub-urban areas or at peripheries, facility of EGD is not available. So, this study will also help to rule out the problem of EVs just assessment through albumin level in case results show high diagnostic accuracy instead of referring patient to some tertiary care hospital which also have burden. This will also help to reduce burden of hospital by reducing number of referrals from peripheries.

MATERIALS AND METHODS

A cross sectional study was conducted at the department of Gastroenterology, Asian Institute of Medical Sciences (AIMS), Hyderabad. The study was carried out from February 2019 to July 2019. Sample size of 95 was determined with estimated percentage of esophageal varices i.e. 60%⁵and taking sensitivity and specificity of serum albumin level i.e. 53.2% and 91%⁷ with 11% and 8% margin of error respectively in patients of CLD. Patients of age 25-60 years of either gender presented in outpatient department with history of chronic liver disease were included in the study. While those received band ligation for EVs, sclerotherapy and prophylactic therapy for portal hypertension or history of thrombosis of splenic or portal veins as well as those with hypoalbuminemia due to congestive cardiac failure (EF<50% on echo), nephritic syndrome (24-hour urinary protein >3.5gm/dl) or underweight (BMI<19kg/m²) etc. were excluded.

Informed consent was taken from all the study patients. Blood specimens of 5cc were obtained and submitted to the laboratory of AIMS for the analysis of serum albumin level. Based on the albumin levels reports, all patients were categorized as negative or positive for esophageal varices (according to operational definition). Serum albumin level <3.4 g/dl was assessed as positive. EGD of all patients was then performed by

expert and senior gastroenterologist for the confirmation and grading of esophageal varices by deFranchis classification' system for the grading of Esophageal varices. According to the classification, Grade I means small straight varices, Grade 2 means: enlarged and tortuous varices occupying less than 1/3rd of the lumen while grade 3 means the coil-shaped large varices occupying more than 3rd of the lumen.¹⁰All information of patients and findings of EGD was recorded using a pre-tested semi-structured questionnaire while the data analysis was performed using SPSS version 22. For quantitative variables such as age and duration of CLD, mean±SD was calculated. Frequencies & percentages were computed for qualitative variables such as gender and presence of EVs on serum albumin and EGD. Sensitivity, Specificity, negative and positive predictive values (NPV & PPV) and diagnostic accuracy of serum albumin taking EGD as gold standard. Pearson correlation was also calculated for measuring the correlation between the levels of serum albumin with the esophageal varices in different grades. P-value <0.05 was considered as the level of significance.

RESULTS

Total 95 cases were participated and examined in the present study. The mean age of the study participants was 49.87±12.58 years with minimum 32 years and maximum 70 years of age. Majority 64 (67.36%) participants were male and 31(32.64%) patients were females (Table I)

Table No.I: Descriptive statistics of age, duration of CLD and serum albumin level(years)

Variables	Mean±SD
Age (years)	49.87±12.58
Duration of CLD (Months)	2.32±1.06
Serum Albumin level (g/dl)	3.65±0.82
Grades of esophageal varices	
• Absent	52
• Grade I	17
• Grade II	26

Table 2 is demonstrating the frequency and percentage distribution of esophageal varices on serum albumin and EGD. (Table 2)

Table No.2: Frequency distribution of esophageal varices on serum albumin and EGD

			Freque-ncy	%ag e
Esophagea l varices	Serum Albumi n	Positive£	41	43.2
		Negative	54	56.8
	EGD	Present	43	45.2
		Absent	52	55.8

£: serum albumin <3.4 g/dl

Pearson correlation coefficient test was conducted between patients of CLD with different levels of serum albumin and grade of EVs. Among the all participants with serum albumin levels <3.4 g/dl, total 25 patients were having serum albumin level <2.8g/dl and 18 having serum albumin level between 2.8 to 3.3 g/dl. Value recorded for Pearson correlation coefficient (r) was - 0.689 with p-value <0.05 (0.000). There was a statistically significant negative correlation between the levels of serum albumin with the esophageal varices in different grades among patients of chronic liver disease was demonstrated (Table 3).

Table No.3: Correlation between serum albumin level and grade of esophageal varices

Albumin Level	Number of patient with different grading of E.Vs		
	Grade I	Grade II	Total
<2.8 g/dl	10	15	25
2.8 to 3.3 g/dl	07	11	18
Total	17	26	43
r = -0.689 p-value <0.05 (0.000)			

The sensitivity, specificity, NPV and PPV of esophageal varices on serum albumin along with the diagnostic accuracy of esophageal varices on serum albumin taking esophageal varices on EGD as gold standard is demonstrated in Table 4.

Table No.4: Comparison of serum albumin with EGD for prediction of EVs

		EVs on EGD		Total
		Positive	Negative	
Esophageal varices on serum albumin	Positive	35	6	41
	Negative	8	46	54
	Total	43	52	95
Sensitivity		81.40%		
Specificity		88.46%		
PPV		85.36%		
NPV		85.18%		
Diagnostic Accuracy		85.26%		

DISCUSSION

Esophageal varices are one of the major complications of portal hypertension resulting due to chronic liver diseases. These can be prevented by detecting them in early stage and with the prompt prophylaxis.¹¹EGD is the gold standard procedure for the detection as well as and treatment of esophageal varices. But due to its higher cost and lack proper skills of different clinicians it not only become problematic for patients but also increase the out of pocket expenditure.¹² Among the noninvasive parameters, serum albumin can play a vital role of proxy marker in early detection and development of esophageal varices among patients with compensated or chronic liver diseases.⁹

Present study is designed to assessed the serum albumin (a potential noninvasive diagnostic marker) to predict the esophageal varices, and found serum albumin was a good forecaster for diagnosis of EVs. In this study mean age of the patients was 49.87±12.58 years with majority (67.36%) of them were male out of all cases. These findings are similar to the study of Kumar S. et al¹ as, out of all cases 62% were males and patients' mean age was 44.6 ± 13.6 years. Kraja B et al¹³ also found similar findings regarding age and gender.

In the present study the mean serum albumin level of the study participants was 3.65±0.82 g/dl. These findings are consistent with the study by Laeeq SM et al⁸ as mean albumin level was 2.88±0.68 among cirrhotic patients presented with EVs. In another study of Khan et al.⁹ 60.5% patients had low albumin level and severity of EVs was significantly correlated with low level of albumin. Ijaz N et al¹² also demonstrated a significant negative association between esophageal varices and low level of serum albumin among cirrhotic cases.

In our study the diagnosis of EV on serum albumin was found positive in 43.2% patients while on EGD it was found positive in 45.2% patients. The diagnostic accuracy of esophageal varices on serum albumin was recorded 85.26% taking esophageal varices on EGD as gold standard with sensitivity and specificity of 81.40% and 88.46% respectively. One study reported that sensitivity of serum albumin for detection of EV i.e. 66% and specificity i.e. 80%.⁸ In another study proposed that serum-ascites albumin gradient is a superior discriminator of portal hypertension as compared to ascites protein concentration.¹⁴ Sarangapani A et al¹⁵ also found similar findings. Khan J. et al also in agreement to our study reported that specificity and sensitivity of serum albumin level for detection of EV was 56% and 83.8% respectively.⁹ Another study reported that sensitivity and specificity of serum albumin level for detection of EV was 53.2% and 91% respectively.⁷ In the study of Kim H et al¹⁶ study, reported higher sensitivity 98.0% and specificity (94.9%) was shown at the level of albumin 4.0 g/dl. Ijaz N. et al and Khan J. et al also demonstrated albumin as a best predictor esophageal varices.^{9, 12}

CONCLUSION

Serum albumin is a useful prognosticator of esophageal varices with high sensitivity as well as specificity among patients of chronic hepatic disorder.

Author's Contribution:

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Conflict of Interest: The study has no conflict of interest to declare by any author.

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