



## Evaluation of Prescriptions and Use of Intravenous Pantoprazole in General Wards and Intensive Care Unit of Shahid Sadoughi Hospital in Yazd

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### ABSTRACT

**Background:** Proton pump inhibitors (PPIs) are currently the most effective agents for acid related disorders. However, studies show that 25-75% of patients receiving intravenous Pantoprazole had no appropriate justification, indicating high rate of inappropriate prescribing in hospitals. The aim of this study is to examine the appropriate use of intravenous Pantoprazole in accordance with guidelines at Shahid Sadoughi hospital.

**Methods:** From January to April 2015, sample of 100 prescriptions who received Intravenous (IV) Pantoprazole were collected with observational and sectional model in Intensive care unit (ICU) and general wards of "Shahid Sadoughi" Hospital of Yazd, Iran. Clinical data from patient records are obtained and these data were mapped to establish clinical criteria and appropriate use of Intravenous Pantoprazole.

**Results:** The majority (63%) of Intravenous Pantoprazole prescriptions were deemed inappropriate in terms of either indication for use, dose or duration of therapy. 51.5% of the patients were above 55 years old. Endoscopy did not performed in most of the Non UGIB (Non upper gastrointestinal bleeding) cases. Most Intravenous Pantoprazole prescriptions were ordered by junior doctors (Intern), and again this group were significantly less likely to prescribe the drug for appropriate reasons when compared with more experienced clinicians.

**Conclusion:** This study suggests that the majority of IV PPI prescriptions in our hospital are inappropriate. Awareness of the result of this article through medical staff could result in more judicious use of intravenous pantoprazole and dose optimization. Physicians and pharmacists can work together to create solutions to inappropriate drug use.

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### Introduction

Proton Pump Inhibitors (PPIs) have emerged as the leading treatment for gastro-esophageal reflux disease

(GERD) and peptic ulcer disease, Due to their efficacy and low toxicity in treating these conditions (1). Upper gastrointestinal bleeding (UGIB) refers the bleeding in the upper gastrointestinal tract, commonly defined as bleeding arising from the esophagus, stomach, or duodenum. Acute upper gastrointestinal bleeding is the most common complication of peptic ulcer, often caused by *Helicobacter pylori*. PPIs are currently the

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most effective agents for acid related disorders. However, studies show that 25-75% of patients receiving intravenous pantoprazole had no appropriate justification, indicating high rate of inappropriate prescribing in hospitals (2). Irrational use of drugs resulted unsafe treatment, increasing adverse drug reaction and higher costs of treatment. DUE (drug utilizing evaluation) can help identify and correct problems associated with inappropriate use of drugs (3). A study conducted by Gilaad et al., (2005) reported that only 25% of patients in UGIB and 51% in non UGIB groups were prescribed intravenous pantoprazole appropriately (4). Creig and his colleagues (2010) concluded that the majority of intravenous pantoprazole prescriptions were inappropriate in term of either indication for use, dose or duration of therapy, particularly amongst patients with Non UGIB (Non upper gastrointestinal bleeding) indications (3). Nalinin's research showed that, 56% of patients who received intravenous pantoprazole, had no acceptable indication for their use (5). In 2014, Paulin found that, unexplained abdominal pain was the main driver for prescribing intravenous PPIs empirically (2). Maleki and his team reported a case with acute interstitial nephritis due to pantoprazole (6). Review of these studies help to obtain information about the existing practice and factors associated with use of intravenous Pantoprazole (2). The aim of our study is to assess the appropriate use of this drug in accordance with guidelines at Shahid Sadoughi Hospital located in Yazd.

## Patients and Methods

This study has been done with observational and sectional model in the Intensive care unit (ICU) and general section of Shahid Sadoughi Hospital of Yazd. Medical records of all patients hospitalized during January to April 2015, and received Intravenous (IV) pantoprazole were reviewed. 100 patients who received IV pantoprazole identified during this 4 months period. Database like Google Scholar and PubMed were used for topic related to appropriate dosing regimen of intravenous Pantoprazole. Criteria for the appropriate use of Intravenous Pantoprazole were adapted from the previous studies such as Kaplan et al., (4), Guda et al. (5), and Schumaker and Franklin (7). We have developed a data collection form including patient's demographic information such as age, gender, weight, and date of admission, pantoprazole dose, and indication of use, duration of therapy, physician specialty and length of stay as per the need of study. The record of endoscopy and the first dose of this drug given to a patient, has been controlled by asking the physicians and duty nurses. The Appropriate Intravenous pantoprazole dosing regimen In Upper gastrointestinal bleeding (UGIB) patients included an initial 80mg bolus followed by an 8mg/h infusion for 72 hours. If rebleeding occurred, diagnosed on clinical and or endoscopic grounds, the patient are allowed to receive

**Table 1.** Baseline demographic and clinical details of patients initiated on Intravenous Proton Pump Inhibitors (PPIs).

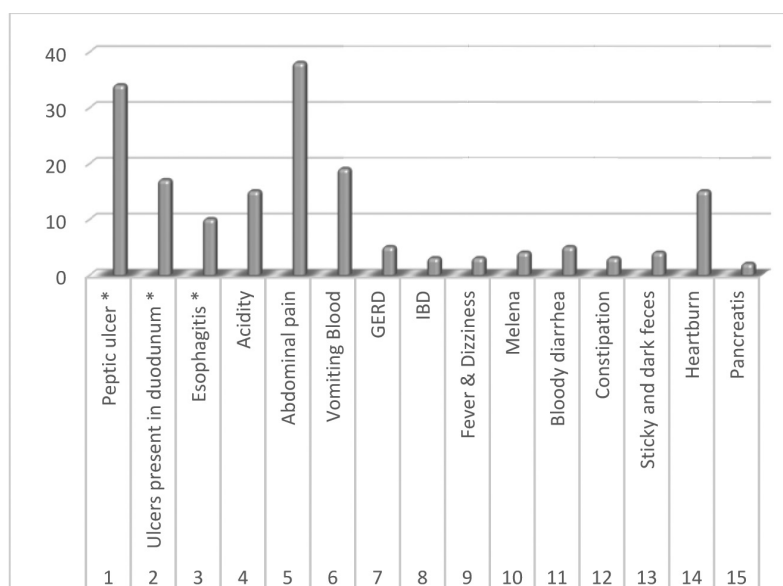
Characteristics	Number ( % ) ( N = 100)
<b>Gender</b>	
Male	69
Female	31
<b>Age ( years )</b>	
<35	6
35 - 55	42
>55	52
<b>UGIB</b>	45
NON.UGIB	55
<b>NPO (nothing by mouth)</b>	27
Non NPO	73
<b>Grade of prescriber</b>	
Intern	43
Resident	34
Specialist registrar	23
<b>Time of prescription</b>	
Day time	35
Night time	41
Weekend	24

UGIB: Upper gastrointestinal bleeding

intravenous pantoprazole for an additional 72 hours. In case of Non bleeding group (Non-UGIB) patient, appropriate dose was defined as a 40-mg (Intravenous) IV bolus once daily, unless the patient had a reasonable indication for twice daily therapy (2, 3, 4). *Intravenous* therapy should be discontinued as soon as the *patient* is able to resume oral therapy. Starting intravenous pantoprazole before endoscopy was considered appropriate, as long as it was discontinued within 12 hours of endoscopy (4). Use of intravenous pantoprazole in patients with abdominal pain or vomiting was considered inappropriate unless the patient had another reason for use of this drug (2). In the non-bleeding cases, intravenous pantoprazole was considered appropriate for stress ulcer prophylaxis in critical care patients, who are not able to tolerate any oral medications (3). Demographic and clinical data were gathered and analyzed using basic descriptive techniques with the statistical program SPSS (version 16) software. P-value less than 0.05 was considered as statically significant difference.

## Result

A total of 100 patients [(69%) male] received IV pantoprazole within the time period of the study. Baseline demographic and clinical details are shown in Table 1. Most of the patients were above 55 yrs. old (51.5%).



\*Data starred indicate present of disease or disease in past in patient.

**Figure 1.** Data obtain from 100 patients receiving Intravenous Pantoprazole.

Abdominal pain was the main presenting symptom for these patients and was the reason for prescribing intravenous pantoprazole (Figure 1). According to (Table 1), 73% of patients were not NPO (nil per os, nothing by mouth) and use of intravenous pantoprazole was considered inappropriate unless the patient had another valid reason for oral PPI use and cannot tolerate oral medications. Studies shows that endoscopy performed in most of the patients who received the drug (62/100). Out of 62 patients, who underwent endoscopy, (41/62), 66.2% received IV pantoprazole prior to endoscopy (Table 3). In most of the Non UGIB cases, (35/55) endoscopy did not performed (Table 2). Most intravenous Pantoprazole prescriptions were ordered by junior doctors (43/100), and again this group were significantly less likely to prescribe the drug for appropriate reasons comparing to the experienced clinicians, particularly specialist registrars. Most of the prescriptions were given at night (41%). As a result, no statically significance found between variable age and sex ( $P=0.23$  &  $P=0.27$ ) with occurrence of UGIB (upper gastrointestinal bleeding), as P-value find to be greater than 0.05. In this study when intravenous pantoprazole was used in the UGIB group, physicians correctly ordered the initial dose (80-mg bolus) in only (44%) of cases. Proper second dose was used in (64%), and in only 29% of the cases the duration of intravenous pantoprazole done appropriately. All 3 components (first dose, second dose, and duration) of the dosing regimen were correct in only 20%. In addition, 51% of Non UGIB group were received the correct dose. The survey of 100 files of the patients

shows that in total 63% of intravenous pantoprazole were ordered inappropriately.

## Discussion

This study suggests that the majority of IV PPI prescriptions in hospital are inappropriate in terms of either indication for use, dose or duration of therapy (63%). A study conducted by Gilaad (2005) reported that only 25% of patients in UGIB and 51% in non UGIB groups were prescribed IV pantoprazole appropriately (4). Creig (2010) reached to this conclusion that, 75.4% of pantoprazole prescriptions were inappropriate. The majority of the prescriptions done by the junior physicians (3). Our study have been noted the similar phenomena suggesting that, most intravenous pantoprazole prescriptions were ordered by junior doctors, and again this group were significantly less likely to prescribe the drug for appropriate reasons when compared with more experienced clinicians. Most of the patients were above 55yrs.old, it could be because of taking multiple medicines at a time. Elderly patients are more susceptible to negative side effects of this medicine, such as bone deficiency and heap fractures, therefore the prescription must be given with caution. Inappropriate use was most common in non UGIBs (craig et al.,) (3). This audit found higher rate of inappropriate intravenous pantoprazole prescriptions among non UGIB group. Some patients may have received IV PPI during short inpatient level and after recovery of symptom of disease, they were not ready to do endoscopy and pay extra bill to continue the treatment. This problem can be one of the reasons to shows

**Table 2.** Information on assessment of endoscopy in Upper gastrointestinal bleeding (UGIB) and NON UGIB patients.

Total number of patients	Bleeding condition	N	Endoscopy status	N
100	UGIB	45	Endoscopy performed	42
			Endoscopy did not performed	3
	NON UGIB	55	Endoscopy performed	20
			Endoscopy did not performed	35

**Table 3.** Frequency of endoscopy test before/after prescribing drug.

Time of endoscopy	N	%
Before prescribing IV Pantoprazole	21	33.8
After prescribing IV Pantoprazole	41	66.2
Total number of patients who had endoscopy	62	

inappropriate prescriptions in non UGIB group of the study. LYE and his team (Malaysia, 2014), justified inappropriate treatment with his hypothesis that, the majority of patients admitted in the hospital with complained of abdominal pain and to reduce the pain need immediate treatments. It was the excuse that the patient didn't want to continue a long treatment and paying an extra expense (2). This Study accept this result. Inappropriate use of pantoprazole in the hospitals through the world is one of the concerned issue. The result of this research and other similar researches shows the weak point in case of argument. The appropriate prescription not only the cause of the improvement of the hospital but also the quick recovery of the patient with a low expense. Awareness of the result of this article through medical staff could result in more judicious use of intravenous pantoprazole and dose optimization (8). Involvement of pharmacy department in drug preparation, instead of drug administration by the nurses, help to involve quality of drug therapy by decreasing the medication errors and adverse drug events (9).

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