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The Appropriateness of Acid Suppressive Medications' Use in a Tertiary Hospital in Kedah



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ABSTRACT

In Malaysia, acid suppressive medications (ASM) are one of the most commonly prescribed groups of medication and are at great expense. Our objectives are (1) To verify the indications of ASM use according to the Food and Drug Administration approved indication and published data on admission and upon discharge, (2) To determine the prevalence of unjustified use of ASM on admission and upon discharge, (3) To determine the preferable choice of ASM by doctors according to indication. A retrospective observational study on 329 consecutive patients was conducted in surgical female inpatient, Hospital Sultan Abdul Halim from 1st of July 2011 till 31st of December 2011. Data was analyzed using Microsoft Excel 2007. The mean (SD) age was 53.44(18.11) years. Majority of patients were Malay, 215(65.3%). 87(26.4%) were on ASM prior to admission and 131(39.8%) were discharged with ASM. The commonest indication for ASM use was stress ulcer prophylaxis (SUP) and peptic ulcer disease (PUD). 94(28.6%) and 33(25.2%) were prescribed with ASM on admission and upon discharge respectively with no clinical indications. Intravenous pantoprazole was the preferred ASM for SUP and PUD in inpatient setting. Tablet esomeprazole was highly used upon discharge for PUD. ASM are commonly and irrationally prescribed with doctors less likely to question the original indication and duration of therapy. Proper guideline on specific indications and duration of therapy with patient education would be beneficial to minimize cost and over prescription of ASM therapy.

INTRODUCTION

Acid suppressive medications (ASM) are a major economic burden for the healthcare system in many countries [1, 2, 3]. Concerns have been raised about the increasing costs associated with prescription of these drugs as they are often prescribed for minor symptoms and without clear indications [1, 2, 3]. Studies from the America, Australia and Europe have demonstrated overuse of Proton Pump Inhibitors (PPI) in hospitalized patients and in primary care [1, 2, 3]. Very limited data exist on the percentage of PPI users on long-term therapy who could discontinue PPI without developing symptoms [4, 5]. Usage of stress ulcer prophylaxis (SUP) is well established within the intensive care setting [6]. In recent years, the use of SUP outside the Intensive Care Unit (ICU) has expanded greatly as clinicians have applied ICU guidelines to patients on the general medical ward [7, 8, 9]. SUP is not recommended for adult medical or surgical patients, unless they present with two or more risk factors for clinically important bleeding such as coagulopathy, shock, sepsis, multiorgan failure and severe burns [6].

In our setting, the use of ASM during hospitalization and upon discharge in some patients is not justified (e.g. gastrointestinal prophylaxis given in low risk patients) and there are cases of inappropriate selection of ASM. The reasons mentioned above relates to the rationale of our study which is to evaluate the appropriateness of ASM use and to determine the prevalence of unjustified use of ASM among surgical female inpatients upon admission and upon discharge so that interventions can be undertaken to overcome this issue. Prescribing behavior of doctors is strongly linked to their knowledge, practice, belief and attitude.

The objectives of our study are to (1) To verify the indications of ASM use upon admission and upon discharge according to the Food and Drug Administration (FDA) approved indication and published data, (2) To determine the prevalence of unjustified use of ASM upon admission and upon discharge, (3) To determine the preferable choice of ASM by surgical doctors according to indication.

MATERIALS AND METHODS

A retrospective observational study on 329 consecutive patients who were prescribed with ASM (Table 1) was conducted in surgical female inpatient, Hospital Sultan Abdul Halim from 1st of

July 2011 till 31st of December 2011. The justified indications for ASM use are summarized in Table 2. Justifications for the usage of ASM were based on FDA approved prescribing information and strong literature evidence for the use of ASM in certain patients [1, 9, 10, 11, 12]. The remaining indications were considered unjustified. Patients who were 18 years and above were included in this study. Pregnant ladies and those with incomplete data were excluded. Records of patients were obtained from Electronic Hospital Information System (eHIS). Data was analyzed using Microsoft Excel 2007. The protocol of this study was registered with the National Medical Research Register and approved by the Medical Research Ethics Committee, Malaysia.

Table 1 Types of ASM available in our institution.

Types of ASM	Dosage Form
H2 Receptor Antagonist	
Ranitidine	Intravenous (IV) and Oral
Proton Pump Inhibitor	
Pantoprazole	IV and Oral
Esomeprazole	IV and Oral
Omeprazole	Oral
Lansoprazole	Oral

Table 2 Justified criteria for prescribing ASM in this study.

Appropriate and approved indications for ASM, FDA based
Gastroesophageal reflux disease (GERD)
Non-erosive reflux esophagitis
Erosive esophagitis
<i>Helicobacter pylori</i> eradication
Prophylaxis of acid aspiration
Pathological hypersecretory conditions (namely, Zollinger Ellison syndrome)
Treatment and prophylaxis of non-steroidal anti-inflammatory drugs (NSAID) induced gastropathy
Non-variceal upper gastrointestinal bleeding (UGIB)
Peptic ulcer disease (PUD)
Appropriate and approved indications for ASM, literature based
SUP
Liver cirrhosis
Organ transplantation
Corticosteroids
Non-ulcer dyspepsia

RESULT

The mean (SD) age was 53.44(18.11) years. Majority of patients were Malay, 215(65.3%) (Table 3). 87(26.4%) were on ASM prior to admission and 131(39.8%) were discharged with ASM. Majority of the patients in our study, 70.8% hospitalized and 87.8% discharged patients were prescribed with PPI in preference to H2 antagonist (Table 4). 94(28.6%) and 33(25.2%) were prescribed with ASM on admission and upon discharge respectively with no clinical indications (Table 5). The commonest indication for ASM use was SUP and PUD (Table 6 and 7). IV pantoprazole was the preferred ASM for SUP and PUD in inpatient setting (Table 6). Tablet esomeprazole was highly used upon discharge for PUD (Table 7).

Table 3 Socio-demographic of Study Population (n=329).

Variables	n (%)
Age(years)	
18 – 30	44(13.4)
31 – 40	33(10.0)
41 – 50	63(19.1)
51 – 60	65(19.8)
61 – 70	53(16.1)
71 – 80	51(15.5)
81 – 100	20(6.1)
Ethnicity	
Malay	215(65.3)
Chinese	43(13.1)
Indian	71(21.6)

Table 4 Types of ASM Used on Admission and Upon Discharge.

Types of ASM	Admission (n=329)	Discharge (n=131)
	n (%)	n (%)
IV Ranitidine	46(14.0)	0(0.0)
Tablet Ranitidine	50(15.2)	16(12.2)
IV Pantoprazole	106(32.2)	0(0.0)
Tablet Pantoprazole	25(7.6)	54(41.2)
IV Esomeprazole	73(22.2)	0(0.0)
Tablet Esomeprazole	20(6.1)	54(41.2)
Tablet Omeprazole	7(2.1)	5(3.8)
Tablet Lansoprazole	2(0.6)	2(1.6)

Table 5 Percentage of Justified and Unjustified Use of ASM on Admission and Upon Discharge

Indication	Admission (n=329)	Discharge (n=131)
	n (%)	n (%)
Justified	235(71.4)	98(74.8)
Unjustified	94(28.6)	33(25.2)

Table 6 Types of ASM Used According to Justified Indication on Admission (n=235).

Indication/Types of ASM	IV	Tablet	IV	Tablet	IV	Tablet	Tablet	Tablet
	Ranitidine n = 28	Ranitidine n = 18	Pantoprazole n = 79	Pantoprazole n = 22	Esomeprazole n = 66	Esomeprazole n = 15	Omeprazole n = 5	Lansoprazole n = 2
SUP	18	10	54	9	16	8	1	0
PUD	10	7	17	10	15	5	4	1
Non-variceal UGIB	0	0	4	3	22	1	0	0
Variceal UGIB	0	0	3	0	2	0	0	0
GERD	0	0	0	0	1	0	0	1
Lower gastrointestinal bleeding (LGIB)	0	0	1	0	5	0	0	0
Treatment/prophylaxis of NSAID/steroid/antiplatelet associated ulcers	0	1	0	0	2	0	0	0
Erosive esophagitis/Esophageal ulcer	0	0	0	0	3	1	0	0

Table 7 Types of ASM Used According to Justified Indication upon Discharge (n=98).

Indication/Types of ASM	Tablet	Tablet	Tablet	Tablet	Tablet
	Ranitidine n = 11	Pantoprazole n = 36	Esomeprazole n = 44	Omeprazole n = 5	Lansoprazole n = 2
SUP	2	12	4	0	0
PUD	7	15	23	3	1
Non-variceal UGIB	0	1	8	0	0
Variceal UGIB	0	5	3	0	0
GERD	0	0	2	0	1
LGIB	0	0	0	0	0
Hiatus Hernia	1	1	1	0	0
Treatment/prophylaxis of NSAID/steroid/antiplatelet associated ulcers	1	1	0	1	0
Erosive esophagitis/Esophageal ulcer	0	1	3	0	0
Dyspepsia	0	0	0	1	0

DISCUSSION

Majority of our hospitalized and discharged patients were prescribed with PPI in preference to H2 antagonist. The contributing factor to this might be due to the increased marketing and advertising on the superior efficacy of PPI over H2 antagonist. Additionally, there are greater choices of new available products of PPI in comparison to H2 antagonist [13]. Pantoprazole and esomeprazole are by far the two most preferred PPI used in our setting, probably due to the reason that they are conceived as the newer and thus better generation of PPI with lower side effects.

In our study, one-fourth of patients were prescribed with ASM on admission and upon discharge respectively with no clinical indications. Parente *et al.* in 2003 concluded that 68.0% of patients have been prescribed with ASM inappropriately during hospitalization as determined by consensus review; 56.4% of patients receiving unnecessary prophylactic treatment whilst in hospital were discharged on therapy, and 46.0% were still receiving the treatment 3 months later [14]. Nardino *et al.* in 2000 concluded that 65.0% of patients had been prescribed with ASM inappropriately during hospitalization and 55.0% were still receiving the treatment upon discharge [9]. This widespread overuse of ASM could be attributed to the common insight of many doctors that ASM has a relatively good safety profile with only very few significant adverse effects and drug interactions. This general perception may not be entirely true when studies have shown that patients prescribed with ASM, especially PPI, have 3.6 times increased risk of developing *Clostridium difficile* colitis during hospitalization than the control group, theoretically due to pH alteration in the gut caused by gastric acid inhibition [15]. In addition, Herzig *et al.* in 2009 had proven an association between acid suppression, particularly PPI use with 30% elevated odds risk of hospital acquired pneumonia [16]. A systematic review and meta-analysis by Eom *et al.*, 2011 concluded that there is a positive relationship between the use of ASM and the risk of both community and hospital acquired pneumonia [17]. Besides that, cases of acute interstitial nephritis and osteoporosis have been reported with the long term use of PPI [3]. H2 antagonists likewise can cause rare but serious adverse effects such as agranulocytosis, leucopenia, thrombocytopenia, seizures and atrioventricular block [18]. Given all the possible risks and adverse effects mentioned above, the unjustified use of ASM in our

setting should not be overlooked. Also, the overprescribing of ASM is due to the lack of awareness on the right established indications of acid suppression among practitioners.

The most common indication for initiating ASM during hospitalization and upon discharge was SUP and PUD. Although the use of ASM for SUP has been well established in the ICU setting, it is rarely needed in general surgical patients unless they present with two or more risk factors for bleeding such as coagulopathy, shock, sepsis, multiorgan failure and severe burns [18]. Therefore, general surgical practitioner's competence on recognizing those patients who would ultimately benefit from ASM by taking into consideration the presence of risk factors for stress ulcer development as well as the potential risks versus benefits, is extremely crucial in ensuring the appropriate indication of ASM for SUP in non-ICU setting. Patients started on ASM during hospitalization were usually continued with the same medication upon discharge as many prescribers tend to reflectively transcribe the ward medication to discharged medication without further evaluating the necessity of ASM and duration of therapy. This occurs particularly to medications such as ASM as they are always deemed to be benign and harmless [18, 19]. The difficulty of discontinuation of ASM in these patients upon discharge may be further complicated by the concern of acid rebound hypersecretion following termination of ASM [4]. Hence, intervention by pharmacists and proper evidence based prescribing guidelines for doctors may possibly help in curbing the overuse of ASM and reducing this unnecessary economic burden to the institution.

The pitfall of this study is that it is only carried out in a single institution and therefore it only reflects the prescribing pattern of doctors in our setting. This study could be expanded to involve more tertiary hospitals in Malaysia.

CONCLUSION

ASM use was unjustified in one-fourth of patients on admission and upon discharge. ASM are commonly and irrationally prescribed with doctors less likely to question the original indication and duration of therapy. Proper guideline on specific indications and duration of therapy with patient education would be beneficial to minimize cost and over prescription of ASM therapy.

CONFLICT OF INTEREST

The Authors declare that they have no conflicts of interest to disclose.

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