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Inappropriate Proton Pump Inhibitor Administration at Hospital Discharge: A retrospective Cohort Study

A. Study Purpose and Rationale

Proton pump inhibitors (PPIs) are drugs frequently prescribed in the inpatient and outpatient setting. The popularity of prescribing PPIs is largely due to their improved efficacy in acid suppression over their progenitor agents, the histamine H2-receptor antagonists and the antacids. PPIs have achieved tremendous success in the prevention and treatment of diseases related to over-secretion of gastric acid. [i] Despite their immense success and popularity, there has been growing concern for many years of inappropriate PPI use. This apparent inappropriate use is concerning because of mounting evidence of potential side effects patients may experience while taking PPIs. These adverse effects include, but are not limited to: increased risk of bone fracture, Clostridium *dificile* –associated diarrhea, pneumonia, vitamin B12, magnesium and iron deficiency, and significant drug interaction.[ii] Furthermore, a worrisome trend has been noted in which people have developed a worsening of symptoms after long-term use of the drugs. In light of this, the aim of my study is to examine and to quantify the appropriateness of PPI use at Columbia Presbyterian Medical Center. More specifically, I will look at how often patients are discharged from the hospital on a PPI without a clear indication. This is important because it may shed light on why people are maintained on PPIs as outpatients without a clear indication. This study will help to frame the problem of PPI overuse and may bring greater awareness to this problem, eventuating in more selective and judicial prescribing practices as well as reduced demand on health care dollars for this institution.

Inappropriate use of PPIs has been a topic of concern for many years. A study in 2000 by Nardino and colleagues showed that 65% of medical inpatient that were

prescribed PPIs did not have an approved indication for use. Even more concerning was that 55% of these patients were continued on PPIs as outpatients.[iii] Similarly, a study by Naunton and colleagues found that 63% of medical inpatients were receiving PPI for unapproved indications.[iv] Walker et al found that only 30% of patients admitted to a hospital on a PPI had an absolute indication for prescribing. The same study looked at PPI-naïve inpatients and found that, of those placed on a PPI while hospitalized, 39% had an absolute indication for doing so, while 10% had a possible indication and 51% had no clearly defined indication.[v]

B. Study Design and Statistical Analysis

This study will be a retrospective cohort study. The study will have a power of 80% testing at P value of 0.05. It will be a single cohort of patients. It will include any patient 18 years of age and older admitted to Columbia Presbyterian Medical Center on the internal medicine service. The duration of stay in the hospital will not be relevant to this particular study. The patients must not have been on an existing PPI medication prior to admission and must have a documented prescription for a PPI on discharge from the hospital.

The total number of study participants needed for approximately 80% power is 35 using a chi-square test and then halving the calculated number to obtain the number of study participants needed (because there is only one group and not two).[vi] The proportions used for the chi-square test were 20% and 5%. The 20% represented the proportion of patients believed to have received a PPI prescription without a clear indication. The 5% represented the proportion of patients that was believed to be statistically significant to our hospital administration, or rather, the minimum percentage believed to have a recognized impact. There is no randomization needed for this study. There is no cross over that will occur in this study.

C. Study Procedure

This study will require a retrospective chart examination. Patient charts will be reviewed by random sampling to select for patients that meet criteria for inclusion

(see below). The duration of the entire study will be two weeks. There are no required laboratory measurements or procedures needed for this study. Patient charts that meet inclusion criteria will be further reviewed to ascertain whether or not there is a clear indication for PPI therapy. A clear indication is defined as per the American College of Physicians as follows: gastro-esophageal reflux disease (GERD), ENT symptoms documented as due to GERD, peptic ulcer disease, H.*pylori* infection eradication, NSAID-induced gastric ulcer disease, erosive esophagitis / Barrett's esophagus, hypersecretory states such as Zollinger-Ellison syndrome, short-term therapy following stress-induced gastritis, and dual-antiplatelet therapy.[vii] A person blinded to the outcome of this study will undertake this review, essentially checking to see if a patient has a documented indication for PPI therapy in their respective discharge paperwork. The study will determine what percentage of patients was prescribed a PPI on discharge that did not have a clear indication based on discharge documents.

D. Study Drugs

The following drugs meet criteria for being classified as a proton pump inhibitor (PPI): omeprazole, lansoprazole, dexlansoprazole, esomeprazole, pantoprazole, rabeprazole and ilaprazole. PPIs reduce gastric acid secretion via the selective and irreversible inhibition of proton-activated and potassium-activated adenosine triphosphatase, an enzyme within the gastric parietal cells.[viii] All of these drugs have been approved by the FDA for use in the aforementioned indications of PPI therapy.[ix] The dosages of these drugs will not be assessed during this study. The known side effects of PPIs include but are not limited to: headache, edema, rash, abdominal pain, vomiting, constipation and allergic reaction.[x]

E. Medical Devices

N/A

F. Study Questionnaires

N/A

G. Study Subjects

-The inclusion criteria are as follows:

1) Age 18 years or older
2) No PPI use prior to admission
3) Admitted to an internal medicine team at the Columbia Presbyterian Medical Center
4) Prescription for PPI on discharge from hospital

-Exclusion criteria include:

1) On existing PPI medication prior to admission
2) Admitted to a service other than internal medicine

H. Recruitment of Subjects

Subjects will be identified from examining admission and discharge paperwork for patients admitted and discharged to the internal medicine service over a two-week period.

I. Confidentiality of Study Data

All study data regarding the patients will be coded and a unique code number will be given to each participant in the study. More specifically, personal identifying information, including hospital unit numbers, social security numbers, subject names/initials, phone numbers, and addresses will be removed. The information used in the study will be stored in a secure database, accessible only to the investigators.

J. Potential Conflict of Interest

There is no potential conflict of interest to disclose

K. Location of the study

This study will take place at the Columbia University Medical Center

L. Potential Risks

There are no potential risks associated with this particular study

M. Potential Benefits

Potential benefits include determining whether or not there are a significant proportion of patients that are inappropriately prescribed PPIs upon discharge from the hospital so that clinicians can be made aware if there is indeed overuse of this drug. This will encourage more selective prescribing and prevent potential side effects of PPIs.

N. Alternative Therapies

N/A

O. Compensation to Subjects

There will be no compensation to subjects in this study

P. Costs to Subjects

There will be no costs to subjects in this study

Q. Minors as research Subjects

Minors will be excluded from the study

R. Radiation or Radioactive Substances

N/A

References

[i] Co Q. D, Pham et a. Prevalent Prescribing of Proton Pump Inhibitors: Prudent or pernicious. P&T journal. Vol. 31 No. 3. March 2006.

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[iii] Nardino R J, Vender R J, Herbert PN. Overuse of acid-suppressive therapy in hospitalized patients. Am J Gastroentero12000;95 :3118-3122.

[iv] Naunton M, Peterson GM, Bleasei MD. Overuse of proton pump inhibitors. J Clin Pharm Ther2000;25:333-340.

[v] Walker NM et al. An Evaluation of the use of proton pump inhibitors. Pharm World Sci. 2001. June: 23(3): 116-7

[vi] http://www.biomath.info/crc/

[vii] American College of physicians. Effective Clinical Practice, November/December 2001

[viii] Sachs G, Shin JM, Howden CW. Review Article: The clinical Pharmacology of Proton Pump Inhibitors. Aliment Pharmacology Therapy. 2006 June; 23 Suppl 2:2-8

[ix] Wolfe, Michael et al. Overview and Comparison of the Proton Pump Inhibitors for the Treatment of Acid-Related Disorders. Uptodate, August 2012.

[x] Sachs G, Shin JM, Howden CW. Review Article: The clinical Pharmacology of Proton Pump Inhibitors. Aliment Pharmacology Therapy. 2006 June; 23 Suppl 2:2-8