

# Correlation between Serum Ascites Albumin Gradient and Endoscopic Grading of Esophageal Varices in patients with cirrhosis

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## ABSTRACT

**Introduction:** The serum-ascites albumin gradient (SAAG) is a medical calculation that can help determine the cause of your ascites. The SAAG may be a more effective discriminator than the usual method of dividing ascites fluid into transudates and exudates.

**Objective:** The objective of this study was to see if there was a link between the serum ascites albumin gradient and the endoscopic grading of esophageal varices in cirrhotic individuals.

**Materials and Methods:** This Cross-sectional study was conducted in Unit II, Department of Medicine, Lahore General Hospital, Lahore during 3-10-2018 to 3-4-2019. A total of 60 patients who met the study's inclusion criteria were included. Blood sample was taken and sent to the laboratory of the hospital for assessment of serum albumin level and SAAG was calculated.

**Results:** Results of this study showed positive moderate correlation between grades of varices and SAAG i.e.  $r = 0.661$ ,  $p$ -value = 0.000. Esophageal varices appear to be directly linked to the severity of SAAG.

**Conclusion:** In individuals with cirrhosis, there is a moderately strong significant association between the SAAG and the endoscopic grading of esophageal varices. In cirrhotic individuals, SAAG may be a useful biomarker for EV development.

**Key words:** Correlation, Serum ascites, Albumin, Gradient, Endoscopic, Esophageal, Varices, Cirrhosis

## INTRODUCTION

Ascites is a common symptom in the internal medicine department; It is a macroscopically yellow citrine that affects young male males seeking abdominal volume growth. It is caused by cirrhosis of the liver and cardiac disease.<sup>1</sup> It is a frequent clinical symptom produced by several circumstances. It is caused by a number of factors, including portal hypertension, peritoneum irritation, an increase in hydrostatic pressure, and a reduction in oncotic pressure. It creates a diagnostic and treatment issue.<sup>2-4</sup> There are several etiologies for ascites, making it necessary to use less expensive and generally accessible biochemical criteria in order to accurately and sensitively identify the etiology of the condition.<sup>5</sup>

For the purpose of identifying the underlying etiology of ascites, doctors employ the serum-ascites albumin gradient (SAAG). Transudates and exudates of ascites fluid may now be distinguished using the SAAG, which may be a superior approach.<sup>6-8</sup> Diagnostic accuracy, Specificity, Positive Predictive Value, Positive Predictive Value and Negative Predictive Value of SAAG were reported to be 96% ; 97.5%; 95.5%; 98%; 96% and 9% correspondingly.<sup>9</sup> SAAG and endoscopic parameters of portal hypertension, such as varices, have been shown to have a strong association. There is no significant association between the SAAG value and varicose grading.<sup>10</sup>

The purpose of this study is to compare SAAG and endoscopic grading of esophageal varices in cirrhotic individuals. The literature has shown mixed outcomes relating SAAG and endoscopic grading of esophageal varices. Moreover, very little research has been done to determine the role of SAAG in identifying the severity of varices, rather than interventional procedures like endoscopy.<sup>11</sup> Endoscopy is considered to be gold standard method for diagnosis of esophageal varices, but also has some disadvantages like rise in Hepatitis C. So, findings of this study will help us in updating the standard hospital protocol for diagnosis or prediction of esophageal varices in cirrhotic patients instead of going for endoscopy. Therefore, we will be able to apply the findings of this study in the future to enhance our practise.<sup>12</sup>

**Objective:** The objective of this study was to see if there was a link between the serum ascites albumin gradient and the endoscopic grading of esophageal varices in cirrhotic individuals.

## MATERIAL AND METHODS

This Cross-sectional study was conducted in Unit II, Department of Medicine, Lahore General Hospital, Lahore during 3-10-2018 to 3-4-2019.

**Sample Size:** Sample size of 60 cases is calculated with 5% type I error, 10% type II error and taking magnitude of correlation between SAAG and endoscopic grading i.e.  $r = 0.55$  in cirrhotic patients. The data was collected through non probability consecutive sampling

### Inclusion Criteria

- Age: 16-70 years.
- Gender: both male and female.
- Patients with cirrhosis (as per operational definition)

### Exclusion Criteria

- Patients with recurrent varices or ascites or already given band ligation or sclerotherapy (on history)
- Patients taking antibiotics or PPI (on medical record)
- Patients with ascites owing to causes other than cirrhosis, such as hepatocellular cancer, portosystemic anastomosis, or portal vein thrombosis. (on medical record)

**Data Collection Procedure:** Total 60 cases fulfilling inclusion criteria were enrolled in study form OPD of Department of Medicine, A hospital in the city of Lahore. Patients gave their permission after being fully informed. A person's name, age, gender, height, weight, and duration of cirrhosis were all documented. After that, a 5cc BD syringe was used to collect blood, which was then delivered to the hospital's laboratory for analysis to determine the serum albumin level and compute SAAG. Ascetic fluid was then drained from patients using a drain. For all patients, a senior gastroenterologist with at least four years of resident experience assisted by a researcher performed endoscopy. A distinction was made between the various types of varices (as per operational definition). A custom-made form was used to capture all of the data (attached).

**Data Analysis:** The data was imported into SPSS version 20 and evaluated. We utilized mean SD to depict quantitative data like average age, BMI, and liver cirrhosis duration. Gender and esophageal varices grades were reported as frequency or percentage. Endoscopic grading of esophageal varices was correlated using Pearson's correlation coefficient. A  $p$ -value of 0.05 or below was considered significant. For example, data was grouped by gender, age of cirrhosis, and BMI. SAAG and the endoscopic grade of esophageal varices were correlated using Pearson's correlation coefficient after stratification. A  $p$ -value of 0.05 or less was considered significant.

**RESULTS**

The data was collected from 60 patients. Mean age of patients in this study was 48±14.84 years. Minimum and maximum age of patients was 22 and 70 years respectively. Among patients 26 (43.3%) patients were male and 34(56.7%) were female. Mean duration of Cirrhosis was 9.20±4.12. Minimum and maximum duration of cirrhosis was 3 and 16 respectively. According to BMI 29(48.3%) BMI was normal, 16(26.7%) were overweight and 15(25%) were obese. The mean serum albumin was 2.75. The lowest and highest values were 1.90 and 3.50.

Table 01: Descriptive statistics for Ascetic Fluid Albumin

n	60
Mean	1.53
SD	.34
Minimum	1.00
Maximum	2.20

Mean ascetic fluid albumin level was 1.53±0.34. Minimum and maximum value of ascetic fluid albumin level was 1 and 2.20 respectively. Mean SAAG level was 1.22±0.58. Minimum and maximum level of SAAG level was 0 and 2.30.

Table 02: Descriptive statistics for SAAG

n	60
Mean	1.22
SD	.58
Minimum	.00
Maximum	2.30

Strong positive correlation was seen between SAAG and grades of varices was 0.661. **(Figure-1)**. In all age groups positive correlation was seen between SAAG and grades of varices. Among male (r=0.707, p-value=0.000) and female (r=0.634, p-value=0.000) patients strong positive correlation was seen between SAAG and grade of varices. For duration of cirrhosis moderate positive correlation was seen between SAAG and grades of varices. i.e. (3-7: r=0.676, p-value=0.000), (8-11: r=0.673, p-value=0.008) & (12-16: r=0.688, p-value=0.003). For all categories of BMI (Normal, overweight, obese) strong positive correlation was seen between SAAG and grades of varices.

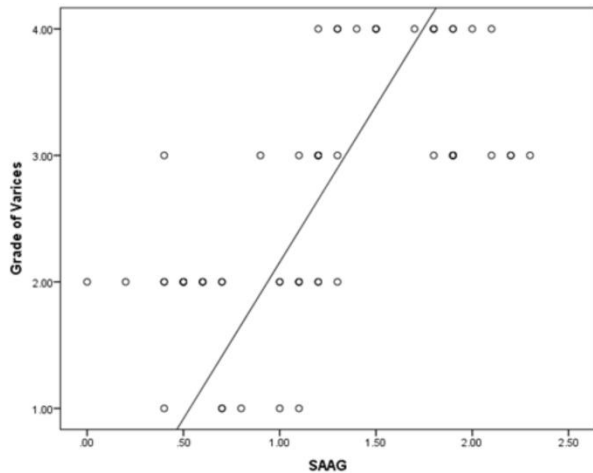


Figure-1: Correlation between SAGG and Endoscopic grading of esophageal varices

Table 03: Correlation between SAGG and Endoscopic grading of esophageal varices stratified for age

		Grade of Varices	
		Correlation coefficient	p-value
SAAG	22-35	0.709	0.001
	36-50	0.499	0.049
	51-60	0.719	0.029
	>60	0.627	0.005

Table 04: Correlation between SAGG and Endoscopic grading of esophageal varices stratified for duration of cirrhosis

		Grade of Varices	
		Correlation coefficient	p-value
SAAG	3-7	0.676	0.000
	8-11	0.673	0.008
	12-16	0.688	0.003

**DISCUSSION**

Various non-invasive factors that may have a clinical influence on the identification of varices in cirrhotic patients have been investigated as part of the development process. Portal vein diameter, platelet count, splenic size, aspartate/alanine aminotransferase ratio, and the transient elastography method, all of which may be used to identify portal hypertension and esophageal varices among other things, are some of the more common noninvasive tests.<sup>13-15</sup>

Results of this study showed positive moderate correlation between grades of varices and SAAG i.e. r= 0.661, p-value=0.000. According to this, the size of the esophageal varices is directly proportional to the SAAG degree. The highest correlation coefficient was seen for patients in age group 51-60 years (r=0.719, p-value=0.029), for male patients correlation coefficient was higher as that of female patients (r=0.707, p-value=0.000), strong positive moderate correlation was seen between these two parameters for patients with all duration categories of cirrhosis and among overweight patients (r=0.705, p-value=0.002) correlation coefficient was highest as compared to patients with normal BMI and obese patients.

Studies have reported variables results regarding correlation between SAAG and endoscopic grading of vrices. The appearance of varices on endoscopy is a telltale marker of portal hypertension, which has been linked to an elevated SAAG score. However, there is no association between the SAAG number and the severity or grades of varices.<sup>16</sup> Serum albumin levels were shown to be negatively correlated with the severity of esophageal varices in cirrhotic individuals who had been infected with hepatitis B and C.<sup>17</sup> One study reported that the correlation between SAAG and endoscopic grading was although weak but positive i.e. r=0.55 (p<0.01).<sup>11</sup> But another study reported that the correlation between SAAG and endoscopic grading was although weak but negative i.e. r=-0.587 (p<0.01).<sup>18</sup>

Different demographics, as well as disparities in prevalence of cirrhosis and severity of liver disease, may be to blame for the discrepancies in outcomes. The predominant cause of liver cirrhosis in Demirel et al. and Torres et AL Western.'s population was drinking, but in our Pakistani patients, the primary cause was chronic viral hepatitis B and C. Another contributing issue might be Pakistani patients' poor nutritional condition.<sup>19-22</sup>

**CONCLUSION**

In individuals with cirrhosis, there is a moderately strong significant association between the SAAG and the endoscopic grading of esophageal varices. In cirrhotic individuals, SAAG may be a useful biomarker for EV development.

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