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Research Paper

Prescribing pattern of medications in patients of acute diarrhea coming to Medicine OPD, tertiary care teaching hospital

Pharma

KEYWORDS : Diarrhea, Ciprofloxacin, FDC (Fixed Dose Combination), ORS (Oral Rehydration Solution)

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ABSTRACT

Background: Diarrhea is defined as an increase in water content and frequency of stools. Infectious diarrhea, a problem of developing countries, affects up to 30% of the populations in developed countries each year. Despite a progressive reduction in global diarrheal disease mortality over the past 2 decades, diarrheal morbidity in published reports from 1990-2000 increased worldwide compared with previous reports. So, the present study was conducted with objective to study prescribing pattern of medications in patients of acute diarrhea coming to medicine OPD, tertiary care teaching hospital. Materials and method: A prospective, observational and non-interventional study was carried out in medicine department on the diarrheal patients who were serially coming over a period of 12 months. Results: Out of 100 patients of diarrhea included in the study, 51 (51%) were male patients and 49 (49%) were female patients. Out of 100 patients of diarrhea, we found that 90% had diarrhea due to infectious etiology. We observed that among the 100 patients, both ciprofloxacin and metronidazole were used for management of 87 (87%) patients while 3 (3%) patients were treated with ceftriaxone. Total percentages of patients with prescribed FDC were 87%. Average numbers of drugs per encounter were 5.61. Other prescribed drug groups were Oral Rehydration Solution (ORS, 100%), probiotics (94%), antiulcer drug (90%), anti-emetic drug (87%), anti motility (10%) and analgesic (3%). Conclusion: A rational prescribing can be offered that is appropriate for the optimal care of the individual patient and for the needs of the community without economical burden.

INTRODUCTION -

Diarrhea is defined as an increase in the water content, volume and usually frequency of stools [1, 2]. In diarrhea, the consistency of the stools is more important than the frequency. So frequent passing of formed stools is not diarrhea. The WHO defines diarrhea as 3 or more watery stools on 2 or more consecutive days [1]. Diarrhea may be further classified as acute (if <2 weeks), persistent (if 2 to 4 weeks) and chronic (if >4 weeks), depending upon the duration of it [3]. Diarrhea, an increased water content of the stool, occurs because of either impaired absorption or active secretion of ions, organic substrates mainly in intestines [4].A common disorder diarrhea, in its acute form, has many causes and ranges from mild to severe form [5].Most cases of mild acute diarrhea are of viral etiology, while severe acute diarrhea, especially associated with fever, tends to be of bacterial etiology. Chronic (>4 weeks) infectious diarrhea is often caused by parasites [6].

Acute diarrheal diseases are a global public health problem both in developing and developed countries. They are a leading cause of mortality and morbidity for children under the age of 5 years worldwide and have a major economic burden in developed countries. Although oral rehydration solution (ORS) along with oral zinc therapy has reduced mortality owing to acute diarrheal diseases, there are essentially no other approved, safe, and effective drugs to decrease stool volume and prevent fluid loss[7].

Gastroenteritis is characterized by the acute onset of diarrhea, which may be accompanied by nausea, vomiting, fever and abdominal pain. It can be caused by a variety of infectious agents [8]. Infectious diarrhea is a problem of developing countries and up to 30% of the populations in developed countries are also affected by food-borne bacterial diarrheas each year [2]. Worldwide, more than 1 billion people suffer with acute diarrhea each year. Among 100 million persons affected annually by acute diarrhea in the united states, nearly half restrict activities, 10% consult physicians, 250,000 require hospitalization, and roughly 3000 die (primarily the elderly).The annual economic burden to the society is estimated at >$20 billion. The prevalence of chronic diarrhea in the general population in developed nations has not been well established, but seems to be around 5% [1].

Diarrheal diseases mainly depend upon the socioeconomic status of the population and the setting in which they are seen. In developing countries, chronic diarrhea is often due to infections, although functional disorders, malabsorption, and inflammatory bowel disease are also found as causing factors. In developed countries, the most common causes are irritable bowel syndrome, inflammatory bowel disease, and malabsorption syndromes [9].

Although diarrhea may present as mere symptom at one extreme, it can be severe or life-threatening at the other. It is imperative for clinicians to appreciate the pathophysiology, etiological classification, diagnostic strategies and therapeutic principles of diarrhea, due to the heterogeneous causes and potential severity of diarrhea, so that rational and cost effective care can be delivered [10]. It is most practical to base, treatment of diarrhea on the clinical type of the illness, which can easily be determined when a patient is first examined. Laboratory studies are not required always [1].Fluid and electrolyte replacement are of central importance to all forms of acute diarrhea. Judicious use of antibiotics is appropriate in selected cases of acute diarrhea. Many physicians still treat moderately to severely ill patients with diarrhea in febrile status empirically without diagnostic evaluation using a quinolone, such as ciprofloxacin (500 mg bid for 3 to 5 days) [3]. Such irrational use of antibiotics leads to both the drug resistance and the adverse drug reaction (ADR). Although ORS has reduced mortality, repeated diarrheal episodes in children have been linked to malnutrition, stunting, and impaired physical and mental development [11]. Although there is a decline in this outcome however the underlying pathogenic mechanisms need to be better defined. Further research must also determine whether treatment for dehydration is sufficient to avoid these consequences or if additional, novel therapies are needed to stop the diarrhea and promote epithelial repair [7].

Despite a progressive reduction in global diarrheal disease mortality over the past 2 decades, diarrheal morbidity in published reports from 1990-2000 slightly increased worldwide compared with previous reports [3]. So, the present study was conducted with the objective to study prescribing pattern of medications in treatment of patients having diarrhea, coming to medicine OPD in a tertiary care teaching hospital.

MATERIALS AND METHOD -

A prospective, observational and non-interventional study was carried out in medicine department on the patients suffering with diarrhea who were serially coming over a period of 12 months at tertiary care teaching hospital after obtaining the approval of institutional ethics committee. A total of 100 patients were enrolled for the study. Patients above 18 years of age having

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diarrhea for not more than 14 days belonging to either sex, who were willing to sign the informed consent form were included in the study. Those patients suffering with diarrhea for more than 14 days, unable to communicate (on ventilators) or not willing to participate in the study were excluded from the study. Patient related information such as age, sex, brief medical history, laboratory investigations and their results, information about drugs like name, dose and route, duration of therapy, indication, and start/stop dates were recorded in case record form and entered in excel sheet for further analysis.

RESULTS -

Out of 100 patients suffering with diarrhea included in the study, 51 (51%) were male patients and 49 (49%) were female patients. Depending on their age they were grouped in five groups that included group I (18-30 years), group-II (31-40 years), group-III (41-50 years), group-IV (51-60 years) and group-V (>60 years) [Table-I].

Table I: Classification of patients suffering with diarrhea according to their age-groups

Different age groups	Male	Female
group I (18-30)	16	19
group II (31-40)	12	8
group III (41-50)	9	9
group IV (51-60)	8	9
group V (>60)	6	4

Out of 100 patients of diarrhea, we found that 90% of patients had diarrhea due to different infectious etiology. Other 6% of patients had drug induced diarrhea and rest of the 4% of patients develop diarrhea due to diabetic gastropathy [Table-II].

Table-II: Percentages of differential diagnosis of total 100 patients

Differential diagnosis	Percentages
Infectious etiology	90 (10.41%)
Drug-induced diarrhea	6 (19.79%)
Diabetic gastropathy	4 (19.79%)

Of the enrolled patients, it was observed that 90 patients were suffering with diarrhea due to infectious etiology. We analyzed the infective organisms in them with the help of laboratory investigations. Nonpathogenic (e coli, clostridium, bacteroides, enterococcus) were in 30 (33.33%), E. coli in 26 (28.89%), V. cholerae in 13 (14.44%), Shigella in 12 (13.33%), Campylobacter in 06 (6.67%) and Salmonella in 03 (3.33%) patients.

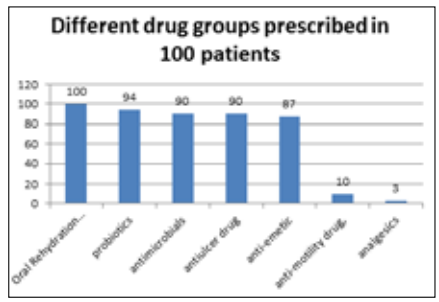
In our study we observed that among the 100 enrolled patients, two antibiotics (ciprofloxacin and metronidazole) were used for management of 87 (87%) patients while 3 (3%) patients were treated with single antibiotic (ceftriaxone). Total percentages of patients with FDC prescribed were 87%. In all of them, prescribed FDC was ciprofloxacin + metronidazole. [Table-III]

Table-III: Prescribing pattern of drugs for diarrhea in total 100 patients

Total no. of prescription	100
Total no. of drugs	561
Average number of drugs per patient	5.61
% of drugs prescribed by generic name	100%
% of drugs prescribed from WHO and national list of essential medicines	100%
% of encounters with antibiotic prescribed	90%
% of patients with injections prescribed	0%
% of patients with FDC (Fixed Dose Combination) prescribed	87%

Other than antibiotics, prescribed drug groups were Oral Rehydration Solution (ORS), anti-motility drug (loperamide), probiotics (sporolac), antiulcer drug (ranitidine) and anti-emetic drug (ondansetron) [Figure-I].

Figure I: Percentage of drug groups prescribed in 100 patients of diarrhea



DISCUSSION -

The main objective of studying the prescribing pattern of medications for any disease is to justify proper effective use of medications without increasing drug resistance, non-compliance and cost of therapy to patients. Most of the patients suffering from acute diarrhea recovered on their own; weather the cause being either infectious or non-infectious. However, morbidity and mortality associated with acute diarrhea is highly significant even in developed countries. Since many patients do not seek medical attention, the prevalence of documented infectious diarrhea is grossly underestimated. The incidence of the various pathogens in the etiology of food poisoning/acute gastroenteritis has changed significantly in the last decade, so one needs to essentially ask for specific details to ascertain the impact of the diarrhea and also its treatment [12, 13].

In total 100 prescriptions of diarrhea, total numbers of drugs prescribed were 561. Average numbers of drugs per encounter were 5.61. In self limiting condition like diarrhea, prescribing 5.61 drugs per encounter are very high in number, also known as polypharmacy. Such overprescribing of medications will lead to increase in cost of therapy, side effects, drug-drug interactions and decrease compliance of patients [10]. So it is negative sign of awareness among physicians which should be corrected by proper vigilance.

We observed that all the drugs were prescribed by generic name and included in WHO and national list of essential medicines. It indicates good prescribing pattern among the physician [14].

In our study, total percentages of encounters with prescribed antibiotics were 90 %, which were very high in number. Diarrhea as a syndrome has a heterogeneous etiology. Acute infectious diarrhea is most often either foodborne or waterborne disease. Infectious causes of diarrhea include viral, bacterial, and parasitic pathogens, while noninfectious causes of diarrhea include drugs, food allergies, primary gastrointestinal diseases such as inflammatory bowel disease, and other disease states such as thyrotoxicosis and the carcinoid syndrome. Antibiotics should not be administered unless there are indications of specific risk or severity [15, 16]. For potentially responsive infections, selecting an effective antimicrobial requires knowledge of the likely sensitivity of the causative agent, information that is usually unavailable during first visit of patient. Higher prescribing of antibiotics for diarrhea (mostly self limiting condition) will lead to increase in chances of antibiotic resistance, cost of therapy and adverse drug reactions to patients. They do not prevent dehydration or improve nutritional status, which should be the main objectives of treatment [17].

Among the prescribed antibiotics, most commonly prescribed antibiotics were ciprofloxacin and metronidazole in combination

(98.30%), followed by ceftriaxone. In Indian market scenario, Ciprofloxacin + Metronidazole, Ofloxacin + Ornidazole, Norfloxacin + Tinidazole, Doxycycline + Tinidazole are commonly available irrational fixed dose combinations (FDCs). Amoebiasis and bacterial diarrhea rarely coexists in same patient, so in a patient of amoebiasis, use of antibacterial, does not fulfill the rationality criterion and vice versa. A proper justified diagnosis favors a single drug usage, rather than these combinations usage which adds to the cost of therapy and more adverse effects due to unnecessary drugs [18, 19].

In our study, we observed that other drug used was Oral Rehydration Solution (ORS) in all 100 patients. An oral rehydration solution (ORS), in majority of cases, is the only measure needed to cure [20]. Widespread use of oral rehydration salt solutions began in the 1970s as an effective and inexpensive method of treating mild to moderate dehydration [21]. Despite the success of oral rehydration therapy (ORT), its proven efficacy [22] and recommendations for use by various organizations [21], studies show that ORT continues to be underused globally [23], and specifically by physicians in high-income countries [24]. Contrasting to above, in our study, all 100 patients of diarrhea received ORS is encouraging and positive sign of prescribing among physician.

Probiotics was second most common drug group prescribed by physician, in our study. Probiotics are microbial cell preparations, either live cultures or lyophillised powders, that are intended to restore and maintain healthy gut flora or have other health benefits. Diarrheal illnesses and antibiotic use are associated with alteration in the population, composition and balance of gut microflora. Recolonization of the gut by nonpathogenic, mostly lactic acid forming bacteria and yeast is believed to help restore this balance. Organisms most commonly used are—*Lactobacillus sp*., *Bifidobacterium*, *Streptococcusfaecalis*, *Enterococcus sp.* and the yeast *Saccharomyces boulardii*, etc. Several reviews and metaanalysis of clinical trials have suggested that probiotics significantly reduce antibiotic-associated diarrhea, acute infective diarrhea and risk of traveller's diarrhea [20]. Probiotics should be prescribed along with ORS in almost all patients to cure diarrheal patients.

We observed that other drug groups prescribed were antiulcer drugs (ranitidine), antiemetic drugs (ondansetron), antimotility drugs (loperamide) and analgesics (paracetamol). Main indication of above prescribed drug groups was symptomatic relief. In case of antimotility drug, most of the studies independently demonstrated that combination regimens of antibiotics with loperamide offer an advantage over antibiotic alone regimens for clinical cure at the first 24–48 hours. By 72 hours, the addition of loperamide did not appear to offer any significant advantage to antibiotic treatment alone. This finding of waning advantage could be explained by the self-limiting nature of the illness: at 72 h after treatment, the illness was at the end of its natural course and, therefore, no differential treatment advantage was attained. Alternatively, those patients still evaluable for clinical cure at 72 h may have been more likely to have invasive pathogens whose clinical course may not be improved by adding an antimotility agent or may have had infections for which the addition of an antimotility agent may have increased treatment resolution because of clearance-prolongation effects [25, 26]. This is a very critical point related to antimotility drug usage. We can reduce the overprescribing of medications by omitting antimotility drugs in all cases.

Many diarrheal diseases can be prevented by following simple rules of personal hygiene and safe food preparation. Handwashing with soap is an effective step in preventing spread of illness and should be emphasized for caregivers of persons with diarrheal illnesses also. Persons can reduce their risk by learning and following the hygiene methods, safe food handling and preparation practices. General educational information on food safety is available from a number of sources, including many Websites, such as the following: http:// www.foodsafety.gov and http://www.healthfinder.gov [10, 27].

Despite the gains in treatment of acute diarrhea with the implementation of Oral Rehydration Solution (ORS) therapy, it will be important to understand whether such treatments can also prevent long-term effects, including changes to the intestinal epithelium. Future research should emphasize understanding of human physiology related to receptors in gastrointestinal tract [28], gastrointestinal microbiology, and nutrient metabolism and use models that lend understanding to the human system.

CONCLUSIONS -

A rational prescribing can be offered that is appropriate for the optimal care of the individual patient and for the needs of the community without economical burden. These general principals are intended to provide clinicians and public health practitioners with a consensus-based document that will aid in the treatment of acute diarrhea by addressing what medication is to be given, and what steps are to be taken to ensure optimal clinical care and to protect the public health.

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