INTERNATIONAL JOURNAL OF PHARMACOLOGY AND THERAPEUTICS
eISSN 2249 – 6467

Research Article

AN OBSERVATIVE STUDY OF COMPARISON BETWEEN NON-ANTIBIOTIC AND WITH ANTIBIOTIC TREATMENT OF ACUTE DIARRHEA IN A TERTIARY CARE HOSPITAL

Wasif S*, Doddamani GB

Gulbarga institute of medical sciences, Kalaburagi.

Corresponding author: - Dr. Wasif S , India

ABSTRACT

Acute diarrheal diseases rank among one of the most common infectious disease in almost all age groups worldwide.. Antibiotic therapy is not recommended for the treatment of diarrhea routinely, only severe cases should be treated with a suitable antibiotic. Because of paucity of published reports in the Indian literature regarding the pattern of use of antibiotics in treatment of acute diarrheal cases, the present study was taken up.OBJECTIVES:To study the comparison of treatment of acute diarrheal cases with or without antibiotic, in terms of outcome, safety and tolerability.MATERIALS AND METHODS:100 properly selected subjects with acute diarrhea were included for the present study. The medications were used orally or intravenously for 5-7 days, depending upon the particular case. The treatment outcome was assessed by noting number of diarrhea and vomiting episodes, pulse, blood pressure, weight and skin pinch of the patient from day 1 till the infection resolve completely. The data collected was analyzed statistically using descriptive statistics. Tolerability and patient compliance for the prescribed medications were also assessed during the follow up visits.RESULTS:Most of the subjects showed complete resolution of episodes of diarrhea and vomiting, with normalization of blood pressure by 2nd day and all subjects by end of 5th day with a minor majority in non-antibiotic treatment. INTERPRETATION AND CONCLUSION:The acute diarrheal cases can be effectively treated by empirical use of non-antibiotics medications itself. Antibiotics are reserved for particular cases only.
KEY WORDS:Diarrhea, Non-antibiotic/antibiotic treatment.

INTRODUCTION

Acute diarrheal infections are caused by a variety of microorganisms like bacteria, viruses, fungi and protozoa.Most of the time the disease is self-limiting. Viral infections are more common in childrens.

Acute diarrheal diseases rank among one of the most common infectious disease in almost all age groups worldwide.

Management of acute diarrhea is entirely based on clinical presentation of the cases. It includes assessment of the degree of dehydration clinically, rehydration therapy, feeding during diarrhea, use of antibiotic(s) in selected cases, micronutrient supplementation and use of probiotics.

Rehydration therapy includes treatment given orally in the form of ORS solution, salt and sugar water solution, rice water therapy or other home made preparations. And intravenous therapy includes medications like normal saline 2% or 5%, ringer lactate and dextrose normal

saline. According to the severity of the dehydration, initially patient is maintained on intravenous therapy and change over to oral therapy.

Antibiotictherapy is not recommended for the treatment of diarrhoea routinely. Only cases of severe cholera and bloody diarrhoea should be treated with a suitable antibiotic. Most commonly used antibiotic are metronadizloe, ornidazole, ciprofloxacin, ofloxacin, norfloxacin, ceftraixone, cefixime etc.

Though acute diarrheal cases can be managed in most of the situation by only rehydration therapy, many doctors prescribe antibiotics routinely. This leads to unnecessary exposure of patients to unwanted side effects of drugs and increase in cost of treatment.
Because of paucity of published reports in the Indian literature regarding the pattern of use of antibiotics in treatment of acute diarrheal cases, the present study was taken up.

Hence, the present study was taken up to generate some valid and clinically useful data.

REVIEW OF LITERATURE

Diarrhea is loosely defined as passage of abnormally liquid or unformed stools at an increased frequency. Diarrhea is further divided in acute and chronic based on the clinical presentation. Acute if the symptoms are present for up to 2 weeks, persistent for 2 to 4 weeks and chronic if 4 weeks in duration. [1.]

Infectious diarrhea is the most common infectious disease syndrome worldwide resulting in more than five million deaths annually. Patients use the term “diarrhea” to refer to any increase in the frequency, fluidity, or volume of the stool or to any change in its consistency. Normally, stools are generally solid and brown, but these features vary with diet. The frequency of stools varies among persons, from one to three daily to two or three stools weekly. Blood, pus (leukocytes), and oil are not present in normal stools.[18.]

Mechanisms of Diarrhea

Osmotic diarrhea occurs when water-soluble molecules are poorly absorbed, remain in the intestinal lumen, and retain water in the intestine. Osmotic diarrhea follows ingestion of an osmotically active substance and stops with fasting. Stool volume is less than 1 L per day, and the stool has an osmolar gap—stool osmolality is greater than the sum of the electrolyte concentrations. Causes of osmotic diarrhea: lactase deficiency, sorbitol foods, andantacids.
In secretory diarrhea, fluid and electrolyte transport is abnormal, that is, the intestine secretes rather than absorbs fluid. Stool volume is greater than 1 L per day, and its composition is similar to that of extracellular fluid, so there is no osmolar gap. The diarrhea persists despite fasting, and hypokalemia is often present. Causes of secretory diarrhea include bacterial toxins, hormone-secreting tumors, surreptitious ingestion of laxative, bile acid diarrhea, and fatty acid. [1.]

ACUTE DIARRHEA

More than 90% of cases of acute diarrhea are caused by infectious agents, these cases are often accompanied by vomiting, fever, and abdominal pain. The remaining 10% or so are caused bymedications, toxic ingestions, ischemia, and other conditions. Most infectious diarrheas are acquired by fecal-oral transmission via direct personal contact or, via ingestion of food or water contaminated with pathogens from human or animal feces.

Diarrhea acute in onset and persisting for less than 2 weeks is most commonly caused by infectious agents, bacterial toxins, or drugs. Community outbreaks (including nursing homes, schools, cruise ships) suggest a viral etiology or a common food source. Similar recent illnesses

in family members suggest an infectious origin. Ingestion of improperly stored or prepared food implicates food poisoning. Day care attendance or exposure to unpurified water (camping, swimming) may result in infection with *Giardia* or *Cryptosporidium*. Finally, risk factors for HIV infection or sexually transmitted diseases should be determined.[1,2.]

Pathophysiology of diarrhea:

The pathophysiology underlying acute diarrhea by infectious agents produces specific clinical features that may also be helpful in diagnosis. Profuse watery diarrhea secondary to small bowel hypersecretion occurs with ingestion of preformed bacterial toxins, enterotoxin-producing bacteria, and enteroadherent pathogens. Diarrhea associated with marked vomiting and minimal or no fever may occur abruptly within a few hours after ingestion of the former two types; vomiting is usuallyless, and abdominal cramping or bloating is greater; fever is higher with the latter.

Cytotoxin-producing and invasive microorganisms all cause high fever and abdominal pain. Invasive bacteria and Entamoebahistolytica often cause bloody diarrhea.Finally, infectious diarrhea may be associated with systemic manifestations. Reiter's syndrome (arthritis, urethritis, and conjunctivitis) may accompany or follow infections by Salmonella,Campylobacter, Shigella, andYersinia. Both enterohemorrhagic E. coli (O157:H7) and Shigella can lead to the hemolytic-uremic syndrome with an attendant high mortality rate. Acute diarrhea can also be a major symptom of several systemic infections including viral hepatitis, listeriosis, legionellosis, and toxic shock syndrome. The major concerns involve the risk of complications, essentially dehydration and malnutrition, especially in vulnerable patients: young children, the elderly, and patients with immunosuppression, for whom rehydration is urgent.[1, 19, 20.]

Evaluation of diarrhea:

The decision to evaluate acute diarrhea depends on its severity and duration and on various host factors. Most episodes of acute diarrhea are mild and self-limited. Indications for evaluation include profuse diarrhea with dehydration, grossly bloody stools, fever 38.5C, duration 48 h without improvement, new community outbreaks, associated severe abdominal pain in patients 50 years, and elderly (70 years)or immunocompromisedpatients.The cornerstone of diagnosis in those suspected of severe acute infectious diarrhea is microbiologic analysis of the stool. Workup includes cultures for bacterial and viral pathogens, direct inspectionfor ova and parasites, and immunoassays for certain bacterialtoxins (C.difficile), viral antigens (rotavirus), and protozoalantigens(Giardia, E. histolytica). H Molecular diagnosis of pathogens in stool can be made by identification of unique DNA sequences; and evolving microarray technologies could lead to a more rapid, sensitive, specific, and cost-effective diagnostic approach in the future.[2.]

TREATMENT

Fluid and electrolyte replacement are of central importance to all forms of acute diarrhea. Fluid replacement alone may suffice for mild cases. Oral sugar-electrolyte solution should be instituted promptly with severe diarrhea to limit dehydration, which is the major cause of death .Profoundly dehydrated patients, especially infants and the elderly, require intravenous rehydration. In moderately severe nonfebrile and nonbloody diarrhea, antimotilityantisecretory

agents such as loperamide can be useful adjuncts to control symptoms. Such agents should be avoided with febrile dysentery, which may be exacerbated or prolonged by them.

Judicious use of antibiotics is appropriate in selected instances of acute diarrhea and may reduce its severity and duration. Many physicians treat moderately to severely ill patients with febrile dysentery empirically without diagnostic evaluation using a quinolone,such as ciprofloxacin (500 mg bid for 3 to 5 d). Selection of antibiotics and dosage regimens are otherwise dictated by specific pathogens and conditions found. Antibiotic coverage is indicated whether or not a causative organism is discovered in patients who are immunocompromised, have mechanical heart valves or recent vascular grafts, or are elderly. Antibiotic prophylaxis is indicated for certain patients traveling to high-risk countries in whom the likelihood or seriousness of acquired diarrhea would be especially high, including those with immunocompromise, inflammatory bowel disease, or gastric achlorhydria.[1.]

Management of acute diarrhoea is entirely based on clinical presentation of the cases. It includes assessment of the degree of dehydration clinically, rehydration therapy, feeding during diarrhoea, use of antibiotic(s) in selected cases, micronutrient supplementation and use of probiotics. Dehydration can be managed with oral rehydration salt (ORS) solution or intravenous fluids. Recently WHO has recommended a hypo-osmolar ORS solution for the treatment of all cases of acute diarrhoea including cholera..Antibiotictherapy is not recommended for the treatment of diarrhoea routinely. zinc supplementation during diarrhoea reduces the severity and duration of the disease as well as antidiarrhoeal and antimicrobial use rate.There is high prevalence of misuse of drugs in the treatment of acute diarrhoea among under-five children which calls for intervention to improve the prescribing pattern as per WHO recommendation. [8,9.]

Management can be done in following way:

Diet

Most mild diarrhea will not lead to dehydration provided the patient takes adequate oral fluids containing carbohydrates and electrolytes. Patients find it more comfortable to rest the bowel by avoiding high-fiber foods, fats, milk products, caffeine, and alcohol. Frequent feedings of tea, "flat" carbonated beverages, and soft, easily digested foods (eg, soups, crackers, bananas, applesauce, rice, toast) are encouraged.[2.]

Rehydration

In more severe diarrhea, dehydration can occur quickly, especially in children, the frail, and the elderly. Most deaths are cheaply preventable with the use of oral rehydration salts (ORS). Oral rehydration with fluids containing glucose, Na^+, K^+, Cl^-, and bicarbonate or citrate is preferred when feasible. Fluids should be given at rates of 50–200 mL/kg/24 h depending on the hydration status. Intravenous fluids (lactated Ringer's injection) are preferred in patients with severe dehydration.[29.]

In 2002 a new formula low sodium low glucose ORS has been released by the WHO. It was found that maximum water absorption occurs from a slightly hypotonic solution and when glucose concentration is between 60-110 mM. Recent studies showed that efficacy of ORS in children with acute noncholeradiarrhoea is improved by reducing Na* andglucose concentration to 75 mM, and total osmolarity to 245 mOsm/L. Glucose-based ORS helps replace fluid and

prevent further dehydration from acute diarrhoea. Since 2004, the World Health Organization has recommended the osmolarity< 270 mOsm/L (ORS ≤ 270) over the > 310 mOsm/L formulation (ORS ≥ 310). Glucose polymer-based ORS (eg prepared using rice or wheat) slowly releases glucose and may be superior.[3,30.]

ORS are the only life-saving treatment for gastroenteritis, which has proved its efficacy for the past 50 years: it is time to use it on a routine basis. . Studies from hospitals and the community each document the effectiveness of ORT for rehydration of patients with invasive diarrhea.[10,13.]

Antidiarrheal Agents

Antidiarrheal agents may be used safely in patients with mild to moderate diarrheal illnesses to improve patient comfort. Opioid agents help decrease the stool number and liquidity and control fecal urgency. However, they should not be used in patients with bloody diarrhea, high fever, or systemic toxicity and should be discontinued in patients whose diarrhea is worsening despite therapy. [2.]

Antibiotic Therapy

Early rehydration is still the mainstay of treatment. Use of etiological treatmentdepends on the severity of disease and risk factors. Routine use of antibiotics for infectious diarrhea must be avoided, because it brings little benefit in most cases and is associated with the risk of increasing antimicrobial resistance, selected cases may require antimicrobial therapy, and the choice of the antimicrobial agent often has to be made empirically. Empiric antibiotic treatment of all patients with acute diarrhea is not indicated. Even patients with inflammatory diarrhea caused by invasive pathogens usually have symptoms that will resolve within several days without antimicrobials. Empiric treatment may be considered in patients with non-hospital-acquired diarrhea with moderate to severe fever, tenesmus, or bloody stools or the presence of fecal lactoferrin while the stool bacterial culture is incubating, provided that infection with *E coli* O157:H7 is not suspected.

The drugs of choice for empiric treatment are the fluoroquinolones (eg, ciprofloxacin 500 mg, ofloxacin 400 mg, or norfloxacin 400 mg, twice daily, or levofloxacin 500 mg once daily) for 5–7 days. Alternatives include trimethoprim-sulfamethoxazole, 160/800 mg twice daily; or doxycycline, 100 mg twice daily. Macrolides and penicillins are no longer recommended because of widespread microbial resistance to these agents. Rifaximin, a nonabsorbed oral antibiotic, 200 mg three times daily for 3 days, is approved for empiric treatment of noninflammatory traveler's diarrhea[.2, 16,21,26,27,28.]

Antibiotic treatment in salmonellosis/campylobacteriosisshould be indicated after comprehensive evaluation of the duration of symptoms, individual risk factors and dynamic changes in markers of inflammation.[5.]*Clostridium difficile* is one of the many aetiological agents of antibiotic associated diarrhoea and is implicated in 15-25 per cent of the cases. Clostridium difficile infection (CDI) is a common cause of nosocomial diarrhea. Due to increase in the incidence of *C. difficile* infection (CDI), emergence of hypervirulent strains, and increased frequency of recurrence, the clinical management of the disease has become important.The

driving force behind the development of new antimicrobial agents is the emergence of resistance among bacterial enteric pathogens against the various antimicrobials used like in case of traveler's diarrhea. Rifaximin and azithromycin are 2 newer antimicrobials that have shown promising results. Rifaximin each day during trips to areas where the risk of traveler's diarrhea is high has shown to be effective as prophylactic.

Fidaxomicin is particularly active against *C.difficile* and acts by inhibition of RNA synthesis. The bactericidal properties of fidaxomicin make it an ideal alternative for CDI treatment. But, it is also noted that patients who remain on antibiotics while undergoing treatment of C. difficile-associated diarrhea have a high likelihood of treatment failure with metronidazole. Diarrhea in the elderly population is one disease that needs special attention in treatment and management, For patients with severe invasive or prolonged diarrhea or who are at high risk of complications, such as the elderly, diabetics, cirrhotics, and immunocompromised patients, empirical treatment with a quinolone antibiotic for 3 to 5 days can be considered. The most significant problem in the antibiotic treatment of infectious diarrhea is the progressive increase in resistance among enteric pathogens.[14,7,15,17,22,23,25,26.]

Probiotic

Probiotics may offer a safe intervention in acute infectious diarrhoea to reduce the duration and severity of the illness. Probiotic preparations containing a variety of bacterial strains have shown some degree of benefit in acute diarrheal conditions, antibiotic-associated diarrhea, and infectious diarrhea, but most clinical studies have been small and conclusions are therefore limited. Because these agents are generally safe, their use continues despite mainly anecdotal evidence of efficacy.[4,24, 8.]

MATERIALS AND METHODS

100 properly selected subjects with acute diarrhea were included for the present study. The medications were used orally or intravenously for 5-7 days, depending upon the particular case. The bacteriological studies were done in randomly selected patients. The treatment outcome was assessed by noting number of diarrhea and vomiting episodes, pulse, blood pressure, weight and skin pinch of the patient from day 1 till the infection resolve completely. The data collected was analyzed statistically using descriptive statistics. Tolerability and patient compliance for the prescribed medications were also assessed during the follow up visits.

RESULTS

Table 1: Age distribution (n=100)

Age group	Total number of patients	Number of patients with non-antibiotic treatment	Number of patients with antibiotic treatment
0-18	6	3	3
19-60	82	38	44
>60	12	9	3
Total	100	50	50

Table 2: Number of diarrheal episodes in the patients on day 1 (n=100)

Grading	Total number of patients	Number of patients with non-antibiotic treatment	Number of patients with antibiotic treatment
1	14	6	8
2	41	23	18
3	45	21	24
Total	100	50	50

Graded as Grade 1 (mild=0-4 episodes), Grade 2 (moderate= 5-8 episodes), Grade 3 (severe=>8 episodes)

Table 3: Number of vomiting episodes in the patients on day 1 (n=100)

Grading	Total number of patients	Number of patients with non-antibiotic treatment	Number of patients with antibiotic treatment
1	26	14	12
2	46	23	23
3	28	13	15
Total	100	50	50

Graded as Grade 1 (no episode), Grade 2 (1-4 episodes), Grade 3 (>4 episodes)

Table 4: Blood pressure (B.P) of the patients (on day 1)

Grading	Total number of patients	Number of patients with non-antibiotic treatment	Number of patients with antibiotic treatment
1	5	1	4
2	51	28	23
3	44	23	23
Total	100	50	50

Graded as Grade 1 (B.P = 120/80 mm of Hg & above), Grade 2 (B.P = 100-119 /80mm of Hg), Grade 3 (B.P = < 100/80 mm of Hg)

Table 5: Outcome of therapy: resolution of number of diarrheal episodes@

Visits	Total number of patients	Number of patients with non-antibiotic treatment	Number of patients with antibiotic treatment
Day 2	54	34	20
Day3	31	10	21
Day4	12	4	8
Day 5	3	2	1
Total	100	50	50

@ Resolution means frequency of diarrheal episodes reduce to one or less, hence treatment discontinued after respective day visits.

Table 6: Outcome of therapy: Cessation of vomiting[@]

Visits	Total number of patients showing cessation of vomiting	Number of patients with non-antibiotic treatment showing cessation of vomiting	Number of patients with antibiotic treatment showing cessation of vomiting
Day 2	54	34	20
Day3	31	10	21
Day4	12	4	8
Day 5	3	2	1
Total	100	50	50

@ Cessation means no more episode of vomiting.

Table 7: Outcome of therapy: on Blood Pressure (B.P) 0f the patients in the respective day visits[@]

Visits	Total number of patients showing B.P normal & above	Number of patients with non-antibiotic treatment showing B.P normal & above	Number of patients with antibiotic treatment showing B.P normal & above
Day 2	54	34	20
Day3	30	9	21
Day4	13	5	8
Day 5	3	2	1
Total	100	50	50

@showing number of patients whose B.P comes to normal (120/80 mm of Hg) or above.

DISCUSSION

In the present study, the comparison of non-antibiotic and with antibiotic treatment of diarrheal cases in terms of outcome, safety and tolerability was assessed in patients attending both inpatient and outpatient department of medicine in GIMS, a tertiary care hospital

The age distribution of the study subjects is shown in theabove table 1. Majority of the patients (~ 82%) were between 19 to 60 years age group. Few were below 18 years and few were above 60 years age group. They were near equally distributed between the study groups at appropriate age groups. Female patients are more (63%) compare to male patients, but equally distributed in both the study groups.

The main features looked in the study are the number of diarrheal episodes, number of vomiting episodes, pulse pressure, blood pressure, weight and skin pinch of the patient.[1,2.] The objective parameters or clinical signs at base line (day-1) have been summarized in the following tables.

Table 2 shows the number of diarrheal episodes in patients of the study groups at the presenting day (day 1). Diarrheal episodes are graded as mild (grade 1) for 0-4 episodes, moderate (grade 2) for 5-8 episodes and severe (grade 3) for more than 8 episodes. Most of the patients (n=86) had grade 2 or grade 3 severity of diarrheal episodes. Few patients were showing

grade 1 severity on day 1. Patients with different grades were nearly equally distributed in both the study groups. Patients with non-antibiotic treatment of grade 1 severity were 6% as compared to patients with antibiotic treatment of 8 %. Patients with non-antibiotic treatment of grade 2 severity were 23% as compared to patients with antibiotic treatment of 18 %. Patients with non-antibiotic treatment of grade 3 severity were 21% as compared to patients with antibiotic treatment of 24 %. There is not much difference in the distribution of patients with different grading.

Table 3 shows the number of vomiting episodes in patients of the study groups at the presenting day (day 1). Vomiting episodes are graded as grade 1 (0-4 episodes), grade 2 (5-8 episodes) and grade 3 (for more than 8 episodes). Most of the patients (n=46) had grade 2 severity of vomiting. Patients with grade 1 and grade 3 had nearly equal number of patients. Patients with different grades were almost equally distributed in both the study groups. Patients with non-antibiotic treatment of grade 1 severity were 14% as compared to patients with antibiotic treatment of 12 %. Patients with grade 2 severity were same in numbers in both the study groups (23%). Patients with non-antibiotic treatment of grade 3 severity were 13% as compared to patients with antibiotic treatment of 15 %. There was not any significant difference in the distribution of patients with different grading.

Table 4 shows the blood pressure readings taken from the patients of both the study groups on day 1. Most of the patients (n=95) were of grade 2 and grade 3.only 5 patients had normal or above blood pressure.. Patients with different grades were nearly equally distributed in both the study groups. Only one patient with non-antibiotic treatment of grade 1 severity while patients with antibiotic treatment were four. Patients with non-antibiotic treatment of grade 2 severity were 28% as compared to patients with antibiotic treatment of 23%. Grade 3 severity patients were same in both the study groups (23%) There is not much difference in the distribution of patients with different grading.

The outcome of therapy have been summarized in the following tables:

Table 5shows the resolution of diarrheal symptoms. Here resolution means decrease in the number of diarrheal episodes to one or less, hence treatment discontinued thereafter. Fifty four patients were resolved on day 2, out of which thirty four were on non-antibiotic and twenty were on antibiotic treatment. Treatment is discontinued and the remaining patients are continued. On day 3, 31 patients (10 with non-antibiotic, 21 with antibiotic) got resolved. On day 4, 12 patients (4 with non-antibiotic, 8 with antibiotic) got resolved. On day 5, only 3 patients left (2 with non-antibiotic, 1 with antibiotic) which also got resolved. All the patients responds to both type of treatment with not much difference.

Table 6 shows the cessation of vomiting. Here cessation of vomiting means no more episode of vomiting. Fifty four patients shows cessation of vomiting on day 2, out of which thirty four were on non-antibiotic and twenty were on antibiotic treatment. On day 3, 31 patients (10 with non-antibiotic, 21 with antibiotic) got ride of vomiting. On day 4, 12 patients (4 with non-antibiotic, 8 with antibiotic) shows no vomiting. Only 3 patients continues to show vomiting till day 5 (2 with non-antibiotic, 1 with antibiotic).

Table 7shows the blood pressure recording on the respective day of treatment in the patients of both study groups. On day 2, out of 100 patients, 54 patients recorded blood pressure normal or above and hence the target is achieved. On day 3, blood pressure of 30 patients (9 with non-antibiotic, 21 with antibiotic) comes to normal level. On day 4, 13 patients (5 with non-antibiotic, 8 with antibiotic) showed normal blood pressure. And on day 5, last 3 patients (2

with non-antibiotic, 1 with antibiotic) also shows normal blood pressure level. Blood pressure of all the patients return to normal level at the end of the day 5.

Pulse pressure of all the patients was either increased or decreased at the start of the treatment. It comes to normal level with subsequent days.

Daily weight measurement of patients is also done in all the patients. It remained same with not much difference in the patients as it is a acute condition.

Skin pinch test is also done on the patients on daily basis. Initially (day 1) it was sluggish, comes to normal with subsequent therapy in all patients.

Investigations are done in the form of stool examination, antibiotic susceptibility and organisms testing in selected cases only.

Treatment is given according to the study groups. Patients on non-antibiotic treatment are given rehydration therapy in the form of oral or intravenous therapy. Oral therapy is given as ORS salt solution treatment. Intravenous therapy in the form of normal saline 25 or 5%, ringer lactate solution and dextrose normal saline. According to the severity of the condition, patients were initially kept on intravenous therapy and thereafter change to oral therapy. Antibiotics used are metronidazole, ornidazole, ciprofloxacin, oflaxacin, norfloxacin and ceftraixone. They are also used orally or intravenously given the present condition.[2,3,10,13,29,30.]

CONCLUSION:

Acute diarrhea is one of the most common disease seen in the day to day life. It can be effectively treated by non-antibiotic treatment alone in most of the cases. Rehydration therapy, orally or intravenously is enough in most of the cases. Antibiotic treatment should be reserved for particular cases only.

REFERENCES:

1. Ahlquist D, Camilleri M editors. Diarrhea and constipation. In: Harrisons: Principles of internal medicine. 16th Ed. McGraw Hill companies: 2006.p.224-228.
2. McPhee SJ, Papadakis MA, Tierney LM editors. Gastroenterology. In: Current medical diagonosis and treatment. McGraw Hill companies: 2008.
3. Tripati KD. Drugs for Diarrhea. In. Essentials of Medical Pharmacology. 6th Ed. Jaypeebrothers medical publishers.2011.
4. Brunton LL, Chabner BA, Knollmann BC, editors. Treatment of Disorders of Bowel Motility and Water Flux. In: Goodman & Gilman's The Pharmacological Basis of Therapeutics. 12thEd. New York: McGraw-Hill Companies; 2011.
5. Polak P, Borlicek Z, Vrba M, et.al**.** When should empirical antibiotic therapy be indicated in acute community-onset diarrhea of suspected bacterial etiology. Article in Czech 2014.
6. Fischer Walker CL, Taneja S, LeFevre A, Black RE, Mazumder S. Appropriate management of acute diarrhea in children among public and private providers in gujarat, india: a cross-sectional survey. Glob Health SciPract. 2015;3(2): 230-241.
7. Vaishnavi C. Fidaxomicin - the new drug for *Clostridium difficile* infection. Indian J Med Res 141, April 2015, pp 398- 407
8. Sur D, Bhattacharya SK. Acute diarrhoeal diseases--an approach to management. J Indian Med Association. 2006 May;104(5):220-3.
9. Alam MB, Ahmed MB, Rahman FU. Misuse of drugs in acute diarrhea in under-five children. Bangladesh Med Res Council Bull. 1998 Aug;24(2):27-31.
10. Mouterde O. Oral rehydration solutions and acute diarrhea: an update. Arch pediatric. 2007 Oct;14 Supply 3:S165-8.

11. Ogielska M, Lanotte P, Lebrun C et.al. Emergence of community-acquired Clostridium difficile infection: the experience of a French hospital and literature review. J Infect Dis. 2015 Jun 16. pii: S1201-9712(15)00141-1.
12. Dutta P. Usefulness of ORT in certain special situations of diarrhoeal diseases. Indian journal of public health. 1994 Apr-Jun:38(2):44-9.
13. Varavithya W, Sunthornkachit R, Eampokalap B. Oral rehydration therapy for invasive diarrhea.Rev Infect Dis. 1991 Mar-Apr;13Suppl 4:S325-31.
14. Oldfield EC, Wallace MR. The role of antibiotics in the treatment of infectious diarrhea. Gastrientrol clinical North America. 2001 sep;30(3):817-36.
15. Modena S, Gollamudi S, F riedenbergF.Continuation of antibiotics is associated with failure of metronidazole for Clostridium difficile-associated diarrhea.In Gastroenterol. 2006 Jan;40(1):49-54.
16. Diniz-santos DR, Silva LR, Silva N. Antibiotics for the empirical treatment of acute infectious diarrhea in children.Braz J Infect Dis. 2006 Jun;10(3):217-27.
17. Adachi JA, Ostrosky-Zeichner L, Ericsson CD.Empirical Antimicrobial Therapy for Traveler's Diarrhea. Special section:Travel medicine. cid. oxfordjournals. org/content/31/4/1079.
18. Carroll KC, Reimer L. Infectious diarrhea: pathogens and treatment.Med Liban. 2000 Jul-Aug;48(4):270-7.
19. De Truchis P, De Truchis A. Acute infectious diarrhea.Presse Med. 2007 April ; 36 (4 Pt 2):695-705. Epub 2007 Feb 27.
20. Jeandel C, Laurain MC, Decottignies F. [Infectious diarrhea in the aged. Rev Prat. 1996 Jan 15;46(2):184-8.
21. Carre D, Coton T, Delpy R et.al. Acute infectious diarrhea: current treatment and perspectives.Med Trop (Mars). 2001;61(6):521-8.
22. Blondeau JM. What have we learned about antimicrobial use and the risks for *Clostridium difficile*-associated diarrhoea?
23. Trinh C, PrabhakarK.Diarrheal diseases in the elderly.ClinGeriatr Med. 2007 Nov;23(4):833-56, vii.
24. Marcos LA, DuPont HL. Advances in defining etiology and new therapeutic approaches in acute diarrhea.J Infect. 2007 Nov;55(5):385-93. Epub 2007 Sep 7.
25. Crum NF,Wallace MR, Oldfield EC. New issues in infectious diarrhea.Rev GastroenterolDisord. 2005;5Suppl 3:S16-25.
26. DuPont HL.Therapy for and prevention of traveler's diarrhea.Clin Infect Dis. 2007 Jul 15;45Suppl 1:S78-84.
27. Yates J. Traveler's Diarrhea. *Am Fam Physician.* 2005 Jun 1;71(11):2095-2100.
28. Leder K.Advising travellers about management of travelers' diarrhea Volume 44, no.1, 2015 Pages 34-37.
29. Wagner Z, Shah M, SoodN.Barriers to use of oral rehydration salts for child diarrhea in the private sector: evidence from India.J Trop Pediatr. 2015 Feb;61(1):37-43. doi: 10.1093/tropej/fmu063. Epub 2014 Nov 10.
30. Gregorio GV, Gonzales MLM, Dans LF et.al Cochrane review: Polymer-based oral rehydration solution for treating acute watery diarrhea. Evidence-Based Child Health: A Cochrane Review Journal. Volume 5, issue 4,pages 1612–1675, December 2010.