

Original Research Article

Drug prescribing pattern in acute gastroenteritis in an in-patient setting in a private hospital

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ABSTRACT

Background: Diarrheal diseases cause significant morbidity in developing countries and are the leading cause of death in children. The study was undertaken to assess drug utilization patterns in patients with gastroenteritis in a private setting.

Methods: The in-patient data records of 208 patients (96 males, 112 females) admitted with acute gastroenteritis in a private hospital in Mumbai over 2 years were analysed. WHO core drug prescribing indicators - average number of drugs per prescription, percentage of drugs prescribed by generic name, percentage of encounters resulting in prescription of an antibiotic, percentage of encounters resulting in prescription of an injection were assessed. Patient demographics and trends in use of antibiotics, antiemetics and antidiarrheals were assessed.

Results: The average total number of drugs prescribed per patient was 6.33 and average number of antibiotics was 1.61. 99% of drugs were prescribed using brand names. Percentage of encounters resulting in prescription of injection was 97.11%. Cephalosporins were the most commonly used group of antimicrobials (62.5%) followed by fluoroquinolones (49.03%) and antiamoebic drugs (35.58%). Diphenoxylate was the most commonly prescribed antidiarrheal drug and ondansetron was the most commonly prescribed antiemetic agent. Cephalosporins were the most commonly used antimicrobials in patients diagnosed with enteric fever.

Conclusions: Empirical irrational use of antibiotics was observed. There was paucity of stool culture for identification of causative agents. Review of antibiotic susceptibility patterns needs to be done on a regular basis. Educational programmes to reinforce the need for ORS and zinc supplementation are necessary.

Keywords: Antimicrobials, Gastroenteritis

INTRODUCTION

Diarrheal diseases are the fifth leading cause of death worldwide and the leading cause of mortality in children under 5 years of age. In India, there are half a million deaths due to diarrhoeal disease among children under 5 years of age.¹

Acute Gastroenteritis can be described as an infective condition with patients presenting with loose stools, vomiting, abdominal pain, fever, acute diarrhoea (three or

more abnormally loose or watery stools), dysentery (blood) or persistent diarrhoea (14 days or more).²

Factors affecting the management for patients with gastroenteritis are the history, stool frequency, type and volume of stools, presence of blood in stools, vomiting, medications received, past medical history, underlying conditions, epidemiological clues, physical examination and examination of vitals.³ The prevalence of diarrhoea is highest amongst younger males and a study showed majority of patients approach nonprofessional healthcare

provider for treatment.⁴ A study demonstrated that only 22% of patients with diarrhoea seek medical attention and only 5% patients underwent a stool examination.³

Empirical therapy is necessary in cases with diarrhea since acute diarrhoea can greatly affect the quality of a patient's life and compromise health status.³ The World Gastroenterology organisation standard treatment guidelines for gastroenteritis suggest a combination of oral rehydration therapy, dietary modifications, probiotics, multivitamin supplements, antimicrobials and supportive and symptomatic treatment.²

METHODS

Patients of all ages of either sex who were diagnosed with gastroenteritis were included in the study. Analysis of the in-patient records was carried out. WHO core drug use indicators were analyzed:

- Average number of drugs per prescription
- Percentage of drugs prescribed by generic name
- Percentage of encounters resulting in prescription of an antibiotic
- Percentage of encounters resulting in prescription of an injection

Following other parameters were assessed -

- Average duration of hospital stay
- Age and gender distribution
- Indications and trends in antibiotics, antiemetics and antidiarrheals used
- Number of drugs prescribed by generic name,
- Therapeutic duplication,
- Number of patients subjected to stool examination and culture.

A subtype of patients initially diagnosed as gastroenteritis but later changed to a diagnosis of typhoid/enteric fever were analysed for patterns of antibiotic use, investigations used for diagnosis of enteric fever such as Widal test or blood culture.

RESULTS

The average age of patients in the study was 40.71 years. The average duration of hospital stay was 3.81 days. The average total number of drugs prescribed per patient was 6.33. The average number of antibiotics prescribed per prescription was 1.61. Most patients were prescribed 2 or more antibiotics per prescription with the maximum number of antibiotics used being 5.

99% of drugs were prescribed using brand names. Only amikacin was prescribed using generic name. Percentage of encounters resulting in prescription of injection was 97.11%. (78.07% of antibiotics and 45.85% of all the drugs were given parenterally)

Cephalosporins were the most commonly used group of antimicrobials (62.5%) followed by fluoroquinolones (49.03%), antiamoebic (35.58%), penicillins (19.23%), macrolides (9.13%), aminoglycosides (5.29%), antihelmintics (0.48%), cotrimoxazole (0.48%) and tetracyclines (0.48%).

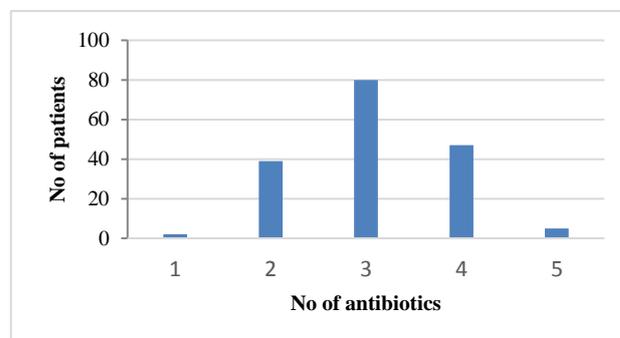


Figure 1: Number of antibiotics used per patient.

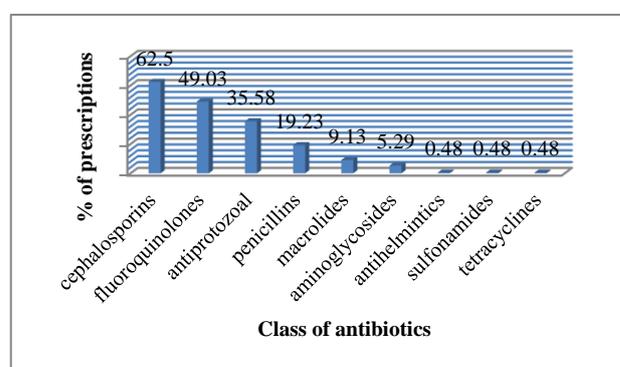


Figure 2: Classes of antimicrobials prescribed.

Ceftriaxone was the most frequently prescribed antibiotic (34.13%), followed by metronidazole (32.21%), ofloxacin (25%), cefexime (20.67%), ciprofloxacin (19.23%) and amoxicillin (18.75%). Most commonly prescribed drugs were ondansetron (86.54% patients), pantoprazole (69.23% patients), vitamin B complex in 61.05% and probiotics in 48.56% of patients of all prescriptions analysed. The most frequently used combinations of antibiotics were -Fluoroquinolones + Metronidazole (25 patients), followed by Amoxicillin/Clavulanic Acid + Fluoroquinolones (21 patients) and Fluoroquin + Metronidazole- (18 patients).

Table 1: Pattern of use of cephalosporins.

Cephalosporin used	% of prescriptions
Ceftriaxone	34.13%
Cefixime	20.67%
Cefoperazone	5.77%
Cefuroxime	0.96%
Cefotaxime	0.96%

Ceftriaxone (71/208 patients) was the most commonly prescribed cephalosporin.

Table 2: Pattern of use of fluoroquinolones.

Fluoroquinolone used	Percentage of prescriptions
Ofloxacin	25%
Ciprofloxacin	19.23%
Levofloxacin	2.40%
Prulifloxacin	0.96%
Gemifloxacin	0.96%

Ofloxacin (52/208 patients) was the most commonly prescribed fluoroquinolone.

Table 3: Use of antiprotozoal drugs.

Drug	Number of prescriptions
Metronidazole	67
Tinidazole	6
Nitazoxanide	1

Metronidazole was considered most appropriate by the treating physician for suspected anaerobic/protozoal infections. Nitazoxanide was used in prolonged diarrhoea.

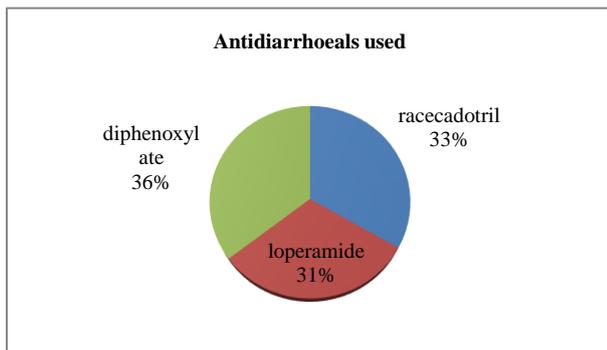


Figure 3: Use of antidiarrheal agents.

Antidiarrheals (antimotility and antisecretory agents) were used in 23.07% patients. Diphenoxylate was the most commonly prescribed antidiarrheal drug followed by Racecadotril and Loperamide.

Table 4: Use of antiemetic agents.

Antiemetic drug used	Number of prescriptions
Ondansetron	180
Domperidone	5
Metoclopramide	1
Prochlorperazine	5

Ondansetron (86.54% prescriptions) was the most commonly used antiemetic agent. Vitamin B complex was prescribed in 61.05% patients and probiotics in 48.56% patients.

Stool was examined microscopically in 16.35% (34 patients) patients, showing following organisms - *Ascariasis* (in 2 patients), *Giardia* (in 2 patients),

Entamoeba Histolytica (in 2 patients). Widal titres were done in 3 patients and were negative in all and stool culture was done in 3 patients all showing gram negative organisms. A Total of 34 patients were confirmed with a diagnosis of typhoid. In patients with suspected typhoid/enteric fever, Widal titre was done in 24 patients and was positive in 17 patients. Blood culture demonstrated salmonellosis in remaining 7 patients.

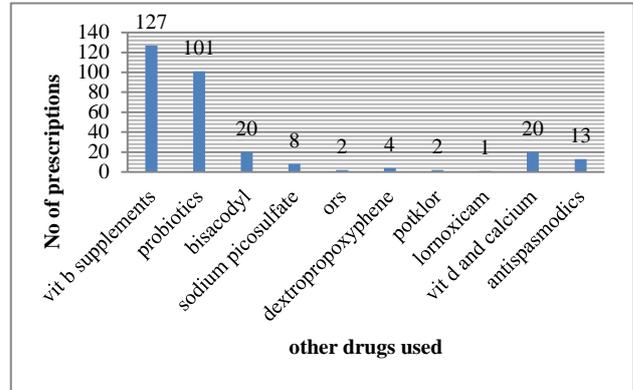


Figure 4: Use of other adjunct drugs.

Stool examination was done in 1 patient, and stool culture in 3 patients. 22 patients were diagnosed as typhoid clinically. Only 6 patients of enteric fever were treated by oral route. Cephalosporins (83%) remained the first choice for typhoid/enteric fever followed by fluoroquinolones and azithromycin. Therapeutic duplication was observed in 2 patients where both diphenoxylate and racecadotril were prescribed.

DISCUSSION

Antibiotics were administered empirically and unjustified multiple antibiotics were used in some patients. Third generation cephalosporins were the most preferred choice for initiating treatment for gastroenteritis followed by fluoroquinolones. This finding is consistent with findings from a study in India where it was observed that cephalosporins and fluoroquinolones were frequently used in a private setting (23.3%) while they were not commonly used in a government setting (9.4%).⁵

Guidelines for management of diarrhoea in adults suggest use of cephalosporins (especially 3rd generation) only as alternative drugs.² Amongst antiprotozoal drugs metronidazole was the preferred choice consistent with suggestions from world gastroenterology organisation.² Antimotility drugs should not be used in patients with infection as it can cause complications. Racecadotril has a superior tolerability and safety compared to loperamide hence its use is preferred.^{6,7}

At times patients having typhoid infection may present as gastroenteritis which needs modifications in the choice of an antibiotic thus emphasizing the importance of relevant investigations.

Rising trends of antibiotic resistance requires that patients not responding to first line of antibiotics be subject to culture sensitivity testing to select appropriate antibiotic. Zinc is found to be effective in controlling of symptoms of diarrhoea and is estimated to decrease mortality by 23%.⁸ Studies done in India demonstrate a need for increasing knowledge of ORS and zinc among public and private sector providers through training and there should be a focus on ensuring adequate supply of zinc and ORS.⁹

Studies have shown that health and nutrition-education intervention programmes result in improved knowledge and attitudes of patients and care takers.¹ There is need for intensive education programmes especially directed towards urban slums to further improve the usage of oral rehydration therapy.¹ Periodic review of the antimicrobial susceptibility patterns of clinically important bacterial pathogens should be undertaken. An evidence based approach to antibiotic prescribing based on standard treatment guidelines is necessary. Procedure of sanctioning antibiotic order forms and infectious disease specialist consultation is necessary.^{10,11}

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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