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Research article

Evaluation of the use of PPIs and H_2 receptor blockers in inpatient department of general medicine in a teaching hospital in Bengaluru

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Abstract

H_2 –receptor antagonists like Ranitidine, which is the first-choice H_2 –receptor antagonist in most patients. Proton pump inhibitors (PPIs) like Omeprazole, Lansoprazole and Pantoprazole. Produce profound gastric acid suppression and are the most effective treatment for gastro -esophageal reflux disease. They are also effective short-term treatments for gastric and duodenal ulcers. They may achieve a faster healing rate than H_2-receptor antagonists, but the relapse rate is similar. Inappropriate use of antisecretory agents can produce further problems in patients so the appropriateness of antisecretory agents is the main objective of the present study, which should be accordance to standard treatment guidelines. This study is a hospital based prospective and observational study conducted at multispecialty teaching hospital over a period of 6 months. All the patients above the age of 18 years who were on antisecretory drugs prescription and willing to give consent were included in the study. Out of 139 patients enrolled in the study, it was observed that Pantoprazole in 29 (26.60%) followed by Rabeprazole 26 (23.85%), and Ranitidine in 11 (10.09%). Out of 138 patients prescribed with antisecretory medications the average cost of treatment was for rabeprazole (Rs.788.08) followed by pantoprazole (Rs.578.65), ranitidine (Rs.83.67) and omeprazole (Rs.312). Our study highlights the need of rational drug use practices like prescribing by generics and drugs under essential drug list. Continuing education about rational drug use and development of easy to use treatment guidelines for common diseases in General Medicine Department is recommended.

Key words: Quality of use, PPIs, Antisecretory Drugs, H_2receptor blockers.

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1. Introduction

H_2–receptor antagonists like Ranitidine, which is the first-choice H_2–receptor antagonist in most patients, has fewer side effects than cimetidine and is less likely to cause interactions with renal or hepatic impairment, concurrent multiple therapy

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and those on high doses for hyper-secratory states. Ranitidine is the recommended injectable H_2-receptor antagonist. Cimetidine is effective in treating gastric and duodenal ulcers and will also relieve peptic esophagitis. It inhibits drug metabolism and so should be avoided in patients stabilized on Warfarin, Phenytoin, Theophylline and Aminophylline [1].

Proton pump inhibitors (PPIs) like Omeprazole, Lansoprazole and Pantoprazole, produce profound gastric acid suppression, and are the most effective treatment for gastro -esophageal reflux disease. They are effective short-term treatments for gastric and duodenal ulcers. They may achieve a faster healing rate than H_2-receptor antagonists, but the relapse rate is similar. PPIs are also used in combination with antibacterial for Helicobacter pylori eradication. Following an initial short healing course of full dose PPI, the majority of patients can stop treatment or should be maintained on the lowest possible dose to control symptoms or taken on demand in response to symptoms. Maintenance therapy with PPIs may be indicated for patients with complications of reflux disease such as erosive ulceration, structuring esophagitis, Barrett's esophagus, Zollinger-Ellison syndrome and largyngopharyngeal reflux or in the prophylaxis of NSAIDs induced peptic ulceration and may require longer treatment with full or high dose PPI [2].

One of the most serious side effects of nonsteroidal anti-inflammatory drugs (NSAIDs) is upper gastrointestinal mucosal damage that may result in erosions, ulcerations and other serious complications. The histamine H2-receptor antagonist ranitidine has been shown to be effective in preventing NSAID-induced duodenal ulcers, but has no efficacy in preventing NSAID-induced gastric ulcers [3].

Acid antisecretory agents are used for the prophylaxis of cancer chemotherapy (CT)-induced gastrointestinal (GI) mucositis. Although these drugs seem to be clinically beneficial, data on their effects on the GI mucosal defense during CT treatment are scant [4].

Newer potent and long-acting inhibitors of acid secretion, such as the proton pump inhibitor omeprazole, are becoming available for general use. These drugs promise to control acid-peptic disease effectively in patients who do not respond adequately to conventional short-acting H2-receptor antagonists [5].

Antisecretory drugs are effective antiulcer agents, but its chronic use generates hypergastrinaemia and accelerates the development of atrophic gastritis in Helicobacter pylori-positive patients [6].

Proton pump inhibitors (PPIs), such as pantoprazole, omeprazole and Lansoprazole, have been shown to be effective in preventing the development of gastric and duodenal ulcers in high –risk patients taking NSAIDs. PPI therapy is also beneficial in healing NSAID-induced ulcers and preventing their recurrence in patients requiring ongoing NSAID therapy. PPIs have an excellent safety profile, and pantoprazole- with its low potential foe drug-drug interactions, is particularly suitable for administration to elderly patients who often require concomitant treatment with other medication [7].

Ranitidine hydrochloride (an H_2-receptor-blocking drug which does not contain the imidazole nucleus of histamine) powerfully inhibited nocturnal and pentagastrin-stimulated gastric secretion in fifteen patients with duodenal ulceration. The drug is satisfactorily absorbed and therefore warrants clinical trial [8].

Sebastian SS et al, study reveals that there is significant evidence that ASDs are being misused. Therefore, individual hospitals

should develop their own strategies to overcome such misuse, notably for PPIs. Strategies that can be used include controlled policies like formulary restriction, PPI order sheets or stop-orders for specific indications [9].

Writing and implementing guidelines for the uses of ASDs, mainly PPIs, by pharmacists can be another strategy to reduce misuse [10].

Inappropriate use of antisecretory agents can produce further problems in patients so the appropriateness of antisecretory agents is the main objective of the present study, which should be accordance to standard treatment guidelines.

2. Materials and Methods

Study design

This study is a hospital based prospective and observational study conducted at Dr. B.R. Ambedkar Medical College and Hospital, a 540 bedded multispecialty teaching hospital over a period of 6 months (August 2015 – February 2016).

Study population

The study was performed in the Department of General Medicine. The data were collected from the patients admitted to General Medicine ward, over three months.

Sampling method

All the patients above the age of 18 years who were on antisecretory drugs prescription and willing to give consent were included in the study. Patients were selected based on the inclusion& exclusion criteria. The General Medicine wards were visited on all the days of the week and information regarding the patient demographics and drug use were recorded in a self designed case report form.

Study materials

Patient Consent Form

Consent was obtained by using a Patient Consent Form. Consent form made in two languages and consent was obtained from each patient.

Patient Data Collection Form

Data was collected by using a self-designed case report form, which consisted of details like patient demographics, laboratory data, drug therapy and other relevant information.

Patient Medical Record

Data was collected from Patient Medical Record which comprised of patient demographics, history of patient, general physical examination, laboratory data, and drug therapy.

Ethical approval

The study was approved by the Institutional Ethical Committee of DR. B.R. Ambedkar Medical College.

Data analysis

The prescriptions were analyzed for the percentage of drugs prescribed by generic name, percentage of encounters with an antisecretory drugs prescribed, percentage of encounters with an injection prescribed, percentage of drugs prescribed, frequency of the treatment, duration of the treatment, the cost of treatment. The data were pooled and descriptive analysis done. All the documented data were evaluated by applying different Statistical Analysis like mean, standard deviation, correlation. This data were analyzed by using Microsoft Excel.

3. Results and discussion

Among the study population, it was observed that Pantoprazole was presented in 29 (26.60%) followed by Rabeprazole 26 (23.85%), and Ranitidine in 11 (10.09%) patients. Table (1), Figure (1).

Table 1. Distribution of commonly prescribed antisecretory drugs (n=138)

Antisecretory drugs	Number of Patients	Percentage (%)
Pantoprazole	77	55.80%
Rabeprazole	47	34.05%
Ranitidine	12	8.70%
Omeprazole	2	1.45%

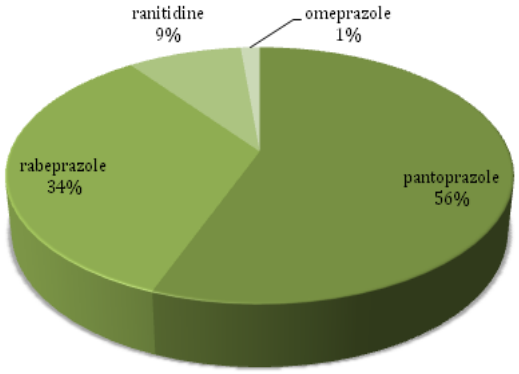


Figure 1. Distribution of commonly prescribed antisecretory drugs

The most preferred dosage form was Injectable. It was used in 136(87.74%) patients, followed by Tablet 10 (6.45%). Table (2).

Out of 138 antisecretory drugs, prescribed 105 (76.09%) were given as Twice a day, followed by 32 (23.19%) were given as once a day and three times a day in 1 (0.72%) patiants. Table (3).

In the study population for prescribed Antisecretory drugs, the most duration of Antisecretory treatment was 3-7 days 79 (57.25%), followed by 7-14 days 43 (31.16%) and >14 days 12 (8.69%).Table (4), Figure (2).

Table 2. Dosage forms Of Antisecretory drugs used observed in our study

Dosage Forms Of Antisecretory drugs Used	Number Of Patients Received Different Dosage Forms	Percentage (%)
Injectable	121	87.67%
Tablet	17	12.32%

Table 3. Frequency of treatment observed in our study

Frequency of treatment	Number of patients prescribed with antibiotics	Percentage (%)
Once Daily	32	23.19%
Twice a day	105	76.09%
Three times a day	1	0.72%

Table 4. Duration of Treatment with antibiotics observed in our study

Duration Of Treatment	Number Of Patients Receiving Treatment	Percentage (%)
>14 days	12	8.69%
7-14 days	43	31.16%
3-7 days	79	57.25%
1-3 days	4	2.90%

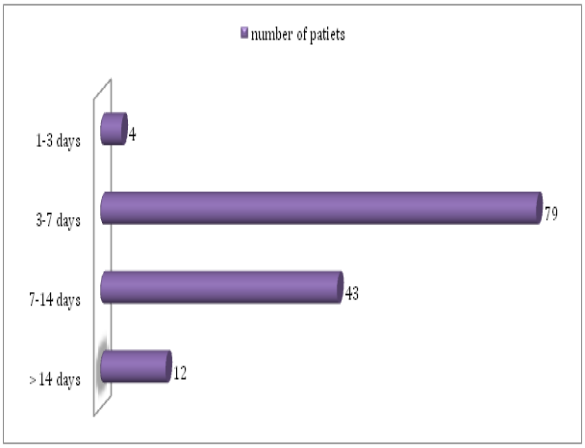


Figure 2. Duration of treatment observed in our study

Among the study population in prescribed drugs most of them were prescribed with brand names in 136 (98.55%), followed by prescribed with generic names in 2 (1.45%). Table (5).

Table 5. type of prescription observed in our study

Type of prescription	No of patients	Percentage
Brand name	136	98.55%
Generic name	2	1.45%

Out of all patients prescribed with antisecretory average the cost of treatment was found to be (Rs. 788.08) for rabeprazole followed by (Rs.578.65) for pantoprazole, (Rs. 83.67) for ranitidine and (Rs. 312) for omeprazole. Table (6). Figure (3).

Table 6: Distribution of cost of antisecretory medication

Antisecretory drugs	Total cost (Rs)	Average cost (Rs)
Pantoprazole	44556	578.649
Rabeprazole	37040	788.085
Ranitidine	1004	83.668
Omeprazole	624	312

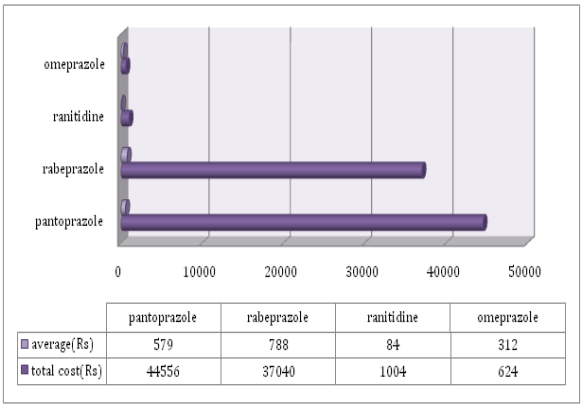


Figure 3. Distribution of cost of antisecretory medications

The total cost of antisecretory medication was found to be, majority in range between 500-1000 (39.13%) followed by 100-500 (34.06%) and for total cost below 100 & above 1000 were nearly same (13%). Table (7).

Table 7: Distribution of total cost of antisecretory medication

Cost of Antisecretory drugs (Rs)	No. of patients	Percentage(%)
Below 100	18	13.04
100-500	47	34.06
500-1000	54	39.13
Above 1000	19	13.77

Out of all patients enrolled in the study, it was observed that pantoprazole in 29(26.60%) followed by rabeprazole 26 (23.85%), the reason may be because of availability of pantoprazole in the market and the cost of the injectable pantoprazole compare to rabeprazole which is similar to the study by *Caro JJ et al,* had shown that rabeprazole 20 mg/dl 0.93(95% Cl) and pantoprazole 40 mg/dl 0.98(95% Cl) [11].

The most preferred dosage form was injectable. It was used in 136(87.74%) patients, followed by Tablet 10(6.45%). The main reason it may be because the injectable form of antisecretory drugs is having 100% bioavailability through the iv administration and directly will go to systemic circulation in which by oral administration there is chance of drug interaction due to consumption of different medications and also iv administration is more convenient for the patients which are admitted to the hospital since multi drug administration is happening so taking the medication through oral route is more difficult for the patients as well as nurses.

Which is similar to study conducted by *Baker DE,* he found that intravenous (iv) administration of a proton pump inhibitors is a faster way to achieve gastric acid suppression than oral administration of the same agent [12].

Among the study population for prescribed Antisecretory drugs, the most duration of Antisecretory treatment was 3-7 days 79(57.25%), followed by 7-14 days 43 (31.16%), as we know the most effective duration of action for antisecretory drugs are 7 days to produce the maximum therapeutic effect in the body.

Out of 138 prescribed drugs most of them was prescribed with brand names in 136 (98.55%), followed by prescribed with generic names in 2 (1.45%). In the study conducted by *Gawron AJ et al, the* academic medical centers, physician-owned practices and community health centers were all more likely to have brand name PPIs [13].

Conclusion

It was found that pantoprazole is the mostly prescribed antisecretory agent followed by rabeprazole, which can explain by the availability of the drug and these are more effective types of drug in compare to H2 receptor blockers and its according to the prescribing guidelines of the hospital. Use of injectable rabeprazole will lead to increase in cost of total therapy. Among the discharge medication also pantoprazole was more frequently used antisecretory drug with the average cost of (Rs.25.91) per patient, which is a proton pump inhibitor that decrease the amount of acid produced in the stomach, is used to treat erosive esophagitis (damage to the esophagus from stomach acid), and other conditions involving excess stomach acid such as Zollinger-Ellison Syndrome.The most commonly rout of administration was injection (iv) and the duration of injectable antisecretory agents were 1-3 Days. Which is more convenient among the patients who were admitted in hospital but the cost of therapy was higher in case of iv therapy and for rabeprazole it was (Rs.788.085) per person during the period of admitting in hospital.

Most of the drugs are prescribed with brand names, so prescribing by generic name should be encouraged. Our study highlights the need of rational drug use practices like prescribing by generics and drugs under essential drug list. Continuing education about rational drug use and development of easy to use treatment guidelines for common diseases in General Medicine Department is recommended.

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