Evaluation of the use of PPIs and H₂ receptor blockers in inpatient department of general medicine in a teaching hospital in Bengaluru

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Abstract
H₂–receptor antagonists like Ranitidine, which is the first-choice H₂–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 H₂-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, H₂ receptor blockers.

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1. Introduction
H₂–receptor antagonists like Ranitidine, which is the first-choice H₂–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
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 for drug-drug interactions, is particularly suitable for administration to elderly patients who often require concomitant treatment with other medication [7].

Ranitidine hydrochloride (an H2-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)

<table>
<thead>
<tr>
<th>Antisecretory drugs</th>
<th>Number of Patients</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pantoprazole</td>
<td>77</td>
<td>55.80%</td>
</tr>
<tr>
<td>Rabeprazole</td>
<td>47</td>
<td>34.05%</td>
</tr>
<tr>
<td>Ranitidine</td>
<td>12</td>
<td>8.70%</td>
</tr>
<tr>
<td>Omeprazole</td>
<td>2</td>
<td>1.45%</td>
</tr>
</tbody>
</table>

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%) patients. 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).
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**

<table>
<thead>
<tr>
<th>Type of prescription</th>
<th>No of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brand name</td>
<td>136</td>
<td>98.55%</td>
</tr>
<tr>
<td>Generic name</td>
<td>2</td>
<td>1.45%</td>
</tr>
</tbody>
</table>

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**

<table>
<thead>
<tr>
<th>Antisecretory drugs</th>
<th>Total cost (Rs)</th>
<th>Average cost (Rs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pantoprazole</td>
<td>44556</td>
<td>578.649</td>
</tr>
<tr>
<td>Rabeprazole</td>
<td>37040</td>
<td>788.085</td>
</tr>
<tr>
<td>Ranitidine</td>
<td>1004</td>
<td>83.668</td>
</tr>
<tr>
<td>Omeprazole</td>
<td>624</td>
<td>312</td>
</tr>
</tbody>
</table>

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**

<table>
<thead>
<tr>
<th>Cost of Antisecretory drugs (Rs)</th>
<th>No. of patients</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 100</td>
<td>18</td>
<td>13.04</td>
</tr>
<tr>
<td>100-500</td>
<td>47</td>
<td>34.06</td>
</tr>
<tr>
<td>500-1000</td>
<td>54</td>
<td>39.13</td>
</tr>
<tr>
<td>Above 1000</td>
<td>19</td>
<td>13.77</td>
</tr>
</tbody>
</table>

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.

References

6. Álvarez, Ángeles M, Sales Ibiza, Mario M. Andrade, García AB, Calatayud S: Gastric antisecretory drugs induce leukocyte-endothelial cell interactions through


