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BACTERIOLOGICAL PROFILE AND ANTIBIOTIC SENSITIVITY PATTERN OF ASCITIC FLUID OF SUSPECTED SPONTANEOUS BACTERIAL PERITONITIS IN DECOMPENSATED CIRRHOSIS PATIENTS

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ABSTRACT

BACKGROUND: Spontaneous bacterial peritonitis (SBP) has high mortality in cirrhotic patients. The occurrence of SBP is independent of the etiology of liver disease with prevalence varying from 8-36%. Patients with SBP may be asymptomatic or symptomatic with fever, abdominal pain or may present with complications like hepatic encephalopathy or renal failure. Hospital mortality of an episode of SBP can be reduced to 20% from 50% with appropriate antibiotics. But the local data on SBP prevalence, appropriate antibiotic regimen were scanty, which prompted us to conduct this study at our institution.

METHOD: This study was conducted in the department of gastroenterology, Kurnool medical college, Kurnool. 200 patients who were admitted with ascites, due to chronic liver disease were evaluated by doing blood investigations, ascitic fluid analysis, culture and sensitivity. Data was collected, recorded and statistical calculation was done.

RESULTS: Out of 200 patients, 58 (29%), had SBP. 14 patients of SBP (24.2%) were asymptomatic at presentation. Most common organism identified was E.coli (54%) followed by Klebsiella pneumonia (16.6%), Pseudomonas aeruginosa (12.5%)and Staphylococcus aureus (8.3%). E.coli strains were resistant to cefotaxime, amikacin, ciprofloxacin, piperacillin-tazobactam, cefoperazone-sulbactam in 30.7%, 30.7%, 38.5%, 15.3%, 23% of cases respectively. 25% of Klebsiella, 33% of Pseudomonas aeruginosa and 50% Staphylococcus aureus isolates were resistant to cefotaxime, amikacin, ciprofloxacin, piperacillin tazobactam, cefoperazone-sulbactam antibiotics. All the isolated organisms were found to be sensitive to meropenem.

CONCLUSION: SBP prevalence found to be more common in patients with advanced liver disease. SBP patients were asymptomatic in 24% of cases. Most common organism identified was E.coli followed by Klebsiella, Pseudomonas, Proteus, Staphylococcus. Cefotaxime or piperacillin tazobactam could be chosen as empirical antibiotic. A high index of suspicion for SBP in cirrhotic patients and ascitic fluid analysis including culture will aid in the treatment and reduce the mortality related to SBP.

KEYWORDS : SBP, Chronic liver disease, Ascites, Ascitic fluid analysis

INTRODUCTION

Spontaneous bacterial peritonitis (SBP) is the most frequent infection in patients with liver cirrhosis requiring prompt recognition and treatment as it is associated with significant morbidity and mortality. SBP is most frequently seen in decompensated cirrhotic patients. Since the infection occurs in the absence of a contiguous source of infection, it is called spontaneous. The occurrence of SBP is independent of the etiology of liver disease.

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SBP is defined by the presence of ≥250 polymorphonuclear cells (PMN)/mm^3 in ascitic fluid in the absence of an intra-abdominal source of infection or malignancy.

Patients of SBP may be symptomatic with fever, abdominal pain and altered gastrointestinal motility[3]. Other patients may present with the development of hepatic encephalopathy or renal failure which may be the predominant or only features. SBP may be asymptomatic or have minor symptoms only in about 20% of patients[4]. In-hospital mortality for the first episode of SBP ranges from 10% to 50%[1]. However, with the early recognition and prompt antibiotic treatment, the in-hospital mortality of an episode of SBP has been reduced to approximately 20%[2]. Given high morbidity and mortality associated with SBP which can be prevented by appropriate antibiotic therapy, there is a need for local data on microbiological and antibiotic sensitivity pattern. The local data on SBP prevalence, appropriate antibiotic regimen were scanty, which prompted us to conduct this study at our institution.

METHODS

This hospital-based prospective study was conducted in the department of gastroenterology, Kurnool medical college, Kurnool. All patients with ascites, due to chronic liver disease were included in the study. Patients with ascites due to renal, cardiac, tubercular and malignant pathologies and patients who received antibiotics within five days prior to admission were excluded from the study.

30 ml of ascitic fluid was collected at bedside using standard and universal precautions from chronic liver disease patients on the day of admission before starting an empirical antibiotic. 10 ml of ascitic fluid was added to EDTA tube for total, and differential counting and 5 ml was added to plain container for sugar, protein and albumin. 15ml of ascitic fluid was injected into the blood culture bottle and culture positive isolates were tested for antimicrobial susceptibility according to the type of bacteria isolated by using the disc diffusion method of modified Kirby Bauer.

RESULTS

The total study group included 200 patients with cirrhosis and ascites. Of these 200 patients, 140 (70%) patients were males, and 60 (30%) were females. Mean age of the SBP population is 50.4 ± 5.9 yrs. Out of the total 200 study population, 58 (29%) patients had SBP. Of the SBP group, 46 patients (79.3%) were males, and 12 (20.7%) were females.

Of all cases of SBP (58), 24 cases were culture positive (41.3%). Antibiotic sensitivity pattern determined in culture positive cases. Most common organism identified was E.coli in 13 cases (54%) followed by Klebsiella pneumonia in 4 cases (16.6%), Pseudomonas aeruginosa in 3 cases (12.5%) and Proteus mirabilis, Staphylococcus aureus in 2 cases each (8.3%).

Of all cases (13) of E.coli, 4 cases (30.7%) were resistant to cefotaxime and amikacin, 5 cases (38.5%) were resistant to ciprofloxacin, 2 cases (15.3%) were resistant to piperacillin-tazobactam, 3 cases (23%) were resistant to cefoperazone-sulbactam.

Of all cases (4) of Klebsiella, one case (25%) was resistant to cefotaxime, amikacin, ciprofloxacin, piperacillin-tazobactam, cefoperazone-sulbactam antibiotics.

All the isolated organisms were found to be sensitive to Meropenem.

Antibiotic sensitivity patterns in culture positive SBP cases

Organism	E.coli (n=13)		Klebsiella pneumonia (n=4)		Pseudomonas aeruginosa (n =3)		Staphylococcus aureus (n=2)		Proteus mirabilis (n=2)	
Antibiotic	Sensitive	Resistant	Sensitive	Resistant	Sensitive	Resistant	Sensitive	Resistant	Sensitive	Resistant

Cefotaxime	9	4	3	1	2	1	1	1	2	0
Ciprofloxacin	8	5	3	1	2	1	1	1	1	1
Amikacin	9	4	3	1	2	1	1	1	1	1
Piperacillin +Tazobactam	11	2	3	1	2	1	1	1	2	0
Cefoperazone +Sulbactam	10	3	3	1	2	1	1	1	2	0
Meropenem	13	0	4	0	3	0	2	0	2	0

DISCUSSION

A total of 200 patients admitted with cirrhosis and ascites irrespective of etiology were included in the study and ascitic fluid analysis was done at the time of admission. Among the 200 patients, 140 (70%) were males, and 60 (30%) were females.

Our study found ascitic fluid culture positivity to be 41.3% (24 cases of 58 SBP pateints). E.coli in 13 cases (54%) followed by Klebsiella pneumonia in 4 cases (16.6%), Pseudomonas aeruginosa in 3 cases (12.5%) and Proteus mirabilis, Staphylococcus aureus in 2 cases each (8.3%). Only gram-positive organism identified in our study was staphylococcus aureus which accounts for 8.3% cases, and no case of Enterococcus identified

In a review by Bhuva M et al[5] the most frequently identified organisms included E. coli, streptococci, and klebsiella which accounted for more than 80% of all cases of SBP. In a study conducted by Suresh et al[6] the most common organism isolated was E.coli followed by Klebsiella and enterococcus. Purohit et al[7] reported 9.6% of cases of Pseudomonas aeruginosa, which was not a common isolate in SBP.
The prevalence of particular organism in SBP and varied representative spectrum of organisms indicate the local microbiological patterns which will help select the appropriate empirical antibiotic till culture results are awaited, thus reducing the mortality rates.

Culture for Anaerobic organisms and fungal culture were not done in our study due to operational difficulties and rarity of the organisms in causing SBP.

In our study E.coli resistance found in 30% of cases to cefotaxime and amikacin, 38.5% of cases to ciprofloxacin, 23% of cases to cefoperazone and sulbactam, 15.7% of cases to piperacillin and tazobactam. 25% of Klebsiella isolates were resistant to all the antibiotics studied except meropenem. In a study done by Aswani et al[8] both E.coli and Klebsiella were 100% sensitive to imipenem and E.coli was 53.3% sensitive to cefotaxime and ciprofloxacin while Klebsiella was 50% sensitive to both of them.

In our study, 33% of pseudomonas cases and 50 % of Staphylococcus aureus were resistant to cephalosporins, amikacin, fluoroquinolones, and piperacillin antibiotics. 50% of Proteus mirabilis were resistant to Ciprofloxacin and amikacin antibiotics and 100% sensitive to other antibiotics tested in the study. All the isolates of the study were 100% sensitive to meropenem.

The resistance pattern in our study is comparable to other previous studies but a high rate of resistant strains of E.coli, Klebsiella were found, which are the more common organisms for SBP.

The increase in resistant strains of common organisms may be due to indiscriminate use of antibiotics and initiation of prophylactic antibiotic treatment with quinolones for SBP. Delay in the initiation of appropriate antibiotic will lead to a substantial increase in mortality hence ascitic fluid culture and appropriate antibiotic should be initiated at the earliest.

CONCLUSION

In this study we identified E.coli being the most common organism for SBP followed by Klebsiella, Pseudomonas, Proteus, Staphylococcus. There was an increasing trend in the incidence of resistant organisms to empirical antibiotic like cefotaxime. 33% of E.coli were resistant to cefotaxime in our study, hence inappropriate antibiotic administration in the community for trivial reasons should be discouraged.

Every institution should have an antibiotic policy with local microbiological patterns to guide the therapy and to streamline the antibiotic stewardship. The reason for changing the antibiotic and upgrading to higher antibiotic should clearly defined with predetermined criteria. This will help in reducing the increased infection with atypical organisms and the emergence of antibiotic-resistant organisms with an associated increase in health care costs.

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