SPONTANEOUS BACTERIAL PERITONITIS;
MICROBIOLOGICAL ANALYSIS OF ASCITIC FLUID IN PATIENTS WITH COMPLICATED LIVER CIRRHOSIS

ORIGINAL
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ABSTRACT... Spontaneous bacterial peritonitis is a serious event in patients with liver cirrhosis and associated with significant morbidity and mortality. Most common causative organisms of SBP are E.coli, streptococcus pneumonia and klebsiella. Liver cirrhosis has multifactorial etiology and the most common causes in our country are hepatitis C and hepatitis B. **Objectives:** (1) To observe the culture and sensitivity pattern of ascitic fluid in patients with liver cirrhosis. (2) To examine the resistance against various antibiotics. **Period:** 6 months. **Setting:** Study was conducted in department of Gastroenterology Hepatology in collaboration with department of microbiology of Sheikh Zayed Hospital, Lahore. **Materials and Methods:** Sample size; 80 patients of liver cirrhosis with ascites. Sampling technique, Non probability purposive technique was adopted. Sample selection; By Inclusion and Exclusion criteria. Data collection procedure; Eighty patients with liver cirrhosis and ascites diagnosed on the basis of history, examination and ultrasound findings. After detailed history examination and full aseptic measures at least 10 ml of ascitic fluid in 20ml syringe with 16G needle was drawn in blood culture bottle at bed side and was sent to microbiology laboratory for culture and sensitivity and record of resistance and sensitivity against various antibiotics used to treat SBP. Data analysis procedure; Data was analyzed by SPSS version 10.Quantitative variables and were recorded as mean + S.D and qualitative variables, were recorded as frequencies and percentages. **Results:** Out of 80 patients with suspected SBP 38(47.5%) were culture positive while 42(52.5%) were culture negative. Among these 14(36.84%) showed gram positive growth and 20(52.63%) gram negative growth while 4(10.52%) showed anaerobes. Most of the organisms were resistant to ceftazidim, cefoperazone & augmentin while sensitive to levofloxacin, ceftriaxone, cefotaxime and ciprofloxacin. Highest resistance was against ceoftazidim which was 36(95%) followed by cefoperazone 35(92%). **Conclusions:** Spontaneous bacterial peritonitis is devastating complication of liver cirrhosis and ascites and is a leading cause of disability and death in patients with chronic liver disease. Early diagnosis and treatment with proper antibiotics and dosage are necessary for better outcome.

Key words: Spontaneous bacterial peritonitis, encephalopathy, portal hypertension, culture and sensitivity and resistance.

INTRODUCTION

Spontaneous bacterial peritonitis (SBP) is a bacterial infection of ascitic fluid in patient with decompensated cirrhosis in the absence of evident intra abdominal infection[1].

Hepatitis C virus infection is the leading cause of cirrhosis in Pakistan[2]. Seroprevalence of HCV infection is found in 4-12.5% of the healthy persons in our population and this carrier rate increase with the increasing age[3].

The diagnosis is established by positive ascitic fluid culture or an elevated ascitic fluid total leukocyte count >500 cell/mm3 or absolute polymorpho-nuclear leukocyte (PMN) counts > 250 cells/mm3. Asymptomatic spontaneous bacterial peritonitis can be the first presentation of ascites in chronic liver disease patients. It is suggested that this condition should be actively sought in all chronic liver disease patients who develop ascites for the first time[4].

Gram negative organisms like Escherichia coli, Klebsiella are more commonly found in SBP than gram positive organisms which have translocated from the bowel. Anaerobes are rarely isolated by culture of ascitic fluid which is the gold standard test for the diagnosis of

SBP[5].

Recent reports have suggested that selective gut decontamination led to a change of microorganisms with predominance of gram positive organisms, compared to predominance of gram negative organisms in the past which cause SBP[6]. These organisms are becoming increasingly resistant to antibiotics like ciprofloxacin and cefotaxime.

This increase in antibiotic resistance in treating patients with SBP requires proper identification of causative organism and its sensitivity so that proper antibiotics could be prescribed which will improve the clinical outcome of the patients[7].

MATERNAL AND METHODS

Study design
Descriptive study.

Setting
The study was carried out in the department of Gastroenterology-Hepatology in collaboration with department of Microbiology of Sheikh Zayed Hospital Lahore.

Duration of study
The duration of study was six months. Sampling size; 80 patients of liver cirrhosis with ascites.

Sampling technique
Non probability purposive technique was adopted for the patient selection.

SAMPLE SELECTION

Inclusion Criteria
Patients known to have cirrhosis with ascites.
Suspicion of spontaneous bacterial peritonitis.
Age ranges between 35-66 years.
Both genders.

Exclusion Criteria
Ascites due to causes other than cirrhosis for example adenocarcinoma gallbladder and stomach and patients who had received empirical antibiotic therapy for at least two weeks before culture were excluded.

DATA COLLECTION PROCEDURE
Eighty patients with liver cirrhosis and ascites diagnosed on the basis of history, examination and ultrasound findings like coarse echotexture, irregularity of margins, and enlarged spleen.

After detailed history examination and full aseptic measure at least 10 ml of ascitic fluid in 20ml syringe with 16G needle was drawn in blood culture bottle at bed side and was sent to microbiology laboratory for culture and sensitivity and record of resistance and sensitivity against various antibiotics conventionally used to treat SBP.

DATA ANALYSIS PROCEDURE
Data was analyzed by SPSS version 10. Quantitative variables such as age, and ascitic fluid analysis were recorded as mean + S.D and qualitative variables like gender, history and examination, drug history, asitic fluid culture and sensitivity were recorded as frequencies and percentages.

RESULT
A total of 80 patients were included in the study. It included 41 (51%) male patients and 39(49%) female patients (Table-II). Mean age was 53.05 years (53.05±6.82) with age range of 35-66 years (Table-I).

Out of 80 patients, with suspected SBP 38(47.5%) were culture positive while 42(52.5%) were culture negative (Table-III). Among these 14(36.84%) showed gram positive growth and 20(52.63%) gram negative growth while 4(10.52%) showed anaerobes (Table-IV). In gram positive group 8(57.14%) had streptococcus pneumonia and 6(42.85%) staphylococcus aureus growth. In gram negative group 14(36.0%) had E.coli growth and 6(16%) had Klebsiella while anaerobes actinobacter were found in 4(11.0 %) (Table-V).

Most of the organisms were resistant to ceftazidime, cefoperazone and augmentin while sensitive to levofloxacine, ceftriaxone, cefotaxime and ciprofloxacin. Highest resistance was against ceftazidime which was

Table-I. Sex distribution of patients

Sex	No. of patients	%age
Male	41	51%
Female	39	49%

Table-II. Age distribution of patients (n=80)

Age in years	No. of patients	%age
35-45	07	9.0%
46-55	42	52.0%
56-65	28	35.0%
>66	03	4.0%
Total	80	100%

Mean+SD = 53.05+6.82 *Key: SD = Standard deviation*

Table-III. Frequency of culture growth obtained in patients (n=80)

Culture growth	No. of patients	%age
Yes Positive	38	47.5%
No Negative	42	52.5%

Table-IV. Frequency of gram positive and negative organisms in patients (n=38)

	No. of patients	%age
Gram positive	14	36.84%
Gram negative	20	52.63%
Others anaerobes	04	10.52%

36(95%) followed by cefoperazone 35(92%), augmentin 26(68%) and amikacin 17(44%). Resistance against cefotaxime was 15(40%), ceftriaxone 10(25%) and levofloxacin 5(14%). Highest sensitivity was with levofloxacin 33(85%), followed by ceftriaxone 28(72%), ciprofloxacine 24(63%), cefotaxime 23(60%) and amikacin 21(55%) (Table VI & VII).

E.coli were found in 14 patients and 100% were sensitive to levofloxacin, 13(92.8%) to cefotaxime and ciprofloxacin 10(71.4%) to ceftriaxone and 9(64.3%) to amikacin while 100% resistant to augmentin, cefoperazone and ceftazidium while against amikacin it was 5(35.7%) and against ceftriaxone it was 4(28.6). Streptococcus pneumonia was found in 8 patient and was 100% sensitive to ceftriaxone, 7(87.5%) to levofloxacin, 6(75%) to augmentin, 6(75%) to ciprofloxacin and 3(37.5%) to cefotaxime, while it was 100% resistant to cefoperazone and ceftazidime and 5(62.5%) to amikacin.

Table-V. Frequency of causative organism in patients (n=38)

Culture organism	No. of patients
E.coli	14
Streptococcus pneumonia	08
Klebsiella	06
Stapholococcus Aureus	06
Others anaerobes actinobacter	04

Staphlococcus aureus was found in 6 patients and was sensitive in 5(83.3%) to augmentin and levofloxacin and 4(66,6%) to ceftriaxone while it was 100% resistant to cefotaxim, cefoperazone, ciprofloxacin and ceftazidim. Klebsiella was found in 6 patient and was 100% sensitive to levofloxacin, 5(83.3%) to ciprofloxacin, cefotaxime and amikacin and 4(66.6%) to ceftriaxone, while it was 100% resistant to augmentin while against cefoperazone and ceftazidime its resistance was 5(83.3%) (Table VI & VII).

DISCUSSION

Causes of ascites vary in different parts of world that is mainly due to variable prevalence of cirrhosis of liver, alcohol consumption and other diseases. The most common cause of ascites in our country is liver cirrhosis due to hepatitis C and B, while in Western population most common cause is alcohol. In Pakistani adults, HBV is responsible for 30% cases of viral hepatitis. The carrier rate of hepatitis B surface antigen is 1.5-2.1%[8]. which is defined as infection with HBV which persists for more than 6 months. Similarly seroprevalence of HCV infection was found in 4-12.5% of the healthy persons in our population and this carrier rate increases with the

Table-VI. Culture and sensitivity pattern of ascetic fluid in patients with SBP (n=38)

Causative organism	Augmentin		Cefotaxime		Ceftriaxone		Cefoperazone	
	Sensitive	Resistive	Sensitive	Resistive	Sensitive	Resistive	Sensitive	Resistive
E.coli (14)	-	14 (100%)	13 (92.8%)	1 (7.2%)	10 (71.4%)	4 (28.6%)	-	14 (100%)
Streptococcus pneumonia (8)	6 (75%)	2 (25.0%)	3 (37.5%)	5 (62.5%)	8 (100%)	-	-	8 (100%)
Klebsiella (6)	-	6 (100%)	5 (83.3%)	1 (16.7%)	4 (66.6%)	2 (33.3%)	1 (16.7%)	5 (83.3%)
Stapholococcus aureus (6)	5 (83.3%)	1 (16.7%)	-	6 (100%)	4 (66.6%)	2 (33.3%)	-	6 (100%)
Actinobacter (4)	1 (25.0%)	3 (75%)	2 (50%)	2 (50%)	2 (50%)	2 (50%)	2 (50%)	2 (50%)
Total (38)	12 (32%)	26 (68%)	23 (60%)	15 (40%)	28 (74%)	10 (26%)	3 (8%)	35 (92%)

Table-VII. Culture and sensitivity pattern of ascetic fluid in patients with SBP (n=38)

Ausative Ganism	Ceftazidime		Ciprofloxain		Levofloxacin		Amikacin	
	Sensitive	Resistive	Sensitive	Resistive	Sensitive	Resistive	Sensitive	Resistive
E.coli (14)	-	14 (100%)	13 (92.8%)	1 (7.2%)	14 (100%)	4 (28.6%)	9 (64.3%)	5 (35.7%)
Streptococcus pneumonia (8)	-	8 (100%)	6 (75%)	2 (25%)	7 (87.5%)	-	3 (37.5%)	5 (62.5%)
Klebsiella (6)	1 (16.7%)	5 (83.3%)	5 (83.3%)	1 (16.7%)	6 (100%)	1 (12.5%)	5 (83.3%)	1 (16.7%)
Stapholococcus aureus (6)	-	6 (100%)	-	6 (100%)	5 (83.3%)	1 (16.7%)	2 (33.3%)	4 (66.6%)
Actinobacter (4)	1 (25.0%)	3 (75%)	-	4 (100%)	1 (25%)	3 (75%)	2 (50%)	2 (50%)
Total (38)	2 (5%)	36 (95%)	24 (63%)	14 (37%)	33 (87%)	5 (13%)	21 (55%)	17 (45%)

increasing age[3].

Spontaneous bacterial peritonitis is a common complication in patients with liver cirrhosis. It carries a considerable morbidity and mortality. Early diagnosis and treatment is the gold standard approach in the management of patients with SBP.

Studies have shown that three most frequently isolated organisms were E.coli, klebsiella and streptococcus pneumonia and the resistance against cefotaxime and ciprofloxacin were increased significantly in past few years[7].

Out of theses 80 patients 41 (51%) were males and 39 (49%) females with mean age 53.05 years. Among these 38(47%) patients were culture positive while 42(53%) were culture negative. Out of these 20(52.63%) were having gram negative and 14 (36.84%) were having gram positive growth. Most of these organisms were resistant to ceftazidime, cefoperazone and augmentin while were sensitive to levofloxacine, ceftriaxone, cefotaxime and ciprofloxacin.

CONCLUSIONS

From the findings of present study it was concluded that, the results of the present study indicates that E.coli, streptococcus pneumonia and klebsiella were the most

common organisms causing SBP and were sensitive to levofloxacin, ceftriaxone, ciprofloxacin and cefotaxime and resistant to ceftazidim, cefoperazone and augmentin. Early diagnosis and treatment with proper antibiotics and dosages are necessary for better outcome.

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PREVIOUS RELATED STUDIES

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