

A Study on Prescription Pattern of Proton Pump Inhibitors in Emergency Ward of a Multispecialty Hospital

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ABSTRACT

INTRODUCTION: Proton pump inhibitors have been reportedly been used inappropriately in different indications. The aim of the study is to evaluate the selection, rationality and implementation of right PPI in emergency department of a multi-specialty hospital.

MATERIALS AND METHODS: we have performed hospital based prospective observational study of 105 patients admitted in emergency department. All data were collected through specially designed data collection form through patient case sheet. All necessary information including patient demographics, patient medical and medication history, reason of admission, allergic reaction, treatment chart and lab investigation were collected for the study.

RESULT: Out of 105 prescriptions of PPIS we found male predominance with 51%, 13.33% of smokers and 16.19% of alcoholics. it was highly prescribed for patients in age group between 57-66 years (21.90%). the major PPI prescribed was rabeprazole 44.15%, and the most commonly used route was iv (61.68%).the most common symptoms of ulcer presented was vomiting 22.86%, and nausea 12.38%. diabetes mellitus (28.57%) was the most common condition under therapy. average cost per day of iv PPI was rs.78.25/day and for oral PPI was rs.7.125/day.

CONCLUSION: our results confirms the need to pay attention to the proper indications of PPI. Additionally the implementation of right PPI should be

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guaranteed .moreover the rationality of the drug should be evaluated on each patients.

Keywords: Proton pump inhibitor, Prescription pattern monitoring studies, Drug utilization research, Medication use evaluation

INTRODUCTION

Prescription pattern monitoring studies or drug utilization studies is conducted to assess the rational use of drugs in a population. There main focus is on prescribing, dispensing and administration of the drugs.

Prescription monitoring helps to understand the profile and extend of drug use in a population its trends and quality of drugs in comparison with the regional and national guidelines of the specific locations.

Proton pump inhibitors is the most commonly prescribed drugs for gastrointestinal disorder most specifically for the acid-related gastrointestinal disorders , so it will reduce the gastric acid production in the organ and thus gives relief.

The most commonly used PPI's in India are Pantoprazole(40mg) , Omeprazole(20mg), Rabeprazole (20mg), Esomeprazole (40mg), lansoprazole (30mg) and Deslanoprazole (60mg) in which the highest ranking given to Pantoprazole ,Rabeprazole and Omeprazole.

PPI's are used in the treatment of many acid related diseases like Peptic ulcer disease (PUD), Gastro esophageal reflux disease (GERD), Barrett's esophagus, Zollinger-Ellison syndromes (ZES) and many more.

The main mechanism of action of action of PPI's is to reduce the acid production in the stomach, it is done by irreversibly blocking hydrogen-potassium-ATP-ase enzyme, the enzyme which controls the gastric acid production.

The inactive substituted benzimidazole (PPI's) will get converted in to active sulfonamides in the acidic environment of the parietal cells. This active form will bind to the enzymes at gastric parietal cells and block the gastric acid production.

The main goal of therapy of the PPI's are to heal the duodenal and gastric ulcers and to treat GERD, and to reduce recurrence of disease frequency.

AIM AND OBJECTIVE

The primary objective of the study is to evaluate the selection of proton pump inhibitors in various clinical conditions in emergency ward of a multispecialty hospital by using patient data collection form. Secondary objective is to provide rational drug use by physician suggestions and also the implementation of right PPI's after discussion with a physician.

METHODS AND MATERIALS.

Study design: A retrospective observational study was carried out in Akash Hospital in Bangalore, Karnataka.

Inclusion and Exclusion criteria: The study includes acute and chronic admissions in emergency department, between age group 18-70 years. Both genders are enrolled. We exclude pregnant and lactating women, people with

ongoing treatment with PPI's or H2RA and those diagnosed with peptic ulcer disease during current hospital admission.

Sample size: Sample population was calculated as 105 samples.

Method of data collection: All necessary and relevant information are collected from patients' case sheet by using specially designed data collection form, designed by using case sheet.

Duration of study: A retrospective observational studies was conducted for 6 months in tertiary care hospital.

Ethical consideration: Ethical clearance was obtained for the protocol of the present study by ethical committee of Aditya Bangalore institute of pharmacy education and research. Informed consents were taken by all participants and we have informed that our study is voluntary and they can withdraw whenever they want.

Statistical analysis: Statistical analysis was done by data entry in to MS excel 2016 and analyzed. Descriptive statistics were expressed in terms of actual number and percentage.

RESULTS AND INTERPRETATION

Gender Categorization

In the study population of 105 patients, males were found to be more (51%) than the females (49%).As shown in Table 1.

Table 1. GENDER CATEGORIZATION

SL. No	Gender	No. of patients	Percentage
1	Male	54	51.43%
2	Female	51	48.57%

Age Distribution

Most of the patients treated with PPIs were in age group between 57-66 years (21.90%) followed by age group 67-76 years (17.14%) and patients in the age group 17-26 years were less just 8.57%.Patients in older age group ≥ 77 were 10.48% and remaining other age group are 41.91%.

Table 2.AGE DISTRIBUTION

SL. No	AGE GROUP	NO. OF PATIENTS	% OF PATIENTS
1	17-26	9	8.57%
2	27-36	13	12.38%
3	37-46	16	15.24%
4	47-56	15	14.29%
5	57-66	23	21.90%
6	67-76	18	17.14%
7	≥ 77	11	10.48%

Psychosocial Factors

Of the population studied, 13.33% of smokers and 16.19% of alcoholics were found to be under PPIs therapy and 70.48% were non-smokers and non-alcoholics.

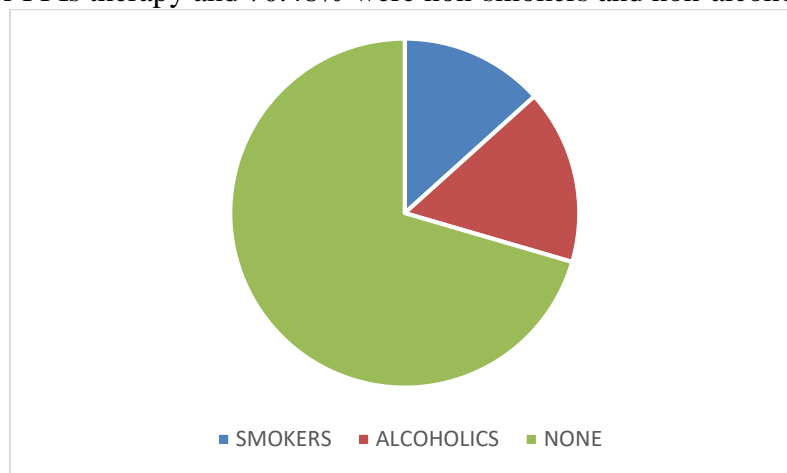


Figure 1. Psychosocial Factors

Symptoms of Ulcer

The major ulcer symptoms treated with PPIs include vomiting 22.86% patients, nausea 12.38% patients, epigastric pain in 7.62%, heartburn in 5.71% and others 51.43%.

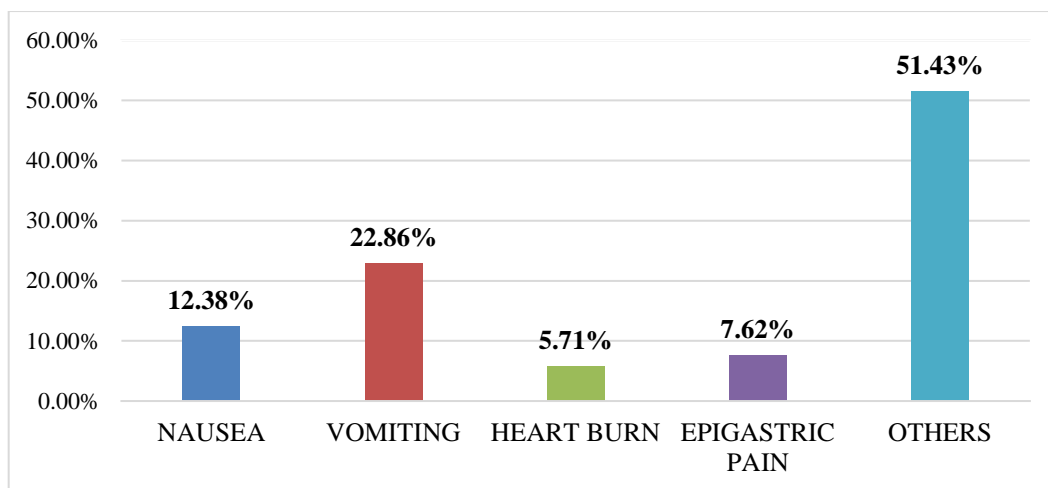


Figure 2. Symptoms of ulcer

Proton Pump Inhibitors Prescribed

Major prescriptions of PPI include Rabeprazole 44.15%, followed by Pantoprazole 35.13%. The least prescribed PPIs were Omeprazole 5.40% and remaining Esomeprazole 15.32%. Both Pantoprazole and Rabeprazole were prescribed in 1.80%, Rabeprazole and esomeprazole were prescribed in 2.7% and Omeprazole and esomeprazole were prescribed together in 0.09%.

Table 3. Drugs Prescribed

SL. No	DRUGS PRESCRIBED	NO. OF PRESCRIPTIONS	%
1	PANTOPRAZOLE	39	35.13%
2	RABEPRAZOLE	49	44.15%
3	OMEPRAZOLE	6	5.40%
4	ESOMEPRAZOLE	17	15.32%

Route of Administration

Among the PPIs prescribed 61.68% was I.V and remaining 38.32% were prescribed oral form. Both I.V and Oral forms were prescribed 1.90%.

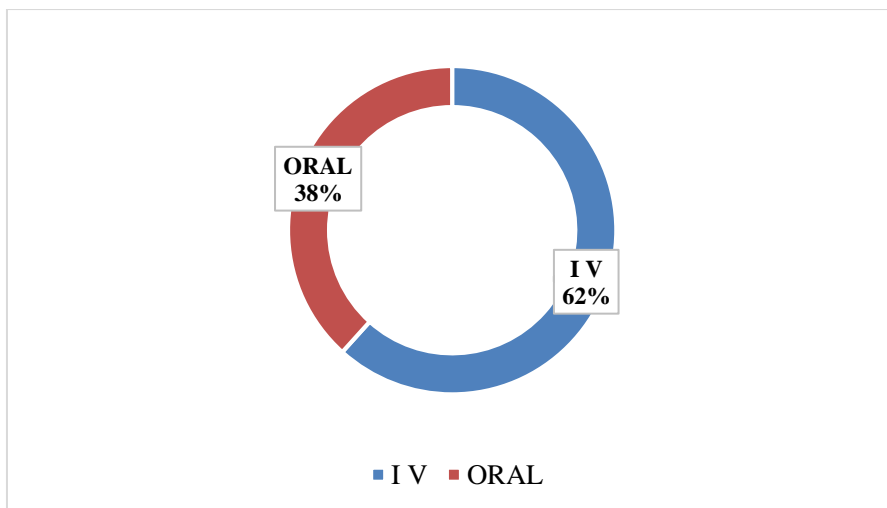


Figure 3. Route of Administration

Break up of IV PPIs prescribed

Among the IV PPIs prescribed Rabeprazole was the highest 67.17%, followed by Pantoprazole 28.36%, least prescribed were Omeprazole 1.49%, and remaining Esomeprazole was 2.98%.

Break up of oral PPIs Prescribed

Among the PPI prescribed Pantoprazole was highest 46.51%, followed by Esomeprazole 34.88%. The least prescribed oral PPIs were Rabeprazole 6.98% and remaining Omeprazole was 11.63%.

Various Conditions under Therapy

Various conditions like gastritis 0.95%, pancreatitis 0.95%, GERD 2.86%, Peptic ulcer 1.90%, and severe diarrhea 0.95% were treated with PPIs as the first line treatment and other cases 92.38% were treated with PPIs as prophylaxis. As shown in Table 4.

Table 4. Various conditions under therapy

SL.No	DISEASE	PATIENTS	PERCENT AGE
1	IDIOPATHIC THROMBOCYTOPENIA	1	0.95%
2	POISONING	4	3.81%
3	RESPIRATORY ACIDOSIS	1	0.95%
4	LRTI	10	9.52%
5	ASTHMA	6	5.71%
6	COPD	11	10.47%
7	HEART ATTACK	2	1.90%
8	PARKINSONISM	1	0.95%

9	MYOCARDIAL INFARCTION	1	0.95%
10	CHF	2	1.90%
11	PEPTIC ULCER	2	1.90%
12	ACUTE RENAL FAILURE	1	0.95%
13	APPENDICITIS	1	0.95%
14	PANCREATITIS	1	0.95%
15	VERTIGO	3	2.86%
16	DIABETES MELLITUS	30	28.57%
17	HYPERTENSION	20	19.04%
18	FRACTURE	6	5.71%
19	ALCOHOLIC LIVER DISEASES	2	1.90%
20	GERD	3	2.86%
21	CHRONIC KIDNEY DISEASE	7	6.66%
22	CHRONIC ALCOHOLIC DISEASE	9	8.57%
23	OSTEOARTHRITIS	1	0.95%
24	SEIZURE	4	3.81%
25	ANAEMIA	6	5.71%
26	ISCHEAMIC HEART DISEASE	3	2.86%
27	CIRRHOSIS	4	3.81%
28	FATTY LIVER	1	0.95%
29	URTI	1	0.95%
30	TYPHOID	1	0.95%
31	SNAKE BITE	1	0.95%
32	SEVERE DIARRHEA	1	0.95%
33	LUMBAR SPONDYLOSIS	2	1.90%
34	HYPOTHYROIDISM	5	4.76%
35	GASTRITIS	1	0.95%
36	OBSTRUCTIVE HERNIA	1	0.95%
37	HYPOGLYCEMIA	2	1.90%
38	PULMONARY TB	1	0.95%
39	ENCEPHALOPATHY	1	0.95%
40	DIABETIC FOOT	1	0.95%
41	HEPATIC ABSCESS	1	0.95%
42	TRAUMATIC ULCER	1	0.95%
43	CELLULITIS	1	0.95%
44	APD	1	0.95%

Cost analysis of PPIs

Among the I.V prescribed Esomeprazole was of highest price Rs.110/dose, next was Rabeprazole with Rs.99/dose and Omeprazole was Rs.56/dose.

Among the oral PPIs prescribed Rabeprazole was of highest price Rs.14.6/dose, next was Esomeprazole and Pantoprazole Rs.4.7/dose and Omeprazole was Rs.4.5/dose.

Table 5. Cost Analysis of PPIs

SL.No	DRUGS	COST FOR IV / DAY	COST FOR ORAL/DAY
1	PANTOPRAZOLE	Rs.48	Rs.4.7
2	ESOMEPRAZOLE	Rs.110	Rs.4.7
3	OMEPRAZOLE	Rs.56	Rs.4.5
4	RABEPRAZOLE	Rs.99	Rs.14.6

DRUG INTERACTION

The major Drug Interactions were with clopidogrel (9), Rifaximin (2). Other Drug interactions were Furosemide (3), Cefuroxime (1), Atorvastatin (1), and Escitalopram (1). Out of 105 prescriptions, 17 drug interactions were found.

Table 6. Drug interactions

SL.No	DRUG	INTERACTING DRUG	EFFECT	NO OF PRESCRIPTION
1	Rabeprazole	Furosemide	Concurrent use leads to hypomagnesemia	3
2	Esomeprazole	Clopidogrel	Esomeprazole reduces the effect of clopidogrel in reducing heart disease.	4
3	Rabeprazole	Cefuroxime	Rabeprazole reduces the absorption and blood levels of cefuroxime	1
4	Pantoprazole	Rifaximin	Pantoprazole increases levels of Rifaximin by P-glycoprotein(MDR1) efflux transporter	2
5	Pantoprazole	Atorvastatin	May increase the plasma concentration of Atorvastatin	1
6	Rabeprazole	Clopidogrel	Rabeprazole reduces the effect of clopidogrel in reducing heart disease.	4
7	Omeprazole	Clopidogrel	Omeprazole reduces the effect of clopidogrel in reducing heart disease.	1
8	Omeprazole	Escitalopram	May increase the blood levels and effects of escitalopram	1
Total				17

DISCUSSION

Irrationality was found during the selection of PPIs, concomitant drug use, route of administration, and cost effectiveness of drug.

Various conditions like gastritis 0.95%, pancreatitis 0.95%, GERD 2.86%, Peptic ulcer 1.90%, and severe diarrhea 0.95% were treated with PPIs as the first line treatment and other cases 92.38% were treated with PPIs as prophylaxis.

PPIs should be initiated as the 1st line therapy only for severe GERD, ZES, and PUD. PPI should be used only when there is documented evidence of a GI disorder which cannot be treated with H₂-receptor antagonist and where a PPI use is clinically justified. Thus PPIs are often used unnecessarily in patients who do not require total suppression of acid production. Long-term use of the medications can

cause severe side effects, such as kidney problems, bone fractures and cancers. PPI is not only less effective in mild and acute conditions and symptom relief, it also has adverse effects such as it triples the risk of dangerous clostridium difficile diarrhea, increases susceptibility to GI infections, delays diagnosis of gastric cancer and sudden withdrawal causes hyper secretion of acid.

Most of the patients treated with PPIs were in age group between 57-66 years (21.90%) followed by age group 67-76 years (17.14%) and patients in the age group 17-26 years were less just 8.57%. Old patient's tendency to develop disease is more as the metabolic system as well as other systems are decreasing their function, Patients in older age group ≥ 77 were 10.48% were treated with PPI.

Major prescriptions of PPI include Rabeprazole 44.15%, followed by Pantoprazole 35.13%. The least prescribed PPIs were Omeprazole 5.40% and remaining Esomeprazole 15.32%. Among the PPIs prescribed 61.68% was I.V and remaining 38.32% were prescribed oral form. Unnecessary use of both IV and Oral forms of PPIs were found in 1.90% of patients.

Among the IV PPIs prescribed Rabeprazole was the highest 67.17% and its cost per day Rs.99, followed by Pantoprazole 28.36% and its cost per day Rs.48. Among the oral PPI prescribed Pantoprazole was highest 46.51%, followed by Esomeprazole 34.88%. The least prescribed oral PPIs were Rabeprazole 6.98% and remaining Omeprazole was 11.63%.

According to the studies IV prescription of PPIs should be switched to oral therapy after 72 hours and in this study none of the prescriptions were changed due to patient's conditions.

The major Drug Interactions were with clopidogrel (9), Rifaximin (2). Other Drug interactions were Furosemide (3), Cefuroxime (1), Atorvastatin (1), and Escitalopram (1).

Out of 105 prescriptions, 17 drug interactions were found. Although interactions were mild to moderate and cautions were taken.

CONCLUSION

Due to effectiveness and safety profile, PPI's are the most prescribed medications in the whole world for the treatment of acid related disorders.

The main aim of our study was to understand the prescribing pattern of PPI's in emergency department of a multispecialty hospital. ALL the 105 patients were carefully screened to study the usage of drugs. Out of the population studied, 51% were males, 13.33% of smokers and 16.19% alcoholics. It was highly prescribed for the age group 57-66. The most commonly used drug was Rabeprazole 44.15% and used route was IV 61.68%. Average cost per day of IV PPI's are 78.25rs/day and for oral PPI's was 7.125rs/day.

We have conducted a retrospective and prospective observational study and we found irrationality in selection, route and cost effectiveness of drug therapy. We have found that PPI's are being used for un-recommended prophylaxis than for the indicated use. Health care professional has a major hand in controlling its irrational use. The knowledge about the recommended indications will help in reducing the irrationality of the drug usage.

SUMMARY

The main aim of our study was to understand the prescribing pattern of proton pump inhibitors in emergency ward of a multispecialty hospital.

This was an observational prospective as well as retrospective study carried out using 105 inpatient prescriptions in emergency medicine department at a multispecialty hospital.

Out of 105 prescriptions of PPIs 51% were male patients and remaining were female. Of the population studied, 13.33% of smokers and 16.19% of alcoholics. It was highly prescribed for patients in age group between 57-66 years (21.90%). The major PPI prescribed was Rabeprazole 44.15%, and the most commonly used route was IV (61.68%). The most common symptoms of ulcer presented was vomiting 22.86%, and nausea 12.38%. Diabetes Mellitus (28.57%) was the most common condition under therapy. Average cost per day of IV PPIs was Rs.78.25/day and for oral PPIs was Rs.7.125/day. Out of 17 drug interactions found 9 interactions were with clopidogrel.

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Conflicts of Interest: No conflicts of interest were reported in the study

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