

# A Study on Patterns and Predictors of Ascites Outcomes in a Tertiary Healthcare Setting

Vankodoth Sireesha\*, Yapachetty Pravarsha, Sumaya, Kompalli Varun, N. Chaitanya, Meghana CH, K. Megana

Department of Pharm. D, CMR College of Pharmacy, Medchal, Hyderabad, Telangana, INDIA.

## ABSTRACT

**Background:** Ascites is the accumulation of abdominal fluid in the peritoneal cavity. Liver cirrhosis, Alcoholic liver disease, Intra-abdominal malignancy, and tuberculosis are the significant etiologies of ascites. In our context, the etiology behind ascites and its correlation with symptoms and complications have not yet been studied, so the present study is conceptualized to evaluate the clinical profile of ascites. The present study aimed to observe the prevalence, clinical management, and assessment of complications associated with ascites in hospitalized patients, offering insights into contemporary ascites management and outcomes. **Materials and Methods:** A prospective observational study was conducted at a tertiary care hospital in Hyderabad, and over 6 months of study was conducted on 113 patients admitted with ascites. All patients who fulfilled the inclusion criteria of patients above 18 years and ascites confirmed by clinical and ultrasound examination were thoroughly evaluated with a detailed history, physical examination, and appropriate investigations. **Results:** The predominantly male (83%) patient population exhibited liver cirrhosis (27%) as the primary cause, followed by alcoholic liver disease (23%) and portal hypertension (17%). Abdominal distension (24%) and hepatic encephalopathy (35%) were prevalent symptoms. Laboratory analysis revealed transudative ascitic fluid in most cases (10% with SAAG values >1.1 mg/dL), prevalent hyponatremia (up to 50% in cirrhosis and ascites patients), hyperkalemia (1.6%) and anaemia (7%). Management primarily involved diuretics (23%) and human albumin transfusions (19%). **Conclusion:** The study highlights early detection and comprehensive management, including liver transplantation consideration for eligible patients, as pivotal for improved outcomes and reduced morbidity and mortality. Emphasizing a multidisciplinary approach, this study underscores the necessity of vigilant monitoring, appropriate fluid handling, and collaborative efforts among medical specialties in ascites management.

**Keywords:** Ascites, Abdominal Cavity, Liver Cirrhosis, Malignancy, Transudative, SAAG, Exudative, Hyperkalemia.

## Correspondence:

Vankodoth Sireesha

Assistant Professor, Department of Pharm D, CMR College of Pharmacy, Medchal, Telangana, INDIA.

Email: sireeshaganesh59@gmail.com

**Received:** 21-12-2023;

**Revised:** 26-02-2024;

**Accepted:** 09-07-2024.

## INTRODUCTION

Ascites is an abnormal fluid accumulation in the peritoneal cavity, often exceeding 1L, arising from various disease states.<sup>1</sup> Liver cirrhosis accounts for 75% of cases, with other causes including malignant tumors, heart failure, tuberculosis and pancreatitis.<sup>2</sup> Ascites can be linked to portal hypertension (cirrhotic ascites) or be independent of it (non-cirrhotic ascites).<sup>3</sup> Ascites has various other causes such as intrahepatic and extrahepatic portal hypertension, low albumin levels and specific diseases like pancreatic and bile ascites (non-Peritoneal causes), malignant peritoneal mesothelioma and peritoneal cancer (peritoneal causes).<sup>4</sup> Ascites develops by portal sinusoidal hypertension

which leads to altered capillary pressure and permeability in the peritoneum, resulting in fluid accumulation via transudation or exudation mechanisms.<sup>5</sup> In cirrhosis, increased intrahepatic vascular resistance also result from an imbalance between vasodilators and vasoconstrictors.

Ascites that develops slowly may go unnoticed in their milder forms, which can have no symptoms. As it progresses to a moderate stage, ascites accelerates weight gain and waist circumference. In severe cases, huge fluid can accumulate and cause discomfort in the abdomen, limit mobility, and result in hernias, particularly umbilical hernias. If ascites appears suddenly and have previously been stable, it may be an indication of other underlying conditions like cancer, tumour infiltration, peritoneal trauma, or damage to other intra-abdominal organs. Patients may present with abdominal distension, weight gain, weakness and shortness of breath due to fluid accumulation.<sup>6</sup> Other symptoms include back discomfort, heartburn, changes



DOI: 10.5530/ijpi.14.4.127

### Copyright Information :

Copyright Author (s) 2024 Distributed under  
Creative Commons CC-BY 4.0

**Publishing Partner :** EManuscript Tech. [www.emanuscript.in]

in bowel habits and swollen limbs.<sup>7</sup> Patients with advanced liver disease may exhibit various symptoms such as jaundice, muscle wasting and gynecomastia. Additionally, Spontaneous Bacterial Peritonitis (SBP) can lead to fever, abdominal tenderness and confusion. Those who have ascites related to cardiac illness such as dyspnea, orthopnea and peripheral oedema. Recognizing the specific symptoms and causes of ascites is essential in diagnosing and treating the underlying condition effectively.

Ascites diagnosis involves a comprehensive medical history, physical examination which shows a gradual rise in the dimensions of the abdomen, paracentesis and ascitic fluid analysis, including Serum Ascites Albumin Gradient (SAAG) calculation to differentiate portal hypertension-related ascites.<sup>9</sup> Ascetic fluid protein and albumin are measured with the serum albumin level to calculate the SAAG. This diagnostic approach helps healthcare providers more accurately identify and treat this condition. If the gradient of ascitic fluid is  $>1.1$  g/dL, it is highly indicative of portal hypertension in the patient, with a 97% accuracy rate. If the gradient is below 1.1 g/dL, it suggests the absence of portal hypertension. Healthcare providers may perform liver biochemical testing, measure serum albumin levels and assess Prothrombin Time (PT) or INR levels. Additionally, measuring serum amylase and lipase levels can help identify the possibility of acute pancreatitis in the patient. When diagnosing ascites, one crucial test to consider is measuring the amylase levels in the ascitic fluid. An amylase level greater than 1000 U/L may suggest the presence of pancreatic ascites. Performing mycobacterial culture is appropriate only when there is a high degree of suspicion of tuberculosis. An elevated diaphragm may be observed on chest X-ray, while ultrasound is sensitive investigative tool for detecting ascites. In addition to identifying ascites, a CT scan can help identify any masses.<sup>8</sup> Ascites indicate poor prognosis, with one and five-year survival rates of approximately 50% and 20% respectively. Mortality increases with kidney failure and other liver-related conditions.<sup>9</sup> Treatment varies based on severity, ranging from dietary salt reduction and diuretics for mild ascites to paracentesis for severe cases. The primary objectives of therapy in individuals with ascites are to reduce the capacity of ascetic liquid and alleviate peripheral edema while avoiding intravascular volume depletion. The mainstay of treatment involves implementing a low-sodium diet and prescribing diuretics. Diuretics (spironolactone to furosemide) and liquid drainage are mainstream approaches. Fluid removal is done to relieve the patient from ascites. In order to avoid hypotension, albumin supplements are given. Instead of albumin, the practice of terlipressin is a recommended treatment option. For patients who don't respond to diuretics, a viable treatment option is Transjugular Intrahepatic Portosystemic Shunt (TIPS). If it is a symptom of a treatable liver condition such as autoimmune hepatitis, chronic hepatitis B, or hemochromatosis, specific therapies for these underlying diseases may be prescribed. For individuals with cirrhotic ascites, hepatic implantation is a more

effective treatment than medical therapy. Paracentesis, the oldest form of therapy for ascites, is a rapid and effective treatment of this complication. This procedure was abandoned after the introduction of modern diuretics because it could induce serious complications, such as bacterial peritonitis, severe hypovolemia, renal failure, hyponatremia, protein depletion and hepatic encephalopathy.

Ascites is classified into 2 groups based on aetiology, Cirrhotic Ascites are due to portal hypertension, hypoalbuminemia, and Non-cirrhotic Ascites are linked to other causes of ascites. approximately 5% of patients have mixed ascites whereas 10% of patients have Refractory Ascites. Refractory ascites is defined by the presence of ascites that are unresponsive to a low-sodium diet and high-dose diuretics, or ascites that recurs rapidly after fluid removal. In cases of refractory ascites, Liver transplantation should be considered as a therapy for patients who may be considered for refractory ascites.<sup>10-12</sup> Diuretics like spironolactone (100 mg/day) and loop diuretics (40 mg/day) are commonly used for cirrhotic ascites management. Careful management and monitoring are crucial to avoid complications.<sup>13,14</sup>

In our context, etiologies behind ascites and their correlation with symptoms and clinical findings are not yet studied and are still unknown, so the present study is initiated to describe ascites in terms of epidemiological, clinical and etiological aspects in a hospital setting.

## MATERIALS AND METHODS

This was a prospective observational study aimed to comprehensively assess the clinical profiles of ascites in a tertiary care hospital Conducted at Gandhi Hospital in Telangana State from September 2022 to March 2023. The objectives included in our study are evaluating ascites's clinical profile, identifying associated risk factors and past medical illness, assessing complications and scrutinizing the management and treatment approaches employed within the hospital setting.

### Study design and Sample

The study focused on ascetic patients admitted to the General Medicine and Gastroenterology in-patient departments. The inclusion criteria used to admit patients into the study include patients with the age group  $>25$  years. The exclusion criteria in the study are patients with age group less than 25 years, Pregnant and lactating women, Geriatric patients ( $>80$  years age group),

Unconscious and critically ill patients. The study was approved by the Institutional Ethics Committee at CMR College of Pharmacy in Hyderabad, ensuring adherence to ethical guidelines throughout the study with IEC number- CMRCP/IEC/2022-23/07. Data collection was meticulously carried out during the specified period from the admitted patient using data collection form. Statistical analysis involves the utilization

of descriptive and inferential statistics, employing relevant significance tests to analyze the gathered data. This study aimed not only to deepen the understanding of ascites' clinical dynamics but also to contribute insights that could potentially enhance its management within this tertiary care hospital.

## RESULTS

Around 113 cases were observed during a study period of 180 days; no patient has left or absconded the hospital. Finally, 113 cases were identified, included, investigated for clinical profile of ascites.

Figure 1 shows the majority of age group was between 40-49 years ( $n=36$ ), and only 03 patients were admitted with Ascites with age group between 0-19 years. Figure 2 depicts that most of the ascites patients enrolled in the study were males (83%) and the rest were females (17%).

The Table 1 shows the most common clinical finding of Ascites as Cirrhosis of liver ( $n=31$ ), followed by Alcoholic Liver Disease ( $n=27$ ), then Portal hypertension ( $n=21$ ), then Jaundice ( $n=14$ ) and Acute kidney injury ( $n=5$ ). The least common etiology of Ascites as Pancreatitis ( $n=03$ ). This represents cirrhotic ascites is more when compared to non-cirrhotic ascites. Thus Table 1 suggests that CLD as the culprit of ascites.

Figure 3 indicates the most common risk factors and past medical illness of Ascites as alcohol ( $n=77$ ) followed by jaundice ( $n=18$ ) then Diabetes Mellitus ( $n=13$ ) and Herbal medicines ( $n=11$ ) then smoking ( $n=10$ ). The least Hazardous factor for Ascites as history of blood transfusion ( $n=2$ ).

Table 2 depicts the most common signs of ascites was Abdominal distension ( $n=85$ ), icterus ( $n=45$ ), pedal edema ( $n=49$ ), weight loss ( $n=4$ ). The most common Symptoms seen were Abdominal pain ( $n=46$ ), Cough ( $n=15$ ), fever ( $n=30$ ), Decrease urine output ( $n=9$ ), Nausea and vomiting ( $n=8$ ), Shortness of breath ( $n=36$ ), Altered sleep pattern ( $n=13$ ).

Hepatic encephalopathy (50) followed by upper gastrointestinal bleed (33) then acute kidney injury (25), altered sensorium (11), oesophageal varices, hemarroids (3) were the complications observed in the study as shown in the Figure 4.

The Table 3 depicts the laboratory findings of ascetic fluid. Among the 113 Patients SAAG (serum ascites albumin gradient) was tested for 106 patients out of which 18 had Exudative type of ascetic [ $<1.1$  mg/dL] and 88 had Transudative type of ascetic [ $>1.1$  mg/dL]. INR values were tested for 84 patients among them the values were found to be normal for 21 patients and the other 63 patients were falling under the Effective Therapeutic Range, hyponatremia were observed in 52 patients and 14 patients showed hypokalemia and 7 patients had hyperkalemia and normal potassium values were found in 48 patients. Increased levels of SGPT values were observed in 49 patients, increased levels of SGOT values were observed in 24 patients suggesting deranged liver function. Increased levels of Prothrombin originated in 43 patients, low serum protein was seen in 4 patients, serum albumin remained less in 18 patients, 54 patients had abnormal ascetic protein values and 64 patients had high blood urea, high creatinine was observed in 74 patients, suggesting deranged renal function. In case of haemoglobin values 46 males were anaemic and 14 females were anaemic.

Table 4 describes the management of ascities, where diuretics were majorly prescribed for 103 patients and human albumin therapy was given for 77 patients and other treatments such as antibiotic therapy for 80 patients, osmotic laxative for 51 patients; vitamins were given to 35 patients, hepato-protectants in 31 patients, 18 patients were prescribed with anti-hypertensive to treat portal hypertension, opioid analgesic were given for 8 patients. Only 1 patient was prescribed anti-epileptics and anti-fungal.

## DISCUSSION

Ascites is a fatal presentation with many causes behind and can occur at any age but specific etiology may differ. This presentation is common all over the world in medical practice. Its Etiology

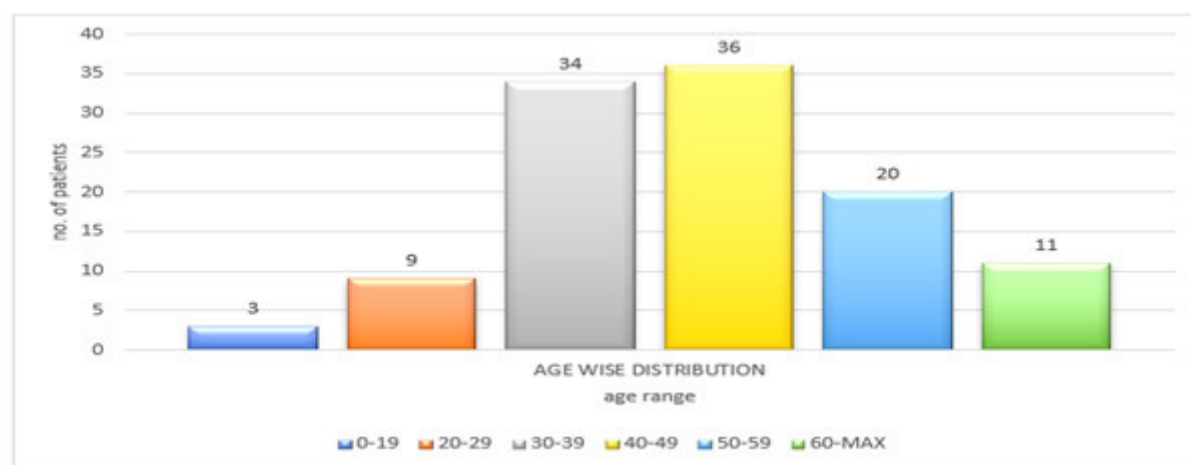
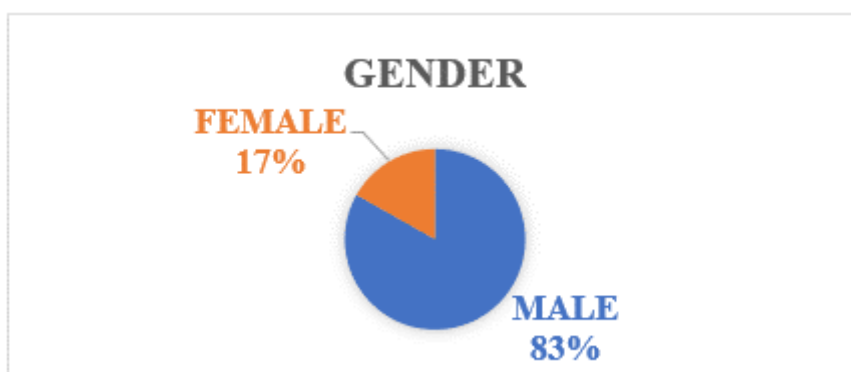


Figure 1: Age-wise distribution of Ascites patients.



**Figure 2:** Gender Wise Distribution of Ascites Patients.

**Table 1: Etiology of ascites.**

Sl. No.	Etiology		Number of Patients (N)	Frequency (%)
1	Cirrhotic Ascities (n=60)	Cirrhosis of liver	31	27.43
		Alcoholic liver disease	26	23
		Hepatitis	3	2.65
2	Non-Cirrhotic Ascities (n=44)	Portal hypertension	20	17.69
		Jaundice	14	12.38
		Tuberculosis	3	2.66
		Pancreatitis	2	1.79
		Acute Kidney Injury	5	4.426
3	Refractory Ascities (n=9)		9	7.97
	Total		113	100

**Table 2: Clinical Features of Ascites.**

Sl. No.	Clinical Findings		Number of Patients (N)	Frequency (%)
1	Signs	Abdominal Distension	85	24
		Pedal Edema	49	14.2
		Icterus	45	13
		Weight Loss	4	1.15
2	Symptoms	Abdominal Pain	46	13.3
		Shortness of Breath	36	10.4
		Fever	30	8.0
		Decreased Urine Output	9	2.6
		Altered sleep pattern	13	3.7
		Nausea/Vomiting	8	2.5
		Cough	15	4.5
		Pleural Effusion	5	1.4
		TOTAL		100

can be suspected from history and examination, but ascitic fluid analysis is an important investigation to diagnose the cause. Its early detection is required to ensure effective management without complications.

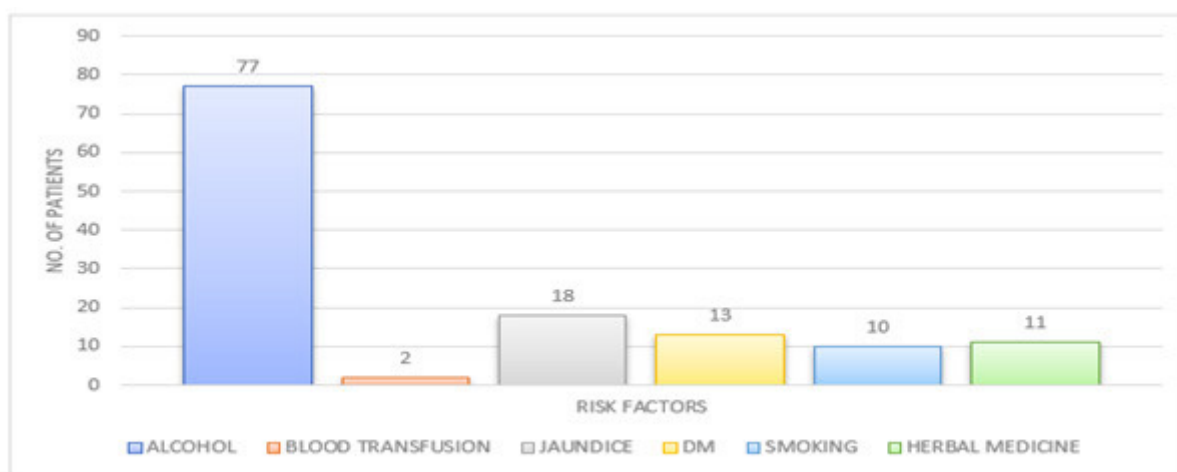
In this prospective observational study, we aimed to comprehensively evaluate the clinical profiles of ascites in a tertiary care hospital. Our findings align with existing research on several aspects of ascites, providing insights into the causes, risk factors and management of this condition. Our study observed a

**Table 3: Laboratory Findings of Ascites.**

Sl. No.	Tests	Reference Value		Number of patients (N)	Frequency (%)	
1	SAAG ( <i>n</i> =106 Patients)	Exudative (<1.1mg/dL)		18	2.1	
		Transudative (> 1.1 mg/dL)		88	10.4	
2	INR Values ( <i>n</i> =84 Patients)	<1.1 (Normal)		21	2.4	
		> 1.1 (Effective Therapeutic Range)		63	7.4	
3	Sodium	Normal (135 - 147 meq/l)		15	1.7	
		Low (<135 meq/l)		52	6.1	
4	Potassium	Normal (3.5 - 5.5 meq/l)		48	5.6	
		Hypokalemia (< 3.5 meq/l)		14	1.6	
		Hyperkalemia (> 5.5 meq/l)		7	0.8	
5	Alanine Transaminase (SGPT)	Normal (0-30 u/l)		17	2	
		High (> 30 u/l)		49	5.8	
6	Aspartate Transaminase (SGOT)	Normal (0-40 u/l)		6	0.7	
		High (> 40 u/l)		24	2.8	
7	Alkaline Transaminase (ALP)	Normal (50 - 160 u/l)		16	1.8	
		High (>160 u/l)		7	0.8	
8	Prothrombin	Normal (9.5 - 13.5 u/l)		15	1.7	
		High (Prolonged)		43	5	
9	Serum Protein	Normal (6.3-8u/l)		6	0.7	
		Low (< 6.3u/l)		4	0.47	
10	Serum Albumin	Normal (3.5-5.5u/l)		2	0.2	
		Low (< 3.5 u/l)		18	2.1	
11	Ascetic Protein	>2.5 u/l		54	6.3	
12	urea	Normal (20-0 u/l)		14	1.6	
		High (> 40)		64	7.5	
13	Creatinine	Normal (0.6-1.1 u/l)		34	4	
		High (> 1.1)		74	8.7	
14	Haemoglobin	Male	Normal	8	0.9	
			Aneamic	46	5.6	
		Female	Normal	3	0.3	
			Anaemic	14	2.8	
		TOTAL				100

higher prevalence of male patients (83.18%) compared to females, consistent with previous research (Dovonou, 2017).<sup>15</sup> This gender distribution suggests potential differences in susceptibility or health-seeking behavior among genders. The age distribution in our study revealed that patients between 40-49 years were the most affected (31.8%), followed by those with the 30-39 years age group (30%), which is in line with research by Mehre Darakhshan (2020).<sup>16</sup> These findings echo trends observed in other studies and emphasize the impact of age on ascites prevalence. Cirrhotic

ascites was the leading cause (27.4%) in our study, followed by alcoholic liver disease (23%) and hepatitis (2.65%), consistent with a study by Bhupinder Kumar (2016).<sup>17</sup> These results correlate with previous studies, underscoring the significant role of liver-related conditions in ascites etiology. Risk factors and past medical history revealed a strong association with alcohol consumption (58.7%), followed by jaundice, diabetes mellitus and herbal medicine use, similar to the findings of Omar Abdu Muhie (2019).<sup>18</sup> The clinical characteristics of ascites patients



**Figure 3:** Risk Factors and Past Medical Illness for Ascites.

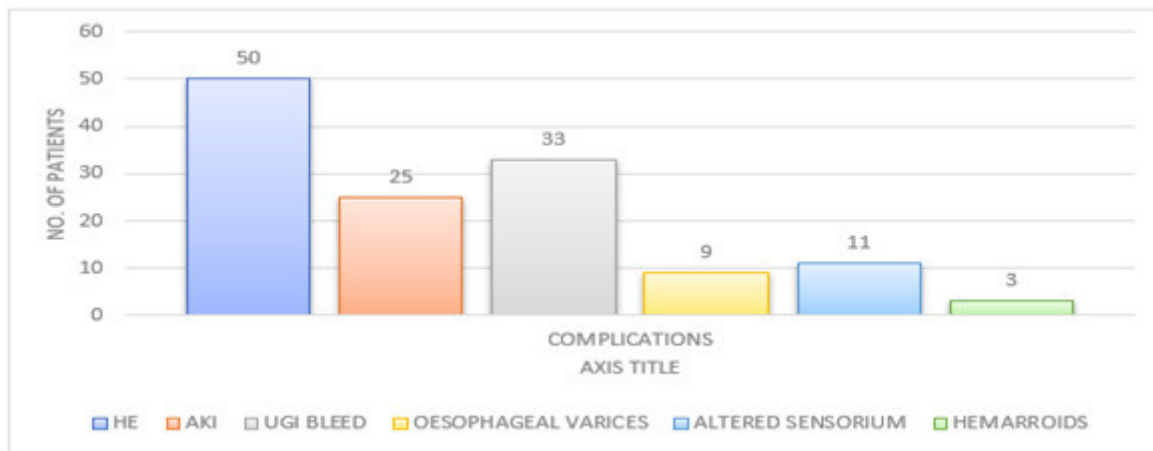
**Table 4:** Clinical Management of Ascites.

Sl. No.	Drug Category	Drug	Number of patients (N)	Frequency (%)
1	Diuretics (n=103)	Lasilactone	19	4.6
		Furosemide	44	10.8
		Spiranolactone	40	9.8
2	Blood Transfusion	Human Albumin	77	19
3	Vitamins	Vitamin K	18	4.4
		Thiamine	8	1.9
		Vitamin B Complex	9	2.2
4	Antibiotics	Rifaximine	43	10.6
		Cefpodoxime Proxetil	12	2.9
		Cefixime	16	3.9
		Ceftriaxone	3	0.7
		Augmentin	4	0.9
		Metronidazole	1	0.2
		Piperacillin Tazobactam	1	0.2
5	Anti-fungal	Fluconazole	1	0.2
6	Osmotic Laxatives	Lactulose	51	1.4
7	Anti-Hypertensive	Terlipressin	6	2
		Carvedilol	12	2.9
8	Opioid Analgesic	Tramadol	8	1.9
9	Hepato- Protectants	Ursodeoxycholicacid	31	9
10	Antiepileptics	Levetiracetam	1	0.2
		TOTAL	405	100

were consistent with prior studies. Abdominal distension (46.44%) was the most common sign, followed by pedal edema and icterus. Abdominal pain (28.39%) was the most frequent symptom, followed by shortness of breath and fever, in agreement with Uddin J (2020).<sup>19</sup> Hepatic encephalopathy (35.71%) emerged as the primary complication in our study, aligning with earlier

findings (Srinivasan Rao Sudulagunta, 2015).<sup>20</sup> This highlights the significant burden of hepatic encephalopathy in ascites patients. Regarding ascitic fluid analysis, our findings showed that transudative ascites (SAAG >1.1g/dL) was more prevalent, suggesting a predominant etiology of cirrhotic ascites, similar to the study by Shrestha D (2018).<sup>21</sup> This is a valuable diagnostic





**Figure 4:** Complications of ascites.

marker for differentiating between liver-related and non-liver-related ascites. In terms of management, diuretics (25.5%) and human albumin therapy (19%) were the most commonly prescribed treatments, consistent with the study by Huang HC (2013).<sup>22</sup> and in line with current guidelines for managing ascites.

## CONCLUSION

In conclusion, our study provides a comprehensive overview of the clinical profiles of ascites in a tertiary care hospital. It reaffirms cirrhotic ascites as the leading cause and highlights the significant role of alcohol consumption and jaundice as risk factors. Abdominal distension and hepatic encephalopathy were predominant clinical characteristics and complications, respectively. The study underscores the effectiveness of diuretics and human albumin therapy in managing ascites. Clinicians should consider the wide range of etiologies when evaluating ascites patients and give due attention to these factors to ensure appropriate and effective management. Further, it is necessary for a clinician to consider and give priority to these diseases, for effective management and to decrease the complication. Thus, research can delve into the impact of gender and age on ascites prevalence and explore new approaches to ascites treatment and prevention.

## ACKNOWLEDGEMENT

The authors are thankful to the CMR College of Pharmacy, Department of Pharm D, which supported the realization of this study. The authors wish to express their sincere gratitude to the principal and Professors of the College for their enthusiasm, patience, insightful comments, helpful information, and practical advice that have helped me tremendously at all times in my research and writing of this thesis. We are also grateful to the college staff for their consistent support and assistance.

## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The research project was approved by IEC, CMR College of Pharmacy.

## ABBREVIATIONS

**SBP:** Spontaneous Bacterial Peritonitis; **TIPS:** Trans jugular Intrahepatic Portosystemic Shunt; **SAAG Serum:** Ascites Albumin Gradient; **INR:** International Normalized Ratio; **ALD:** Alcoholic Liver Disease; **COL:** Cirrhosis of Liver; **LVP:** Large Volume Paracentesis; **CA:** Chylous Ascites; **DP:** Dialysis Peritoneal; **PHTN:** Portal Hypertension; **HRS:** Hepato Renal Syndrome; **UGI:** Upper Gastro Intestinal; **AKI:** Acute Kidney Injury.

## REFERENCES

- Gokturk HS, Demir M, Ozturk NA, *et al.* The role of ascitic fluid viscosity in the Differential diagnosis of ascites. *Can J Gastroenterol Hepatol.* 2010;24(4). doi: 10.1155/2010/896786.896786.
- Staff writer. Oakland, CA: Institute of American Cultures; 2010. Ascites. Dictionary.com: An. Available from: Ask.com Service. [retrieved Dec 14, 2201]
- Pedersen JS, Bendtsen F, Møller S. Management of cirrhotic ascites. *Ther Adv [publication].* May. 2015;6(3):124-37. doi: 10.1177/2040622315580069. PMID 4416972, PMID 25954497.
- Runyon BA. Ascites. In: Schiff L, Schiff ER, editors. *Diseases of the liver.* 7<sup>th</sup> ed. Philadelphia: Lippincott. p. 1993990-1015.
- Dib N. Current management of the complications of portal hypertension: variceal Bleeding and ascites. *C.M.A.J Can Med Assoc J.* 2006;174(10):1433-43
- Dovonou AC, Alassani AC, Saké K, Adé S, Attinsounon CA, Ahoui S, *et al.* Epidemiological, clinical and etiological aspects of ascites in the Medicine Department at the Departmental University Hospital of Borgou. *Open J Intern Med.* 2017;7(3):58-63. doi: 10.4236/ojim.2017.73006
- Muhie OA. Causes and clinical profiles of ascites at University of Gondar Hospital, Northwest Ethiopia: Institution-Based Cross-Sectional Study. *Can J Gastroenterol Hepatol.* 2019;2019:5958032. doi: 10.1155/2019/5958032, PMID 31360695
- Sireesha V, Sumaya Sumaya, Varun K, Pravarsa Y, Tadikonda RR. A review on ascites: causes, diagnosis and management. *Int J Sci Eng Dev Res, ISSN: 2455-2631.* 2023;8(10):126-30
- Hulin P, Fortea JI, Crespo J, Fábrega E. Ascites: treatment, complications and prognosis: March 16<sup>th</sup>, 2017. *Rev Educ.* 2017. doi: 10.5772/intechopen.70384.
- Storni F, Stirnimann G, Banz V, De Gottardi A. Treatment of malignant ascites using an automated pump device. *Am J Gastroenterol.* 2018;113(7):1060-1. doi: 10.1038/s41395-018-0100-1, PMID 29867179.

11. Moore KP, Wong F, Gines P, Bernardi M, Ochs A, Salerno F, *et al.* The management of ascites in cirrhosis: report on the consensus conference of the International Ascites Club. *Hepatology*. 2003;38(1):258-66. doi: 10.1053/jhep.2003.50315, PMID 12830009.
12. European Association for the Study of the Liver. EASL clinical practice guidelines on the management of ascites, spontaneous bacterial peritonitis and hepatorenal syndrome in cirrhosis. *J Hepatol*. 2010;53(3):397-417. doi: 10.1016/j.jhep.2010.05.004, PMID 20633946.
13. Arroyo V, Ginès P, Gerbes AL, Dudley FJ, Gentilini P, Laffi G, *et al.* Definition and diagnostic criteria of refractory ascites and hepatorenal syndrome in cirrhosis. International ascites club. *Hepatology*. 1996;23(1):164-76. doi: 10.1002/hep.510230122, PMID 8550036.
14. Biggins SW, Angeli P, Garcia-Tsao G, Ginès P, Ling SC, Nadim MK, *et al.* Diagnosis, evaluation and management of ascites, spontaneous bacterial peritonitis and hepatorenal syndrome: 2021 Practice Guidance by the American Association for the Study of Liver Diseases. *Hepatology*. 2021;74(2):1014-48. doi: 10.1002/hep.31884, PMID 33942342.
15. Dovonou AC, Alassani AC, Saké K, Adè S, Attinsounon CA, Ahoui S, *et al.* Epidemiological, clinical and etiological aspects of ascites in the Medicine Department at the Departmental University Hospital of Borgou. *Open J Intern Med*. 2017;7(3):58-63. doi: 10.4236/ojim.2017.73006.
16. Uddin J, Mehdi MD, Kumar S, Singh MP. Study of etiological and clinical profile of ascites in a tertiary Care Hospital in Seemanchal region of Bihar. *Ann. Int. Med. Den. Res*. 2020;6 (5):ME18-ME18-ME2.
17. Kumar B, Sharma B, Raina S, Sharma N, Gupta D, Mardi K. Etiology of ascites in adults Living in the Hills of Himachal Pradesh, India: A Hospital-based study. *CHRISMED J Health Res*. 2016;3(1):41-4. doi: 10.4103/2348-3334.172398.
18. Muhie OA. Causes and clinical profiles of ascites at University of Gondar Hospital, Northwest Ethiopia: Institution-Based Cross-Sectional Study. *Can J Gastroenterol Hepatol*. 2019; 2019:5958032. doi: 10.1155/2019/5958032, PMID 31360695.
19. Uddin J, Mehdi MD, Kumar S, Singh MP. Study of etiological and clinical profile of ascites in a tertiary Care Hospital in Seemanchal region of Bihar. *Ann. Int. Med. Den. Res*. 2020; 6(5):ME18-ME18-ME2.
20. Sudulaguntaa SR, Sodalaguntab MB, Kumar S. Bangalorer raja, Hadi Khorramd, Mona Sepehrar, Zahra Noroozpoura, Clinical profile and complications of paracentesis in refractory ascites patients with cirrhosis, *Gastroenterol res*. 2015;8(3-4):228-33.
21. Shrestha D, Pande R, Maharjan S. Clinical Profile of ascites based on Presentation and Laboratory Findings: an institutional experience from Kathmandu, Nepal. *J Res Innov*. 2018; 2 (1):e000101. doi: 10.15419/jmri.10.
22. Huang LL, Xia HHX, Zhu SL. Ascitic fluid analysis in the differential diagnosis of ascites: focus on cirrhotic ascites. *J Clin Transl Hepatol*. 2014;2(1):58-64. doi: 10.14218/JCTH.2013.00010, PMID 26357618.

**Cite this article:** Sireesha V, Pravvarsha Y, Sumaya S, Varun K, Chaitanya N, Meghana C, Megana K A Study on Patterns and Predictors of Ascites Outcomes in a Tertiary Healthcare Setting. *Int. J. Pharm. Investigation*. 2024;14(4):1166-73.