World Journal of Pharmaceutical and Life Sciences
WJPLS
www.wjpls.org

SJIF Impact Factor: 7.409

A COMPARATIVE OBSERVATIONAL ANALYSIS OF BLOOD AND ASCITIC FLUID PARAMETERS IN THERAPEUTIC PARACENTESIS IN PATIENT WITH DIFFERENT LIVER DISEASE

Dr. Aashima Singh Chauhan*, Dr. Khushi Pathak, Dr. Shruti Rana, Dr. Pankti Dalwadi

A-One Pharmacy College**,** SNME Campus, Ahmedabad, India.

***Corresponding Author: Dr. Aashima Singh Chauhan**
A-One Pharmacy College, SNME Campus, Ahmedabad, India.

Article Received on 03/06/2025 **Article Revised on 24/06/2025** **Article Accepted on 14/07/2025**

ABSTRACT

Ascites is the abnormal accumulation of fluid in the peritoneal cavity, often treated with therapeutic paracentesis. This observational study aimed to compare pre-paracentesis blood parameters and the ascitic fluid, as significant research in this area is limited despite the frequent use of paracentesis for ascites in patients with various liver diseases. A total of 73 patients were enrolled in the study. Among them, males were more affected than females, comprising 81% of the participants, while females made up 19%. The age group most impacted was 61-70 years, accounting for 27% of the cases. Chronic liver disease emerged as the most common cause of ascites. Serum-Ascites Albumin Gradient (SAAG) values greater than 1.1 g/dL were observed in 90% of patients, indicating that transudative ascites is the predominant type. The variations across different liver disease and in normal cases were assessed using the Kruskal-Wallis test. This analysis revealed significant differences in Bilirubin, SGOT, and GGT indicating strong indicators of liver disease severity, especially in conditions like cirrhosis, ALD, and jaundice, with p-values of 0.0003, 0.0219, and 0.0136, respectively ($p < 0.05$). Platelet count also significantly correlates with disease severity, particularly in advanced liver diseases like cirrhosis and cancer with p value of 0.0328. Whereas other markers (creatinine, albumin, SGPT) show no significant variations across different liver diseases. Additionally, ascitic fluid analysis indicated significant differences in protein ($p = 0.0200$) and albumin concentrations ($p = 0.0444$). These findings highlight the importance of considering the underlying liver condition when interpreting results related to ascites which facilitates improved clinical practices and patient care.

KEYWORDS: *Paracentesis, Ascites, Liver disease severity, Ascitic fluid analysis, Blood parameters Comparison, Liver function test, SAAG.*

INTRODUCTION

- The liver is an extremely essential organ for the maintenance and defense of the body with over 100 recognized types of disease that can affect people of all ages.[1] Liver disorders are among the top ten most deadly illnesses in India [2] Among different liver disorders alone cirrhosis and Chronic liver disease account for almost 50% of patients after 10 years of follow up with refractory ascites. [3] Ascites is the pathologic accumulation of fluid (>25 ml to > 5L) within the peritoneal cavity. [4] When it gets uncontrolled despite medical treatment it is known as refractory ascites. The procedure of removal of more than 5L of ascitic fluid from the peritoneal cavity is called therapeutic paracentesis.
- The present research article revolves around the comparison of blood and ascitic fluid parameters in patients with various liver diseases, aiming to understand the different severity between patients with various liver diseases.
- The study aims to classify patients according to gender, age, prevalence rate of etiology leading to ascites and type of ascites by evaluating SAAG profile. Blood parameters like Platelet counts, Bilirubin, Albumin levels, Creatinine, SGPT, SGOT and GGT levels and ascitic fluid parameters like Total cell count, total protein and fluid albumin are studied to find the trends in different etiologies and compare them to control group to find the severity of disease.

MATERIALS AND METHODOLOGY

- This cross-sectional observational study aims to analyze the patients of ascites with different liver disease having prevalence of 5% resulting in the sample size of 73.[5] The inclusion criteria for the individuals induced are age group >18 years, confirmed diagnosis of different liver disease, presence/ history of ascites, undergone

paracentesis, stable medical condition and who are interested and have willingness to participate in the study. Also, the patients excluded were if they will be pregnant, cognitively impaired or diagnosed with psychological issues, recent liver transplant, with uncontrolled infection, severe coagulopathy and previous allergic reactions, other significant organ failure, and their unwillingness to participate. Data, including patient demographics, underlying liver disease, laboratory parameters such as blood and ascetic fluid, and complications, were collected from medical records. For the study of comparison of severity between different liver disease undergoing therapeutic paracentesis the Statistical analysis, including descriptive statistics and the Kruskal- Wallis test. Moreover, this study is adhered to ethical guidelines, with informed consent obtained where applicable.

Inclusion Criteria

- Age group >18 years.
- Patients with confirmed diagnosis of different liver disease.
- Patients with presence/ history of ascites.
- Patients who have undergone paracentesis.
- Patients with stable medical condition.
- Patient interest and willingness to participate in the study.

Exclusion Criteria

- Participants will be excluded from the study if they will be pregnant, cognitively impaired or diagnosed with psychological issues.
- Patients with recent liver transplant
- Patients with uncontrolled infection.
- Patients with severe coagulopathy and previous allergic reactions.
- Patients with other significant organ failure.
- Patient's unwillingness to participate.

RESULTS

1. Demographic Characteristics

- This study encompassed 73 patients with liver-related disorders, evaluated for demographic and etiological attributes as summarized in Table:1. Among the participants, 59 were male (81%), while 14 were female (19%), spanning an age range of 21 to 90 years. The age group with the highest representation was 61–70 years, comprising 27% of the sample, followed by the 51–60 age group at 21%.
- Etiological analysis revealed that Chronic Liver Disease (CLD) was the most prevalent condition, affecting 37% (n=27) of the cohort. Cirrhosis was observed in 19% of cases, while alcoholic liver disease (ALD) affected 15% of patients. Other etiologies included jaundice (11%), cancer (10%), and hepatic parenchymal disease (8%). This distribution highlights the diverse range of liver pathologies in the cohort and provides a basis for analyzing disease-related trends within this population.

Table 1: Demographic and Etiological Distribution of the Study Population.

Characteristic	Category	Frequency	Percentage (%)
Gender	Male	59	81
	Female	14	19
Age Group (years)	21–30	4	5
	31–40	8	11
	41–50	11	15
	51–60	15	21
	61–70	20	27
	71–80	10	14
	81–90	5	7
Etiology	Chronic Liver Disease	27	37
	Cirrhosis	14	19
	Alcoholic Liver Disease	11	15
	Jaundice	8	11
	Cancer	7	10
	Hepatic Parenchymal Disease	6	8
Total		**73**	**100**

2. SAAG Interpretation and Distribution

- This study assessed Serum-Ascites Albumin Gradient (SAAG) in 73 participants to differentiate transudative from exudative ascites. A SAAG ≥1.1 g/dL indicated transudative ascites, commonly associated with portal hypertension (e.g., chronic liver disease), while a SAAG <1.1 g/dL suggested exudative ascites due to non-portal causes (e.g., malignancy, cardiac disorders). Overall, 82% of cases were transudative and 18% exudative in Table: 2. These results support SAAG as a reliable tool for the diagnostic evaluation of ascites.

Table 2: SAAG Interpretation and Distribution.

SAAG Distribution	Frequency	Percentage
Transudative	60	82
Exudative	13	18
Total	73	100

3. Trends in Laboratory Parameters for Diagnosis of Liver Disease

- This study analyzed laboratory parameters associated with liver disease to assess their correlation with ascites, focusing on platelet count, ALT, AST, ALP, GGT, bilirubin, creatinine, and albumin levels. Significant elevations—exceeding twice the normal range—were observed across all cases, underscoring their diagnostic relevance.
- Platelet counts were lowest in malignancy-related ascites, while creatinine levels were notably elevated in chronic liver disease (CLD) cases, indicating renal involvement. Albumin levels were consistently low, with the lowest values observed in jaundice patients. Bilirubin peaked in jaundice cases, whereas SGPT and SGOT were highest in jaundice and CLD, respectively. GGT elevations were most prominent in cirrhosis and hepatic parenchymal disease, reflecting advanced liver dysfunction.
- CLD was the leading cause of ascites, with spontaneous bacterial peritonitis (SBP) occurring in 11% of cases and three reported mortalities, highlighting the severity and complications associated with advanced liver disease.

Table 3: Trends in Laboratory Parameters for Diagnosis of Liver Disease.

Etiology	Platelets	Creatinine	Albumin	Bilirubin	SGPT	SGOT	GGT
Control	315400 ± 41059.2	0.88 ± 0.22	3.26 ± 0.29	0.5 ± 0.13	19.1 ± 1.7	21.7 ± 1.5	27.4 ± 4.4
Chronic Liver Disease (CLD)	170963.0 ± 132015.6	6.6 ± 20.5	2.8 ± 0.6	6.4 ± 7.2	33.1 ± 17.4	77.7 ± 52.6	78.0 ± 44.5
Alcoholic Liver Disease (ALD)	185818.2 ± 111384.8	1.6 ± 0.8	3.0 ± 1.0	6.2 ± 13.3	45.6 ± 70.3	50.7 ± 41.1	93.3 ± 92.0
Cirrhosis	162214.3 ± 125441.5	1.4 ± 1.2	2.8 ± 0.5	2.9 ± 2.3	37.5 ± 22.8	60.8 ± 37.5	153.5 ± 211.4
Cancer	95800.0 ± 96232.7	0.9 ± 0.6	2.9 ± 0.8	2.7 ± 2.9	41.3 ± 34.2	55.9 ± 42.6	60.0 ± 67.4
Hepatic Parenchymal Disease	307000.0 ± 194454.1	1.5 ± 1.7	2.7 ± 0.6	1.8 ± 0.9	25.0 ± 12.4	58.2 ± 38.9	200.7 ± 332.1
Jaundice	398875.0 ± 513949.8	1.7 ± 1.6	2.6 ± 0.2	17.7 ± 11.3	70.7 ± 108.4	66.9 ± 33.9	56.5 ± 52.9

4. Comparative Analysis of Disease Severity Across Etiologies

- To assess the variation in disease severity across liver disease etiologies, a Kruskal- Wallis test was conducted, setting a significance level at 0.05. This analysis tested the null hypothesis that no meaningful differences in severity exist among the various etiologies compared to a control group, with an alternative hypothesis positing that such differences are present.
- The results identified significant differences in platelet count, bilirubin, SGOT, and GGT levels, with p-values of 0.0328, 0.0003, 0.0219, and 0.0136, respectively, all below the threshold of significance. Bilirubin levels demonstrated the strongest association ($p < 0.001$), indicating a marked relationship with liver disease severity.
- These findings underscore that these markers may serve as valuable indicators in differentiating severity across liver disease etiologies. In contrast, parameters such as creatinine, albumin, and SGPT did not display significant variability across groups, suggesting limited relevance to severity assessment in this particular analysis.
- This study's findings suggest that platelet count, bilirubin, SGOT, and GGT levels are useful markers for differentiating disease severity in liver-related conditions, which aligns with prior studies that highlight these indicators' roles in liver disease diagnosis. These insights directly address the research objective, validating these markers' potential diagnostic relevance across liver disease etiologies.
- Null Hypothesis (H0): There is no meaningful difference in severity levels across the etiologies among patients with liver disease in comparison to the control group.
- Alternative Hypothesis (H1): There is a significant variation in disease severity levels between etiologies among patients with liver disease compared to the control group.
- Significance Level (α): 0.05

➢ Decision Criterion:

- Reject H0 if $p \leq \alpha$.
- Do not reject H0 if $p \geq \alpha$.

➢ The findings for each parameter's p-value, presented in Table:4 indicate where significant differences were detected.

Table 4: Comparative Analysis of Disease Severity Across Etiologies.

Parameter	p-Value
Platelet Count	0.0328*
Creatinine Level	0.0958
Albumin Level	0.766
Bilirubin Level	0.0003***
SGPT Level	0.4336
SGOT Level	0.0219*
GGT Level	0.0136*
*p value < 0.05: significant difference when compared to control	
***p value < 0.001: highly significant difference when compared to control	

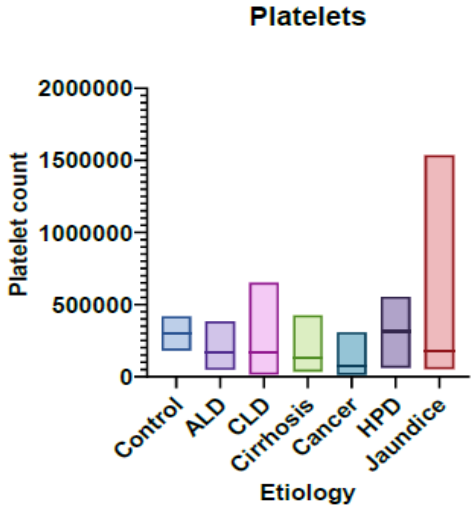


Figure 4.1: Median Distribution based on Platelets count

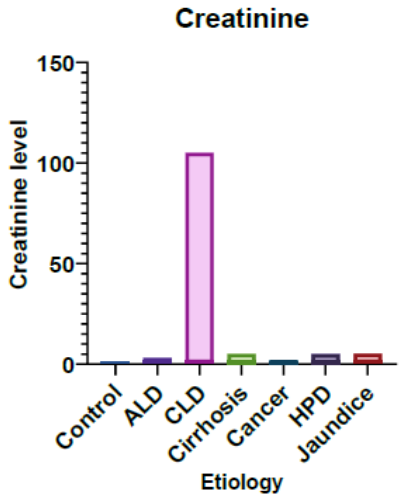


Figure 4.2: Median Distribution based on Creatinine level

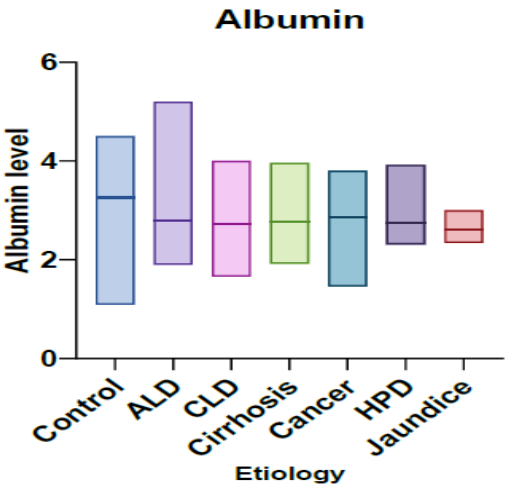


Figure 4.3: Median Distribution based on Albumin level.

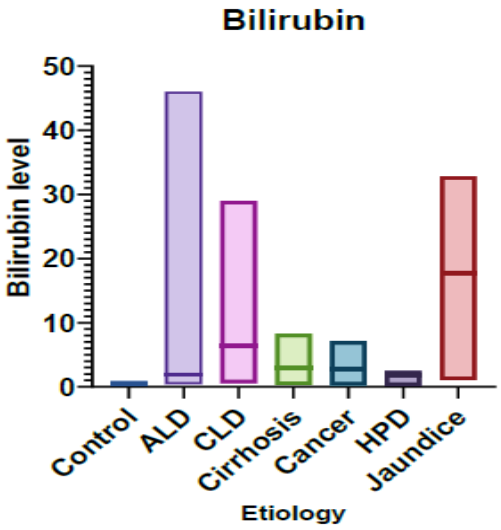


Figure 4.4: Median Distribution based on Bilirubin level.

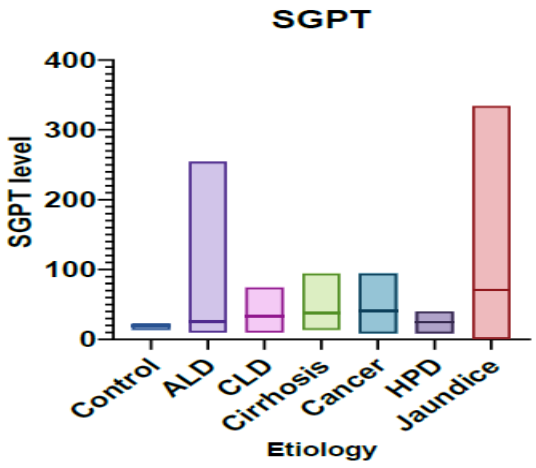


Figure 4.5: Median Distribution based on SGPT.

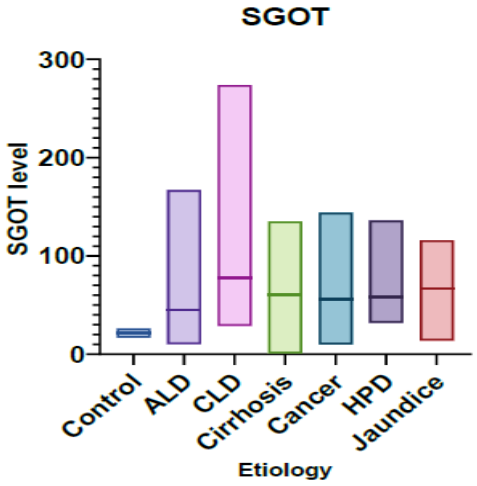


Figure 4.6: Median Distribution based on SGOT.

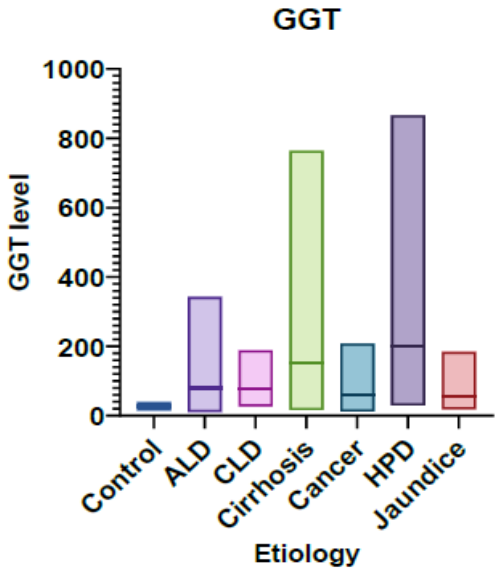


Figure 4.7: Median Distribution based on GGT.

5. Trends of Ascitic Fluid Parameters Based on Different Etiologies

- This analysis highlights distinct trends in total cell count, protein concentration, and albumin concentration within ascitic fluid, differing across liver disease etiologies.

Total Cell Count

- Among the different etiologies, Alcoholic Liver Disease (ALD) showed the highest mean total cell count (2745.1 ± 7720.0 cells), followed by Jaundice (1519.6 ± 2079.3 cells) and Hepatic Parenchymal Disease (726.7 ± 1249.1 cells), while Cancer cases had the lowest count (375.0 ± 460.2 cells) (Table 5.1). These findings suggest a more pronounced inflammatory or infectious process in ALD and Jaundice compared to malignancy-related

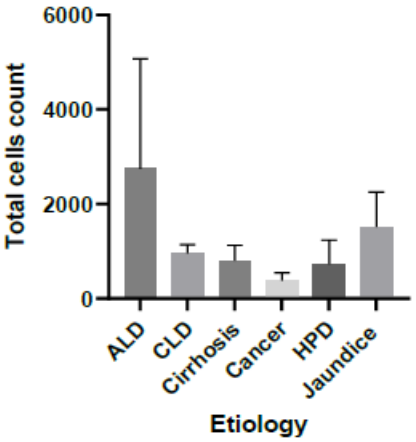
Protein

- Protein levels were highest in Jaundice (2.8 ± 0.8 g/dL), with elevated values also observed in Hepatic Parenchymal Disease (2.2 ± 1.5 g/dL) and CLD (1.9 ± 1.3 g/dL) (Table 5.2). Cancer cases exhibited the lowest protein concentration (1.1 ± 0.4 g/dL), indicating less exudative fluid characteristics compared to inflammatory liver diseases.

Albumin Concentration:

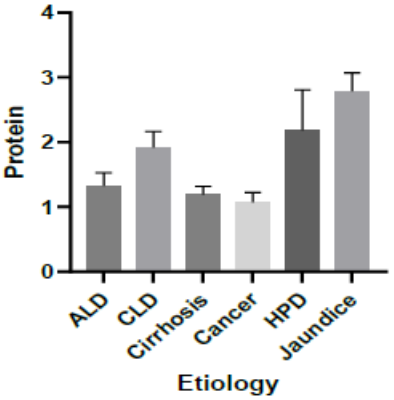
- Albumin concentrations were highest in Hepatic Parenchymal Disease and CLD (1.2 ± 0.9 g/dL and 1.2 ± 0.8 g/dL, respectively), followed by Jaundice (1.1 ± 0.8 g/dL), with the lowest levels observed in Cancer (0.4 ± 0.2 g/dL) (Table 5.3). These variations emphasize albumin's role as a marker of hepatic synthetic function and ascites etiology, where lower albumin is associated with advanced liver dysfunction.

Etiologies	Total Cells
ALD	2745.1 ± 7720.0
CLD	952.0 ± 1000.9
Cirrhosis	802.4 ± 1219.3
Cancer	375 ± 460.2
Hepatic Parenchymal Disease	726.7 ± 1249.1
Jaundice	1519.6 ± 2079.3



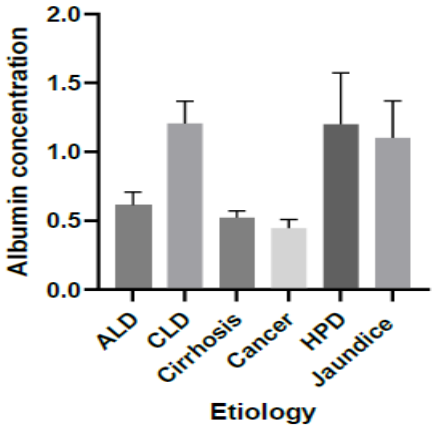
5.1) Trends in Total Cell Count in Ascitic Fluid by Etiology.

Etiologies	Protein
ALD	1.32 ± 0.7
CLD	1.9 ± 1.3
Cirrhosis	1.2 ± 0.5
Cancer	1.1 ± 0.4
Hepatic Parenchymal Disease	2.2 ± 1.5
Jaundice	2.8 ± 0.8



5.2) Trends in protein in Ascitic Fluid by Etiology

Etiologies	Albumin Concentration
ALD	0.6 ± 0.3
CLD	1.2 ± 0.8
Cirrhosis	0.5 ± 0.2
Cancer	0.4 ± 0.2
Hepatic Parenchymal Disease	1.2 ± 0.9
Jaundice	1.1 ± 0.8



5.3) Trends in Albumin in Ascitic Fluid by Etiology

6. Comparison of Ascitic Fluid Parameters Among Different Etiologies Using the Kruskal-Wallis Test

- To investigate differences in ascitic fluid parameters among various liver disease etiologies, the Kruskal-Wallis test was employed. This non-parametric test was selected due to its suitability for assessing significant differences across groups with categorical independent variables (etiology) and continuous dependent variables (ascitic fluid parameters).

Hypotheses and Methodology

- The null hypothesis (H_0) proposed no significant differences in ascitic fluid parameters (protein

concentration, albumin concentration, total cell count) among the etiologies, while the alternative hypothesis (H_1) suggested significant variability reflecting underlying pathophysiological processes. A significance level (α) of 0.05 was adopted, with the decision rule as follows:

- Reject H_0 if $p \leq 0.05$, indicating significant differences among groups.
- Fail to reject H_0 if $p > 0.05$, indicating no significant differences.

Statistical Findings:

- As presented in Table 6, significant differences were observed in protein concentration ($p = 0.0200$) and albumin concentration ($p = 0.0444$), both below the predefined significance threshold. These findings indicate that protein and albumin levels vary significantly across liver disease etiologies, suggesting their diagnostic relevance in characterizing ascitic fluid profiles. In contrast, total cell count exhibited a p-value of 0.2437, demonstrating no significant variability across groups.

Table 6: Comparison in various diseases.

Parameter	p-value
Total Cell Count	0.2437
Protein Concentration	0.0200*
Albumin Concentration	0.0444*

*Significant at $p < 0.05$.

Interpretation and Clinical Implications

- The significant variation in protein and albumin concentrations highlights their utility in differentiating the underlying causes of ascites. Elevated protein levels are generally associated with exudative ascites, often secondary to malignancy or infection, while lower protein concentrations are typical of transudative ascites, commonly linked to cirrhosis or portal hypertension. Similarly, decreased albumin levels reflect impaired hepatic synthetic function, correlating with advanced liver disease severity.
- The lack of significant differences in total cell counts suggests limited discriminatory power for this parameter in differentiating liver disease etiologies in ascitic fluid analysis, although it remains important for identifying infectious complications such as spontaneous bacterial peritonitis.
- These findings align with previous research, reinforcing the role of protein and albumin measurements as valuable diagnostic markers in the evaluation of ascites. Overall, ascitic fluid analysis remains a critical tool in guiding the assessment and management of patients with liver disease.

7. Comparative Analysis of Ascitic Fluid Characteristics in Different Etiologies

- This analysis examines key ascitic fluid parameters—total cell count, protein concentration, and albumin concentration—to elucidate patterns across different liver disease etiologies, aiding in the assessment of liver dysfunction severity and underlying causes of ascites.

Total Cell Count

- Cirrhosis and Hepatic Parenchymal Disease show moderate to high elevations (↑↑) in total cell count, suggesting significant inflammation linked to portal hypertension and liver damage.
- Jaundice also demonstrates a marked increase (↑↑), which could indicate heightened liver inflammation or infection.
- Cancer presents with the lowest cell count (↓), reflecting a non-inflammatory, likely malignant source of ascites, often seen with peritoneal metastasis.

Protein Concentration

- Cirrhosis displays a mild decrease (↓) in protein concentration, consistent with reduced liver synthesis due to portal hypertension.
- Cancer exhibits a marked reduction (↓↓), likely indicative of malignancy-related exudative ascites.
- Jaundice shows a mild increase (↑) in protein levels, suggesting an earlier stage of liver dysfunction with less extensive fibrosis.

Albumin Concentration

- Both Cirrhosis and Cancer exhibit substantial decreases in albumin (↓↓), a hallmark of advanced liver dysfunction and diminished synthetic capacity.
- Jaundice and Hepatic Parenchymal Disease maintain relatively stable albumin levels (N), possibly reflecting moderate liver involvement without severe decompensation.

Clinical Implications

- This comparative analysis of ascitic fluid characteristics highlights the utility of these parameters in distinguishing between liver disease etiologies. Elevated total cell counts in conditions such as Jaundice and Hepatic Parenchymal Disease suggest active liver inflammation or infection, while significant reductions in protein and albumin levels in Cirrhosis and Cancer align with severe liver dysfunction and the presence of exudative ascites. Such insights enhance clinicians' ability to differentiate portal from non-portal causes of ascites, promoting targeted diagnostic and treatment strategies.

Table 7: Comparative Analysis of Ascitic Fluid Parameters in Various Liver Diseases.

Test	ALD	CLD	Cirrhosis	Cancer	Hepatic Parenchymal Disease	Jaundice
Total Cells	↑↑	↑	↑↑	↓	↑	↑↑
Protein	↓↓	↓	↓↓	↓↓	N	↑
Albumin	↓	N	↓	↓↓	N	N

Parameter guide

Total Cells: (↑- *Mild Elevation: Total cell count 500-1000 WBCs/µL or mL,* ↑↑- *Moderate Elevation: Total cell count 1000-5000 WBCs/µL or mL,* ↓- *Mild Decrease: Total cell count <400 WBCs/µL or mL)*

Protein: (↓- *Mild Decrease: Less than 1.5 g/dL,* ↓↓ - *Moderate Decrease: 1.0 - 1.5 g/dL,* ↑ - *Mild Increase: Levels ranging from 2.5 g/dL to 3.5 g/dL, N- Normal range)*

Albumin*: (*↓ - *Mild Decrease,* ↓↓- *Moderate Decrease****,*** *N- Normal range)*

DISCUSSION

- A major worldwide health burden is caused by liver illnesses, including cirrhosis, alcoholic liver disease, hepatocellular carcinoma and jaundice. Laboratory indicators that represent the severity of the disease are frequently used to evaluate their pathogenesis. The focus of current research is on better understanding these characteristics in order to improve clinical care and patient outcomes. About 72% of cases of liver disease, primarily cirrhosis, alcoholic liver disease, and chronic liver disease, were caused by alcohol use; the prevalence was higher in men.
- This aligns with previous studies indicating that increased rates of alcoholic hepatitis and cirrhosis are associated with alcohol consumption predominantly among men (Méndez-Sánchez et al.; Desai et al.). [2],[6]
- According to the data, the prevalence of liver illness increased significantly with age, especially among those between the ages of 51 and 70, who made up 49% of cases. Given that liver illnesses can affect people of all ages but typically appear later in life, this distribution is in line with earlier research (Méndez-Sánchez et al.)[6] and emphasizes the significance of age-specific surveillance.
- According to this study's etiological distribution of liver illnesses, chronic liver disease is the most common (37%) and is in line with Joshi et al.'s [7] findings (71.05%) Significant causes also included cirrhosis (19%) and alcoholic liver disease (15%), which were in line with Kumar et al.[8] and Desai et al.[2], respectively. Because liver pathology is complex, additional aetiologies included hepatic parenchymal disease (8%), liver cancer (10%), and jaundice (11%). The mean ± SEM values of important biochemical markers for several liver disease groups are shown in Table.3
- The current study showed variation across liver disease aetiologies, with the jaundice group having the greatest mean platelet count (398,875.0 ± 513,949.8) and the cancer group having the lowest (95,800.0 ± 96,232.7). The CLD group had the highest creatinine level (6.6 ± 20.5), while cancer patients had the lowest (0.9 ± 0.6), suggesting renal impairment in liver dysfunction. ALD had the greatest albumin levels (3.0 ± 1.0), whereas jaundice had the lowest (2.6 ± 0.2), indicating poor liver function and the severity of the disease, especially in liver fibrosis and ascites. Impaired liver function was confirmed by bilirubin levels that were lowest in hepatic parenchymal disease (1.8 ± 0.9) and greatest in jaundice (17.7 ± 11.3). Jaundice (70.7 ± 108.0) and CLD (77.7 ± 52.6) had the greatest SGPT and SGOT, which were correlated with the severity and course of the disease. Desai et al. [2] confirmed that GGT was increased in cirrhosis (153.5 ± 211.4) and hepatic parenchymal disease (200.7 ± 332.1), indicating alcohol- induced hepatocyte damage.
- The blood parameters of the liver disease and control groups differed significantly, according to the Kruskal-Wallis test, especially the platelet count ($p = 0.0328$), bilirubin ($p = 0.0003$), SGOT ($p = 0.0219$), and GGT ($p = 0.0136$). According to Paolo Gallo et al. [9], a low platelet count, which is linked to decreased thrombopoietin synthesis, indicates declining liver function and bleeding risks. According to Ashish Sharma et al.[10], elevated bilirubin is a sign of liver disease and poor bilirubin metabolism. According to M. Ammar Kalas et al. [11], increased SGOT may be a sign of problems in other organs, and both SGOT and GGT levels are correlated with the severity of the condition. Patients undergoing paracentesis should have these markers regularly checked to evaluate pathology, side effects, and responsiveness to treatment.
- Creatinine, SGPT, and albumin levels did not significantly differ between liver disease groups and controls, which is in line with research by Vincenza C et al.[12] and S.K. Sayal et al.[13] Although normal levels may indicate metabolic syndrome, end-stage liver disease, or metabolic alterations, SGPT abnormalities were observed in the majority of cases. According to Claire Francoz et al.[14], creatinine is a predictive indicator for cirrhosis but is not a reliable indicator of renal function. According to Manuel Tufoni et al.[15], albumin is essential for controlling the consequences of cirrhosis and avoiding circulatory and renal failure.
- According to Suman Set al.'s [16] findings in Bihar,

India, the SAAG successfully distinguished between exudative ascites (18%) and transudative ascites (82%). As the leading cause of transudative ascites, chronic liver disease (CLD) was found to have a substantial correlation with portal hypertension. Other causes included cirrhosis, hepatic parenchymal disease, primary liver cancer, alcohol-related liver disease (ALD), and jaundice. These findings demonstrate the diagnostic use of SAAG in determining the cause of ascitic fluid.

CONCLUSION

- This study draws attention to the important contribution of hematology and the analysis of ascitic fluid to the evaluation of liver disease severity and its etiology. Liver disorders were most common in males aged between 51–70 and alcohol liver damage were found to be one of the prominent causes. Chronic liver disease was the most frequent etiology, followed by cirrhosis and alcoholic liver disease.
- Significant differences reflecting diagnostic value were found in key biochemical markers such as platelet count, bilirubin, SGOT, and GGT among the disease groups. While there was no statistically significant change for creatinine, SGPT, and albumin, their clinically relevant value—especially in latter stages of the disease—cannot be ignored.
- With regard to differentiating transudative from exudative ascites, the Serum-Ascites Albumin Gradient (SAAG) stands out in diagnosing portal hypertension-related ascites, confirming its use as a marker. In conclusion, using these parameters together improves the diagnosis and management of liver diseases.

REFERENCES

1. Harsh Mohan. ―Pathology: Quick Review and MCQs: Based on Textbook of Pathology, 7th Edition.‖ Jaypee, 2015; 4: 381.
2. Kishan P Kotak, Namrata A Desai, Snehal S Patel. ―Investigation of epidemiology and etiology of liver diseases and characterization of its association with various factor.‖ Journal of Pharmaceutical Science and Research, 2015.
3. Moore, K P, and G P Aithal. ―Guidelines on the management of ascites in cirrhosis.‖ Gut, 2006; 55(6): vo1-12
4. Andy S. Yu, Ke-Qin Hu. ―Management of Ascites.‖ Clinics in Liver Disease, 2001; 5: 541-568.
5. Kulkarni AV, Kumar P, Sharma M, Sowmya TR, Talukdar R, Rao PN, Reddy DN. ―Pathophysiology and Prevention of Paracentesis-induced Circulatory Dysfunction: A Concise Review. ‖ J Clin Transl Hepatol, 2020; 8(1): 42-48.
6. Méndez-Sánchez N, Aguilar-Ramírez JR, Reyes A, et al. "Etiology of liver cirrhosis in Mexico." Ann Hepatol, 2004; 3(1): 30-33
7. Rinku Joshi, Dhan Bahadur Shrestha, Rajib Pande, Sukriti Maharjan. "Clinical Profile of Ascites Based on Presentation and Laboratory Findings: An institutional experience from Kathmandu, Nepal." Journal of Medical Research and Innovation, 2018.
8. Bhupinder Kumar, Brij Sharma, Sujeet Raina, Sharma Neetu. "Etiology of ascites in adults living in the Hills of Himachal Pradesh, India: A hospital-based study". CHRISMED Journal of Health and Research, 2016; 3(1): 41-44.
9. Paolo Gallo, Francesca Terracciani, Giulia Di Pasquale, Matteo Esposito, Antonio Picardi, UmbertoVespasiani-Gentilucci. "Thrombocytopenia in Chronic liver disease: Physiopathology and new therapeutic strategies before Invasive procedures." World J Gastroenterol, 2022; 28(30): 4061–4074.
10. Ashish Sharma, Shivaraj Nagali. "Chronic liver disease." In: StatPearls. Treasure Island (FL): StatPearls Publishing, 2023.
11. M Ammar Kalas, Luis Chavez, Monica Leon, Pahnwat Tonya Taweesedt,Salim Surani. "Abnormal liver enzymes: A review for clinicians" World J Hepatol, 2021 Nov 27; 13(11): 1688–1698.
12. Vincenza Calvaruso, Antonio Craxì. "Implication of normal liver enzymes in Liver disease". Journal of Viral Hepatitis, 2009; 16(8): 529-536.
13. SK Sayal, CM Gupta, AL Das, PK Chattwal. "A comparative study of liver function tests in patients of chronic liver disorders with and without cutaneous manifestations." Indian J Dermatol Venereol Leprol, 1997; 63: 15-19.
14. Claire Francoz, Denis Glotz, Richard Moreau, François Durand. "The evaluation of renal function and disease in patients with cirrhosis". Journal of Hepatology, 2010; 52(4): 605-613.
15. Manuel Tufoni, Giacomo Zaccherini, Paolo Caraceni, and Mauro Bernardi. "Albumin: Indications in chronic liver disease". United European Gastroenterol J., 2020; 8(5): 528–535.
16. Shanker Suman, Divya Jyoti, Pramod Kumar Agrawal, Bijoy Kumar Bhattacharya. "Clinicopathological correlation of serum ascites albumin gradient with ascitic fluid total protein in patients of ascites with portal hypertension attending a tertiary care hospital in Eastern Bihar, India". International Journal of Advances in Medicine, 2017; 4(3): 842-846.