Research Article
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Prevalence and microbiological features of spontaneous bacterial peritonitis in hospitalized ascitic patients: Single center study

Abstract

Spontaneous bacterial peritonitis (SBP) is a common serious complication in cirrhotic patients. The aim of this work is to determine the microbiological causes and their susceptibility pattern in patients with SBP admitted to Hepatology Unit at Mansoura Specialized Medical Hospital. This study included 400 patients with liver cirrhosis, ascites and clinical picture suggestive of SBP. All patients suspected to paracentesis. The aspirated fluid was examined for total leucocyte count and bacterial culture. 179 patients (58.3 %) out of 400 SBP patients were found to have Culture Negative Neutrocytic Ascitis (CNNA) while were 128(41.7%) patients had positive cultures. The causative microorganism was found to be *E coli* which was found in 57 patients (44%), *staph. aureus* in 32 patients (25%) and then *K pneuminiae* found in 20 patients (16%) finally *strept pneumoniae* in 19 patients (15%) of culture positive patients. Amoxicillin and Clavulanic acid (AMC) were the most sensitive antibiotic to be used as an oral antibiotics giving 92% sensitivity on all the detected bacteria.

Keywords: SBP, CNNA, *strept pneumonia,* HCV, HBV, asterixis

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Introduction

Spontaneous bacterial peritonitis (SBP) is infection of the ascitic fluid that occurs in the absence of a visceral perforation or abdominal inflammatory focus such as abscess, acute pancreatitis. SBP is a serious complication in cirrhotic patients.[1,2]

The prevalence of SBP on a study was conducted on 100 cirrhotic,ascitic patients presented to the Internal Medicine Department, Kasr Elaini hospital was about 57%.[3] It has been suggested that the microbiological causes of SBP and the susceptibility of the causative organisms to antibiotics are changing for several reasons.[4,5] We are in need of these results to treat patients successfully to prevent complications.

Patients & methods

This study included 400 patients (222 were males and 178 were females) admitted to Hepatology Unit at Mansoura Specialized Medical Hospital with liver cirrhosis, ascites and clinical picture suggestive of spontaneous bacterial peritonitis (abdominal pain, fever and or impaired level of consciousness). This study was performed during the period between 11-2014 and 2-2015.

Depending upon polymorph leucocytic count in the aspirated ascitic fluid, patients were divided into two groups:

A-SBP patients with ascetic fluid polymorph nuclear count (PMNL) ≥250 cells/mm^3

B-NON SBP with ascetic fluid polymorph nuclear count (PMNL) <250 cells/mm^3

Patients who were on antibiotic therapy were excluded.

Methods

All patients were submitted for

I. History taking (HCV, HBV, alcohol consumption, previous attacks of spontaneous bacterial peritonitis).

II. Clinical examination including symptoms: abdominal distension, elevation of body temperature, abdominal pain, impairment of consciousness level, vomiting of blood and bleeding per rectum and signs: ascites, fever, abdominal tenderness, encephalopathy {flabbing tremors (asterixis) impaired consciousness level and confusion}, jaundice and lower limb oedema.

III. Laboratory investigation

On the day of admission, all patients suspected to paracentesis under local anaethestic and strict aseptic condition was done.

The aspirated fluid was examined for

Total leucocyte count

Culture on automated blood culture system (Bact/ALERT 3D) from biomerieux.

IV. Statistical analysis

Data were tabulated, coded then analyzed using the computer program SPSS (Statistical package for social science) version 17.0.

Results

The study showed a significant increase in gram negative bacteria as a causative micro-organism in culture positive SBP patients. The causative organisms detected were *E. coli* (44%), *Staph. aureus* (25%), *K. pneumoniae* (16%) and *Strept. pneumoniae* (15%).

The culture results showed that *E coli* was highly sensitive to Amoxicillin and clavulanic (91.2%) followed by erythromycin (89.4%) and amoxicillin (87.7%). *Staph aureus* was most sensitive to cefoprazone (100%) while *k. pneumoniae* is most sensitive to meropenem (95%) It also shows that *Strept pneumoniae* is most sensitive to AMC, Ofloxacin and meropenem (100%).

Discussion

Spontaneous bacterial peritonitis is a grave and fatal complication for individuals with liver cirrhosis and ascites with high mortality and recurrence rates and poor long term prognosis.[6] In this study, we found that 78.5% of SBP patients were in class C while 21.5% in class B according to child Pugh classification (Table 1) (Table 2) (p value <0.001).

Table 1 Classification of all patients according to child pugh score

		SBP(307)		Non SBP(93)		P
		No	%	No	%	
Childpuogh	B	66	21.50%	42	45.20%	<0.001**
	C	241	78.50%	51	54.80%	

In this study that was conducted on patients having decompensated cirrhosis, we found a high prevalence of SBP in 307 patients (76.7%) (Table 3).

This agrees with a study by Abeer et al.[3] who found the prevalence of SBP in a study was conducted on 100 cirrhotic, ascetic patients presented to the Internal Medicine Department, Kasr Elaini hospital was about 57%.

In another study by Gills et al.[7] it was found that the prevalence of SBP in ascitic patients who were admitted into the medical ward of the Ekiti State University Teaching Hospital (EKSUTH), AdoEkiti, Nigeria is about 50 %-60%.

According to results of ascetic fluid culture of SBP patients, it was also found that 179 patients (58.3 %) among 400 SBP patients were found to have Culture Negative Neutrocytic Ascitis (CNNA) while were 128 (41.7%) patients had positive cultures (Table 4).

Payal et al.[8] studied 217 clinically suspected cases of SBP and concluded that 71 (43.80%) had ascitic fluid polymorphonuclear cells (PMN) count ≥250/mm^3. 31 (43.6%) cases were culture positive and 40 (56.4%) cases were culture-negative neutrocytic ascites.

Table 2 Laboratory data

	SBP (307)		Non SBP (93)		P
WBC	8.7	1.30-32.00	9	4.10-25.30	0.9
HB	9.2	±1.98	9.28	±2.04	0.7
Platlets	72	8.80-400.00	81	12.00-200.00	0.6
Creatinine	1.8	0.70-7.00	1.7	0.70-7.00	0.4
Albumin	2.68	±.77	2.79	±.71	0.2
HCVab	142	46.30%	38	40.90%	0.36
HBVsAg	28	9.10%	13	14.00%	0.17
AST	84	16.00-887.00	59	2.00-441.00	0.08
ALT	54	14.00-420.00	48	15.00-232.00	0.01*
Bilirubin	3.2	0.80-61.00	3	1.20-18.00	0.3
PT	15.3	12.50-62.00	15.2	12.40-58.00	0.9
INR	1.62	±.84	1.59	±.74	0.7
Na	126	90.00-1112.00	126	90.00-140.00	0.2
K	4	2.30-32.00	3.8	2.30-5.00	0.6
PMNL in ascitic fluid	600	250.00-70000.00	100	50.00-300.00	<0.001**

Table 3 Classification of studied patients according to PMNL count of ascetic fluid

		No	%	P value
Group 1	SBP	307	76.70%	<0.001**
Group 2	Non SBP	93	23.30%	
	Total	400	100%	

It was also found that positive cultures were gram negative in 77 patients culture (60.2%) and gram positive in 51 patients culture (39.8%) (p<0.001) as shown in (Table 5). In the presnt study, the causative micro organism was found to be *E coli* which was found in 57 patients (44%), *Staph aureus* in 32 patients (25%) and then *K pneumoniae* found in 20 patients (16%) finally *Strept pneumoniae* in 19 patients (15%) of culture positive patients (Table 6).

It was also found that Gram negative bacteria were highly sensitive for Amoxicillin and Clavulanic acid (AMC), Meropenem and Erythromycin (Table 7) (Table 8) meanwhile Gram positive bacteria were highly sensitive for Amoxicillin and Clavulanic acid (AMC), Ofloxacin and cefoprazone (Table 7). So from results obtained In this study, it could be concluded that. Amoxicillin and Clavulanic acid (AMC) the most sensitive antibiotic to be used as an oral antibiotics

giving 92% sensitivity on all the bacteria detected (88.3% for Gram negative cultures and 98% for Gram positive cultures) (Table 9).

Table 4 Classification of SBP patients according to culture results

		No	%	P value
Culture	Negative (CNNA)	17900%	58.30%	0.017*
	Positive	128	41.70%	
	Total	307	100%	

Table 5 Classification of SBP according to gram stain

Organism	No	%	P
Gram negative	77	60.20%	<0.001**
Gram positive	51	39.80%	
Total	128	100%	

Table 6 Types of micro-organisms in culture positive SBP

Bacteria in positive culture	No	%	P
E coli (Gram -ve)	5700.00%	44%	<0.001**
Staph aureus (Gram +ve)	3200.00%	25%	
K Pnumonia (Gram -ve)	2000.00%	16%	
Strepto pnumonia (Gram +ve)	19	15%	
Total	128	100%	

P, Probability; Test used, Pearson's chi-squar; *, Significance <0.05; **, High significance

Table 7 Antibiotic sensitivity in positive cultures

	Bacteria						P value
	Gram-ve (n=77)		Gram+ve (n=51)		Total (128)		
	No	%	No	%	Total sensitive	%	
Cefatriaxone	62	80.50%	45	88.20%	107	83.50%	-
AMC (Amoxicillin and Clavulanic acid)	68	88.30%	50	98.00%	118	92.19%	0.6
SAM(Ampicillin-Salbactam)	64	83.10%	48	94.10%	112	87.50%	0.8
Ofloxacin	62	80.50%	50	98.00%	112	87.50%	0.8
Cefoprazone	61	79.20%	50	98.00%	111	86.72%	0.8
Meropenem	66	85.70%	45	88.20%	111	86.71%	0.8
CEPHALEX	62	80.50%	46	90.20%	108	84.40%	0.96
Clarithromycin	63	81.80%	45	88.20%	108	84.38%	0.96
Erythromycin	67	87.00%	40	78.40%	107	83.60%	1
Teicloplanin	60	77.90%	46	90.20%	106	82.80%	0.96
Nitrofurantion	60	77.90%	45	88.20%	105	82.03%	0.92
SXT(Sulphamethoxazole And Trimethoprim)	57	74.00%	45	88.20%	102	79.70%	0.8
norfloxacin	51	66.20%	46	90.20%	97	75.78%	0.6
TZP(Piperacillin and Tozabactam)	57	74.00%	36	72.00%	93	72.66%	0.45
CIPRO	53	68.80%	34	66.70%	87	67.90%	0.28
Amoxicillin	57	74.02%	29	56.80%	86	67.20%	0.25
Vancomycin	33	42.80%	43	25.50%	76	59.37%	0.08
Amikacin	53	68.80%	6	11.80%	59	46.10%	0.003*

P, Probability; Test used; Pearson's chi-square or fisher-exact test; *, significance; <0.05**, High significance; S, sensitive

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None.

Conflict of interest

The authors declare there is no conflict of interest.

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