FREQUENCY OF SPONTANEOUS BACTERIAL PERITONITIS IN PATIENTS WITH NEPHROTIC SYNDROME

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ABSTRACT

Introduction: Nephrotic syndrome is defined by edema, proteinuria of more than 3.5 g in 24 hours and hypoalbuminemia of less than 30 g/l. The loss of plasma proteins in the urine causes complications of NS as a direct result of the changing protein concentrations in the plasma or as a secondary result of altered cellular function. Urinary loss of small molecular proteins such as immunoglobulin G fractions, factor I, and factor B may alter opsonization, phagocytosis and killing of bacteria and result in defective humoral and nonspecific immunity. Infectious complications are common in nephrotic syndrome (NS), especially spontaneous bacterial peritonitis and occurs within first 2 years of onset of disease.SBP is the infection of ascitic fluid that occurs in the absence of a visceral perforation, intra abdominal inflammatory focus such as abscess, acute pancreatitis or orcholecystitis.

Objective: To determine the frequency of spontaneous bacterial peritonitis in patients with nephrotic syndrome.

Methodology: This study was conducted at Nephrology unit, Khyber Teaching Hospital, Peshawar. The study was descriptive, cross sectional study and the duration of the study was one year, from the 20th September 2016 to 20th September 2017 in which a total of 156 patients were observed. All patients with nephrotic syndrome presenting to Out Patient Department, including all genders and age group of 2-18 years were selected. The demographic information like name, age, sex and address was recorded in a predesigned proforma. All patients were worked up with laboratory investigations including full blood count with ESR, C reactive protein, fasting and random blood glucose levels, blood urea, Serum Creatinine, serum electrolytes, total serum protein, 24 hours urinary proteins, liver functions test and abdominal ultrasonography.

Results: In this study, total number of patients were 156, mean age was 9 years with SD ± 3.71.55% percent of the patients were male while 45% patients were female. The frequency of spontaneous bacterial peritonitis was found to be 19% in patients with nephrotic syndrome.

Conclusion: Our study concludes that the incidence of spontaneous bacterial peritonitis was found to be 19% in patients with nephrotic syndrome in our setup.

Key Words: spontaneous bacterial peritonitis, nephrotic syndrome.

INTRODUCTION

Nephrotic syndrome is defined by edema, proteinuria of more than 3.5 g in 24 hours and hypoalbuminemia of less than 30 g/l.[1] The loss of plasma proteins in the urine causes complications of NS as a direct result of the changing protein concentrations in the plasma or as a secondary result of altered cellular function.[2] Urinary loss of small molecular proteins such as immunoglobulin G fractions, factor I, and factor B may alter opsonization, phagocytosis and killing of bacteria and result in defective humoral and nonspecific immunity.

Infectious complications are common in nephrotic syndrome (NS), especially Spontaneous bacterial peritonitis and occurs within the first 2 years of onset of disease.[3] SBP is infection of the ascitic fluid that occurs in the absence of a visceral perforation, intra abdominal inflammatory focus such as abscess, acute pancreatitis or orcholecystitis. For its diagnosis, number of polymorphonuclear leucocytes (PMN) in the ascitic fluid obtained must exceed 250 cells/mm3.[4]

The incidence of major infections in NS has been reported (in India) up to 36.6%. Among the major infections, peritonitis and pneumonia together accounted for 72.9%, while alone, SBP has been documented in up to 16% patients (children up to 13 years age).[5] Whereas another study has reported low frequency of SBP in nephrotic syndrome up to 11.4%[6]. SBP carries a high mortality rate i.e, >80%[7] since patients with nephrotic syndrome have low immunity.[8]

The rationale of the present study is to determine the exact frequency of SBP in nephrotic syndrome in our set up as on one side a study showed a very high frequency of SBP in nephrotic syndrome whereas in another study the frequency of SBP in NS is low. As

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discussed earlier due to low immunity in NS the mortality rate is very high. The results of this study can be used in devising policy recommendations and suggestions for the treatment and management of SBP in NS. If the results of this study show a significant number of patients having SBP then the results will be disseminated to other health professionals and suggestions will be given to routinely screen or have a high suspicion for SBP in NS. This will further help us in reducing the complications associated with SBP in NS.

OBJECTIVE

To determine the frequency of spontaneous bacterial peritonitis in patients with nephrotic syndrome.

METHODOLOGY

This study was conducted at Nephrology unit, Khyber Teaching Hospital, Peshawar. Study design was descriptive, cross sectional study and the duration of the study was one year, from 20th September 2016 to 20th September 2017.In this study a total of 156 patients were observed with 11.4% frequency of SBP in patients with nephrotic syndrome with 95% confidence interval and 5% margin of error, using WHO software for sample size calculation. Moreover consecutive (non-probability sampling) was used for sample collection. All patients with nephrotic syndrome presenting to Out Patient Department, all genders and age group of 2-18 years were included while all the patients presenting with signs and symptoms of generalized peritonitis due to surgical causes as evident by history, clinical examination and clinical record, with liver and blood malignancies and Diabetes Mellitus were excluded because these patients are immune compromised and was excluded by clinical examination and known clinical record. All those receiving antibiotics within 48 hours prior to presentation as SBP were not detected on ascitic fluid analysis and culture, all patients who had previous attacks of spontaneous bacterial peritonitis evident by previous hospital record were excluded because such patients have greater tendency for re- infection, all patients who have any abdominal paracentesis of ascitic fluid with aseptic measures known by history and clinical record were excluded due to possible contamination of peritoneal cavity. The study was conducted after approval from hospitals ethical and research committee. All patients meeting the inclusion criteria were included in the study through OPD and were admitted in the nephrology ward for further work up. From all the patients, detailed clinical history was taken followed by clinical examination and laboratory examination. The demographic information like name, age, sex and address was recorded in a predesigned proforma. All patients were worked up with laboratory investigations like full blood count with ESR, C reactive protein, fasting and random blood glucose levels, blood urea, Serum Creatinine, serum electrolytes, total serum protein, 24 hours urinary proteins, Liver functions test and abdominal ultrasonography. The purpose and benefits of the study were explained to all patients and they were assured that the study was done purely for research and data publication and if agreed upon, a written informed consent was obtained for abdominal paracentesis. The type of treatment undertaken in nephrotic syndrome was according to medical ethics, beneficial and non harmful to the patients. Paracentesis was done in an emergency room at nephrology ward where all the essential equipments and medicines were present to deal with any emergency encountered during paracentesis. The patient was on his/her back in a slightly recumbent position toward the site of paracentesis. The abdomen was percussed and the area of dullness was marked. Insertion site for paracentesis was in the right iliac fossa and at the level of percussed dullness. Under fully aseptic conditions, the area was cleaned with pyodine solution in a circular fashion from the center out and sterile drapes were applied. The entry point of skin was infiltrated with 5ml injection Xylocaine 2% diluted in 5 ml of distilled water. Then a 20G Introducer needle was inserted into the peritoneal cavity and 50cc syringe was connected to it. 50 ml of ascitic fluid was aspirated and was sent to Pathology Department, Khyber Teaching Hospital, Peshawar in a bottle, for white blood cells count. After the procedure, the patient remained in bed for 2 hours and his blood pressure was checked half hourly and on normal readings, patient was allowed to go to bed in the ward. All admissions during the study period were included in the study. The exclusion criteria had been strictly followed to control confounders and exclude bias in the study result. All the results were followed by the principal investigator and all the above mentioned informations including name, age, gender, findings on ascitic fluid white blood cells count were recorded in a pre designed proforma. Data was analyzed by using Statistical package for social sciences (SPSS) version 16.0. Mean ± standard deviation was calculated for continuous variables like age. Frequency and percentages were calculated for qualitative variables like gender and spontaneous bacterial peritonitis. Spontaneous bacterial peritonitis was stratified among age and gender to see the effect modifiers. Post stratification chi square test was applied in which P value ≤0.05 was considered as significant value. All the results were presented as tables / charts.

RESULTS

In this study age distribution among 156 patients were analyzed as 90(58%) patients were in age range 2-10 years, 66(42%) patients were in age range 11-18 years. Mean age was 9 years with SD ± 3.71. (table no 1). Gender distribution among 156 patients were analyzed as 86(55%) patients were male while 70(45%) patients were female. (table no 2). Spontaneous bacterial peritonitis among 156 patients was analyzed as 30(19%) patients had SBP while 126(81%) patients didn't have SBP. (chart no 1). Stratification of spontaneous bacterial

Table No 1: Age Distribution (n=156)

Age	Frequency	Percentage
2-10 years	90	58%
11-18 years	66	42%
Total	156	100%

Mean age was 9 years with SD ± 3.71

Table No 2. Gender Distribution (n=156)

Gender	Frequency	Percentage
Male	86	55%
Female	70	45%
Total	156	100%

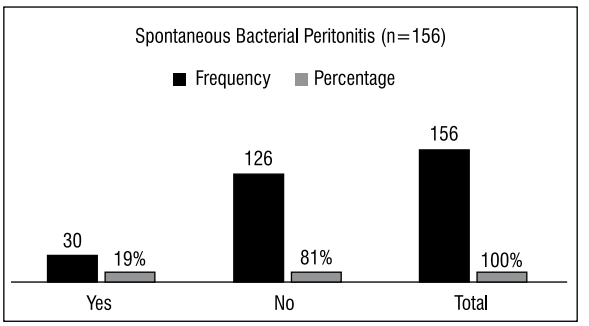

Chart No 1.

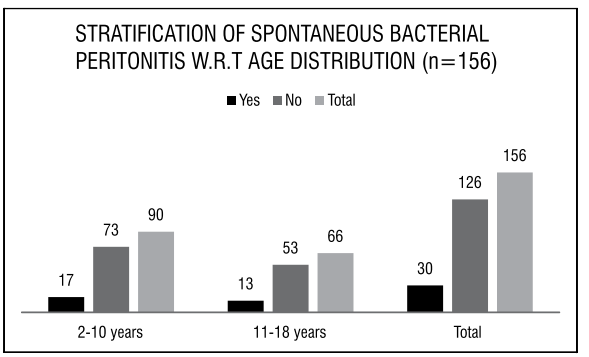

Chart No 2. Chi square test was applied in which P value was 0.8993

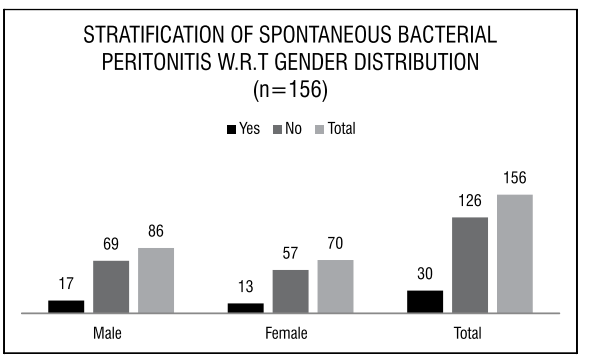

Chart No 3. Chi square test was applied in which P value was 0.8504

peritonitis with respect to age and gender is given in chart no 2,3

DISCUSSION

Nephrotic syndrome is defined as edema, proteinuria of >3.5 g in 24 hours and hypoalbuminemia of <30 g/l.[1] The loss of plasma proteins in the urine causes complications in Nephrotic patients including peritonitis, pneumonia etc.[2] Urinary loss of small molecular proteins may alter opsonization, phagocytosis and result in defective immunity.

Our study shows that out of 156 patients with nephrotic syndrome, 58% patients were in age range 2-10 years, 42% patients were in age range 11-18 years. Mean age was 9 years with SD ± 3.71. Fifty five percent patients were male while 45% patients were female. The incidence of spontaneous bacterial peritonitis was found to be 19% in patients with nephrotic syndrome in our setup.

The incidence of major infections in NS has been reported (in India) up to 36.6%. Among the major infections, peritonitis and pneumonia together accounted for 72.9%, while alone SBP has been documented in up to 16% patients (children up to 13 years age).[5] Whereas, another study has reported low frequency of SBP in nephrotic syndrome up to 11.4%[6]. SBP carries a high mortality rate i.e>80%[7] patients with nephrotic syndrome have low immunity.[8]

Similar results were found in another study conducted by Rashij D et al[7] in which 100 of nephrotic syndrome patients were observed, 19 had peritonitis with male to female ratio of 2:1. Peritonitis was more common in patients with relapse (n=16; 84%) as compare to newly diagnosed cases (n=3; 15%).12 developed peritonitis within the first year of diagnosis of nephrotic syndrome, 5 patients after first year of establishing the diagnosis and two patients after two years of diagnosis of nephrotic syndrome.

In a study conducted in Germany, frequency of peritonitis in nephrotic syndrome was found to be 16%[8] In another study conducted at New Delhi, India, the frequency was found to be 15.8%[9] According to another study conducted in Pakistan a few years ago, the frequency of peritonitis in children with nephrotic syndrome was 32%.[10] The reports about the causes of peritonitis demonstrated more or less different results. To date, initial reports have established that majority of cases were caused by gram-positive organism particularly the Pneumococcus and hemolytic streptococci. But some of them described the altered pattern of infecting organisms with a relative increase in the proportion of gram-negative organism and culture negative cases. From an initial prevalence of pneumococcal infections in earlier years, the frequency of gram-negative infections have increased since the late 1950's, an occurrence that is presumably related to the introduction of steroid therapy and broader use of antibiotics. In 1975, Rubin reported two cases of H. influenza type b peritonitis in

two nephrotic children.[11] In the same year, Dougal found that gram-negative bacteria, usually E. coli accounted for the 69% of cultured organisms in cases of primary peritonitis during a 10-year period[12]. In 1982, Krensky found 24 episodes of peritonitis in 351 nephrotic children[13] Streptococcus was the most common pathogen, but the E. coli was the other common organism in 25% of these cases, suggesting that the E. coli is a significant pathogen. Tapaneya described 55 episodes of peritonitis in 347 children with primary nephrotic syndrome during 1969 to 1989[15]. Gram positive and gram-negative bacilli were found in equal numbers with definite increasing trend of gram-negative bacilli over the last four years. Adhikari found 35 episodes of peritonitis in 191 children with nephrotic syndrome between 1981 and 1988.[16] Gram-negative organisms were cultured in 55% of positive blood cultures. In our study it was found that culture was positive in 4 patients out of 19 patients of peritonitis (21%). Pneumococcus was present in 03 (15%) and E. coli in 01 patient (05%). Anaerobic bacteria have generally been thought to play a minor role in primary nephrotics. The predominant symptoms of peritonitis in this study were abdominal distension (100%), abdominal pain (94%), abdominal tenderness (94%) and fever (63%). Similar results were found in another study conducted in Texas in which abdominal pain was most common symptom present in 98% of children. [17] Peritonitis should always be considered in a patient with nephrotic syndrome who complains of abdominal pain. Differently from the Adhikari's study[18] we could not find any difference of signs and symptoms between culture positive and culture negative patients. Peritonitis was more common in patients with relapse as compared to the patients who were newly diagnosed. Similar results were found in a study in 1995 conducted at Lucknow, India[19]. Aype Balat indicated a higher risk of peritonitis within the first year of diagnosis that was 53.3%.[20] In our study 12 patients out of 19 developed peritonitis within the first year of diagnosis (63%), five after two years of diagnosis (26%), and two patients after two years of diagnosis (10%). Deaths associated with severe infection are the most featured outcome of nephrotic syndrome in childhood. In some studies the mortality ranges from 0% to 20%.[19] There is no mortality because of peritonitis in our study. It was probably related to early diagnosis and initiation of treatment with broad-spectrum antibiotics in these patients. The prognosis of peritonitis in childhood nephrotic syndrome remains excellent when a high degree of suspicion is maintained and diagnosis is made and subsequent appropriate therapy is started.

Peritonitis is the third most common infection in childhood nephritic syndrome (10.8% of total infections)[21], with a mortality rate of 1.5%[22]. Development of SBP in adults with nephrotic syndrome, however, is extremely rare. Ascites in nephrotic syndrome is more common in children than in adults (52% vs 23%)[23]. The significant difference in the prevalence of ascites between children and adult patients with nephrotic syndrome may partially explain the low rate of SBP in adults[23].

CONCLUSION

Our study concludes that the incidence of spontaneous bacterial peritonitis was found to be 19% in patients with nephrotic syndrome in our setup.

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