

A dissertation on

**A STUDY ON ESTIMATING PREVALENCE OF SPONTANEOUS
BACTERIAL PERITONITIS IN ASYMPTOMATIC OUTPATIENTS
WITH CIRRHOTIC ASCITES UNDERGOING THERAPEUTIC
TAPPING**



Dissertation submitted to

**THE TAMIL NADU Dr M.G.R. MEDICAL UNIVERSITY
CHENNAI, TAMILNADU**

with partial fulfilment of the regulations required

for the award of degree of

M.D. GENERAL MEDICINE

BRANCH- I



REG NO: 201711317

COIMBATORE MEDICAL COLLEGE

COIMBATORE

MAY 2020

1 CERTIFICATE

This is to certify that this dissertation titled **“A STUDY ON ESTIMATING PREVALENCE OF SPONTANEOUS BACTERIAL PERITONITIS IN ASYMPTOMATIC OUTPATIENTS WITH CIRRHOTIC ASCITES UNDERGOING THERAPEUTIC TAPPING ”**

has been done by **Dr.SUBITHA.S** under my guidance.

Further certified that this work is an original, embodying study of bonafide cases.

Department of Medicine,
Coimbatore Medical College Hospital,
Coimbatore

Professor and Head of the Department, Dean,
Department of Medicine, Coimbatore Medical College Hospital,
Coimbatore Medical College Hospital Coimbatore
Coimbatore

2 CERTIFICATE - II

This is to certify that this dissertation titled **“A STUDY ON ESTIMATING PREVALENCE OF SPONTANEOUS BACTERIAL PERITONITIS IN ASYMPTOMATIC OUTPATIENTS WITH CIRRHOTIC ASCITES UNDERGOING THERAPEUTIC TAPPING”**

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All the details of the patients, the materials and methods used are true to the best of my knowledge.

I assure that this dissertation has not been submitted to or evaluated by any other Medical University.

DR. SUBITHA.S

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**INSTITUTIONAL HUMAN ETHICS COMMITTEE
COIMBATORE MEDICAL COLLEGE, COIMBATOR - 14**

EC Reg No. ECR/892/Inst/TN/2016
Telephone No: 0422 - 2574375/76
Fax : 0422 - 2574377

CERTIFICATE OF APPROVAL

To
Dr.Subitha S
Post Graduate,
Department of General Medicine,
Coimbatore Medical College & Hospital
Coimbatore -18.

Dear **Dr.Subitha S**

The Institutional Ethics Committee of Coimbatore Medical College, reviewed and discussed your application for approval of the proposal entitled "**A Study on Prevalence of Asymptomatic Spontaneous Bacterial Peritonitis in Patients with Cirrhotic Ascites** .-No.096/2017.


The following members of Ethics Committee were present in the meeting held on 28.11.2017.conducted at MM - II Seminar Hall, Coimbatore Medical College Hospital Coimbatore-18.

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10	Dr.N.Paramasivan MD., Professor of Pharmacology, Sri Ramakrishna Dental College, Coimbatore	Basic Medical Scientist
11	Mrs.A.Sharmila BA., BL., Advocate	Legal Expert
12	Dr.K.P.Sampath Kumar M.Pharm, Ph.D., Asst. Prof. of Pharmacy, CMC, Cbe	Scientific Member
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15	Mr.V.A.Shahul Hameed, +2	Lay-Person

We approve the Proposal to be conducted in its presented form.

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The Institutional Ethics Committee expects to be informed about the progress of the study, and SAE occurring in the course of the study, any changes in the protocol and patients information/informed consent and asks to be provided a copy of the final report.


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ABSTRACT:

Introduction:

Spontaneous bacterial peritonitis (SBP) is most common, potentially lethal and characteristic infectious complication of cirrhosis. SBP is defined as the presence of infection in ascetic fluid in absence of any distinguishable secondary cause of peritonitis. The profile of SBP may differ with different ethnic groups, geographic factors, social factors and etiological factors. Although there is evidence of SBP, from both the developed and developing nations, there has not been any study conducted in India to find out the occurrence of SBP, especially in southern part of India and in a tier II city like Coimbatore. Hence, we intended to conduct this to assess the frequency of Spontaneous Bacterial Peritonitis in asymptomatic outpatients with cirrhotic ascites, through the analysis of ascetic fluid. This further aimed to study the variations in CLD patients and relationship of different signs, symptoms or laboratory outcomes with the presence of SBP.

Objectives:

To assess the frequency of Spontaneous Bacterial Peritonitis and to analyse ascitic fluid and serum values of asymptomatic outpatients with cirrhotic ascites.

Methodology:

This is cross sectional study done among the Medicine OPD patients of CMCH, Coimbatore Hospital presenting with the cirrhosis and ascites. This study was conducted over 18 months (March 2018-March 2019) among 50 individuals.

Results:

In this study, 48% of the subjects had cirrhosis due to alcohol followed by 24% due to HCV, 14% due to HCV & alcohol and 14% were cryptogenic. In this study, 68% of the subjects showed negative in their ascitic fluid culture. Of the remaining 32% who showed positive in their ascitic fluid culture, 16% showed Staph. aureus and 16% showed Staph. Viridians. 30% of the subjects showed negative for spontaneous bacterial peritonitis. Of the remaining 70% who showed positive for spontaneous bacterial peritonitis, 32% had culture positive neutrocytic ascites and 38% showed culture negative neutrocyticascites.62% of the subjects were hospitalized and out of them 56% received cefotaxime antibiotic and 6% received Norfloxacin antibiotic.

Conclusion:

Among subjects with Child's score class C, 100% subjects had SBP. Also there is significant relationship between Child's score and SBP. Serum sodium, albumin, bilirubin, ascitic fluid protein and total leucocyte count were significantly different among the SBP patients and hence these values can be considered as early predicting markers of SBP in patients with cirrhosis.

LIST OF ABBREVIATIONS:

SBP	SPONTANEOUS BACTERIAL PERITONITIS
MELD	MODEL FOR END STAGE LIVER DISEASE
TLC	TOTAL LEUKOCYTE COUNT
PMN	POLYMORPHONUCLEAR CELLS
HCV	HEPATITIS C VIRUS
Na	SODIUM
PT	PROTHROMBIN TIME
CNNA	CULTURE NEGATIVE NEUTROCYTIC ASCITES
PHT	PORTAL HYPERTENSION
AF	ASCITIC FLUID
SAAG	SERUM-ASCITES ALBUMIN GRADIENT
HCC	HEPATOCELLULAR CARCINOMA
CLD	CHRONIC LIVER DISEASE
DCLD	DECOMPENSATED CHRONIC LIVER DISEASE
LDH	LACTATE DEHYDROGENASE
ABA	ASYMPTOMATIC BACTERASCITES
SBA	SYMPTOMATIC BACTERASCITES

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1 Introduction:

Liver cirrhosis is a disease of the liver characterised by defects in the normal microcirculation, the gross vascular anatomy, and the hepatic architecture, with fibrous septa adjoining to the regenerated or regenerating parenchymal nodules. Cirrhosis is an growing cause of morbidity and mortality in more developed countries. It is the 14th most common cause of death globally. (1)

Spontaneous bacterial peritonitis (SBP) is most common, potentially lethal and characteristic infectious complication of cirrhosis. SBP is defined as the presence of infection in ascetic fluid in absence of any distinguishable secondary cause of peritonitis.(2) More than half of cirrhosis patients who develop ascites within ten years of the diagnosis of cirrhosis.(3,4)

Incidence of SBP varies from 7% to 30% per year in ascites patients.(5) A classic case of SBP is diagnosed based on a positive ascitic fluid culture or a neutrophil count > 240/cmm. Conn and Fessel first described it in 1971 as a syndrome of infected ascetic fluid. (6,7)Two variants of SBP are present such as Culture Negative Neutrocytic Ascites (CNNA) and Bacterascites (BA). (8)

Compared to other fluids, the ascitic fluid chemical examination changes slightly during SBP. This can be contrasted to gut perforation into ascitic fluid in which the glucose concentration drops and LDH raise occurs in almost all the patients. (9)The clinical Variants of Spontaneous Bacterial peritonitis syndrome include the following:

1. Spontaneous bacterial peritonitis (culture positive peritonitis)
2. Culture negative SBP (false-negative SBP or probable SBP)
3. Asymptomatic bacterascites (ABA)

4. Symptomatic bacterascites (SBA). (10)

Common symptoms and signs that are described to have some relationship with SBP comprise of fever, diarrhoea, gastro intestinal bleeding, abdominal pain/ tenderness, vomiting, diarrhoea, hepatic encephalopathy etc.(11) Since the clinical features of the SBP are non-specific and the diagnosis is complex by the ascitic fluid analysis, early recognition of the disease is not possible. However, the early diagnosis and appropriate management of the illness will reduce the in-hospital mortality rate to 20%. (12)

Polymorphonuclear (PMN) cell count in the ascitic fluid plays a vital role in the diagnosis and management of spontaneous bacterial peritonitis. (13) Accordingly, raise of PMN counts to $> 250/\text{mm}^3$ in ascitic fluid has been accepted as a diagnostic criterion of SBP, with out the consideration of the recognition of bacteria in cultures of the ascitic fluid. (12)

The infection of ascitic fluid in SBP is deliberated to be blood-borne. SBP is monomicrobial in (majority almost 90%) of patients. Its manifestation is connected to reduced levels of protein and diminished opsonic activity in ascitic fluid. Most occurrences of spontaneous bacterial peritonitis are monomicrobial. These episodes are produced by enteric bacteria. Of such occurrences, 67% include gram- negative bacteria, Escherichia coli being the most commonly isolated organism. (14)

The mechanism by which ascites progresses in cirrhosis is multifactorial. Severe sinusoidal portal hypertension, impairment of immune defence mechanism and hepatic insufficiency are the preliminary factors.(15) SBP is mostly initiated by Gram-negative bacteria present in intestine. Gram-positive cocci can be involved in nosocomial-acquired SBP. It has a mortality rate of about 30% occurrence since it is associated with

complications, like renal and circulatory failure, coagulopathy, encephalopathy, cardiac dysfunction, and relative adrenal insufficiency, eventually leading to multi-organ failure and death within a few days or weeks certain number of cases.(16)

The profile of SBP may differ with different ethnic groups, geographic factors, social factors and etiological factors. Although there is evidence of SBP, from both the developed and developing nations, there has not been any study conducted in India to find out the occurrence of SBP, especially in southern part of India and in a tier II city like Coimbatore. Hence we intended to conduct this to assess the frequency of Spontaneous Bacterial Peritonitis in asymptomatic outpatients with cirrhotic ascites, through the analysis of ascetic fluid. This further aimed to study the variations in CLD patients and relationship of different signs, symptoms or laboratory outcomes with the presence of SBP.

2 Aim and Objectives:

Aim:

To assess the frequency of Spontaneous Bacterial Peritonitis in asymptomatic outpatients with cirrhotic ascites.

Objectives:

To analyse the ascetic fluid in asymptomatic outpatients with cirrhotic ascites attending the OPD of CMCH, Coimbatore.

To study the prevalence of SBP in asymptomatic outpatients with cirrhotic ascites attending the OPD of CMCH, Coimbatore.

3 Review of Literature:

Review of Literature of this study is discussed under the following heads:

i. Cirrhosis

- a. Aetiology
- b. Complications

ii. Ascites

- a. Pathogenesis
- b. Causes
- c. Classification
- d. Ascitic fluid laboratory tests
- e. Management of Ascites

iii. Spontaneous Bacterial Peritonitis

- a. Pathogenesis
- b. Differential diagnosis
- c. Management
- d. Treatment
- e. Prophylaxis indications
- f. Prophylaxis regimens

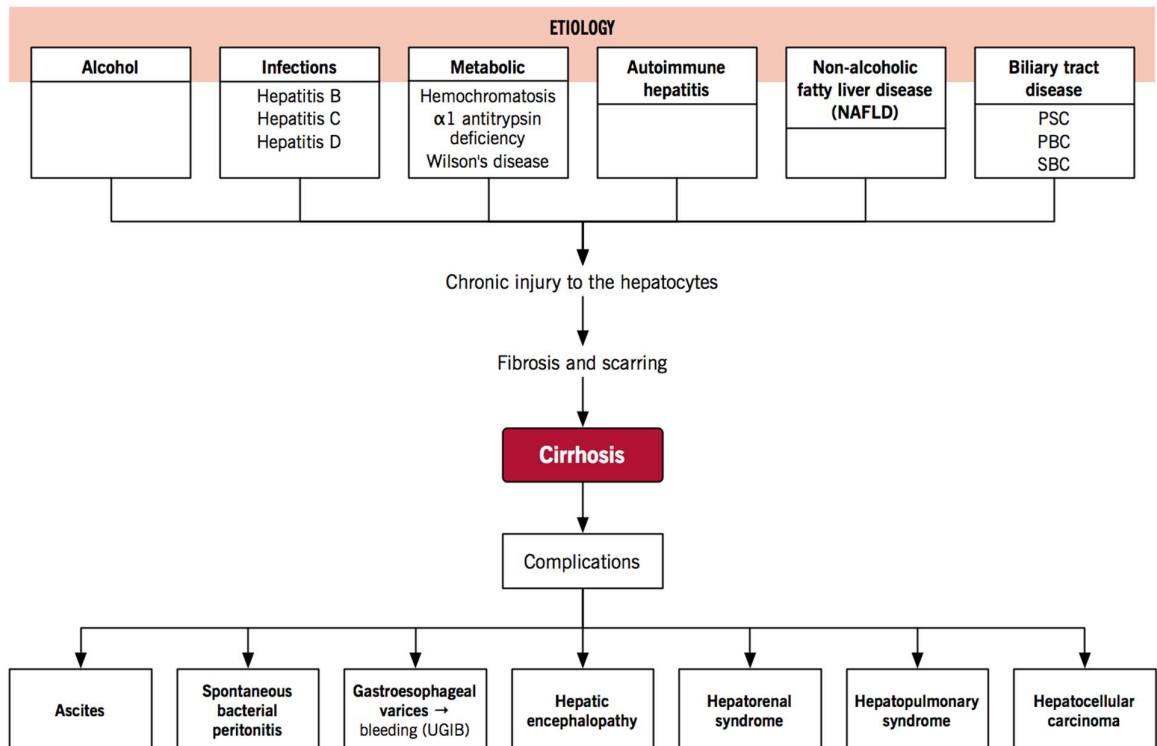
iv. Similar studies in this topic.

i. Cirrhosis:

Liver is a complex organ with multiple functions. The metabolism of carbohydrate, fat, protein and drugs occur in Liver. Apart from that metabolic functions, synthesis, storage, digestion, excretion and immunology happens in Liver.(17) Liver cirrhosis is a disease of the liver characterised by defects in the normal microcirculation, the gross vascular anatomy, and the hepatic architecture, with fibrous septa adjoining to the regenerated or regenerating parenchymal nodules. (1)

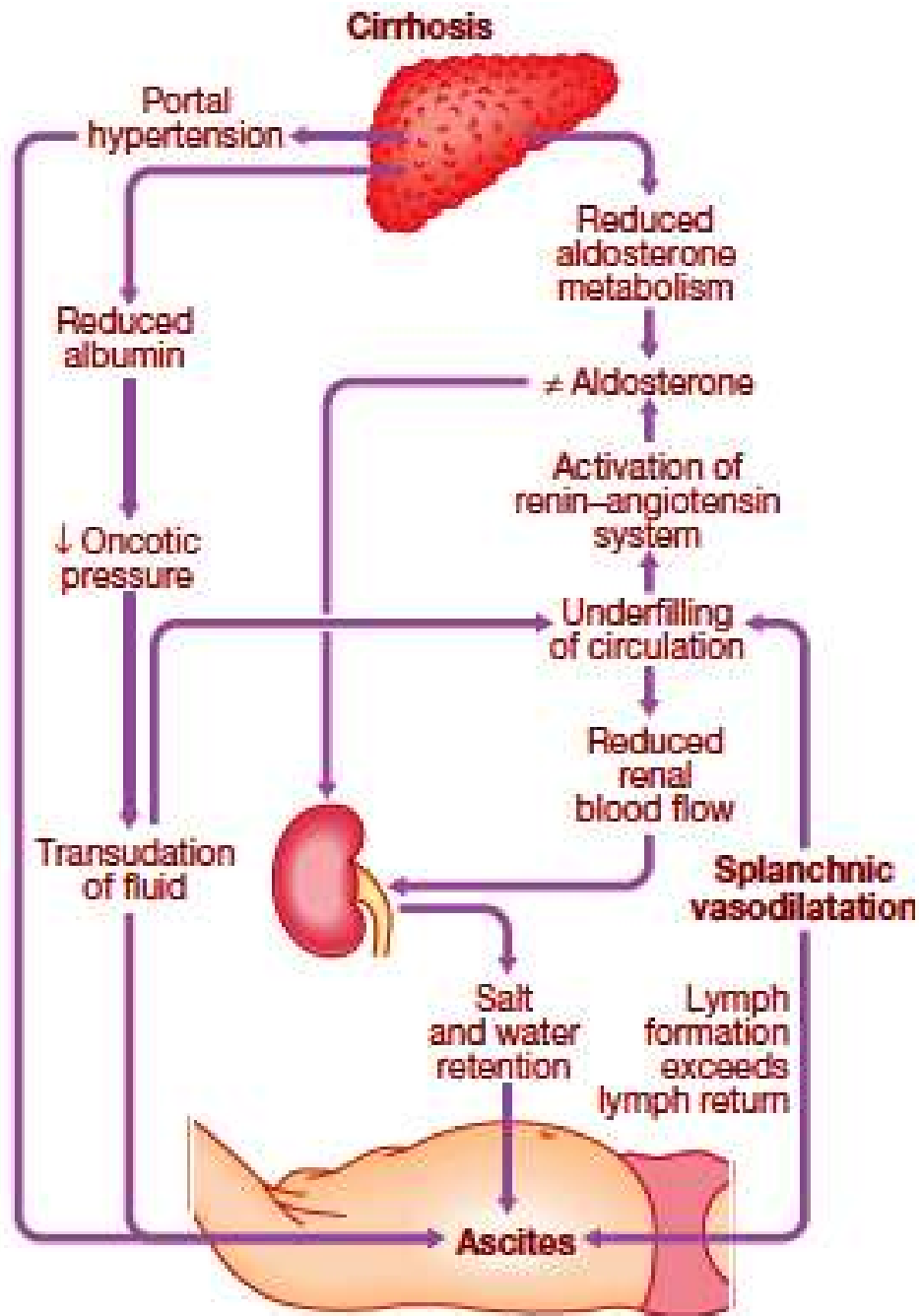
The major causes of liver cirrhosis comprise of excessive alcohol consumption, non-alcohol related fatty liver disease, autoimmune liver disease, viral hepatitis, and metabolic liver disease. (18–20) The following image represents the aetiology and complications of cirrhosis,(21)

Fig. Aetiology and complications of Cirrhosis:



The following image represents the development of ascites in cirrhosis,

Fig. Mechanism of Ascites in Cirrhosis:

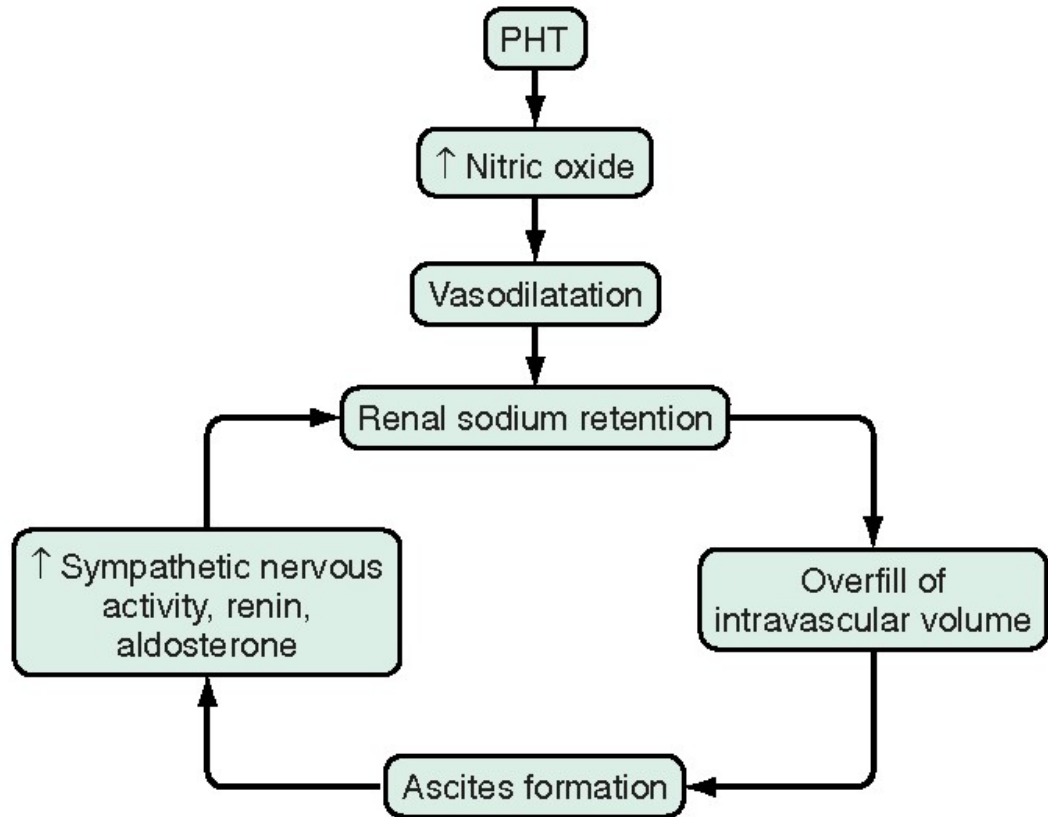


ii. Ascites:

Ascites is accumulation of free fluid in the abdominal cavity (peritoneum). It is a sign of decompensation of Liver function. (1,22) Approximately about one fifth of people affected with cirrhosis will have ascites. The yearly incidence rate is about 1 to 4%. It is the first sign of compensated liver disease in about one third of the patients. (23,24)

The following image represents the pathogenesis of ascites in cirrhosis,(25)

Fig. Pathogenesis of ascites in cirrhosis:



The following table represents the causes of ascites in which cirrhosis is the most common cause of ascites,(25)

Table. Causes of Ascites:

CAUSE	%
Cirrhosis (with or without infection)	85
Miscellaneous portal hypertension-related disorder (including 5% with two causes)	8
Cardiac disease	3
Peritoneal carcinomatosis	2
Miscellaneous nonportal hypertension-related disorders	2

The following image represents the classification of ascites in to high and low gradient based on the serum albumin gradient and the conditions associated with it,

Fig. Classification of ascites by serum-ascites albumin gradient:

HIGH GRADIENT ≥1.1 g/dL (11 g/L)	LOW GRADIENT <1.1 g/dL (11 g/L)
Alcoholic hepatitis	Biliary ascites
Budd-Chiari syndrome	Bowel obstruction or infarction
Cardiac ascites	Nephrotic syndrome
Cirrhosis	Pancreatic ascites
Fatty liver of pregnancy	Peritoneal carcinomatosis
Fulminant hepatic failure	Postoperative lymphatic leak
Massive liver metastases	Serositis in connective tissue diseases
“Mixed” ascites	Tuberculous peritonitis
Myxedema	
Portal vein thrombosis	
Sinusoidal obstruction syndrome	

The table represents the routine, optional, unusual and unhelpful lists of ascitic fluid laboratory tests,

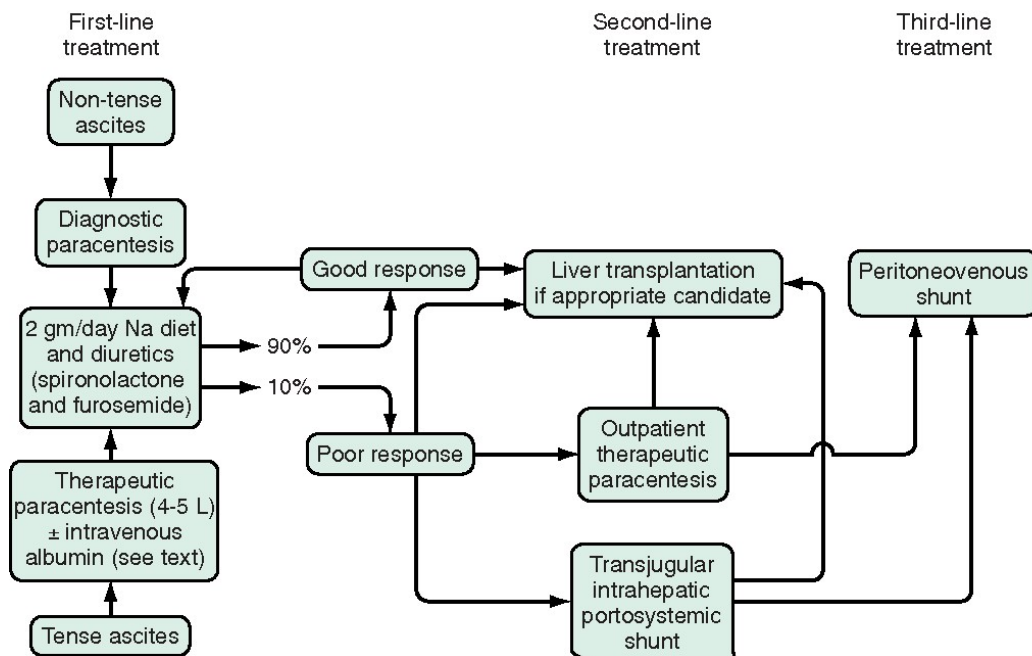
Table. Ascitic fluid laboratory tests:

ROUTINE	OPTIONAL	UNUSUAL	UNHELPFUL
Cell count	Amylase	Bilirubin	Cholesterol
Albumin	Culture in blood culture bottles	Cytology	Fibronectin
Total protein	Glucose	TB smear, culture, and PCR test	Lactate
	Gram stain	Triglycerides	pH
	LDH		

LDH, lactate dehydrogenase; PCR, polymerase chain reaction; TB, tuberculosis.

The following image represents the algorithm for management of ascites in cirrhosis patients,(25)

Fig. Management of ascites in cirrhosis:



iii. Spontaneous Bacterial Peritonitis:

When the ascitic fluid is infected with bacteria, it is termed as spontaneous bacterial peritonitis (SBP). The ascitic fluid culture has a poor sensitivity and hence spontaneous bacterial peritonitis is diagnosed by a polymorphonuclear (PMN) leukocyte count of greater than 250 / mm³ in the ascitic fluid. (2)

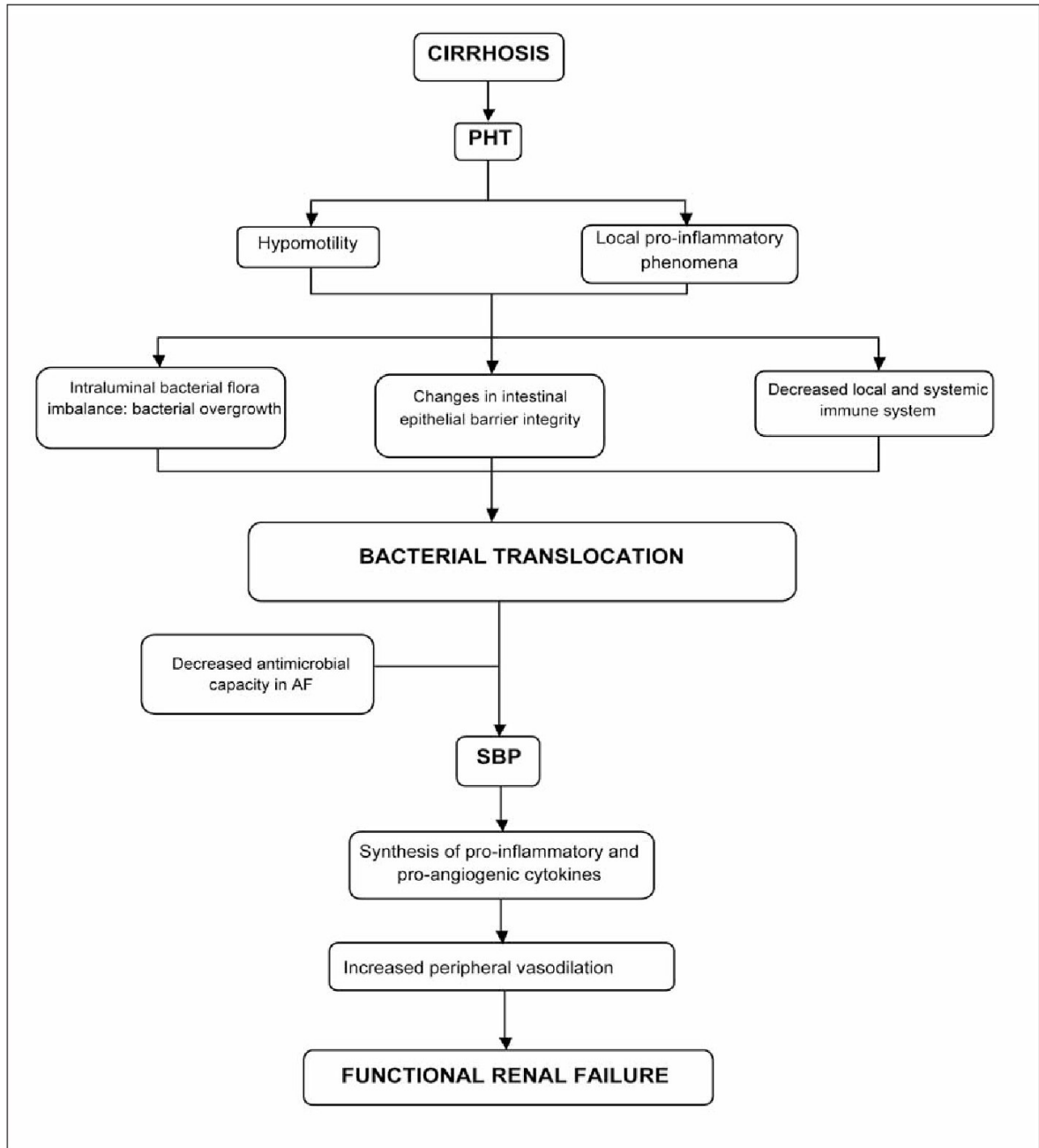
Spontaneous bacterial peritonitis may or may not be associated with symptoms. These include symptoms of peritonitis like abdominal pain and systemic infection such as fever, rigors, chills, and hypotension. (26)

The pathophysiology is not completely understood. The probable mechanism are,

- i. Increased portal systemic hypertension
 - a. Causes mucosal oedema of the bowel wall
 - b. Increases transmural migration of enteric organisms into the ascitic fluid
- ii. Impaired phagocytic function in the liver
- iii. Impaired immunologic activity in ascitic fluid.

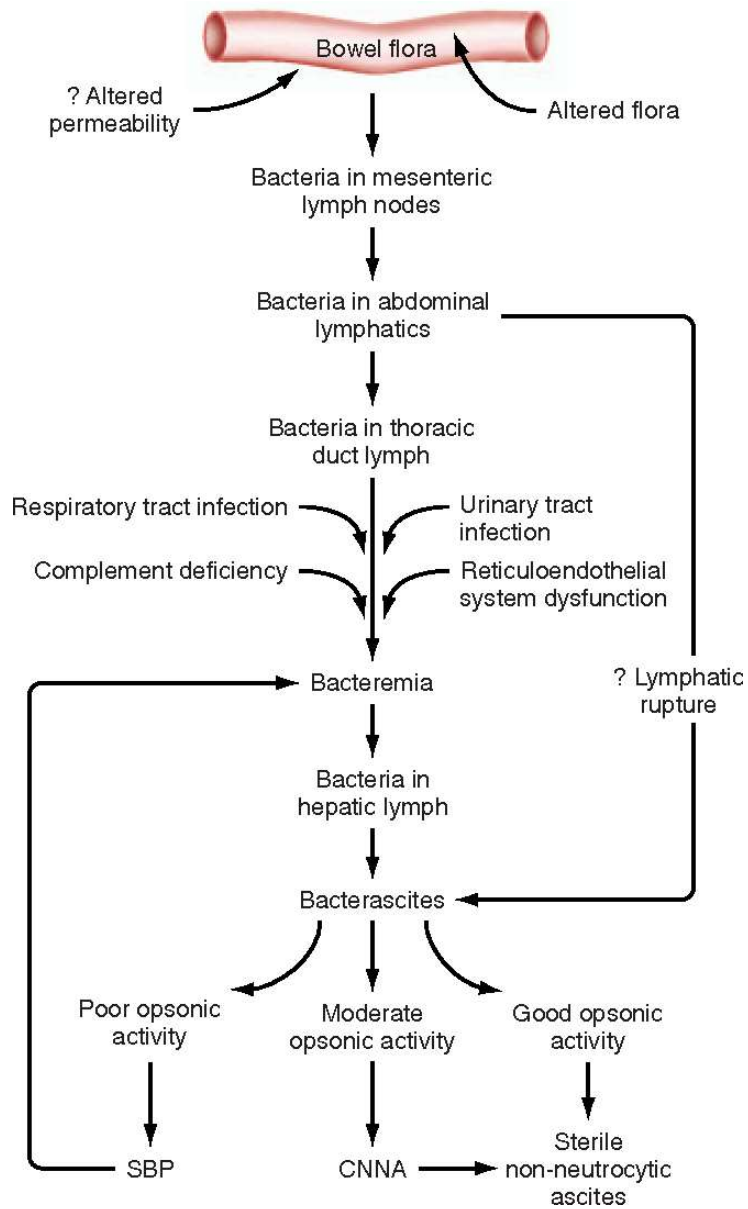
The following image represents the pathophysiology of SBP,(27)

Fig. Pathophysiology of SBP:



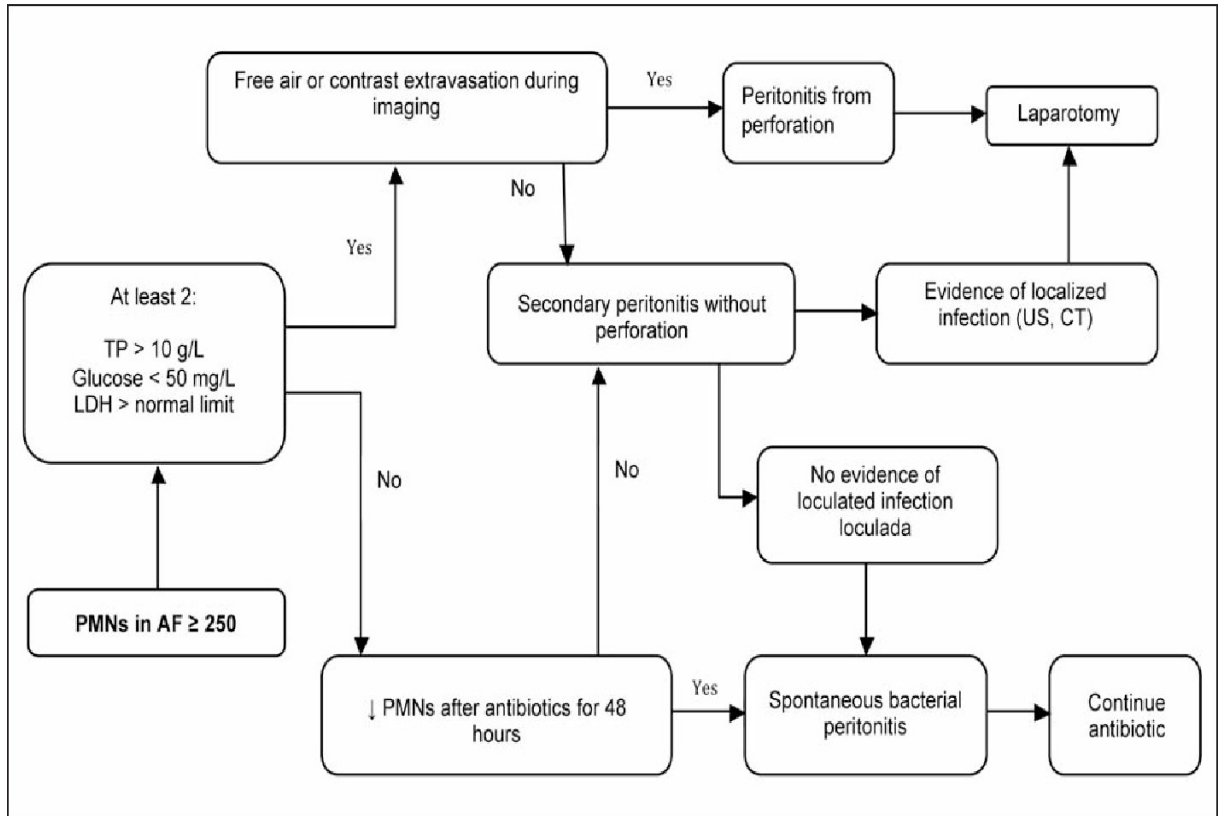
The following image represents the proposed pathogenesis of spontaneous ascitic fluid infection,(25)

Fig. Pathogenesis of spontaneous ascitic fluid infection:



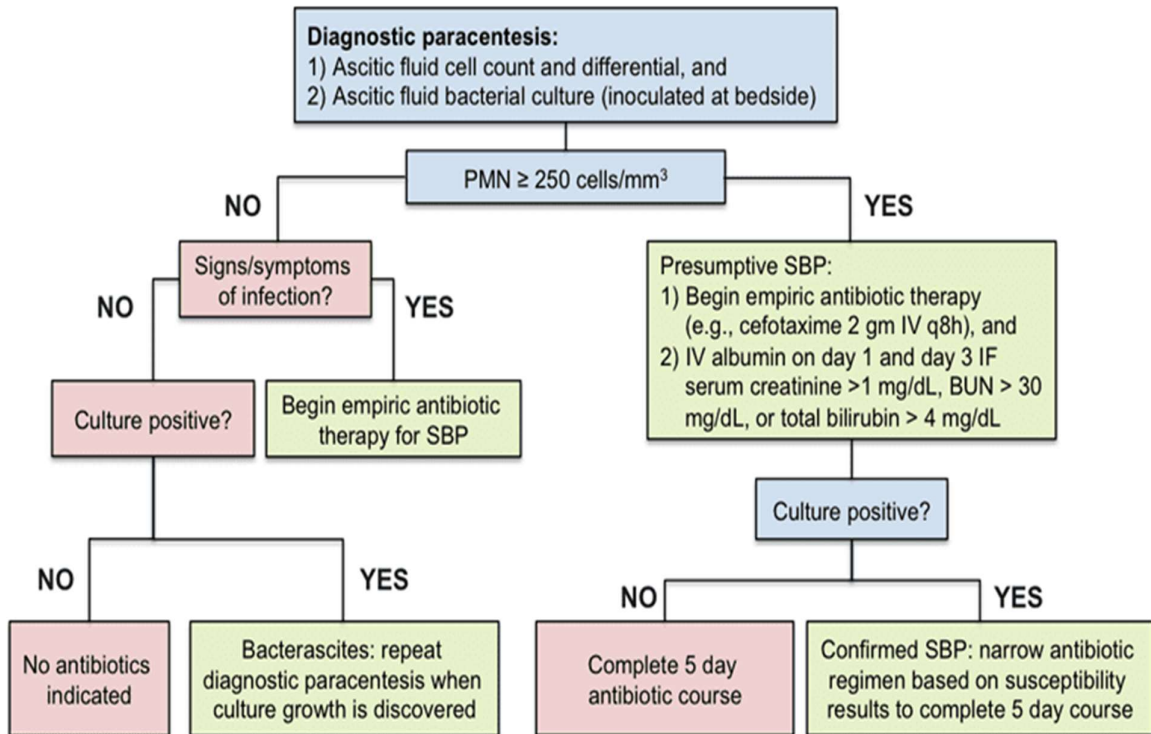
The following image represents the algorithm for the differential diagnosis between spontaneous and secondary bacterial peritonitis,(28)

Fig. Differential diagnosis between spontaneous and secondary bacterial peritonitis:



The following image represents the approach to Management of Spontaneous Bacterial Peritonitis, (29–32)

Fig. Approach to Management of Spontaneous Bacterial Peritonitis:



The following table represents the treatment of the Spontaneous Bacterial Peritonitis,(33,34)

Table. Treatment of the Spontaneous Bacterial Peritonitis:

Special Considerations	Preferred Antibiotic Therapy	Reasonable Alternative
Standard therapy	Cefotaxime 2 gm IV q8h x 5 days	Ceftriaxone 1 gm IV q12h or 2 gm IV q24h x 5 days
Uncomplicated SBP*	Ofloxacin 400 mg PO bid x 8 days is an option	Ciprofloxacin 500 mg PO bid or Levofloxacin 500 mg PO q24h
Nosocomial SBP	Extended spectrum antibiotics (carbapenems, piperacillin-tazobactam)	Depends on local resistance patterns
Patient receiving fluoroquinolone or trimethoprim-sulfamethoxazole SBP prophylaxis	Cefotaxime 2 gm IV q8h x 5 days	Ceftriaxone 1 gm IV q12h or 2 gm IV q24h x 5 days
Beta lactam hypersensitivity	Ciprofloxacin 400 mg IV q12h	Levofloxacin 750 mg IV q24h
Advanced liver or renal failure: serum creatinine greater than 1 mg/dL, blood urea nitrogen greater than 30 mg/dL, or total bilirubin greater than 4 md/dL	IV Cefotaxime 2 gm IV q8h x 5 days <i>plus</i> IV albumin 1.5 g/kg given on day 1 and 1.0 g/kg given on day 3	

The following table represents the Indications for Spontaneous Bacterial Peritonitis (SBP) Prophylaxis,(33,34)

Table. Indications for Spontaneous Bacterial Peritonitis (SBP) Prophylaxis:

Indicator	Comments
Prior episode(s) of SBP	Indefinite duration unless ascites resolves
Patients with cirrhosis and ascites who have ascitic fluid total protein less than 1.5 g/dL and at least one of the following: <ul style="list-style-type: none"> - Serum creatinine \geq1.2 mg/dL, - Blood urea nitrogen \geq 25 mg/dL, - Serum sodium \leq 130 mEq/L, or - Child-Pugh Score \geq 9 + bilirubin \geq 3 mg/dL 	Indefinite duration unless ascites resolves
Acute gastrointestinal bleeding	Duration limited to 7 days

The following table represents the regimens for the Spontaneous Bacterial Peritonitis (SBP) Prophylaxis,

Table. Regimens for Spontaneous Bacterial Peritonitis (SBP) Prophylaxis:

Indication	Recommended Regimen	Alternative Agents	Duration
1. One or more prior episodes of SBP	Ciprofloxacin 500 mg PO daily	Trimethoprim-sulfamethoxazole one double-strength tablet daily	Indefinite as long as ascites is present
2. Primary SBP prophylaxis for patients with advanced cirrhosis who meet criteria*	Ciprofloxacin 500 mg PO daily Trimethoprim-sulfamethoxazole one double-strength tablet daily	Levofloxacin 250 mg PO daily	Indefinite as long as ascites is present
3. Acute gastrointestinal hemorrhage in patients with advanced cirrhosis	Ceftriaxone 1 g IV daily	May transition to oral therapy once bleeding stops and oral intake has resumed: Ciprofloxacin 500 mg PO twice daily Trimethoprim-sulfamethoxazole one double-strength tablet twice daily	7 days total (combined IV and oral therapy)

iv. Similar studies in this topic:

AA Oladimeji et al, studied the frequency of spontaneous bacterial peritonitis among 31 patients with liver cirrhosis with ascites in Nigeria from August 2009 to July 2010. Of the 21 that developed spontaneous bacterial peritonitis, culture positive spontaneous bacterial peritonitis was existing in 66.7% (14/21). The poor predictive pointers found in this study were; coagulopathy, reduced ascitic protein, hepatic encephalopathy, renal failure (creatinine >2mg/dl) and leucocytosis ($p < 0.05$). (35)

JosepLlach et al, studied the occurrence and factors predicting the first occurrence of SBP in 127 cirrhosis with ascites and its relevance with the concentration of ascitic fluid protein level. 13 patients (10%) had the first SBP episode during follow-up. It is only the ascitic fluid protein level was established to relate independently with SBP progress ($p = 0.002$). The likelihood of first spontaneous bacterial peritonitis after 3 year follow-up period was 24% and 4% for the subjects with ascetic fluid protein with <1gram/ dl and >1gram/ dl respectively. (36)

T. P. Almdal et al, studied the Incidence, Diagnosis, and Prognosis of Spontaneous Bacterial Peritonitis in patients with 342 Cirrhosis patients. 14 episodes of SBP were observed in 13 patients, which is a general occurrence of peritonitis of 19%. The infected patients had lesser mean ascites pH. They have a higher mean ascites leukocyte and polymorphonuclear cell counts than non-infected patients. (37)

Luke T.Evans et al, studied the pattern of Spontaneous bacterial peritonitis in 427 asymptomatic cirrhotic outpatients presenting with ascites. They found a prevalence of 3.5%. SBP is less frequent, occurs in patients with less advanced liver disease with poor outcome.(38)

Maryum Khalid et al, studied the prevalence of asymptomatic spontaneous bacterial peritonitis in outdoor patients with liver cirrhosis in Rawalpindi, Pakistan in 2013. The prevalence was found to be 10%. Occurrence of silent SBP in asymptomatic cirrhotic patients' cases was significantly high.(39)

Puri AS et al, studied the frequency, spectrum of microorganisms and outcome of 70 spontaneous bacterial peritonitis in Northern part of India. They concluded that spontaneous bacterial peritonitis is one of the common complication of decompensated liver disease and was present 30% (21) of the study population. It is related with significant increase in in-hospital mortality. Ciprofloxacin is an effective drug for early management of SBP/CNNA. Synchronous extra-peritoneal focus of infection is a common existence in these group of patients.(40)

Rubinstein P et al, studied the incidence, bacterial pattern and mortality pattern among the 64 liver cirrhosis patients for SBP in Uruguay. They found an incidence of 26.56%. The mortality rate related with SBP was 47% (8/17). This is larger than the group with cirrhosis without SBP. (41)

Amarapurkar DN et al, studied the incidence, bacterial pattern and mortality pattern among the 31 liver cirrhosis patients for SBP in India. Seven (22.58%) patients had ascitic fluid increased polymorphonuclear count of > 500/mm. Ascitic fluid polymorphonuclear count and bedside inoculation of blood culture bottles with ascitic fluid are sensitive indicators of spontaneous bacterial peritonitis. (42)

Lata, Jan et al, studied the prevalence and aetiology of Spontaneous bacterial peritonitis in the Czech Republic. They included 99 patients with liver cirrhosis. 35 (35.4%) were diagnosed with SBP. (43)

Syed VA et al, studied the prevalence and aetiology of Spontaneous bacterial peritonitis among the 81 patients with cirrhotic ascites through a prospective study in Nepal. 24.67% of them had SBP. The most common organisms found were *Escherichia coli* (n=3) and *Streptococcus pneumoniae* (n=2). 94% of the patients reacted positively to the therapy after 2 days of management. (44)

Jain AP et al, studied the prevalence and aetiology of Spontaneous bacterial peritonitis among the 63 patients with cirrhotic ascites in India. 22 (34.92%) of the study participants developed SBP. Spontaneous bacterial peritonitis is frequent complication in class C of Child Pugh cirrhosis classification. (45)

4 Research Question or Hypothesis:

Research Question:

What is the prevalence of Spontaneous Bacterial Peritonitis in asymptomatic outpatients with cirrhotic ascites?

Null Hypothesis:

There is no difference in prevalence of Spontaneous Bacterial Peritonitis in asymptomatic outpatients with cirrhotic ascites.

Alternate or Research Hypothesis:

There is a difference in prevalence of Spontaneous Bacterial Peritonitis in asymptomatic outpatients with cirrhotic ascites.

5 Methodology:

5.1. Study Subjects:

Outpatients presenting with cirrhosis in CMCH, Coimbatore.

5.2. Study Design:

Cross-Sectional Study.

5.3. Study setting:

Outpatients presenting with cirrhosis in General Medicine Department of CMCH, Coimbatore.

5.4. Study Duration:

One year (march 2018-March 2019)

5.5. Inclusion Criteria:

Outpatients with cirrhosis of liver and ascites

5.6. Exclusion criteria:

Clinical symptoms of infection (fever, Abdominal Pain and tenderness).

Hepatic encephalopathy.

Upper GI bleed.

Deranged renal profile.

Antibiotic treatment in the last two weeks.

Past history of Spontaneous Bacterial Peritonitis.

5.7. Sample Size:

50

Basis for Sample size calculation:

According to **Almdal TP et al study**, (37) considering the prevalence of Prevalence of Spontaneous Bacterial Peritonitis as 19% with a precision of 11% and 95% confidence interval, the sample size is calculated as

$$N = Z^2_{1-\alpha/2} * p * (1 - p) / d^2$$

Where,

$Z_{1-\alpha/2}$ - two tailed probability for 95% confidence interval = 1.96

p (%) - prevalence of Prevalence of Spontaneous Bacterial Peritonitis = 0.19

d (%) - precision or allowable error for Prevalence of Spontaneous Bacterial Peritonitis = 0.11

Hence,

$$N = 1.96^2 * 0.19 * (1 - 0.19) / 0.11^2$$

$$N = 48.86$$

Thus the total sample size required for the study is 49. And hence rounded off to 50.

5.8. Study procedure:

The study procedure includes history, physical examination, blood investigation, ultrasound abdomen, ascetic fluid analysis of all asymptomatic cirrhotic ascites patient.

5.9. Ethical Consideration:

Institutional Ethical Committee approval was obtained before the start of the study.

Informed written consent was obtained from each participant.

5.10. Statistical Methods:

Descriptive Statistics:

1. Continuous variables are represented in mean, median, mode and standard deviation.
2. Categorical variables are represented in frequencies and percentages. Pie-charts and bar diagrams are used as appropriate.

Inferential Statistics:

3. When a Categorical Variable is associated with a categorical variable, the variables are represented in both by tables and bar diagrams. For test of significance, chi-square test is used. Fisher's exact test is used when more than 20% of the cell values have expected cell value less than 5.
4. When a Continuous variable is associated with the categorical variables such as patient groups independent t test is used after checking for normality. Otherwise non parametric tests were used.
5. P-values less than 0.05 were considered statistically significant.
6. Data was entered in MS excel sheet and analysed using SPSS software version 16.

6 Results:

Results of this study are described under the following headings:

a. Descriptive statistics:

- i. Age
- ii. Gender
- iii. Age and Gender
- iv. Cause of cirrhosis
- v. Serum and ascitic fluid parameters
- vi. Blood cell parameters
- vii. MELD score
- viii. Child's score
- ix. Ascitic Fluid Polymorphonuclear cells
- x. Ascitic Fluid culture
- xi. Spontaneous Bacterial Peritonitis
- xii. Hospitalization status and antibiotics administered

b. Inferential Statistics:

- i. Comparison of Spontaneous Bacterial Peritonitis with the age group of the subjects in the study population
- ii. Comparison of Spontaneous Bacterial Peritonitis with the gender of the subjects in the study population
- iii. Comparison of Spontaneous Bacterial Peritonitis with the Cause of Cirrhosis in the subjects of study population

- iv. Comparison of Spontaneous Bacterial Peritonitis with the serum bilirubin and sodium of the subjects in the study population
- v. Comparison of Spontaneous Bacterial Peritonitis with the serum albumin and ascitic fluid protein of the subjects in the study population
- vi. Comparison of Spontaneous Bacterial Peritonitis with the blood cell count of the subjects in the study population
- vii. Comparison of Spontaneous Bacterial Peritonitis with the MELD score of the subjects in the study population
- viii. Comparison of Bacterial Peritonitis with the Child's score of the subjects in the study population.

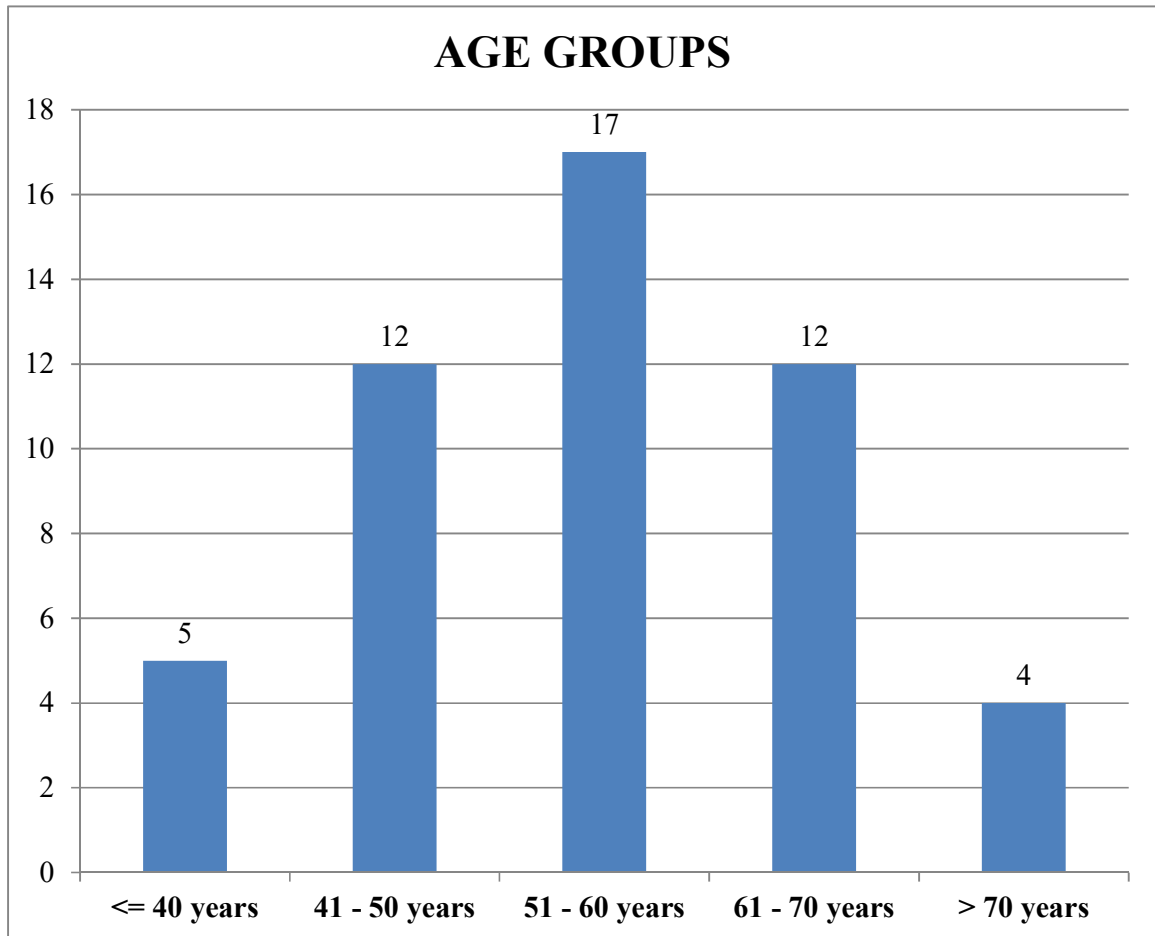
I. Distribution of age group of the subjects in the study population

Among the study population, 34% of the subjects were in 51 – 60 years age group followed by 24% subjects each in 41 – 50 years and 61 – 70 years age group, 10% in less than or equal to 40 years age group and 8% subjects more than 70 years age group.

Table 1: Distribution of age group of the subjects in the study population

Age Group	Count	%
<= 40 years	5	10.0%
41 - 50 years	12	24.0%
51 - 60 years	17	34.0%
61 - 70 years	12	24.0%
> 70 years	4	8.0%

Fig 1:Distribution of age group of the subjects in the study population



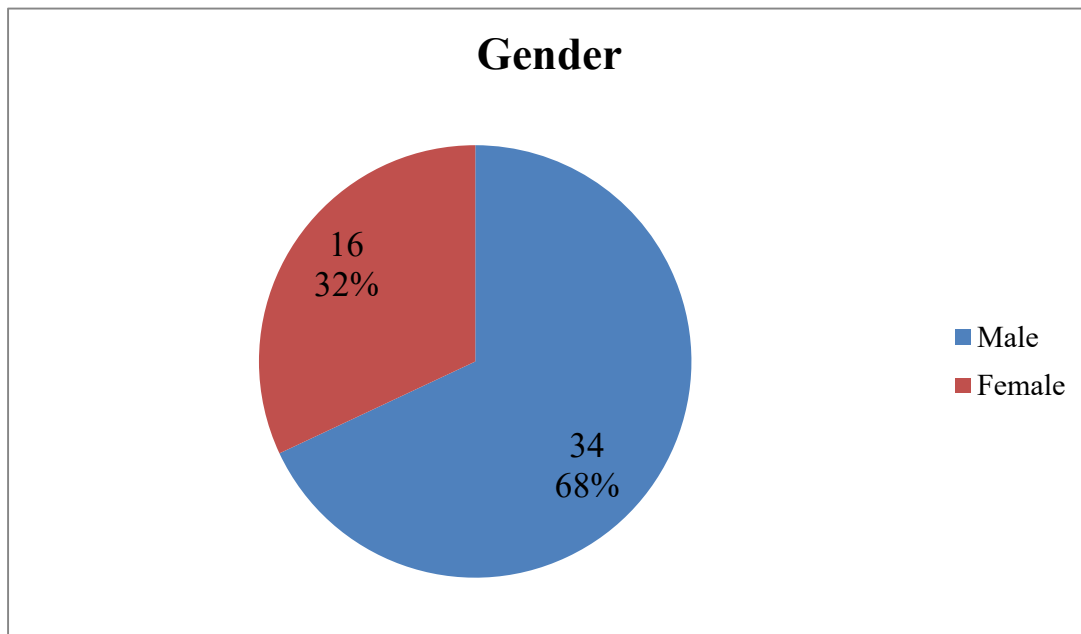
II. Distribution of gender of the subjects in the study population

Among the study population, 68% of the subjects were males and 32% were females.

Table 2: Distribution of gender of the subjects in the study population

Gender	Count	%
Male	34	68.0%
Female	16	32.0%

Fig 2: Distribution of gender of the subjects in the study population



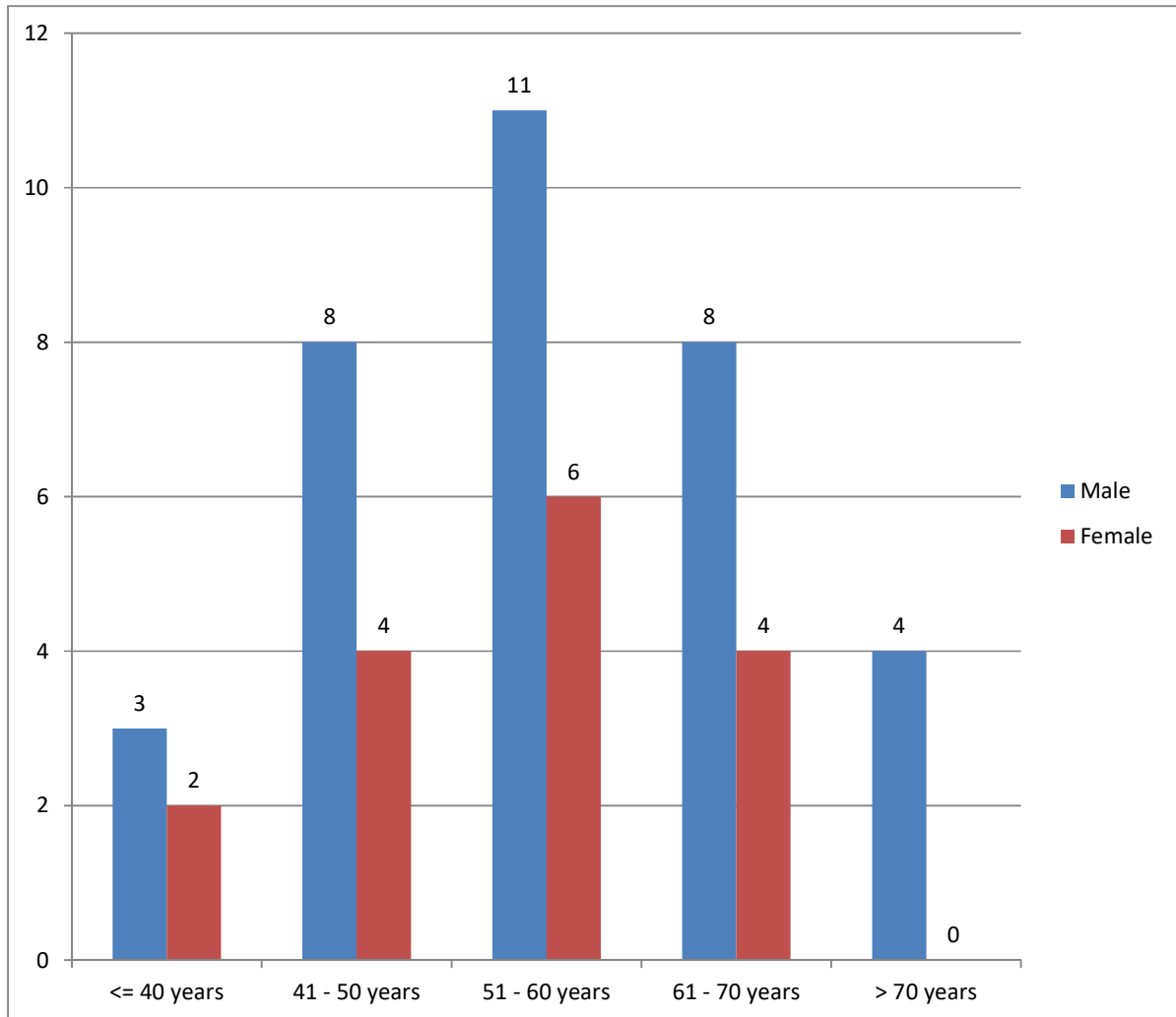
III. Distribution of age group and gender of the subjects in the study population

Among the study population, in all age groups the distribution of males is almost double times the number of females. The distribution of males and females were more in 51 – 60 years age group and least in less than 40 years and more than 70 years age group.

Table 3: Distribution of age group and gender of the subjects in the study population

Age Group	Gender		Total
	Male	Female	
<= 40 years	3	2	5
41 - 50 years	8	4	12
51 - 60 years	11	6	17
61 - 70 years	8	4	12
> 70 years	4	0	4
Total	34	16	50

Fig 3: Distribution of age group and gender of the subjects in the study population



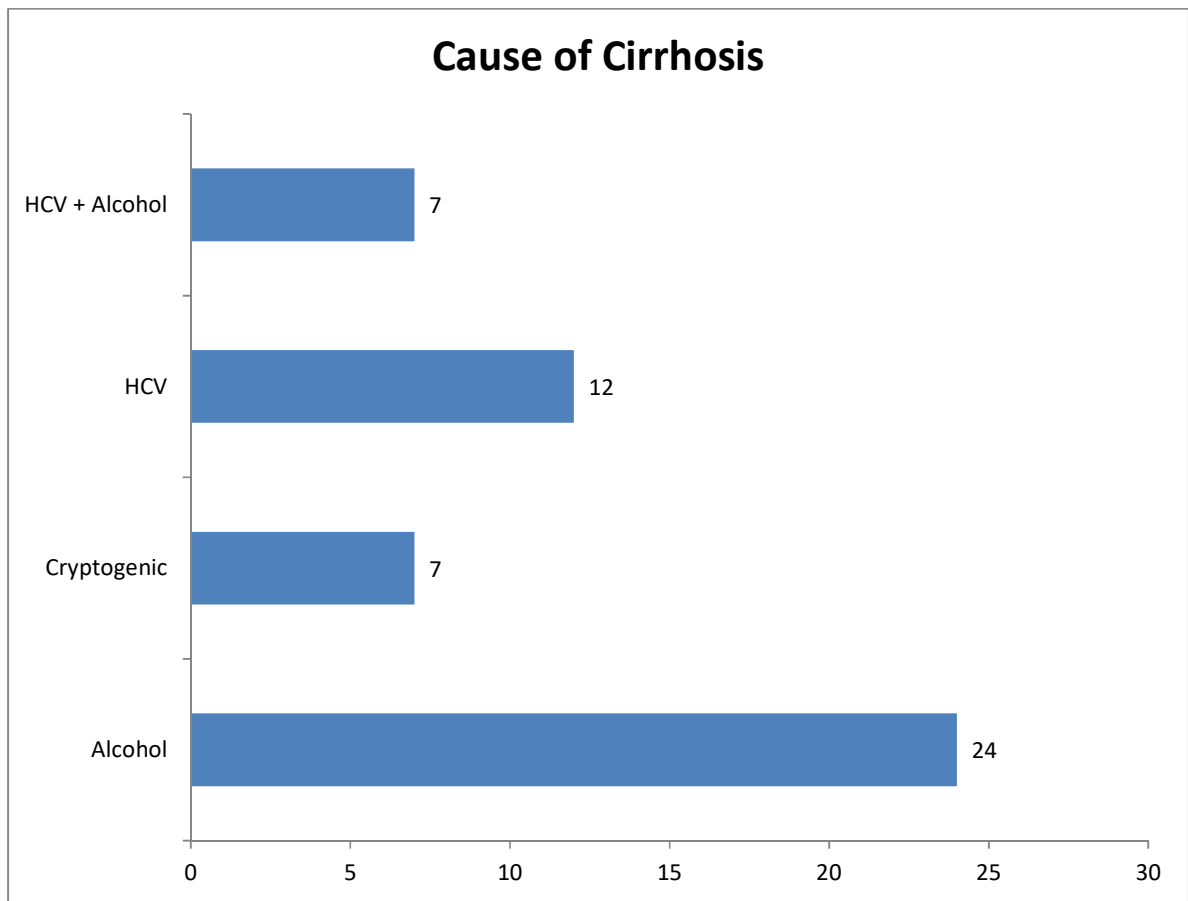
IV. Distribution of cause of cirrhosis of the subjects in the study population

Among the study population, 48% of the subjects had cirrhosis due to alcohol followed by 24% due to HCV, 14% due to HCV & alcohol and 14% were cryptogenic.

Table 4: Distribution of cause of cirrhosis of the subjects in the study population

Cause of Cirrhosis	Count	%
Alcohol	24	48.0%
Cryptogenic	7	14.0%
HCV	12	24.0%
HCV + Alcohol	7	14.0%

Fig4: Distribution of cause of cirrhosis of the subjects in the study population



V. Distribution of serum and ascitic fluid parameters of the subjects in the study population

In the study population, serum bilirubin of the subjects ranges from 3.8 to 13.8 with a mean of 6.55 and standard deviation of 2.72. Serum albumin ranges from 1.8 to 3.2 with a mean of 2.52 and standard deviation of 0.54. Ascitic Fluid Protein ranges from 0.4 to 1.2 with a mean of 0.71 and standard deviation of 0.26. Serum sodium ranges from 124 to 142 with a mean of 134.48 and standard deviation of 5.49.

Table 5: Distribution of serum and ascitic fluid parameters of the subjects in the study population

	N	Minimum	Maximum	Mean	Std. Deviation
Serum Bilirubin	50	3.80	13.80	6.55	2.72
Serum Albumin	50	1.80	3.20	2.52	0.54
Ascitic Fluid Protein	50	0.40	1.20	0.71	0.26
Serum Sodium	50	124.00	142.00	134.48	5.49

VI. Distribution of blood cell parameters of the subjects in the study population

In the study population, total leukocyte count of the subjects ranges from 4000 to 13000 with a mean of 9660 and standard deviation of 2576. Platelet count ranges from 67000 to 150000 with a mean of 100920 and standard deviation of 21481. Prothrombin time ranges from 10 to 21 with a mean of 14.02 and standard deviation of 3.76.

Table 6: Distribution of blood cell parameters of the subjects in the study population

	N	Minimum	Maximum	Mean	Std. Deviation
Total Leukocyte count	50	4000	13000	9660	2576
Platelet count	50	67000	150000	100920	21481
Prothrombin Time	50	10.00	21.00	14.02	3.76

VII. Distribution of MELD score of the subjects in the study population

Among the study population, 4% of the subjects had MELD score of 27, 20% of the subjects with MELD score between 19 – 24, 28% subjects with MELD score between 11 – 18 and 48% subjects having MELD score less than or equal to 10.

Table 7: Distribution of MELD score of the subjects in the study population

MELD Score	Frequency	Percent
7.0	9	18.0
8.0	9	18.0
9.0	4	8.0
10.0	2	4.0
15.0	4	8.0
18.0	10	20.0
20.0	2	4.0
23.0	2	4.0
24.0	6	12.0
27.0	2	4.0
Total	50	100.0

Fig: Distribution of MELD score of the subjects in the study population

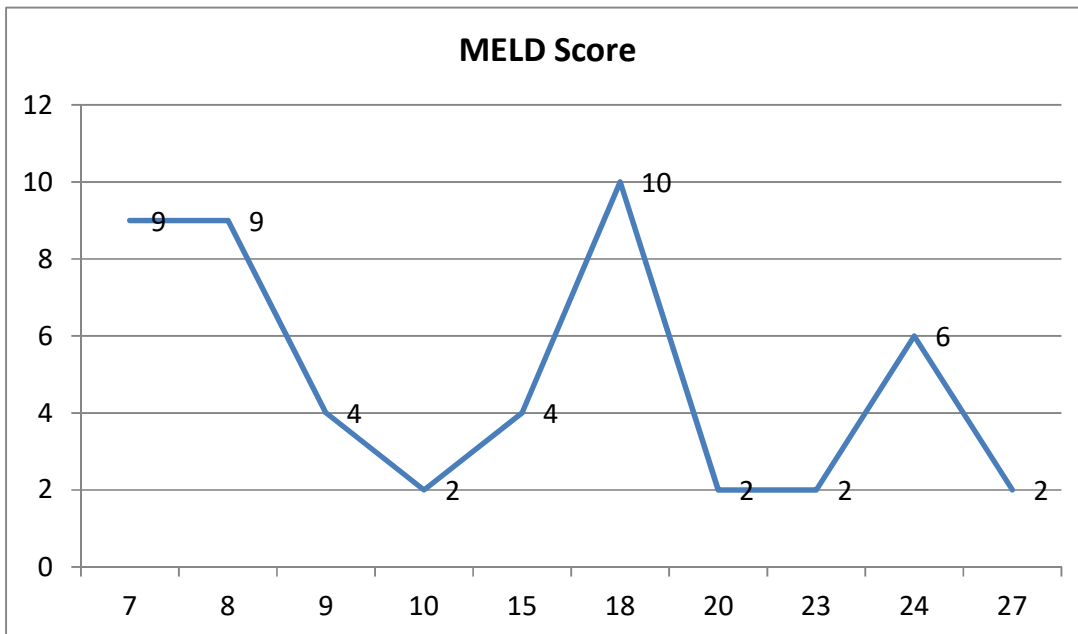


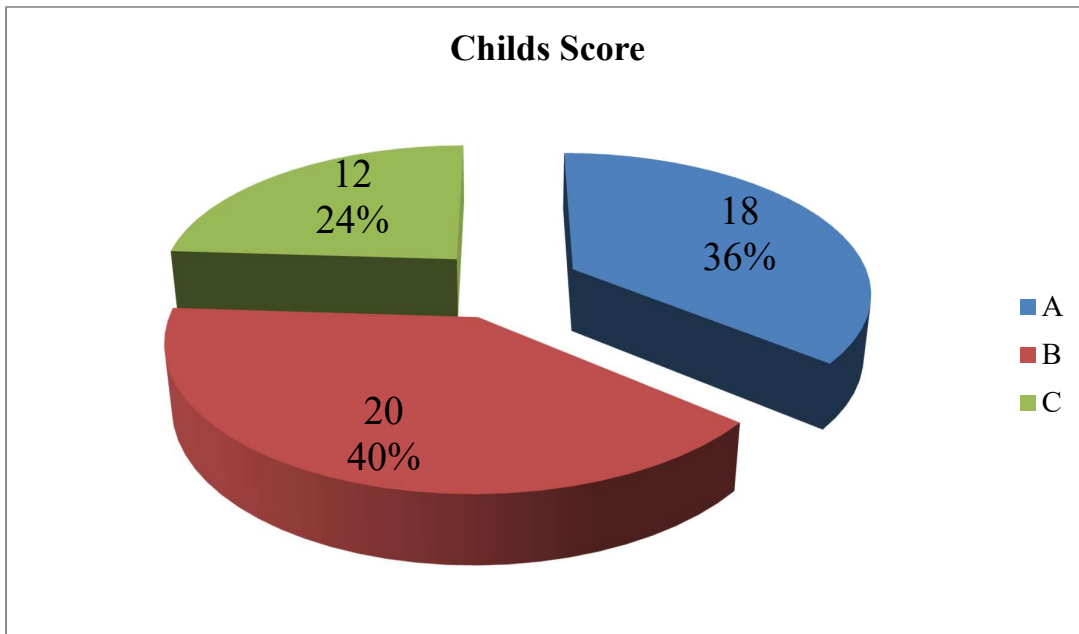
Table. Distribution of mean MELD score of the subjects in the study population

	N	Minimum	Maximum	Mean	Std. Deviation
MELD Score	50	7.0	27.0	14.300	6.7439

VIII. Distribution of Child's score of the subjects in the study population

Among the study population, 36% of the subjects belonged to class A of Child's score, 40% of the subjects belonged to class B of Child's score, 24% of the subjects belonged to class C of Child's score.

Fig: Distribution of Child's score of the subjects in the study population



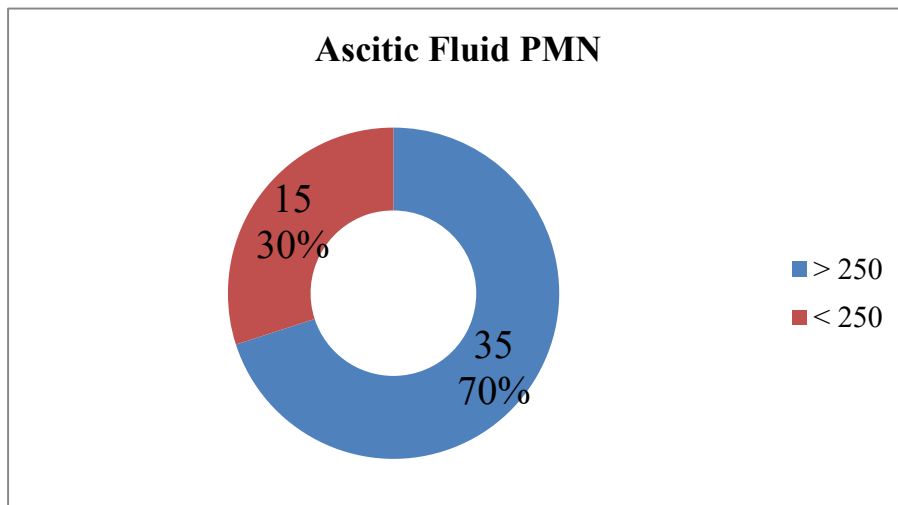
IX. Distribution of Ascitic Fluid Polymorphonuclear cells of the subjects in the study population

In the study population, ascitic fluid PMN of the subjects ranges from 11 to 803 with a mean of 395.8 and standard deviation of 215.93.

Table: Distribution of Ascitic Fluid Polymorphonuclear cellsof the subjects in the study population

	N	Minimum	Maximum	Mean	Std. Deviation
Ascitic Fluid PMN	50	11.0	803.0	395.860	215.9397

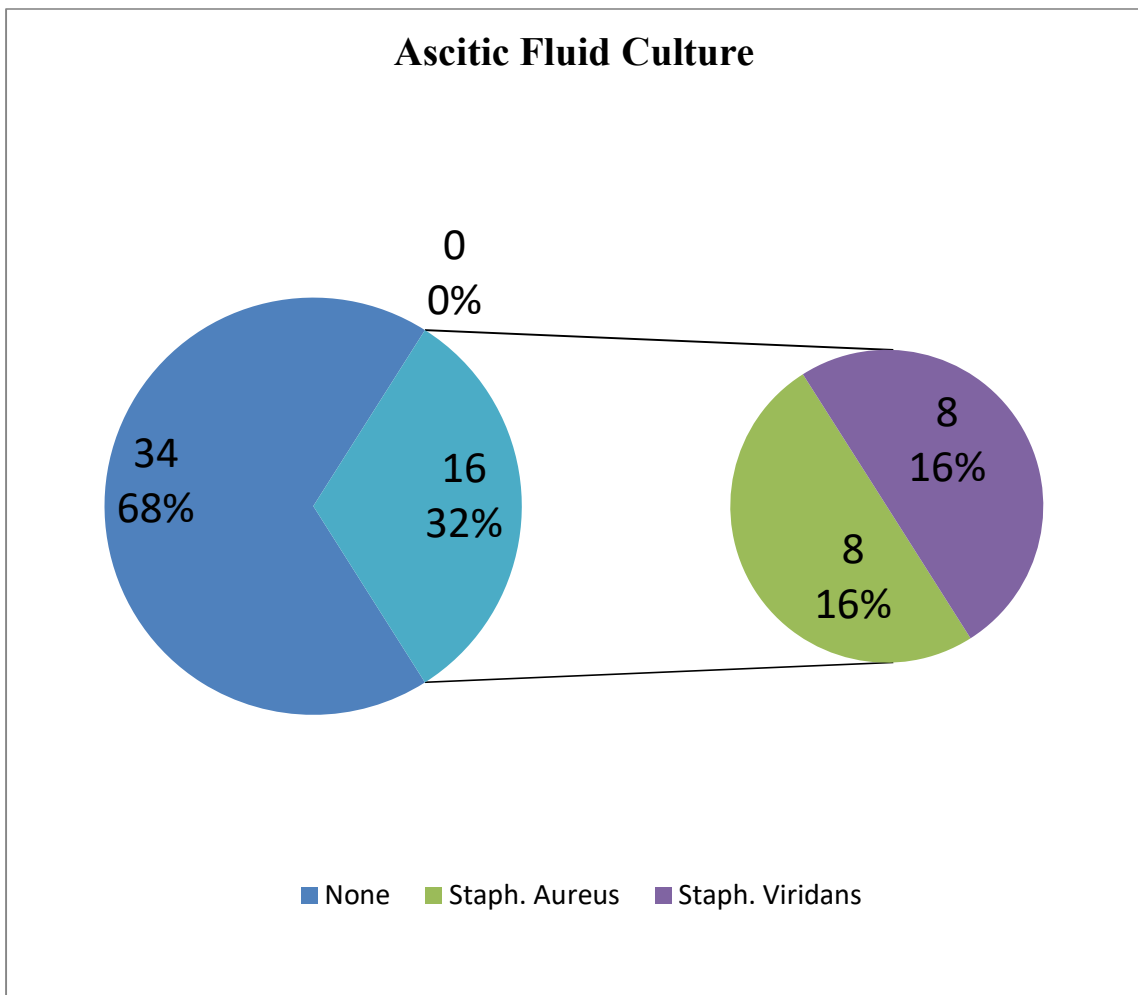
Fig: Distribution of Ascitic Fluid Polymorphonuclear cellsof the subjects in the study population



X. Distribution of Ascitic Fluid culture of the subjects in the study population

Among the study population, 68% of the subjects showed negative in their ascitic fluid culture. Of the remaining 32% who showed positive in their ascitic fluid culture, 16% showed Staph. aureus and 16% showed Staph. Viridians.

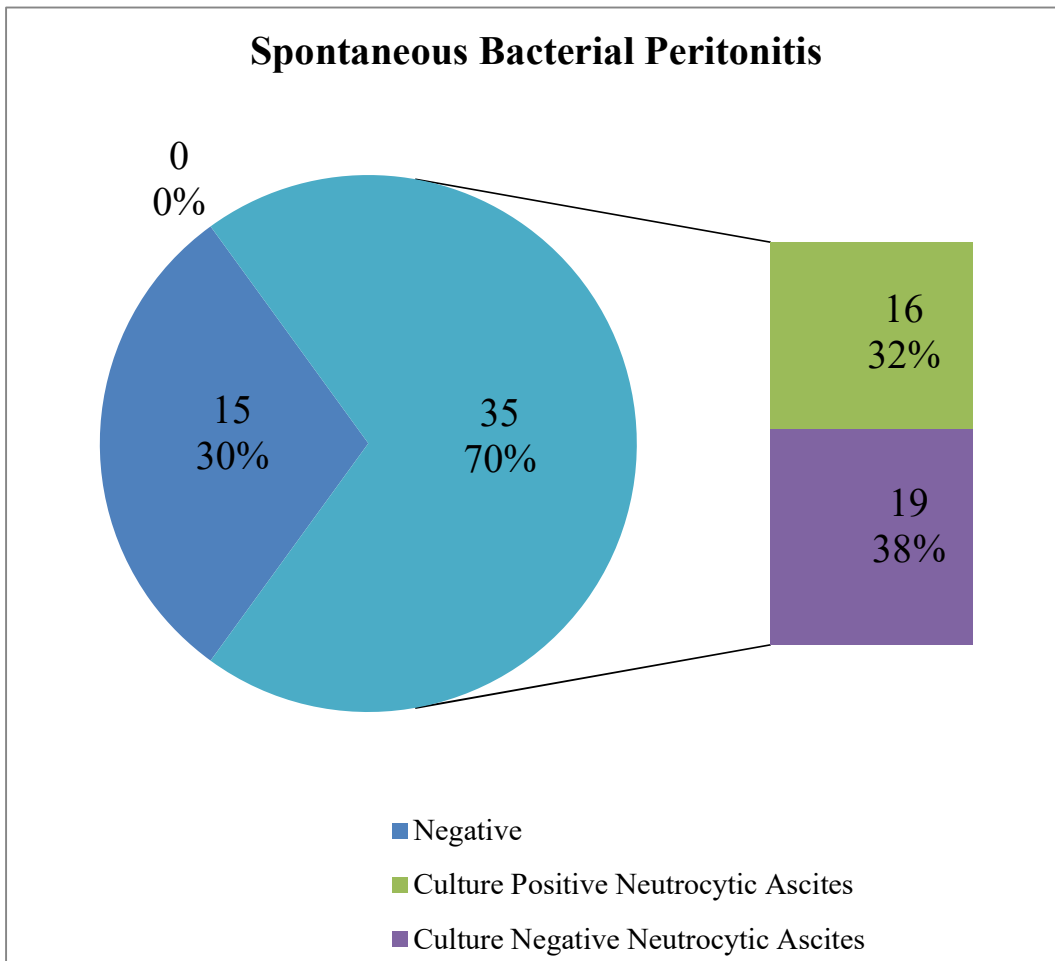
Fig: Distribution of Ascitic Fluid Culture of the subjects in the study population



XI. Distribution of Spontaneous Bacterial Peritonitis of the subjects in the study population

Among the study population, 30% of the subjects showed negative for spontaneous bacterial peritonitis. Of the remaining 70% who showed positive for spontaneous bacterial peritonitis, 32% had culture positive neutrocytic ascites and 38% showed culture negative neutrocyticascites.

Fig: Distribution of Spontaneous Bacterial Peritonitis of the subjects in the study population



XII. Distribution of the hospitalization status and antibiotics administered among the subjects in the study population

Among the study population, 62% of the subjects were hospitalized and out of them 56% received cefotaxime antibiotic and 6% received Norfloxacin antibiotic.

Table: Distribution of the hospitalization status and antibiotics administered among the subjects in the study population

		Count	%
Hospitalised	Yes	31	62.0%
	No	19	38.0%
Antibiotic administered	Cefotaxime	28	56.0%
	Norfloxacin	3	6.0%
	No	19	38.0%

Distribution of Spontaneous Bacterial Peritonitis with the age group of the subjects in the study population

Age Group	Spontaneous Bacterial Peritonitis		Total	Fisher exact p value
	Positive	Negative		
<= 40 years	3 (60%)	2 (40%)	5 (100%)	0.089
41 - 50 years	9 (75%)	3 (25%)	12 (100%)	
51 - 60 years	10 (58.82%)	7 (41.17%)	17 (100%)	
61 - 70 years	10 (83.33%)	2 (16.66%)	12 (100%)	
> 70 years	3 (75%)	1 (25%)	4 (100%)	
Total	35 (70%)	15 (30%)	50 (100%)	

The SBP was higher in 61 – 70 years age group (83.3%) followed by more than 70 years age group and 41 – 50 years age group (50%), 60% in less than 40 years age group and 58.8% in 51 – 60 years and 60. The difference was not statistically significant ($p < 0.05$).

Distribution of Spontaneous Bacterial Peritonitis with the gender of the subjects in the study population

Gender	Spontaneous Bacterial Peritonitis		Total	Fisher exact p value
	Positive	Negative		
Male	24 (70.58%)	10 (29.41%)	34 (100%)	0.254
Female	11 (68.75%)	5 (31.25%)	16 (100%)	
Total	35 (70%)	15 (30%)	50 (100%)	

The SBP was higher in males (70.58%) compared to females (68.75%). The difference was not statistically significant ($p < 0.05$).

Distribution of Spontaneous Bacterial Peritonitis with the Cause of Cirrhosis of the subjects in the study population

Cause of Cirrhosis	Spontaneous Bacterial Peritonitis		Total	Fisher exact p value
	Positive	Negative		
Alcohol	15 (62.5%)	9 (37.5%)	24 (100%)	0.069
Cryptogenic	7 (100%)	0 (0%)	7 (100%)	
HCV	6 (50%)	6 (50%)	12 (100%)	
HCV + Alcohol	7 (100%)	0 (0%)	7 (100%)	
Total	35 (70%)	15 (30%)	50 (100%)	

The SBP was higher in subjects with HCV and Alcohol (100%) followed by subjects who were alcoholic (62.5%) and subjects with HCV (50%). The difference was not statistically significant ($p < 0.05$).

Distribution of Spontaneous Bacterial Peritonitis with the serum bilirubin and sodium of the subjects in the study population

	Spontaneous Bacterial Peritonitis	N	MEAN	STD. DEVIATION	p VALUE BY 't' TEST
Serum Bilirubin	Positive	35	7.30	2.93	0.001
	Negative	15	4.79	0.60	
Serum Sodium	Positive	35	132.29	5.10	0.001
	Negative	15	139.60	1.45	

Among subjects with Spontaneous Bacterial Peritonitis, serum bilirubin was 7.3 ± 2.93 which is higher compared to others (4.79 ± 0.6) and the difference was statistically significant. Serum sodium was lower among subjects with spontaneous bacterial peritonitis (132.3 ± 5.1) compared to others (139.6 ± 1.45) and the difference were statistically significant ($p < 0.05$).

Distribution of Spontaneous Bacterial Peritonitis with the serum albumin and ascitic fluid protein of the subjects in the study population

	Spontaneous Bacterial Peritonitis	N	MEAN	STD. DEVIATION	p VALUE BY 't' TEST
Serum Albumin	Positive	35	2.32	0.51	0.001
	Negative	15	3.00	0.19	
Ascitic Fluid Protein	Positive	35	0.61	0.18	0.001
	Negative	15	0.95	0.27	

Among subjects with Spontaneous Bacterial Peritonitis, serum albumin was 2.3 ± 0.51 which was lower compared to others (3 ± 0.19) and the difference was statistically significant. Ascitic fluid protein was lower among subjects with spontaneous bacterial peritonitis (0.61 ± 0.18) compared to others (0.95 ± 0.27) and the difference were statistically significant ($p < 0.05$).

Distribution of Spontaneous Bacterial Peritonitis with the blood cell count of the subjects in the study population

	Spontaneous Bacterial Peritonitis	N	MEAN	STD. DEVIATION	p VALUE BY 't' TEST
Total Leukocyte count	Positive	35	10400.00	1897.37	0.011
	Negative	15	7933.33	3150.21	
Platelet count	Positive	35	93342.86	17610.06	0.001
	Negative	15	118600.00	19580.60	
Prothrombin Time	Positive	35	15.23	3.85	0.001
	Negative	15	11.20	1.08	

Among subjects with Spontaneous Bacterial Peritonitis, total leukocyte count was higher compared to others and the difference was statistically significant ($p < 0.05$). Platelet count was lower among subjects with spontaneous bacterial peritonitis compared to others and the difference was statistically significant ($p < 0.05$). Prothrombin time was higher among subjects with spontaneous bacterial peritonitis compared to others and the difference was statistically significant ($p < 0.05$).

Distribution of Spontaneous Bacterial Peritonitis with the MELD score of the subjects in the study population

	Spontaneous Bacterial Peritonitis	N	MEAN	STD. DEVIATION	p VALUE BY 't' TEST
MELD score	Positive	35	17.00	6.35	0.001
	Negative	15	8.00	0.76	

The mean MELD score among subjects with spontaneous bacterial peritonitis was 17 ± 6.35 which was higher compared to others (8 ± 0.76) those who didn't had SBP. The difference was statistically significant ($p < 0.05$). The higher the MELD scores the poorer the outcome of the liver disease. The subjects with SBP was expected to have poorer outcome compared to others.

Distribution of Spontaneous Bacterial Peritonitis with the Child's score of the subjects in the study population

Child's score	Spontaneous Bacterial Peritonitis		Total	Fisher exact p value
	Positive	Negative		
A	5 (27.77%)	13 (72.22%)	18 (100%)	< 0.001
B	18 (90%)	2 (10%)	20 (100%)	
C	12 (100%)	0 (0%)	12 (100%)	
Total	35 (70%)	15 (30%)	50 (100%)	

Among subjects with Child's score class C, 100% subjects had SBP which is higher compared to subjects with Child's score class B (90%) and subjects with Child's score class A (27.7%). This difference in prevalence of SBP among different Child's score class subjects were statistically significant ($p < 0.05$).

7 Discussion

The main objective of the study is to assess the frequency of Spontaneous Bacterial Peritonitis in asymptomatic outpatients with cirrhotic ascites, through the analysis of ascetic fluid. In this study, 34% of the subjects were in 51 – 60 years age group followed by 24% subjects each in 41 – 50 years and 61 – 70 years age group, 10% in less than or equal to 40 years age group and 8% subjects more than 70 years age group. **Mihai AA et al**, reported in their study that the mean age of all patients was 44 years, with a range of 16 to 68.(46)

In this study, 68% of the subjects were males and 32% were females. In all age groups, the distribution of males is almost double times the number of females. This may be due to high incidence of alcoholic liver disease among males and nearly half of the study population were suffering from cirrhosis of liver. Nearly, One third of the female population suffer from the disease in this population may be due to increasing Non-Alcoholic steatohepatitis (NASH) in the country. The distribution of males and females were more in 51 – 60 years age group and least in less than 40 years and more than 70 years age group.

In this study, 48% of the subjects had cirrhosis due to alcohol followed by 24% due to HCV, 14% due to HCV & alcohol and 14% were cryptogenic. Spontaneous bacterial peritonitis may or may not be symptomatic. In a study by **Ruf A et al**, in USA showed that the aetiology of cirrhosis was hepatitis C in 66 (25%), followed by chronic cholestasis in 59 (23%), autoimmune hepatitis in 36 (14%), alcoholic liver disease in 35 (13%), cryptogenic in 31 (12%), hepatitis B in 17 (6%), and other causes in 18 (7%) patients. (47)

In the study population, serum bilirubin of the subjects ranges from 3.8 to 13.8 with a mean of 6.55 and standard deviation of 2.72. Serum albumin ranges from 1.8 to 3.2 with a mean of 2.52 and standard deviation of 0.54. Ascitic Fluid Protein ranges from 0.4 to 1.2 with a mean of 0.71 and standard deviation of 0.26. Ascitic fluid lactate and pH may offer extra diagnostic support when the PMN count is unclear.(48)

Serum sodium ranges from 124 to 142 with a mean of 132 and standard deviation of 0.54. In the study population, total leukocyte count of the subjects ranges from 4000 to 13000 with a mean of 9660 and standard deviation of 2576. Platelet count ranges from 67000 to 150000 with a mean of 100920 and standard deviation of 21481. In a study by **Lata J et al**, The decrease of the platelet count in a set of patients with spontaneous bacterial peritonitis indicates the effect of portal hypertension in the aetiology of the illness.(43) Prothrombin time ranges from 10 to 21 with a mean of 14.02 and standard deviation of 3.76.

The model for end-stage liver disease (MELD) is based on three biochemical variables. They are serum bilirubin, serum creatinine, and the international normalized ratio (INR) of prothrombin time. These variables are readily available, reproducible, and objective. (47) Model for End-Stage Liver Disease (MELD) score is the independent predictive factor of mortality. (49) In this study, 4% of the subjects had MELD score of 27, 20% of the subjects with MELD score between 19 – 24, 28% subjects with MELD score between 11 – 18 and 48% subjects having MELD score less than or equal to 10. SBP is associated with arterial under filling and renal vasoconstriction. MELD score is a best indicator for predictor of sepsis in cirrhosis patients. (49)

In this study, 36% of the subjects belonged to class A of Child's score, 40% of the subjects belonged to class B of Child's score, 24% of the subjects belonged to class C of

Child's score. **Chi-Sen Chang et al**, studied the overgrowth of bacteria in 20 cirrhotic patients with SBP and 20 cirrhotic patients without SBP, The Child-Pugh scores in the SBP group were higher than in the non-SBP group. (50)

In this study, 68% of the subjects showed negative in their ascitic fluid culture. Of the remaining 32% who showed positive in their ascitic fluid culture, 16% showed Staph. aureus and 16% showed Staph. Viridians. In a Nepal based study by **Syed VA et al**, the most common organisms were Escherichia coli (n=3) and Streptococcus pneumoniae (n=2). (44) The commonest organism in **Jain AP et al** study in India showed coagulase positive Staphylococcus aureus eight (44.44%) followed by E. coli (22.22%). (45) The most frequent organisms isolated from culture of ascitic fluid **M.B. V.F. Larcher et al** study, were Streptococcus pneumonia, Klebsiella, and Haemophilus influenzae. (51)

In this study, 30% of the subjects showed negative for spontaneous bacterial peritonitis. Of the remaining 70% who showed positive for spontaneous bacterial peritonitis, 32% had culture positive neutrocytic ascites and 38% showed culture negative neutrocytic ascites. 62% of the subjects were hospitalized and out of them 56% received cefotaxime antibiotic and 6% received Norfloxacin antibiotic. Antibiotic prophylaxis has been shown to decrease the incidence of spontaneous bacterial peritonitis (SBP) in patients with cirrhosis and ascites. Norfloxacin prophylaxis is superior in efficacy compared to the Trimethoprim-sulfamethoxazole prophylaxis. (52) Empiric antibiotic therapy for treatment is intravenous third-generation cephalosporin; preferably, cefotaxime in a single dose of 2 g is the recommended antibiotic drug of choice. (53)

The following table indicates the Prevalence of SBP in cirrhosis of other studies with their sample size, study area and follow up period:

Table. Prevalence of SBP in cirrhosis of other studies:

Study	Study area	Sample size	Prevalence
This Study	Coimbatore, India	50	70%
Puri AS et al(40)	North India	70	30%
Luke T Evans et al(38)	Rochetser, USA	427	3.5%
Rubinstein P et al(41)	Uruguay	64	26.56%
Amarapurkar DN et al (42)	India	31	22.58%
Lata Jan et al, (43)	Czech Republic	99	35.4%
Syed VA et al, (44)	Nepal	81	24.86%
Jain AP et al, (45)	India	63	34.92%

The SBP was higher in 61 – 70 years age group (83.3%) followed by more than 70 years age group and 41 – 50 years age group (50%), 60% in less than 40 years age group and 58.8% in 51 – 60 years and 60. The difference was not statistically significant ($p < 0.05$).The difference can be statistically significant with the larger sample size.

The SBP was higher in males (70.58%) compared to females (68.75%). The difference was not statistically significant ($p < 0.05$). This may be due to the aetiology with severe diseases are more common among females like autoimmune hepatitis. The SBP was higher in subjects with HCV and Alcohol (100%) followed by subjects who were alcoholic (62.5%) and subjects with HCV (50%). The difference was not statistically significant ($p < 0.05$).

Among subjects with Spontaneous Bacterial Peritonitis, serum bilirubin was 7.3 ± 2.93 which is higher compared to others (4.79 ± 0.6) and the difference was statistically significant. Serum sodium was lower among subjects with spontaneous bacterial peritonitis (132.3 ± 5.1) compared to others (139.6 ± 1.45) and the difference were statistically significant ($p < 0.05$). Among subjects with Spontaneous Bacterial Peritonitis, serum albumin was 2.3 ± 0.51 which was lower compared to others (3 ± 0.19) and the difference was statistically significant. Ascitic fluid protein was lower among subjects with spontaneous bacterial peritonitis (0.61 ± 0.18) compared to others (0.95 ± 0.27) and the difference were statistically significant ($p < 0.05$). Among subjects with Spontaneous Bacterial Peritonitis, total leukocyte count was higher compared to others and the difference was statistically significant ($p < 0.05$). Hence the above mentioned values can be early markers for suspicion of SBP in patients with cirrhosis with ascites.

Platelet count was lower among subjects with spontaneous bacterial peritonitis compared to others and the difference was statistically significant ($p < 0.05$).). Prothrombin time was higher among subjects with spontaneous bacterial peritonitis compared to others and the difference was statistically significant ($p < 0.05$).

The mean MELD score among subjects with spontaneous bacterial peritonitis was 17 ± 6.35 which was higher compared to others (8 ± 0.76) those who didn't had SBP. The

difference was statistically significant ($p < 0.05$). The higher the MELD scores the poorer the outcome of the liver disease. The subjects with SBP was expected to have poorer outcome compared to others. The main drawback of MELD score is Serum creatinine is strongly powered in the MELD formula. MELD score is considered superior when compared to Child-Turcotte-Pugh (CTP) score and modified Maddrey's Discriminant Function (DF) score in predicting in-hospital mortality of patients with alcoholic hepatitis. (54)

In this study, Among subjects with Child's score class C, 100% subjects had SBP which is higher compared to subjects with Child's score class B (90%) and subjects with Child's score class A (27.7%). This difference in prevalence of SBP among different Child's score class subjects were statistically significant ($p < 0.05$). In a study by **Puri AS et al**, in North India, 95% of the patients who developed this complication were belonging to class C according to Child-Pugh classification. (40)

8 Limitation:

Since this is a hospital based study, selection bias is possible. This will overestimate the prevalence of SBP among the cirrhotic patients with ascites. Many of the severe cases needing admission will be inevitably included and hence the prevalence and mortality will be overestimated.

Precision of the study will be small since Sample size is small in spite of the fact that all the cases are collected during the study period.

Generalisability of the study results will be small since the sampling method is not random one.

Information bias is also possible due to various reasons like severely ill etc.,

Misclassification bias is also possible since the diagnosis of SBP is complex.

9 Recommendation:

Among subjects with Child's score class C, 100% subjects had SBP. Also there is significant relationship between Child's score and SBP. Hence Child's score Class C can be advised on empirical or prophylactic therapy.

Serum sodium, albumin, bilirubin, ascitic fluid protein and total leucocyte count were significantly different among the SBP patients and hence these values can be considered as early predicting markers of SBP in patients with cirrhosis.

Since the prevalence of alcoholic liver disease among the study population is the major cause (48%), interventions can be done to reduce the harmful use of alcohol among the general population.

10 Conclusion:

In this study, 48% of the subjects had cirrhosis due to alcohol followed by 24% due to HCV, 14% due to HCV & alcohol and 14% were cryptogenic. In this study, 68% of the subjects showed negative in their ascitic fluid culture. Of the remaining 32% who showed positive in their ascitic fluid culture, 16% showed Staph. aureus and 16% showed Staph. Viridians. 30% of the subjects showed negative for spontaneous bacterial peritonitis. Of the remaining 70% who showed positive for spontaneous bacterial peritonitis, 32% had culture positive neutrocytic ascites and 38% showed culture negative neutrocyticascites.

In the study population, 62% of the subjects were hospitalized and out of them 56% received cefotaxime antibiotic and 6% received Norfloxacin antibiotic. Among subjects with Child's score class C, 100% subjects had SBP. Also there is significant relationship between Child's score and SBP. Serum sodium, albumin, bilirubin, ascitic fluid protein and total leucocyte count were significantly different among the SBP patients and hence these values can be considered as early predicting markers of SBP in patients with cirrhosis.

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ANNEXURE

A STUDY ON ESTIMATING PREVALENCE OF SPONTANEOUS BACTERIAL PERITONITIS IN ASYMPTOMATIC OUTPATIENTS WITH CIRRHOTIC ASCITES UNDERGOING THERAPEUTIC TAPPING

1.PROFORMA

1. Name

2. Age/Sex:

3. Address:

4. IP No. Date of admission:

5. Occupation:

6. Income:

7. Habits:

Alcohol

Smoking

IV drug abuse/Exposure to CSW

Month/Year/Hospital of diagnosis of liver disease

Duration of disease

Current drugs taken

8. Clinical details (symptom-duration)

GI Bleed

Haematemesis

Malena

Rectal bleeding

Ascites

Jaundice

Oliguria

Symptoms of hepatic encephalopathy

9. Comorbid illness (DM/HT/COPD/CVA/Seizures/HCV/HIV)

10. Clinical examination:

Pallor

Icterus

Clubbing

Cyanosis

Pedal Edema

KF ring

Vitals

Pulse rate

Blood Pressure

Respiratory rate

JVP

Signs of bleeding skin/nose/gums

CNS examination

CVS

Respiratory system

Abdomen

Free fluid

Splenomegaly

11. Investigations:

Complete Hemogram

Platelet count

BT/CT

RFT

Urea

Creatinine

Electrolytes

LFT

Total/Direct Bilirubin

ALT

AST

SAP

Total protein

S.Albumin

Ascitic Fluid Analysis

Sugar/Protein

Cell Count

Cytology

Gramstain/AFB

Culture

SAAG ratio

Prothrombin time/INR

USG abdomen

Viral markers (HBsAg, Anti HCV)

Child's Grading

A/B/C

12. Treatment

Drugs

13. Outcome

TREATED

DEATH

II- Consent Form

**DEPARTMENT OF GENERAL MEDICINE
COIMBATORE MEDICAL COLLEGE COIMBATORE**

Principal investigator : Dr. SUBITHA.S

Research guide : Dr. RAVEENDRAN.M

Organisation : Department of General Medicine.

Informed consent : I have been invited to participate in the research project titled **“A STUDY ON ESTIMATING PREVALENCE OF SPONTANEOUS BACTERIAL PERITONITIS IN ASYMPTOMATIC OUTPATIENTS WITH CIRRHOTIC ASCITES UNDERGOING THERAPEUTIC TAPPING”**.

I understand I will be answering a set of questionnaire, undergoing physical examination, investigations and appropriate treatment.

I also give consent to utilize my personal details for the study purpose and can be contacted if necessary.

I am aware that I have the right to withdraw at any time which will not affect my medical care.

Name of the participant :

Signature :

Date :

ஒப்புதல் படிவம்

நோயாளியின் பெயர்:

பாலினம் :

வயது :

பெற்றோர் பெயர் :

முகவரி :

அரசு கோவை மருத்துவக் கல்லூரியில் □□□□□□□□□□ துறையில் பட்ட மேற்படிப்பு பயிலும் □□□□□□ SUBITHA.S அவர்கள் மேற்கொள்ளும் ஆய்வில் செய்முறை மற்றும் அனைத்து விளக்கங்களையும் கேட்டுக் கொண்டு எனது □□□□□□□□□□ தெரிவுபடுத்திக் கொண்டேன் என்பதை தெரிவித்துக் கொள்கிறேன்.

இந்த ஆய்வில் நான் முழு சம்மதத்துடனும், சுயசிந்தனையுடனும் கலந்து கொள்ள சம்மதிக்கிறேன்.

இந்த ஆய்வில் என்னைப் பற்றிய அனைத்து விவரங்கள் பாதுகாக்கப்படுவதுடன் இதன் முடிவுகள் ஆய்விதழில் வெளியிடப்படுவதில் ஆட்சேபனை இல்லை என்பதை தெரிவித்துக்கொள்கிறேன். எந்த நேரத்திலும் இந்த ஆய்விலிருந்து நான் விலகிக் கொள்ள எனக்கு உரிமை உண்டு என்பதையும் அறிவேன்.

இடம் :

தேதி :

கையொப்பம் / ரேகை

