Original Article

Analysis of patients with suspected diagnosis of spontaneous bacterial peritonitis in the emergency department

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Abstract

Aim: In this study, we aimed to determine the epidemiological characteristics, microbiological and laboratory parameters of the patients diagnosed with spontaneous bacterial peritonitis (SBP) in the tertiary emergency department and to determine the in-hospital mortality rates.

Material and Methods: A total of 294 patients who met these criteria and whose data were fully accessible from the hospital information management system included in the study. Demographic data such as age, gender, cirrhosis etiology, laboratory results and in-hospital mortality were recorded on the study form previously prepared. Child-Pugh and model for end stage liver disease (MELD) scores were calculated according to the formulas.

Results: The mean age of the patients was 49 ± 17 years (mean ± SD) and 212 (72.1%) were male. When the patients were examined in terms of the etiology of cirrhosis; the most common cause was viral hepatitis with 53.4% (n: 157), followed by alcoholic hepatitis with 28.4% (n: 83). In terms of Child-Pugh grades, 45.2% (n: 132) of the patients were Child-Pugh grade C. In acid fluid analysis; there were 57 (19.3%) patients in SBP group, 45 (15.3%) patients in the culture negative neutrocytic ascites group and 192 (65.4%) patients in monomicrobial bacterascites group.

Conclusion: Since the first admission address of these patients are mostly ED, especially emergency physicians should always keep this diagnosis in mind for such patients.

Keywords: Ascitic fluid; Emergency medicine; Infection; Peritonitis.

INTRODUCTION

The condition characterized by the accumulation of more than 25 mL of fluid in the peritoneal cavity is defined as ascites, and it can be seen in many conditions including; infectious, infiltrative and malignant liver cirrhosis (1). Bacterial infection occurring in the ascites fluid without any focal infection or surgical intervention in the abdomen is defined as spontaneous bacterial peritonitis (SBP) (2). In patients with end-stage liver disease, SBP is the most common infection with urinary tract infection (3). In the etiology, the translocation of bacteria into mesenteric lymph nodes and acid fluid is responsible. Spontaneous bacterial peritonitis is responsible for approximately one third of bacterial infections seen in patients with hepatic impairment (4). When it was first described in 1970s, mortality rate of SBP was around 80%. Despite improvements in treatment over time, mortality rates still reach up to 30% even after a single SBP attack (5).

Among the isolated microorganisms, gram-negative enteric bacteria such as; Escherichia coli and non-enteric streptococcus spp. are the most common (6). The high Child-Pugh score, low levels of serum protein as well as high bilirubin levels are among the factors facilitating the development of SBP (7). Delayed diagnosis and treatment result in a significant increase in mortality (8). The accepted method in the diagnosis is; the presence of 250/mm3 polymorphonuclear (PMN) or 500/mm^3 white blood cells (WBC) in ascites fluid. The first place of admission for these patients is usually Emergency Department (ED) and the complaints are mostly fever and abdominal pain (9). Therefore, in the absence of timely diagnosis and treatment of patients with SBP, the disease can progress to septic shock and in-hospital mortality is doubled for each delayed hour (10). In this study, we aimed to determine the epidemiological characteristics, microbiological and laboratory parameters of the patients diagnosed with SBP

in the tertiary emergency department and to determine the in-hospital mortality rates.

MATERIAL and METHODS

After obtaining the approval of the local ethical committee, hospital information management system (ENLIL) scan was performed for the detection of patients with initial diagnosis of spontaneous bacterial peritonitis between November 2013 and November 2018. For detection of the patients, Spontaneous bacterial peritonitis International Statistical Classification of Diseases and Related Health Problems (ICD) code (K.65.2) was used. A total of 312 patients were detected after the search. Inclusion criteria were defined as; liver cirrhosis due to Hepatitis B, Hepatitis C, Alcohol or cryptogenic caused and to have initial diagnosis of SBP in the ED. A total of 294 patients who met these criteria and whose data were fully accessible from the hospital information management system included in the study. Demographic data such as age, gender, cirrhosis etiology, laboratory results and in-hospital mortality were recorded on the study form previously prepared. Child-Pugh and model for end stage liver disease (MELD) scores were calculated according to the formulas (11). For statistical evaluation SPSS Statistics for Windows, Version 19.0, (Serial number: 10240642 IBM. Armonk, NY: IBM Corp.) was used after all data were recorded. Frequency and percentages were used as descriptive statistics. Chi-square test was used to evaluate the relationship between qualitative variables. Fisher Exact test was applied when the smallest expected value was below 5 when examining the relationship between qualitative variables. As descriptive statistics arithmetic mean ± standard deviation (SS) were used in quantitative variables and number (n) and percentages (%) were used for the evaluation of categorical data. The significance limit for all statistics was defined as; $p < 0.05$.

RESULTS

The mean age of the patients was 49 ± 17 years (mean ± SD) and 212 of them (72.1%) were males. When the patients were examined in terms of the etiology of cirrhosis; the most common cause was viral hepatitis with 53.4% (n: 157), followed by alcoholic hepatitis with 28.4% (n: 83). In terms of Child-Pugh grades, 45.2% (n: 132) of the patients were Child-Pugh grade C. Baseline characteristics of patients are shown in Table 1.

When the blood parameters of the patients were examined; mean hemoglobin levels were 10.2 ± 2.4 g / dL, total bilirubin levels were 8.2 ± 7.6 mg / dL and sodium levels were 129 ± 5.8 mEq / L. Blood parameters of patients are shown in Table 2.

In acid fluid analysis; there were 57 (19.3%) patients in SBP group (the total number of leukocytes was above 500/mm3, the number of neutrophils was above 250/mm3 and culture positive group). There were 45 (15.3%) patients in the culture negative neutrocytic ascites group (the total number of leukocytes was above 500/mm3, the neutrophil

count was above 250/mm3 and culture negative). There were 192 (65.4%) patients in monomicrobial bacterascites group (the total number of leukocytes was below 500/mm3, the number of neutrophils was below 250/mm3 and culture positive). Monomicrobial bacterascites group was found to be significantly higher than the other groups (p: 0.024). In a total of 249 patients had culture positive and gram negative bacteria were the most common agents (n: 176 ,70.6%) the causative agent was Eschericia coli in 91 (36.5%) patients. Escherichia coli was found to be significantly higher than all the other groups (p: 0.036). Bacteria and their types isolated from the acid fluid are shown in Table 3.

Table 1. Baseline characteristics of the patients		
Characteristic	**n (%)**	**p**
Age (mean±SD) year	49±14	
Gender		
Male	212 (72.1)	0.027
Female	82 (27.9)	0.643
Etiology of cirrhosis		
Viral hepatitis	157 (53.4)	0.035
Alcoholic hepatitis	74 (25.1)	0.247
Cryptogenic cirrhosis	36 (12.2)	0.462
Others	27 (9.3)	0.512
Complaint of admission		
Abdominal pain	121 (41.1)	0.044
Fever	74 (25.1)	0.126
Deterioration in general condition	52 (17.6)	0.258
Altered mental status	47 (16.2)	0.262
Hemodialysis at least 2 times per week	23 (7.8)	
Child – Pugh Score (mean±SD)	10±3	
Child – Pugh grade		
B	102 (34.7)	0.272
C	192 (65.3)	0.038
MELD score (mean±SD)	19.3±6.7	
In-hospital mortality	11(3.7)	

Table 2. Blood parameters of the patients	
Parameter	mean±SD
Hemoglobin (g/dL)	10.2±2.4
Leucocyte count (mm3)	13147±7483
Platelet count 105/mm3)	105±0.47
International Normalized Ratio (INR)	1.9±1.2
Total proteins (g/dL)	5.7±1.6
Albumin (g/dL)	2.1±0.72
Aspartate aminotransferase (AST) (IU/L)	114±86
Alanine aminotransferase (ALT) (IU/L)	63±47
Lactate dehydrogenase (LDH) (U/L)	326±273
Glucose (mg/dL)	127±91
Sodium (mEq/L)	129±8.3
Potassium (mEq/L)	4.7±1.4

Table 3. Microorganism isolated from acid fluid		
Isolated microorganism (n:249, %100)	n (%)	p
Gram negative microorganism	176 (70.6)	0.026
Escherichia coli	91 (%36.5)	0.035
Klebsiella spp.	34 (13.6)	0.248
Pseudomonas spp.	14 (5.6)	0.398
Aeromonas	11 (4.4)	0.472
Others	26 (10.5)	0.361
Gram positive microorganism	73 (29.4)	0.074
Streptococcus spp.	44 (17.6)	0.232
Staphylococcus spp.	21 (8.4)	0.473
Others	8 (3.4)	0.852

DISCUSSION

In the current study that 294 patients were included with initial diagnosis of SBP in the emergency department, only 57 (19.3%) patients were diagnosed as SBP. In the study of Reginato et al. (12), this rate was found to be 31.7%. We think that; such a low rate is related to be as high as monomicrobial bacterascites group (n: 192, 65.4%), as well as the initial diagnosis of all of the cirrhotic patients who admitted to the ED with the complaints of abdominal pain or fever is SBP. The mean age of patients diagnosed with SBP in the study of Heo et al was found to be 56 ± 12 years, and in our study it was 49 ± 14 years. Although this result is similar to the literature, we think that it is giving us a warning about cirrhosis and related complications development in terms of being seen at an earlier age in our country.

In the study of Karakütük et al. (13), the rate of male patients was found to be 57.2% among the patients who have cirrhosis and related acid, whereas in our study this rate was determined as 72.1%. However, when the other studies in the literature were examined (14-16), it was found that this rate is between 40% and 80%. In our opinion, the reason for the higher rate of male patients compared to the study of Karakütük et al. (13) is related to the higher rates of alcoholic hepatitis in our region as high as 25.1%, and the majority of them are male patients. In a study conducted in our country (13), cirrhosis rates due to viral hepatitis was found to be 41.8%, while this rate was 77.7% in a study conducted abroad. In the current study, this rate was determined as 53.4%. Although the rate obtained in our study was lower than the literature, it was found to be higher than the data of our country. We believe that; it is more effective to make the diagnosis of viral hepatitis easier than the increased prevalence of viral hepatitis.

In the previous studies (17,18), it was stated that; the most frequent complaints of the cirrhotic patients to admit to the ED were; fever and followed by abdominal pain. In the present study, the most common frequent reason for admission was abdominal pain with the rate of 41.1% and the second was fever with 25.1%. We think that the reduced response to the infection due to immune deficiency caused by advanced liver disease is the reason of lower rates of fever. Child-Pugh stage C patients accounted for 65.3% of the patients included in the study and the mean Child-Pugh Score of the patients was 10 ± 3 (mean ± SD). Child-Pugh and MELD scores were lower than expected, although Child-Pugh stages were high. We believe that; the reasons of this situation are; not very high bilirubin and INR levels, not very low albumin levels, and limited number of patients receiving hemodialysis treatment on a regular basis. Although it is stated in the literature (17) that; peritonitis related mortality rates can be reached up to 20%, this rate was determined as 3.7% in our study. We think that; in addition to early diagnosis, no delay to start the treatment are effective in this result.

When microorganisms isolated from acid fluid were examined, it was seen that 70.6% of the microorganisms were formed by gram negative microorganisms. The most common among these microorganisms was Escherichia coli (36.5%). Similar studies in the literature (18-21) also reported that E. coli is the most commonly isolated microorganism in SBP. Although this is the case, the prevention of contamination especially during paracentesis is important in terms of the failure of the culture results.

Another important point here is that empirical antibiotic treatment should be started without loss of time after paracentesis in the ED. In case of delayed diagnosis, SBP may progress to sepsis and become mortal (22).

There are a few factors limiting our study. The first is that the number of patients is slightly less than other studies in the literature. We think that searching the patients by using ICD codes and not including the patients with any ICD code except K.65.2 are responsible to this result. Another limitation was that other comorbidities of the patients were not included in the study. We think that; considering other diseases that may help with the development of acid and SBP will give more effective results in future studies.

CONCLUSION

As a result, delaying in the diagnosis and treatment of cirrhosis and which is a serious complication of SBP are still very important due to sepsis and organ failure. Since the first admission address of these patients are mostly ED, especially emergency physicians should always keep this diagnosis in mind for such patients.

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