

Prevalence of Inappropriate Prescription of Acid Suppression Therapy among Adults Hospitalized at a General Hospital in Bogotá

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Abstract

Objective: This study's objective was to determine the prevalence of prescriptions of acid suppression therapy consisting of proton pump inhibitors (PPIs) or H₂ receptor antagonists (H₂RA) in adult patients hospitalized in the Hospital Universitario - Fundación Santa Fe de Bogotá (HU-FSFB - Santa Fe de Bogotá Foundation University Hospital) that are not in accordance with clinical practice guidelines (CPG). **Methods:** This is a cross-sectional descriptive observational study that included adult patients hospitalized in the HU-FSFB who were treated with acid suppressors for the first time. We determined the indications for prescriptions used and compared them with validated indications. We excluded patients who had previously taken acid suppressants for two weeks, patients admitted to the intensive care unit, and patients who stayed in the hospital for less than one day. **Results:** Between January and July 2015, 306 patients with an average age of 56.6 years were included in this study. The prevalence of acid suppression prescriptions without indications based on the evidence was 59.5%. The most common indications were prophylaxis of bleeding due to gastrointestinal ulcers in low risk patients (64.9%) and cause not established (13.7%). Statistically significant associations were found between inappropriate prescription of acid suppression and hospitalization times of less than seven days (OR: 2.39 95% CI 1.4-3.9) and ages of less than 60 years (OR: 1.9 95% CI 1.2-3.03). **Conclusion:** The prevalence of inappropriate prescriptions of acid suppression for adult patients hospitalized in the HU-FSFB was (59.5%). There were positive associations with ages under 60 years and short hospital stays.

Keywords

Proton pump inhibitors, hospitalized, clinical practice guidelines, H₂ receptor antagonists

INTRODUCTION

Acid suppression therapy (AST) using either proton pump inhibitors (PPI) or H₂ receptor antagonists (H₂RA) is one of the most-widely prescribed drug sets in the world. Its use has been considered safe due to the relative paucity of adverse effects which include headaches, abdominal pain, nausea, diarrhea, vomiting and flatulence. This has favored indiscriminate use in recent years. (1) PPIs' mechanism of action consists in irreversible blockage of the H⁺/K⁺ + ATPase (adenosine-triphosphatase) pump in the parietal cells while H₂RA blocks H₂ receptors resulting in the reduction of acid secretion. (2)

Recent studies motivated by interest in evaluating repercussions of increasing numbers of AST prescriptions have shown that administration of PPIs and H₂RA is associated with decreased absorption of nutrients such as iron, vitamin B12, calcium and magnesium. (3-5) On the other hand, the chronic use of PPIs has been associated with increased risk of fractures, (6) and there is a positive association of AST with increased risk of gastroenteritis, clostridium difficile infections, community-acquired pneumonia and chronic kidney disease. (7-10, 11, 12)

The literature has reported a prevalence of AST prescriptions that does not coincide with clinical practice guideli-

nes (GPC) or prescription indications from the Food and Drug Administration (FDA). It ranges from 50% to 70% demonstrating that these drugs are excessively prescribed and that the potential risk of serious adverse for patients receiving AST without proper indications. (13-23)

Because there have been few reports evaluating the use of AST in Latin America and Colombia, this study seeks to evaluate the prevalence of prescriptions to hospitalized patients that are not in accordance with prescription indications in a fourth level general hospital.

METHODS

This is an observational, descriptive, prevalence and cross-sectional study of patients at the University Hospital Universitario Fundación Santa Fe de Bogotá (HU-FSFB). Patients included were hospitalized adult patients who had been prescribed AST for the first time and who received at least one dose of PPI (omeprazole, esomeprazole, pantoprazole or lansoprazole) or H2RA (ranitidine) during their hospital stay. AST indications were determined and compared with the validated indications, most frequent reasons and associations among clinical variables to establish the prevalence of inappropriate AST prescriptions. Patients were excluded if they had previously been treated with or prescribed any of these medications for at least 2 weeks, and/or if they had been admitted to the intensive care unit (ICU) or stayed in the hospital less than 1 day.

To determine sample size, Harold A. Kahn and Christopher T. Sempos' formula (1989) was used for point prevalence, and a minimum theoretical population of 271 patients was established with a type I error of 0.05 and 90% accuracy.

Data were collected from medical records of the HIS-ISIS® electronic information system of the HU-FSFB and included both sociodemographic and clinical variables such as history of acid-peptic disease, medications used, main reason for hospitalization, time of hospitalization, type of AST prescribed, dose, duration of treatment, reason for using AST and prescription for AST following discharge.

For this study, a list of prescription indications for AST in hospitalized patients was used that was based on the recommendations of the FDA, the American Gastroenterology Association (AGA), the American College of Gastroenterology (ACG) and the American Society of Health-System Pharmacists (ASHP). The list had previously been validated and has been used in other studies (Table 1). (19, 22, 24)

A statistical analysis was performed with measures of descriptive statistics of central tendency and dispersion. A chi-squared test and calculation of odds ratios (OR) were used to establish associations among age, sex, time of hospitalization and use of ulcerogenic drugs (non-steroidal anti-inflammatory drugs [NSAIDs], steroids and anticoa-

gulants) with prescription of AST not based on evidence. P less than 0.05 was taken as statistically significant. STATA 12.0 was used to analyze the data.

This study was approved by the ethics committee of the HU-FSFB at its meeting of December 14, 2015 and meets the criteria of good clinical practice and the 2013 Helsinki Declaration.

Table 1. Indications for AST prescriptions for hospitalized patients according to the evidence (19, 22, 24) *

Indications
Maintenance treatment for erosive esophagitis
Treatment of symptomatic GERD
Treatment to eradicate <i>Helicobacter pylori</i>
Treatment of duodenal ulcer
Treatment of gastric ulcers
Treatment of Zollinger-Ellison syndrome
Treatment of gastric ulcer induced by NSAIDs
Suspected upper gastrointestinal bleeding
Chest pain with negative cardiac and pulmonary exams with suspected dyspepsia or GERD
Prophylaxis of gastrointestinal bleeding due to ulcers in: <ul style="list-style-type: none"> Prevention of gastric ulcers induced by NSAIDs if there are: <ul style="list-style-type: none"> History of complicated ulcer disease Concomitant use of more than 1 NSAID including aspirin Use of high doses of NSAIDs Concomitant use of anticoagulants History of uncomplicated peptic ulcer disease Age > 65 years Concomitant use of steroids
Patients intubated with coagulopathy
Burn patients
Patients with severe cranial injuries

* FDA, AGA, ACG and ASHP. GERD: gastroesophageal reflux disease.

RESULTS

We included 306 patients who met the inclusion and exclusion criteria, between January and July 2015. Average patient age was 56.6 (\pm 38) years, 48% of the patients were women, 54% had completed at least some university level education, and 70.4% had prepaid medical plans in the contributory health care system.

Only 42 (13.7%) of the patients had previous histories of gastrointestinal disease: twenty (6.5%) had had acute or chronic gastritis, ten (3.3%) had had gastroesophageal reflux disease, and nine (3%) had had gastric or duodenal ulcers.

Anticoagulants had been prescribed for twenty-eight patients (9.1%), NSAIDs or aspirin had been prescribed for 27 patients (8.8%), corticosteroids had been prescribed for 17 patients (5.5%).

The mean hospital stay was 7.4 days, with a minimum of one day and a maximum of 55 days. Prescriptions for AST included 266 prescriptions (86.9%) for PPIs, 28 (10.5%) for H2RA and 12 (4%) for both types of medications.

The most commonly used medications, dosage and route of administration were 40 mg of IV omeprazole every 24 hours (32.9% of total prescriptions), 20 mg of oral omeprazole every 24 hours (17% of total prescriptions), and 20 mg of oral esomeprazole every 24 hours (13% of total prescriptions). AST was most commonly administered intravenously.

The prevalence of inappropriate prescriptions of AST among patients hospitalized at HU-FSB in the period from January to July 2015 was 59.5% (Figure 1).

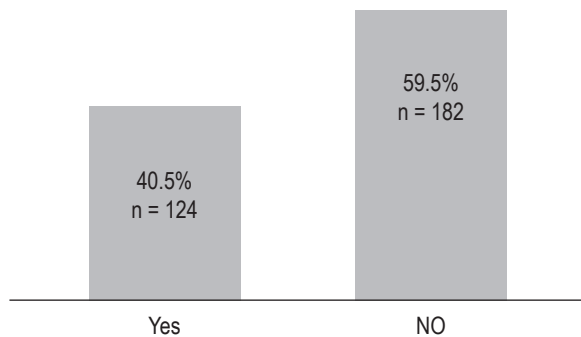


Figure 1. Prescriptions of AST according to the evidence (n = 306) (19, 22, 26). Yes = based on the evidence; No = not based on evidence. FDA, AGA, ACG and ASHP.

Based on the evidence, the most common reason for prescription of AST for these 124 patients was prophylaxis of gastrointestinal bleeding due to ulcers (67.7%) followed by the suspicion of upper gastrointestinal bleeding (10.5%) (Table 2).

Table 2. Evidence-based AST indications (n = 124)

Indication	Patients	%
Prophylaxis of gastrointestinal bleeding due to ulcers	84	67.7
Suspected upper gastrointestinal bleeding	13	10.5
Treatment of GERD	7	5.6
Treatment of gastric ulcers	6	4.8
Maintenance treatment for erosive esophagitis	5	4.0
Treatment of duodenal ulcers	3	2.4
Patients with severe cranial injuries	3	2.4
Chest pain with negative cardiac and pulmonary exams with suspicion of dyspepsia or GERD	3	2.4

Among the reasons for prescriptions given to the 182 patients that were not based on the evidence, the most com-

mon were prophylaxis of gastrointestinal bleeding in patients following low-risk surgery who did not meet the established criteria for prophylaxis (64.9%), cause not established or justified in the patients' clinical histories (13.7%), dyspeptic symptoms of pyrosis and epigastralgia (10%) and prevention of gastrointestinal bleeding due to ulcers in patients who did not meet criteria (5.5%) (Table 3).

Table 3. Indications for AST not based on evidence (n = 182)

Indication	Patients	%
Prophylaxis of gastric ulcers to postoperative patients	118	64.9
Cause not established	25	13.7
Dyspeptic symptoms (heartburn and epigastralgia)	18	9.9
Prevention of gastric ulcers for patients who did not meet criteria	10	5.5
History of GERD or non-symptomatic ulcers	6	3.3
Use of nasogastric tube	3	1.6
Gastroenteritis	2	1.1

Of the total sample, 47 patients (15.4%) were discharged from the hospital with prescriptions for AST that were not based on the evidence.

Statistically significant associations were found between inappropriate prescriptions of AST and patient age under 60 years (OR: 1.9, 95% CI: 1.2-3.03) and hospital stays of less than 7 days (OR: 2.39, 95% CI: 1.4-3.9). No associations were found between inappropriate prescriptions of AST and sex of the patients or use of ulcerogenic medications (NSAID, anticoagulant or corticoid) using a chi-squared test with a significant p value of less than 0.05 (Table 4).

Table 4. Variables associated with inappropriate prescriptions of AST

Variable	Category	OR	95% CI	Value of p*
Age	18-60 years	0.52	0.33-0.83	0.006
	>60 years	1.91	1.20-3.03	0.006
Sex	Male	1.29	0.81-2.03	0.282
	Female	0.78	0.49-1.23	0.282
Hospital stay	1-7 days	0.42	0.25-0.70	0.001
	>7 days	2.39	1.43-3.99	0.001
NSAID	Yes	1.65	0.75-3.65	0.209
	No	0.6	0.27-1.33	0.209
Corticosteroids	Yes	2.19	0.81-5.93	0.114
	No	0.46	0.17-1.23	0.114
Anticoagulant	Yes	1.3	0.60-2.85	0.504
	No	0.77	0.35-1.67	0.504

* Chi-squared test, significant value of p < 0.05.

DISCUSSION

PPIs accounted for the majority of AST prescriptions in these patients which coincides with reports in the literature that prescriptions of PPIs account for 76% of AST with H2RA accounting for the rest. (13)

The prevalence of AST prescription not based on the evidence in the Santa Fe Foundation of Bogotá is 59.5%, which is significantly high. However, this prevalence is in agreement with other studies such as those of Reidd et al. and Gupta et al. in the United States. The former found that 50% of the patients at a hospital in Colorado in the United States did not have any valid indication for the prescription of AST while the latter reported a 73% prevalence of inadequate indication at the Medical Center of the University of Florida. (16, 19) Other reports include one from a hospital in Singapore which report that 55% of AST use was inappropriate. (20) In Peru, one study reported that the 54.57% of the prescriptions of PPIs were not based on any CPG. (22) A study conducted at the San Ignacio Hospital in Bogotá has reported a rate of inappropriate use of 59.7% which is very similar to that found in this study. (23) Another descriptive study that analyzed more than 100,000 prescriptions of PPIs in 2010 in Colombia through a review of data from the general system of social security in health found that the annual unjustified cost amounts to US \$2,202,590. (25) The prevalence of inappropriate prescriptions of AST in our hospital is in accordance with other reports in the literature that range between 50% and 70%. This situation is related to high unjustified costs. (13-23)

Among the reasons for prescription of AST based on the evidence in this study, the most important was prophylaxis of gastrointestinal bleeding in patients with risk factors such as the use of NSAIDs. This is consistent with other studies such as that by Bustamante and Scagliarini. (22, 26)

The most frequent indication not based on evidence was prophylaxis of gastrointestinal bleeding in low risk patients, especially following surgery. These patients did not meet the criteria for prophylaxis such as the use of NSAIDs, cranial injuries, intubation and burns. This agrees with findings of other studies whose frequencies range between 20% and 30% and which show that the foremost reasons is prophylaxis of stress ulcers in low-risk patients. (19, 22, 24, 26) Similarly, a study of patients who had received PPIs in the general surgery service of a hospital in Lausanne, Switzerland has shown that 79% had no risk factors for prophylaxis of gastrointestinal bleeding which is similar to the findings of our study. (21)

A review of the literature on the incidence of gastrointestinal bleeding in low-risk patients found one important study of more than 78,000 patients who were not in the ICU. It found that the incidence of evident bleeding was 0.26% in

patients who received antacid medications and was 0.18% in patients without antacid medication. This translates into a number needed to treat (NNT) of 834 patients in order to prevent one episode of significant gastrointestinal bleeding. This is not cost-effective. (14, 27)

In this study, no significant association was found between prescriptions of AST and the use of ulcerogenic drugs (NSAIDs, anticoagulants and steroids). This differs from studies such as that by Gupta which found that the use of ulcerogenic drugs accounts for 15% of the total. (19) Similarly, Bustamante found that polypharmacy was the most important indication of inappropriate AST prescription in an internal medicine the hospital, and Chia et al. found this same association in 35% of the patients in their study. (20, 22)

It is noteworthy that up to 15% of patients were given AST prescriptions without evidence. Nevertheless, this rate is lower than some found in other studies such as that by Ahrens in Germany which found that 58% of 506 patients followed in 36 primary care centers had been given AST prescriptions without evidence-based indications after hospital discharge. This could expose patients to chronic use of a drug with adverse effects and unnecessary costs. (28)

On the one hand, this study is subject to limitations such as the information bias found in the review of medical records, since not all the antecedents or reasons for a course of action related to a given patient are reported including prescriptions of AST. On the other hand, this study is limited to inpatients at the hospital and excludes outpatient consultations within which a significant excess of these medications has also been reported.

This study warns about the high prevalence of prescriptions of AST that is not based on the evidence in a general hospital in Colombia and shows the inadequate level of knowledge of the approved prescription indications for AST. It also makes evident the need to disseminate the approved indications to medical personnel in order to reduce the rate of inappropriate indications, the associated cost and exposure to unnecessary risks that may be serious for patients receiving these medications. Therefore, we suggest the creation of Clinical Practice Guidelines adapted to our environment that are applicable to all hospitals in the country.

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