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Original Research Article

Study of Correlation of Serum Ascitic Albumin Gradient with Oesophageal Varices in Patients with Portal Hypertension in Chronic Liver Disease – Retrospective Study

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Conflict of interest: Nil

Abstract

Background: The ascites analysis provides the etiology of portal hypertension, and elevation of the serum ascitic albumin gradient (SAAG) shows the accuracy of portal hypertension.

Method: 90 adult patients with liver disease were studied. USG was carried out for the diagnosis of cirrhosis of the liver. Blood examination included CBC, liver function test, a renal function test, and a coagulation profile; Child-Pugh scores were calculated for severity of disease, and paracentesis of ascitic fluid was performed. Ascitic fluid was analyzed for SAAG calculation.

Results: In the study of esophageal varices, the grading of esophageal varices had a significant p-value ($p<0.001$). Apart from the elevation of SAAG serum albumin (g/dl), bilirubin (mg/dl) levels also increased.

Conclusion: The present pragmatic study shows there is a strong correlation between SAAG and the presence and severity of esophageal varices in patients with chronic liver disease having portal hypertension.

Keywords: Paracentesis, Child-Pugh classification, Endoscopy, Portal hypertension, esophageal varices.

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Introduction

Any condition that interferes with flow or vascular resistance in the portal venous system can lead to portal hypertension. Cirrhosis remains the most common cause of portal hypertension [1]. It is also reported that molecular and cellular mechanisms involved in the development and progression of liver fibrosis as well as vascular remodeling are the main drivers of portal hypertension [2].

Portal hypertension leads to an increase in the portosystemic collateral flow in an attempt to decompress the portal venous system [3]. The most clinically important site of collateral flow is within the mucosa of the proximal stomach and distal esophagus, resulting in the development of gastroesophageal varices. Gastroesophageal varices lie in their risk of rupture and potentially life-threatening nature [4].

Ascites represents the pathological accumulation of fluid in the peritoneal cavity as a result of significant peritoneal portal hypertension. Hence, an attempt was made to analyze ascitic fluid to find out the etiology. The serum ascites albumin gradient (SAAG) is elevated in portal hypertension with a diagnostic accuracy of 97 to 98%. The easiest method to rule out the portal hypertension.

Material and Method

90 (ninety) adult patients aged between 20-65 year admitted at the Institute of Medical Sciences and Research Centre Mayani Taluk Khatav, Dist. Satara, Maharashtra-415102 were studied.

Inclusion Criteria: Consecutive patients above 18 years of age with chronic liver disease and ascites due to any etiology. Ascites confirmed by ultrasonography, endoscopy confirmed the esophageal varices. The patients who gave their consent in writing were selected.

Exclusion Criteria: Patients with recent variceal bleeding within six weeks, patients on usage of beta-blockers for primary prophylaxis, patients with

hepatocellular carcinoma, pregnant patients, patients with spontaneous bacterial peritonitis, and immunocompromised patients were excluded from the study.

Method: Demographic data, medical history, and clinical examination were carried out in every patient. The blood examination included a complete blood count, liver function test, renal function test, and coagulation profile. The Child-Pugh score is used to grade the severity of cirrhosis of the liver. Paracentesis was performed and ascitic fluid analyzed for cell count, protein, albumin, and culture of ascitic fluid, also studied serum samples were obtained for paracentesis for SAAG calculation. Upper gastrointestinal endoscopy was performed blinded to SAAG results. Esophageal varices were graded according to the Paquet classification (Grade O—no varices; Grade I—small varices without protrusion; Grade II—moderate-sized varices with minimal protrusion; Grade III—large varices substantially protruding; Grade IV—very large varices, occluding lumen). USG abdomen was studied to assess liver echogenicity, spleen size, portal vein diameter, and collaterals.

The duration of the study was from January 2016 to June 2016.

Statistical Analysis: Demographic and clinical manifestations, endoscopic findings, and laboratory parameters. Factors associated with esophageal varices were classified with percentages; t-tests and ANOVA tests were carried out to study the association of SAAG with esophageal varices. The statistical analysis was carried out in SPSS software. The ratio of male and female was 3:1.

Observation and Results

Table 1: Demographic and clinical manifestations

- Age group: 20-40 years were 27 (30%), 41-60 were 53 (58.8%) and > 60 were 10 (11.1%).
- Alcoholic liver disease patients were 82 (91.1%) and 8 (8.8%) were chronic hepatitis patients.
- Co-morbidities: 24 (26.6%) had hypertension, 4 (4.4%) had COPD, 20 (22.2%) had type-II DM, Absentees of co-morbidities were 40 (44.4%)

Table 2: Endoscopic and laboratory parameters details

- Presence of varices were 62 (68.8%) and 28 (31.1%) had absence of varices.
- Grading of esophageal varices 20 (22.2%) were grade I, 26 (28.8%) were grade II, 10 (11.1%) were grade-III, 6 (6.6%) grade IV.
- Laboratory parameter was: serum albumin: 2.74 (± 0.30) Bilirubin was 2.50 (± 0.80), SAAG was 1.6 (± 0.28).
- INR Parameters had: 24 (26.6%) had class-A, 40 (44.4%) had class B, 26 (28.8%) had class C.

Table 3: Association of SAAG with Esophageal varices: Presence of Esophageal varices were 62 and absentees were 28, t test was 6.5 and $p<0.001$ (p value was highly significant). In grading of Esophageal varices 26 patients had grade II, 6 had grade IV, F value was 13.7 and $p<0.001$ (p value was highly significant).

Table 4:

Factors associated with Esophageal varices: In age group $p>0.39$ (p value was insignificant). In Etiological study has $p>0.62$ (p value was insignificant). In child-Pugh classification $p>0.21$ (p value was insignificant).

Table 1: Demographic and clinical manifestations of the patients

Parameters	No. of patients	Percentage (%)
(A) Age group		
20-40	27	30
41-60	53	58.8
> 60	10	11.1
(B) Alcoholic liver		
Disease	82	91.1
Chronic hepatitis	8	8.8
(C) Co-morbidities		
hypertension	24	26.6
Diabetes Mellitus	20	22.2
COPD	4	4.4
CAD	2	2.2
Absent	40	44.4

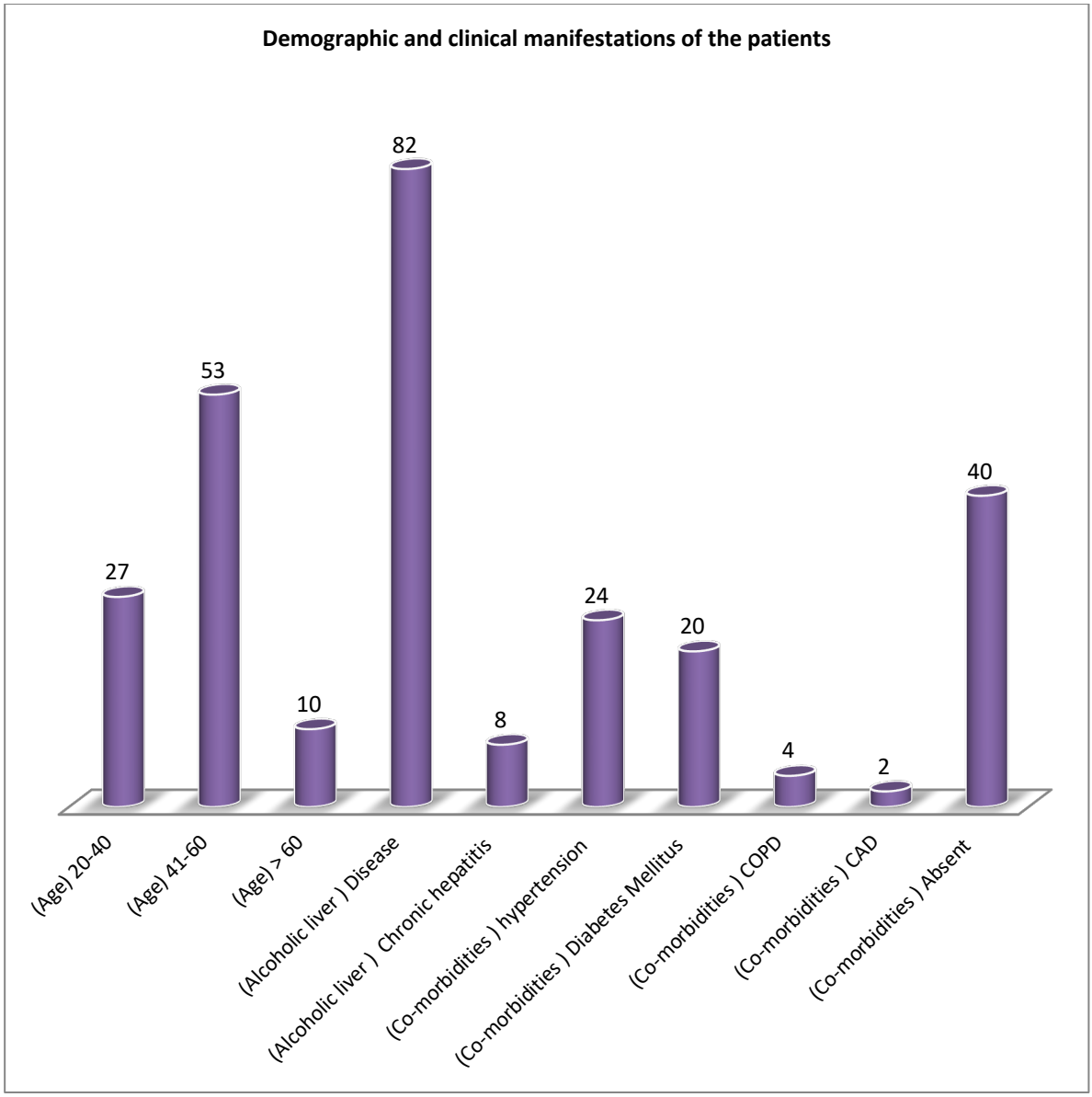

Figure 1: Demographic and clinical manifestations of the patients

Table 2: Endoscopic findings and Laboratory parameters

Details	Value
(A) Present of oesophageal varices	
present	62 (68.8%)
Absent	28 (31.1%)
(B) Grading of Oesophageal varices	
Grade-I	20 (22.2%)
Grade-II	26 (28.8%)
Grade-III	10 (11.1%)
Grade-IV	6 (6.6%)
(C) Laboratory parameters serum	
albumin (g/dl)	2.74 (± 0.30)
Bilirubin (mg/dl)	2.50 (±0.80)
SAAG (g/dl)	1.6 (± 0.28)
(D) INR Child – Pugh classification	
Class A	24 (26.6%)
Class B	40 (44.4%)
Class C	26 (28.8%)

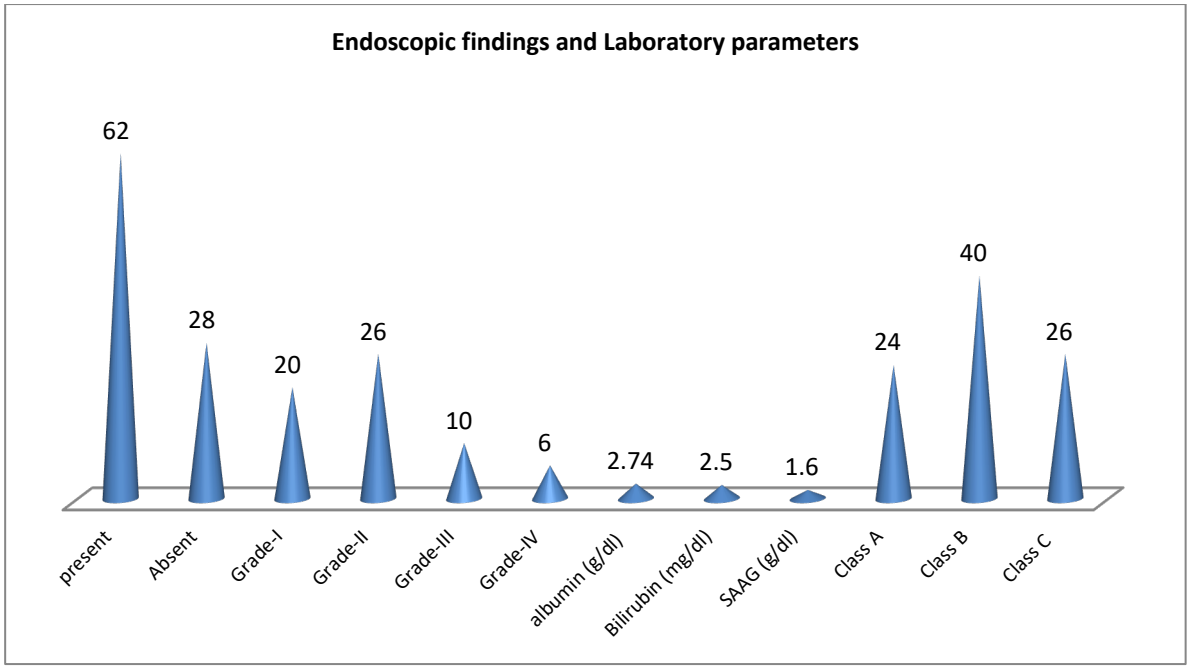

Figure 2: Endoscopic findings and Laboratory parameters

Table 3: Association of SAAG with oesophageal varices

Details	SAAG value (Mean ±SD)	t test	p value
(a) Oesophageal varices			
Present (No – 62)	1.68 (±0.3)	6.5	P<0.001
Absent (No – 28)	1.3 (± 0.1)		
(b) Grading of Oesophageal varices			
Grade-I (N – 20)	1.3 (±0.29)	13.7	P<0.001
Grade-II (N-26)	1.4 (± 0.26)		
Grade-III (N-10)	1.8 (±0.29)		
Grade-IV (No-6)	1.93 (± 0.22)		

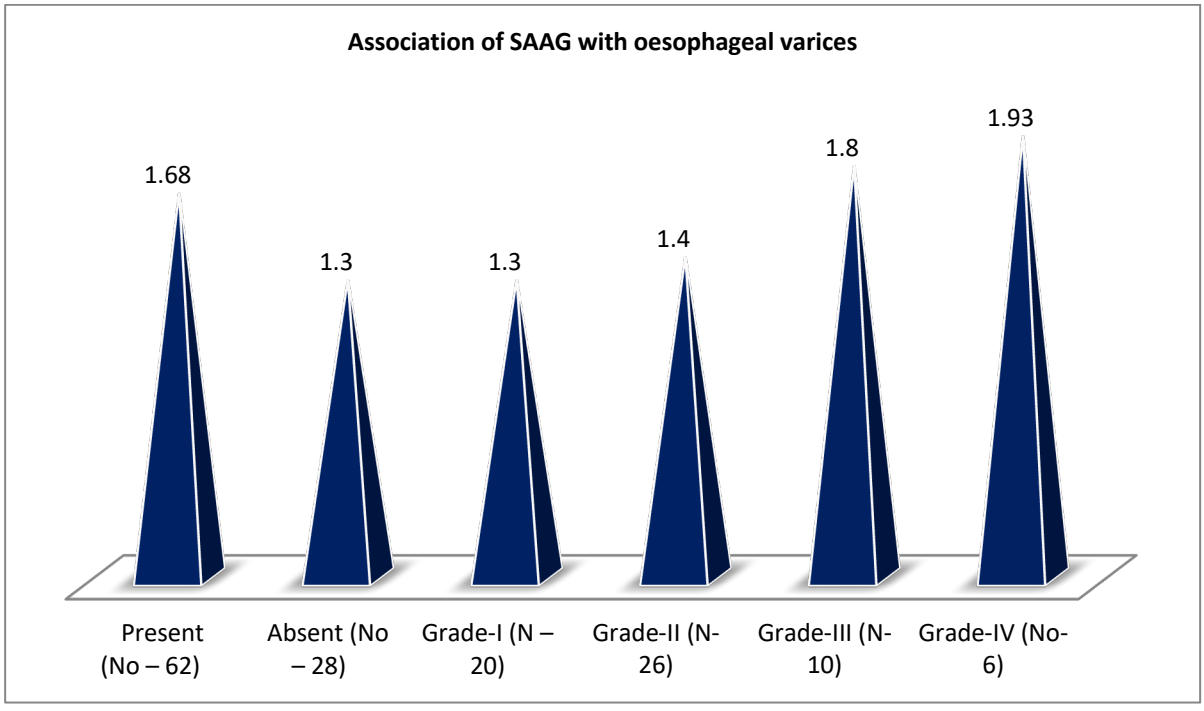

Figure 3: Association of SAAG with oesophageal varices

Table 4: Factors Associated with Oesophageal varices

Factors	Varices Present	Varices Absent	p value
(a) Age group			
20-40	16 (25.8%)	10 (35.7%)	P>0.39
41-60	38 (61.2%)	14 (50%)	
> 60	8 (12.9%)	4 (14.2%)	
(b) Etiology			
Alcoholic liver disease	60 (96.7%)	22 (78.5%)	p>0.62
Chronic Hepatitis	2 (3.2%)	6 (21.4%)	p>0.62
(c) Child-Pugh classification			
Class A	12 (19.3%)	12 (42.8%)	p>0.21
Class B	32 (51.6%)	8 (28.5%)	
Class C	18 (29%)	8 (28.5%)	

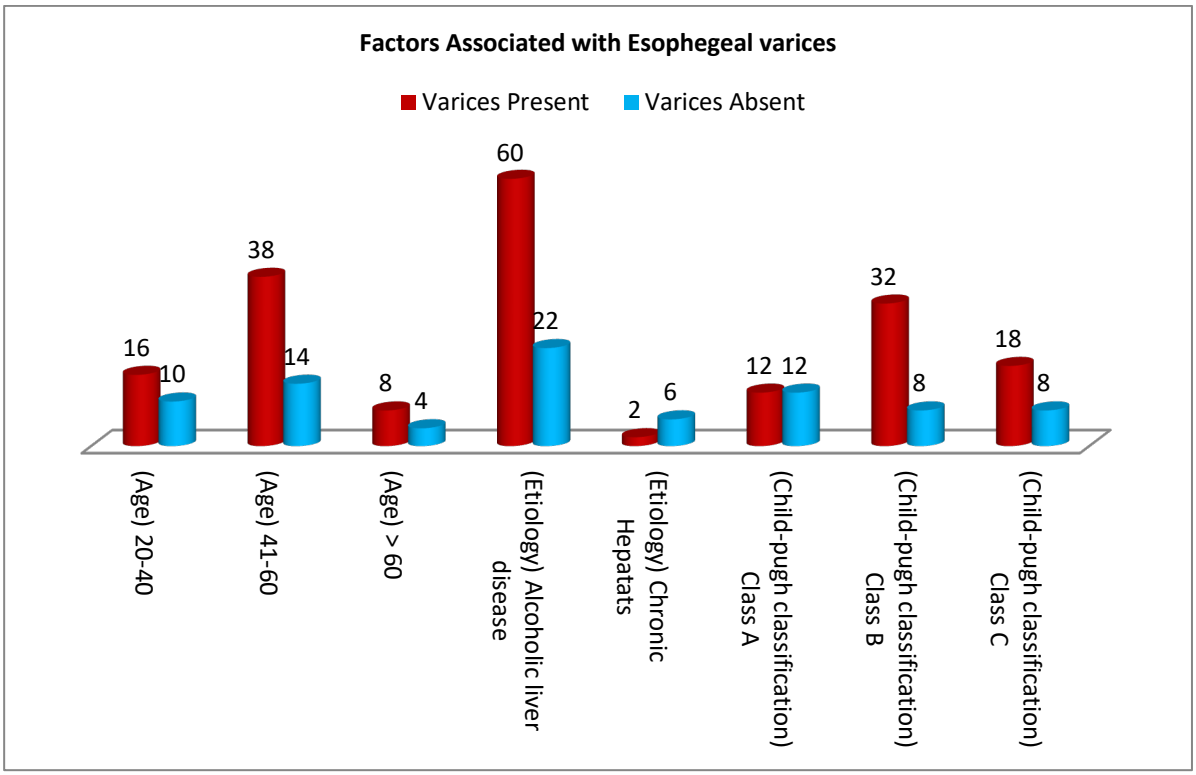

Figure 4: Factors Associated with Esophegeal varices

Discussion

Present a correlative study of SAAG with esophageal varices in patients with portal hypertension. There were 82 (91%) alcoholic liver disease patients and 8 (8.8%) chronic hepatitis patients in the present study. Co-morbidities were 24 (26.6%) hypertensive, 20 (22.2%) diabetic mellitus, 4 (4.4%) COPD, and 2 (2.2%) CAD (Table 1). 62 (68.8%) had esophageal varices, elevated serum bilirubin, and serum albumin SAAG was observed.

In the Child-Pugh classification, class B-40 (44.4%) was the highest, followed by 24 (26.6%) in class A, and the least was 26 (28.8%) in class C (Table 2). The esophageal varices study and grading of esophageal varices had a significant p-value ($p<0.001$). Factors associated with esophageal varices, like age group, etiology, and Child-Pugh classification, were more or less the same; hence, p-values were insignificant ($p>0.62$). These findings are more or less in agreement with previous studies [5,6,7]. Screening esophagogastroduodenoscopy (ECD) for diagnosis of esophageal and gastric varices is recommended by American Association for the Study of Liver Disease (AASLD) guidelines. It is also reported that alcoholic cirrhosis of the liver has a significant correlation with SAAG and either portal hypertension or esophageal varices; on the contrary, this study was insignificant in non-alcoholic cirrhosis of the liver patients [8]. It is also observed that the SAAG value increased in ascites due to portal hypertension, but there is no close relation between the severity of esophageal varices and the SAAG value [9]. Chronic hepatocellular injury promotes activation of perisinusoidal cells, known as hepatic satellite cells (HSCs), which acquire a fibrogenic myofibroblast phenotype, resulting in collagen production, and sinusoidal

obstruction results in resolution of portal hypertension [10].

Effective reduction in portal pressure may decrease the incidence of complications in patients with cirrhosis and potentially improve survival [11]. Unfortunately, currently available therapeutic options have limited efficacy or carry substantial risks.

Summary and Conclusion

There is a significant correlation between SAAG value and endoscopic parameters of portal hypertension manifested by the presence of varices; the presence of varices can be predicted by the portal hypertension and SAAG value by ascitic analysis. Analysis SAAG value by ascitic fluid will be enough to rule out varices and portal hypertension, which is cost-effective and avoids the unnecessary financial burden of endoscopy examination and prolongs the hospital stay of the patients. Despite many advanced techniques of treatment, portal hypertension remains largely a progressive disease. Early liver transplant in cirrhosis may reduce the morbidity and mortality.

Limitation of study: Owing to remote location of research Centre, small number of patients lack of latest techniques we have limited finding and results.

This research work was approved by the ethical committee of Institute of Medical Sciences and Research Centre Mayani Taluk Khatav, Dist. Satara, Maharashtra-415102.

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