Original Research Article

Antibiotic treatment comparison in patients with diarrhea

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Abstract

Background: Infectious diarrheal disease is the most frequent reason of diarrhea around the world and it is the leading cause of death amongst children. Vancomycin has been regarded as the drug of choice for management of C. difficile-related colitis. However, outbreaks of infection with vancomycin resistant enterococci have led to restriction in its use. The present study was conducted with the aim to determine the efficacy of different antibiotics in managing diarrhea cases.
Materials and methods: The study was conducted in the Department of medicine for a period of 8 months. All the subjects were randomized into three groups, receiving metronidazole, vancomycin and teicoplanin respectively. No additional drugs or probiotics were administered to the patients so that the exacting efficacy of the drug can be established. Both clinical and laboratory evaluations were used to assess and monitor the adverse events. Chi square test and student t test were used to analyze the differences between the groups. Probability value of less than 0.05 was considered significant.
Results: The study included a total of 90 subjects. There were 30 subjects who received metronidazole, 32 subjects received vancomycin and 28 subjects received Teicoplanin. The mean age of the subjects was 46 +/- 8 years. The mean temperature in all the three groups was 36.8+/-0.8, 39.1+/-0.3 and 37.2+/-0.4 respectively. Clinical cure was seen amongst 93.3% subjects receiving metronidazole, 93.7% subjects receiving vancomycin and 96.4% subjects receiving teicoplanin. There was no significant difference between the groups as the p value was more than 0.05.
Conclusion: From the present study, all the three drugs have been found equally efficacious in managing cases of diarrhea.

Key words

Antibiotic, Diarrhea, Efficacious.

Introduction

Infectious diarrheal disease is the most frequent reason of diarrhea around the world and it is the leading cause of death amongst children. Gastrointestinal infections exert a major impact amongst the developing world. In the developed countries, despite various improvements in public health facilities and economic wealth, the prevalence of intestinal diseases remains high and it continues to be an important clinical issue. In the last 10 years, there have been significant major provisions in the knowledge regarding the management of infectious diarrhea. It is estimated that 1.8 billion cases of childhood diarrhea occur per year and mostly all are related to different infectious agents. In certain parts of Africa preschoolers suffer up to seven attacks of acute diarrhea in a year, the average worldwide distribution is approximately three episodes per year. Antimicrobial therapy for managing infectious diseases makes the bowel susceptible to colonization and overgrowth of Clostridium difficile bacteria [1], C. difficile initially presents in different forms: as an asymptomatic carriage, colitis with or without formation of pseudomembrane, and fulminant colitis [2] and sometimes with perforation. C. difficile bacteria are highly vulnerable to various antibiotics like vancomycin, rifampin [3], metronidazole, bacitracin, tiacumarin Band tiacumarin C [4], and teicoplanin [5], ramoplanin [6]. Vancomycin has been regarded as the drug of choice for management of C. difficile-related colitis [2]. However, outbreaks of infection with vancomycin resistant enterococci have led to restriction in its use. Alternative drugs like metronidazole and teicoplanin have been used and have shown to have similar efficacy and were associated with similar relapse rates [7-9]. The present study was conducted with the aim to determine the efficacy of different antibiotics in managing diarrhea cases.

Materials and methods

The study was conducted in the Department of medicine for a period of 8 months. The study was approved by the Institute's ethical board and all the subjects were informed about the study and a written consent was obtained from all in their vernacular language. Subjects with hypersensitivity to any of the drugs were excluded from the study. Only subjects more than 18 years of age, persistent diarrhea were included in this study. The assays for cytotoxin and clinical evaluations were performed 15 days after the discontinuation of treatment regimen. All the subjects were randomized into three groups, receiving metronidazole, vancomycin and teicoplanin respectively. The efficacy of the drug was based on the microbiological and clinical criteria's. The clinical characteristics that were used to assess the effectiveness of the drug were the frequency and number of stools, levels of C-reactive protein and leukocyte count and the ESR. A complete lack of all the symptoms and fever was regarded as clinical cure of the condition. No additional drugs or probiotics were administered to the patients so that the exacting efficacy of the drug can be established. Both clinical and laboratory evaluations were used to assess and monitor the adverse events. All the data was arranged in a tabulated form and analyzed using SPSS software. Chi square test and student t test were used to analyze the differences between the groups. Probability value of less than 0.05 was considered significant.

Results

The study included a total of 90 subjects. There were 30 subjects who received metronidazole, 32 subjects received vancomycin and 28 subjects received Teicoplanin. The mean age of the subjects was 46 +/- 8 years.

Table - 1 shows the baseline characteristics of the subjects. There were 30 subjects who received metronidazole, 32 subjects received vancomycin and 28 subjects received Teicoplanin. All the patients had received some previous treatment with antimicrobials. The mean temperature in all the three groups was 36.8+/-0.8, 39.1+/-0.3 and 37.2+/-0.4 respectively. The mean age of subjects receiving metronidazole was 44+/-16 years. The mean age

of subjects receiving vancomycin was 38+/-12 years. The mean age of subjects receiving metronidazole was 44+/-16 years. The mean age of subjects receiving Teicoplanin was 42+/-15 years. The mean number of days taken for resolution of diarrhea was 3.4+/-1.3, 3.1+/-1.3 and 2.9+/-1.7 respectively.

Table - 2 shows the comparison of treatment outcome amongst different groups. Clinical cure was seen amongst 93.3% subjects receiving metronidazole, 93.7% subjects receiving vancomycin and 96.4% subjects receiving teicoplanin. There was no significant difference between the groups as the p value was more than 0.05. Clinical relapse rate was 16.7% in subjects taking metronidazole, 18.7% in subjects taking vancomycin and 7.1% in subjects taking teicoplanin. There was no significant difference between the groups.

Table - 1: Baseline characteristics of the subjects.

Characteristic	Metronidazole	Vancomycin	Teicoplanin
Total no. of patients	30 (100%)	32(100%)	28(100%)
No. who received previous antimicrobial therapy	30 (100%)	32(100%)	28(100%)
Mean temperature in °C +/-SD	36.8+/-0.8	39.1+/-0.3	37.2+/-0.4
Mean age in years +/-SD	44+/-16	38+/-12	42+/-15
Mean no. of days to resolution of diarrhea +/- SD	3.4+/-1.3	3.1+/-1.3	2.9+/-1.7

Table - 2: Comparison of treatment outcome amongst different groups.

Variable	No. of patients	Clinical cure rates	P value	Clinical relapse rate	P value	Persistence of cytotoxins in stool	P value
Treatment received							
Metronidazole	28	93.3%	5	16.7%	22	73.3%	
Vancomycin	30	93.7%	6	18.7%	24	75%	
Teicoplanin	27	96.4%	2	7.1%	25	89.3%	
Comparative assessment							
Vancomycin vs. metronidazole			>0.05		>0.05		>0.05
Metronidazole vs. teicoplanin			>0.05		>0.05		0.04
Vancomycin vs. teicoplanin			>0.05		>0.05		>0.05

Discussion

In the developed countries, in spite of various improvements in public health measures, the percentage of subjects with intestinal infection are high and it is an important clinical issue, although the mortality associated with it has fallen in recent decades. In England, around 1 in every 5 people has intestinal infection in every year, of which 1 out of 6 presents to general practitioner. Majority of the cases are not being reported to the Health Protection Agency and have now being incorporated the Public Health Laboratory Service [10]. In England and Wales, the prevalence of gastrointestinal conditions appears to have stabilized since the mid-1990. Oral rehydration therapy is central to the

management of case but numerous advances have been made through the advent of hypotonic saline's and resistant starch may act as a substrate for the future. As per our study, there were 30 subjects who received metronidazole, 32 subjects received vancomycin and 28 subjects received Teicoplanin. All the patients had received some previous treatment with antimicrobials. The mean temperature in all the three groups was 36.8+/-0.8, 39.1+/-0.3 and 37.2+/-0.4 respectively. The mean age of subjects receiving metronidazole was 44+/-16 years. The mean age of subjects receiving vancomycin was 38+/-12 years. The mean age of subjects receiving metronidazole was 44+/-16 years. The mean age of subjects receiving Teicoplanin was 42+/-15 years. The mean number of days taken for resolution of diarrhea was 3.4+/-1.3, 3.1+/-1.3 and 2.9+/-1.7 respectively. Teicoplanin drug is available as powder that is soluble in water or in tea and is tasteless. On the contrary, vancomycin is bitter tasting and cannot be given in a solution form. According to a study[4], patients with Clostridium difficile associated diarrhea that were managed using teicoplanin (200 mg) twice a day for 10 days, there were only 4.5% of treated subjects were found to be carriers without any relapse. According to our study, clinical cure was seen amongst 93.3% subjects receiving metronidazole, 93.7% subjects receiving vancomycin and 96.4% subjects receiving teicoplanin. There was no significant difference between the groups as the p value was more than 0.05. Clinical relapse rate was 16.7% in subjects taking metronidazole, 18.7% in subjects taking vancomycin and 7.1% in subjects taking teicoplanin. There was no significant difference between the groups. However we cannot directly compare the results with our study as these studies used positive culture tests not toxin assay as an end point to obtain results [4, 11]. Direct comparisons between our study and these others. Parenteral delivery of the drug is found to be of no use in the managing cases of C. difficile associated diarrhea [11]. Metronidazole is a drug that is well absorbed after oral administration. During acute attacks of Clostridium difficile associated colitis, there were high amounts of the drug are in stools [12], that can be because of diffusion from the serum compartment via the damaged mucosa into the lumen. In the present study, equivalent efficacies of metronidazole and vancomycin were observed, and similar have been shown by previous studies previously [8, 9]. Treatment costs have also shown varied interest globally. If cost effectiveness must be considered than metronidazole is the drug of choice and glycopeptides should be given to subjects that are unresponsive to metronidazole.

Conclusion

From the present study, all the three drugs have been found equally efficacious in managing cases of diarrhea. Diarrhea is a commonly encountered condition and has affected nearly every subject in some phase of the life. Therefore correct management protocol for diarrhea form an important part of medical practice.

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