Evaluation of a Pharmacist-Driven Protocol to Reduce Inappropriate Use of Acid-Suppressive Medications In the Non-ICU Setting

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ABSTRACT

Purpose: Proton pump inhibitors (PPIs) and histamine-2 receptor antagonists (H2 blockers) continue to be over utilized for stress ulcer prophylaxis (SUP). Our study aims to evaluate the effectiveness and feasibility of a pharmacist-driven termination protocol in a community teaching hospital to limit the inappropriate use of acid-suppressive medications in the non-intensive care unit (ICU) setting.

Methods: Patient charts were evaluated for the appropriate use of PPIs or H2 blockers. A centralized pharmacist contacted healthcare providers for medication discontinuation if the acid suppressant use was deemed inappropriate. The primary outcome of the study was the number of patients who had acid-suppressive medication discontinued after the implementation of the pharmacist-driven termination protocol.

Results: Acid-suppressive medication was inappropriately prescribed for nine patients. It was discontinued for eight of those patients based on the pharmacist-driven termination protocol; this was a statistically significant decrease (P < 0.001). The pharmacist spent, on average, less than one minute on each patient’s chart.

Conclusion: Our study revealed that a pharmacist-driven termination protocol resulted in a 6% overall reduction rate in inappropriately used acid-suppressive medications, with little impact on pharmacist workflow. Implementing such a termination protocol could help to decrease the inappropriate use of acid-suppressive medications in an inpatient hospital service.

Keywords: pharmacist, quality improvement, proton pump inhibitors, antagonists, histamine-2

BACKGROUND

Despite the availability of guidelines for stress ulcer prophylaxis (SUP), proton pump inhibitors (PPIs) and histamine-2 receptor antagonists (H2 blockers) are still being over prescribed.1,2 One study revealed a 42% increase in the number of patients who were prescribed an acid-suppressive medication after hospitalization; only 10% of patients had an acceptable indication.1 Similarly, another study found that 56% of patients who were receiving SUP did not have any appropriate indication(s).2 The American Society of Health-System Pharmacists (ASHP) guidelines from 1999 provide indications for SUP in the inpatient setting.3

Problems associated with the use of acid-suppressive medications are well known and include an increased risk of Clostridium difficile infection and pneumonia, electrolyte and vitamin abnormalities, and drug interactions.4 Overutilization of acid-suppressive medications increases the likelihood of these adverse events occurring and places additional costs on the healthcare system.5,6 For patients with C. difficile infection, treatment costs have been shown to be 40% higher than in patients without the infection.6

Several studies have reported the positive impact that pharmacists have brought about by reducing the inappropriate use of SUP in acute-care settings.7-10 Buckley and colleagues reported a 58.3% decrease in inappropriate SUP use among ICU patients and an 83.5% reduction among general ward patients after the implementation of a pharmacist-based protocol.7 Khalil and colleagues reported a 36.5% decrease in the use of inappropriate acid-suppressive medications on an infectious disease ward.8 These studies relied on a rounding clinical pharmacist to implement the protocols to reduce the use of these medications. Other pharmacist-driven protocols have been shown to improve the monitoring of medications, decrease adverse effects, decrease the inappropriate use of medications, and improve dosing regimens in the acute-care setting.9,10 Our study aims to evaluate the effectiveness and feasibility of a pharmacist-driven termination protocol in a community teaching hospital for limiting the inappropriate use of acid-suppressive medications in the non-ICU setting.

METHODS

Study Design and Setting

The implementation of a pharmacist-driven termination protocol was designed to limit the inappropriate use of acid-suppressive medications. Criteria for appropriate use were developed based on approved indications and SUP guidelines, which included gastroesophageal reflux disease (GERD), erosive gastritis or esophagitis, upper gastrointestinal (GI) bleed, peptic ulcer disease (PUD), duodenal ulcer, Zollinger-Ellison syndrome, Barrett’s esophagitis, H. pylori infection,

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and pancreatitis. The criteria were approved by the pharmacy and therapeutics (P&T) committee at the study institution. Based on these criteria, a previous study determined that 26 of 132 patients were inappropriately receiving acid-suppressive medications.14

Two centralized pharmacists used a web-based clinical surveillance system to identify patients on the hospitalist service who were receiving either a PPI or an H2 blocker. If an acid-suppressive medication was considered to be inappropriate based on the above criteria, a pharmacist would contact the healthcare provider to discontinue it. The data collected included the number of patients screened; the type of acid-suppressive medication that patients received, and their indication (if it existed); the number of inappropriate medications discontinued during inpatient admission; the number of inappropriate medications prescribed at discharge; and the time needed for intervention by a pharmacist. Upon review, the designated institutional review boards determined that this project qualified as a quality improvement initiative.

Patient Selection
Patients were included in the study if they were 18 years of age or older, were admitted to the hospitalist service, and were prescribed a PPI or an H2 blocker. Patients were excluded if the PPI or H2 blocker was a home medication or if they were admitted to the ICU.

Outcomes
The primary outcome of this study was to determine the impact of a pharmacist-driven termination protocol on inappropriate acid-suppressive medication use in hospitalized patients. A secondary outcome evaluated the number of inappropriate medication(s) that were continued at discharge. The time required to perform the intervention was also recorded.

Statistical Analysis
A total sample size of 119 participants was needed to detect a 10% decrease in inappropriate prescriptions with a power of 80% and an alpha level of 0.05. The sample size in our study was increased to 132 patients to account for a potential data loss of 10% from documentation error or ambiguous documentation. We evaluated outcomes by the Fisher’s exact test, utilizing SAS v9.4 to perform statistical analysis. Descriptive statistics were used to determine the frequency of the acid-suppressive medication prescribed and the time the pharmacist spent making the intervention.

RESULTS
We evaluated a total of 132 patients who were admitted to the hospital over a one-month period. Of these, 113 patients were excluded because their acid-suppressive medication was a home medication. The patients’ average age was 66.8 years. Ten patients met the criteria for appropriate indications: four were treated for GERD, three for GI bleed, and one each for PUD, pancreatitis, and gastritis. Inappropriate acid-suppressive medications were prescribed for nine patients, with five being prescribed a PPI. The pharmacist-driven termination protocol discontinued the acid-suppressive medication for eight patients. Only one patient was prescribed a PPI at discharge. Pharmacists spent less than one minute, on average, to review a patient’s chart to determine if the patient should be excluded because of home medication use. An average of 2.9 minutes (range, 1–6 minutes) was spent on evaluating each chart (n = 19) for appropriate use of the acid-suppressive medication.

There was a statistically significant 88.9% (P < 0.001) decrease in the inappropriate use of acid-suppressive medications in the inpatient setting. However, there was no statistical difference for patients who were discharged on acid-suppressive medications (P = 0.18).

DISCUSSION
This study demonstrated that a pharmacist-driven termination protocol aimed at limiting the inappropriate use of acid-suppressive medications was effective in a non-ICU setting. Our study differed from many of the other published protocols utilizing a centralized pharmacist. We observed a 6% overall reduction in the use of unnecessary acid-suppressive medications, which is similar to the 5.8% reduction reported by Mitchell.15 But our study differed from Mitchell’s in that we included pancreatitis as an appropriate indication for acid-suppressive medication use, and we contacted the prescriber directly for discontinuation. In contrast, acid-suppressive medications without indications were automatically discontinued in Mitchell’s study.15

The average amount of direct time that pharmacists needed to implement the protocol was about three minutes, making it a feasible workflow process. This time period is lower than others reported in the available literature, most likely because of the use of a web-based surveillance system to identify target medications.16 As the surveillance system was already in place and had been used before our project was initiated, operational and administrative times were not assessed. We anticipate that the time period would be shorter if physicians were notified electronically instead of via telephone calls. This would be an important outcome in community teaching hospitals, where resources are limited and the available clinical pharmacist may not be able to attend patient care rounds on a consistent basis. The web-based system allows pharmacists to focus on target medications.

Although the results of our study are encouraging, there are limitations to their generalizability. First, we relied on the accurate documentation of indications for acid-suppressive medication(s) in the patient’s chart, but documentation was lacking and may have over-inflated the number of uses of “inappropriate” medication. Second, a large number of patients were excluded from the study because they were taking a PPI or an H2 blocker at home prior to admission. However, those medications could also have been inappropriately prescribed, which could have affected the number of patients who were inappropriately taking acid-suppressive medications at the study baseline. Walking and colleagues, for example, were able to overcome this limitation because their study was based in a Veterans Administration system, where outpatient records were readily accessible.17 In that study, 220 of 537 (41%) patients were on acid-suppressive medications inappropriately. Of those patients, 211 (95.9%) were able to discontinue the inappropriate medications as inpatients. Another limitation of our study is the definition we used for “appropriate” SUP. Although the
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AHSP reference provides guidance on when the use of acid-suppressive medication is appropriate, the guideline is awaiting an update and does not take into consideration other situations where a PPI may also be considered appropriate, in certain clinical contexts. Finally, our study was not powered to determine whether the pharmacist-driven protocol would decrease the number of outpatient prescriptions, which might be why our results were not statistically significant. Unfortunately, our study also had insufficient power regarding the primary endpoint of a 10% decrease in the use of inappropriate acid-suppressive medications. Nevertheless, we were still able to demonstrate a statistical difference.

CONCLUSION

The use of inappropriate medications can cause harm to patients and increase healthcare costs; therefore, the early identification of potential errors is essential. Attempts to curb the over-utilization of acid-suppressive medications in the hospital setting have been evaluated, and a few have proved successful. Our study demonstrated that a pharmacist-driven termination protocol is effective at reducing the inappropriate use of acid-suppressive medications in the non-intensive care setting, with little impact on pharmacist workflow. This could reduce the risk of adverse events, in addition to the associated burden on both patients’ lives and the healthcare system.

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REFERENCES


