Prescribing pattern of acid suppressive medications for medical inpatients in a teaching hospital in Qatar

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ABSTRACT

الأهداف: تقييم نمط صرف أدوية مثبطات إفراز الحمض المعدي (ASMs) للمرضى المنومين في المستشفى التعليمي بقطر، ومقارنتها بالإستخدامات المصدق عليها من إدارة الأغذية والدواء الأمريكية، بالإضافة إلى الإستخدامات المنشورة في الأوراق الطبية.

الطريقة: تمت مراجعة ملفات المرضى الطبية للبحث عن أي صرف لأدوية مثبطات إفراز الحمض المعدي (ASMs)، مثل مضادات مستقبلات الهيستامين–2 (H_2RAs) ومثبطات مضخات البروتون (PPIs). شملت الدراسة جميع المرضى المنومين في القسم الباطني – مستشفى حمد العام – الدوحة – قطر، خلال الفترة ما بين مايو 2007م وحتى يونيو 2007م. تمت مراجعة معلومات المرضى، نوع الدواء، وقت الصرف (قبل أو خلال الدخول)، عوامل الخطر لحدوث القرحة المعدية، ودواعي الإستعمال. تم متابعة تقييم ملفات المرضى المتعاطين لهذه الأدوية بدون دواعي إستعمال معترف بها حتى بعد شهرين من تاريخ الترخيص.

النتائج: كان عدد المرضى المدخلين للقسم الباطني 389 مريضاً، 206 (53%) منهم تلقوا مثبطات إفراز الحمض المعدي (ASMs) خلال إقامتهم في المستشفى، 48 (12%) مريضاً كانوا يتلقون هذه الأدوية قبل دخولهم المستشفى. عدد المرضى الذين تلقوا ومثبطات مضخات البروتون
PPIs –184– (89%)
و 22 مريضاً (11%) تلقوا مضادات مستقبلات الهيستامين–2 (H_2RAs). ما مجموعه 129 (63%) من المرضى تم ترخيصهم من المستشفى بهذه الأدوية، حيث كان 59 (46%) منهم بدواعي معترف بها. ولقد تم ترخيص 70 مريض بهذه الأدوية بدون الحاجة إلى إستخدامها، منهم 30 مريضاً (43%) تم تكرار صرف هذا النوع من الأدوية لهم بعد شهرين من تاريخ الترخيص.

خاتمة: تصرف أدوية مثبطات إفراز الحمض المعدي لعدد كبير من هذه الفئة من المرضى من غير دواعي إستعمال معترف بها. بالإضافة إلى ذلك، يستمر صرف هذه الأدوية لكثير من هؤلاء المرضى بعد شهرين على الأقل من تاريخ الترخيص.

Objective: To assess the prescribing pattern of acid suppressive medications (ASMs) in medical inpatients in a teaching hospital in Qatar, and compare this with the American Food and Drug Administration approved indications, and published data.

Methods: This study is based on a review of the patient's medical records for the usage of ASMs, namely, histamine-2 receptor antagonists (H_2RAs), and proton pump inhibitors (PPIs) in patients admitted consecutively to the medical wards of Hamad General Hospital, Doha, Qatar from May through June 2007. The review included the type of ASM used, timing of prescription (before, or during admission), risk factors for ulcer development, and indication for use. Records for patients using ASMs after discharge without justified indication were assessed 2 months later.

Results: A total of 389 patients were admitted, 206 (53%) received ASMs during their hospital stay, 48 (12%) of them were taking ASMs before admission. One hundred and eighty-four patients (89%) received PPI, and 22 (11%) received H_2RA. During admission, the usage of ASMs was justified in 70 (34%) patients. One hundred and twenty-nine (63%) received ASMs after discharge, the usage of which was justified in only 59 (46%) patients. From the 70 patients receiving ASMs after discharge for unjustified indications, 30 (43%) patients were re-prescribed with ASMs, 2 months or more after discharge.

Conclusion: Acid suppressive medications are prescribed in the majority of these patients without justified indication. Moreover, many of them continued their ASMs for at least 2 months after discharge.

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Usage of stress ulcer prophylaxis (SUP) is well established within the intensive care setting.[1] Stress ulcer prophylaxis is not recommended for adult medical or surgical patients, unless they present 2 or more risk factors for clinically important bleeding. Prescribing acid suppressive medications (ASMs) such as histamine-2 receptor antagonists (H_2RAs), and proton-pump inhibitors (PPIs) in medical inpatients seems to be a routine habit, and ranges from 27-71%.[2] The indications for prevention of stress related mucosal damage (SRMD) in non-intensive care setting are limited. Moreover, a significant number of patients are discharged on ASMs, increasing cost, and potentially increasing the risk for unwanted effects such as pneumonia, or *Clostridium difficile*-associated diseases.[2-4] While most data are from Western countries, there are no data from Doha, State of Qatar, or from other Middle Eastern countries. This study was undertaken to evaluate the prescribing pattern of ASMs in general medical inpatients admitted to the general medical wards in Hamad General Hospital, Hamad Medical Corporation, Doha, Qatar, and to verify the indications (upon admission, during the hospital stay, and upon discharge), and compare these with the recommended ones, and compare our findings with the data from other parts of the world.

Methods. Hamad Medical Corporation at Doha, State of Qatar, is a community teaching hospital with a total capacity of 1,600 beds. Medical patients were admitted to Hamad General Hospital, a 600-bed hospital. The patient population includes locals, as well as expatriates mainly from other Arab countries, and Asia. Healthcare (including medication) is free for locals, and highly subsidized for residents. During a 2-month period (May through June 2007), records of all patients admitted to the medical wards were evaluated. Patient's medical records were reviewed for the usage of ASMs, namely, H_2RAs, and PPIs. All medical patients admitted to the general medicine wards during the 2 month study period were included in the study. Their medical records were assessed for possible usage of ASMs upon admission, and during their hospital stay until discharge. Patients receiving ASM upon discharge were re-assessed 2 months later for possible continuation of ASM use. The following data were recorded: gender, age, current diagnosis, length of stay, admission through ICU, type of ASM used together with route and total daily dose, ASM usage before admission, possible risk factors, and indication for use. Drug prescriptions were used to identify continuous usage of ASMs after discharge from the hospital (retrieved through the patient file, and the computerized pharmacy management system). Medical records for patients using ASMs after discharge without justified indication were re-assessed 2 months later. These were verified for, whether or not ASMs were re-prescribed during a follow-up visit in the outpatient clinic. Justification for the usage of ASMs was based on the American Society of Health-system Pharmacists (ASHP) Therapeutic guidelines on stress ulcer prophylaxis, Food and Drug Administration (FDA) approved prescribing information, and strong literature evidence for the use of ASM in certain patients.[5-7] The justified ASMs that was used in the study is summarized in **Table 1**. The remaining indications were considered as unjustified. Acid suppressive medications available in our institution at the time of the study were: ranitidine as H_2RA, and lansoprazole, omeprazole, and rabeprazole as PPIs. Waiver of informed consent was obtained and the Institution's Medical Research Committee approved the study.

Statistics. Descriptive statistical analysis was carried out using the Statistical Package for Social Sciences (SPSS version 15.0). Where appropriate, values are expressed as percentage, mean ± SD, or range.

Results. During the study period, 389 patients were admitted to the medical wards. Two hundred and six patients (53%) were taking ASMs during their hospital stay (48 patients [12%] were taking ASMs before admission, and 158 patients [40%] were started on ASMs during hospitalization). One hundred and eighty-four patients (89%) received PPI, and 22 patients (11%) received H_2RA. In 70 patients (34%),

Table 1 - Justified criteria for prescribing acid suppressive medicationss in this study.

Appropriate and approved indications for acid suppressive medications, Food and Drug Administration-based
1. Treatment of duodenal and benign gastric ulcers
2. Symptomatic gastro-esophageal reflux disease
3. Erosive esophagitis
4. *Helicobacter pylori* eradication (used in combination with antibiotics).
5. Prophylaxis of acid aspiration
6. Pathological hypersecretory conditions (namely, Zollinger-Ellison syndrome)
7. Treatment and prophylaxis of non-steroidal anti-inflammatory drug-associated benign gastric ulcers, duodenal ulcers, and gastroduodenal erosions in patients with a previous history of gastroduodenal lesions, whom require continued non-steroidal anti-inflammatory drug- treatment (proton pump inhibitors only)
Appropriate and approved indications for acid suppressive medications, literature-based:
1. Stress ulcer prophylaxis[1]
2. Liver cirrhosis[6]
3. Organ transplantation[5]
4. Corticosteroids (when combined with non-steroidal anti-inflammatory drug)[7]

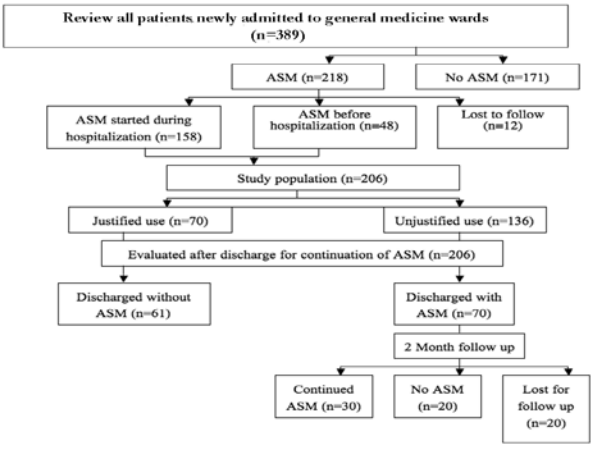

Figure 1 - Summary of patients at different stages of their medical record review. ASM - acid suppressive medications

the use of ASM was justified. On discharge, 129 patients (63%) were prescribed ASM; 59 patients (46%) were continuing ASMs for a justified indication, while 70 patients (54%) were prescribed ASM for a non-justified indication, as shown in the study flow chart (**Figure 1**). The characteristics of our study population, and a summary of the overall usage of ASMs are provided in **Table 2**. Details on justified usage of ASMs are given in **Table 3**. The details on the non-justified usage of ASMs are provided in **Table 4**.

Discussion. The overuse of ASMs in general medicine practice is a worldwide problem.[2-4] The study method and design slightly differs from the overall trend, however, confirming the overuse of ASMs is pretty similar. While in our patient population, antacids, and sucralfate were not used, misuse of both PPIs and H_2RAs was noticed. The usage of ASMs in our study population rose from 12% before admission, to 53% during hospitalization, with unjustified usage in 64% of the patients. Upon discharge, 54% were still prescribed ASMs for non-justified indications. Our findings seem to correlate with those from the other parts of the world. Several studies performed in other parts of the world report similar usage rates. Pham et al[2] reviewed retrospectively, 213 randomly selected medical charts from a 3-month list of medical inpatients. Prior to admission, 29% were taking ASMs, while during admission, the usage of ASMs increased to 71%. Zink et al[8] performed a retrospective chart review of 814 consecutive patients admitted to a general medicine in-patient teaching service in a large community hospital over a period of 6 months. A total of 324 patients received ASMs with 60% of the

Table 2 - Characteristics of study population admitted at the medical units and receiving ASMs (n=206).

Characteristics	No. (%)
Gender	
Male	166 (81)
Female	40 (19)
Age	
Mean ± SD	51 ± 16.5
Range	14-90
Ethnicity	
African	7 (3.4)
Middle Easterners	124 (60.2)
South Asian	62 (30.1)
Southeast Asian	12 (5.8)
Caucasian	1 (0.5)
Length of stay (days)	
Mean ± SD	9.1 ± 7.4
Range	1-30
Total patient (1873 days)	
1-3 days	31 (15.0)
4-6 days	75 (36.4)
7-9 days	37 (18.0)
10-12 days	18 (8.7)
>12 days	45 (21.8)
Admission status	
Emergency Department	182 (88)
from ICU	24 (12)
Patients on ASMs before admission to the medical unit	48 (12)

ASM - acid suppressive medication, ICU - intensive care unit

Table 3 - Acid suppressive medicines for justified indications (n=70).

Reason for use	No. of patients (%)	
	Inpatient	Discharge
NSAID prophylaxis (high risk)	15 (21.4)	15 (21.4)
Renal/hepatic transplant	15 (21.4)	15 (21.4)
Gastric/duodenal ulcer	9 (12.9)	9 (12.9)
Non ulcer dyspepsia	9 (12.9)	9 (12.9)
ESRD with dyspepsia or GERD	7 (10.0)	7 (10.0)
Hepatic Failure (cirrhotic)	6 (8.6)	6 (8.6)
Helicobacter pylori eradication regimen	5 (7.1)	5 (7.1)
GERD	2 (2.9)	2 (2.9)
SUP (according to ASHP criteria)*	2 (2.9)	2 (2.9)

ASHP - American Society of Health-system Pharmacists, ESRD - end stage renal disease, GERD - gastro-esophageal reflux disease, NSAID - non-steroidal anti-inflammatory drug, SUP - stress ulcer prophylaxis, *2 patients on mechanical ventilation.

Table 4 - Acid suppressive medicines for non justified indications (n=136).

Reason for use	Study population		
	Inpatient (n=136)	Discharge (n=70)	After 2 months (n=30)
NSAID (low risk)	29	19	9
Step-down from ICU	19	8	2
Vomiting	17	6	3
Stress ulcer prophylaxis (low risk)	12	7	3
Epigastric pain (non-specific)	9	5	2
Lower GI bleeding	7	4	2
Renal disease (without GI symptoms)	6	3	1
Acute pancreatitis	6	4	1
Gastroenteritis	6	5	2
ARF (Resolved)	5	3	3
Alcoholic	5	1	1
No reason Found	4	2	0
Warfarin therapy	3	0	0
Low dose steroid therapy	3	1	1
Anemia	2	0	0
*Other	3	2	0

ARF - Acute renal failure, GI -Gastrointestinal, ICU - Intensive care unit, NSAID - Non-steroidal anti inflammatory drug
*Other: include Crohn's disease, maintenance of peptic ulcer disease despite treatment for *Helicobacter pylori,* acute cholecystitis

prescriptions for ASMs being inappropriate. Six months after discharge, 50% of patients for whom follow up details were available, remained on acid suppression without an accurate indication.[8] A study conducted by Nardino et al[9] in a 511-bed community teaching hospital reported that 65% of the patients receiving ASMs were for non justified indications as determined by a consensus review. Among patients placed on ASMs for ulcer prophylaxis, 55% were discharged on the therapy. They concluded that there is a significant overuse of acid-suppressive therapy in hospitalized patients, and the problem of placing low-risk patients on ulcer prophylaxis unnecessarily is compounded by discharging these patients with the medication.[9] Mat Saad et al[10] found an initiation rate for PPIs of 71% of inpatients, while only one third of them were properly evaluated to justify, or refute the need for therapy. The researchers also noticed the frequent combination of PPIs and H_2RAs, while this combination can only be justified in patients with refractory gastroesophageal reflux disease.[10] Another study performed by Walker et al[11] found that 67% of PPIs were prescribed for unapproved indications in hospital inpatients. Another 7-month retrospective study review found that only 37% of the medical inpatients from a major teaching hospital were prescribed PPIs, for indications accepted by the Australian schedule of pharmaceutical benefits.[12] While prescribing guidelines for the usage of ASMs exist for patients in ICUs,[1] guidelines for medical inpatients are lacking. Doctors tend to prescribe, and over prescribe due to the universal indication of stress ulcer prophylaxis. This idea seems to be rather derived from intensive care unit guidelines than based on sound evidence for medial inpatients. Most physicians agree on the fact that they over prescribe ASMs for medical inpatients. Based on the number of publications in the last decade, the prescribing trend remains high. Despite this fact, literature and evidence are lacking for the majority of indications in which ASMs are prescribed, this trend does not seem to change. Moreover, little is known about the long term usage of ASMs.

While ASMs will be well tolerated by most medical patients, specific patient groups deserve special attention. In patients with renal failure, the effect on the central nervous system (CNS) with H_2RAs may occur.[13] Proton-pump inhibitors are mostly free of clinically important adverse events, with mild gastro-intestinal and CNS toxicities being the main concern.[2] Drug-drug interactions should not be overlooked, and some ASMs may also cause problems in patients with feeding tubes.[14] Omeprazole pellets for example, may occlude feeding tubes resulting in change of the feeding tube with potential consequences, and discomfort for the patient. The potential for interaction between ASMs and the feeding itself, as well as with the feeding tube should not be overlooked either.[14] These drug-enteral feed interactions are not always completely known, and the usage of intermittent feedings, whereby medicines can be given during feeding free periods, can minimize these. Beside the known risks as described above, and the unknown risks for long term treatment, the economic burden should not be overlooked. Pham et al[2] stated that many patients being treated with ASMs while being hospitalized, continue ASMs as outpatients. The cost related to the inappropriate usage of ASMs in medicine patients in one US trial was estimated to exceed US$111,000 for one year.[4]

This study includes medical inpatients from one institution, and is only an attempt to provide a preliminary insight in the usage pattern of ASM in a major health care center in the Middle East. Data are too limited though, to extrapolate with other centers, and/or countries in the neighborhood. Therefore, findings from any other centers are eagerly awaited. Guidelines for the usage of ASMs in medical inpatients

admitted to this institution have been formulated and will be implemented in the near future. Another evaluation was planned 6 months later to assess the impact of these guidelines. The selection of this inpatient group in our institution was mainly based on the data available, through the consumption data in the pharmacy database. Future studies to review ASM usage in other patient groups, such as surgical and pediatric patients are under consideration.

In conclusion, our findings support the need for the development and implementation of evidence based guidelines regarding the usage of ASMs in medical inpatients.

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References

1. ASHP Therapeutic Guidelines on Stress Ulcer Prophylaxis. ASHP Commission on Therapeutics and approved by the ASHP Board of Directors on November 14, 1998. ***Am J Health Syst Pharm*** 1999; 56: 347-379.
2. Pham CQ, Regal RE, Bostwick TR, Knauf KS. Acid suppressive therapy use on an inpatient internal medicine service. ***Ann Pharmacother*** 2006; 40: 1261-1266.
3. Heidelbaugh JJ, Inadomi JM. Magnitude and economic impact of inappropriate use of stress ulcer prophylaxis in non-ICU hospitalized patients. ***Am J Gastroenterol*** 2006; 101: 2200-2205.
4. Grube RR, May DB. Stress ulcer prophylaxis in hospitalized patients not in intensive care units. ***Am J Health Syst Pharm*** 2007; 64: 1396-1400.
5. Skála I, Marecková O, Vítko S, Matl I, Lácha J. Prophylaxis of acute gastroduodenal bleeding after renal transplantation. ***Transpl Int*** 1997; 10: 375-378.
6. Svoboda P, Ehrmann J, Klvana P, Machytka E, Rydlo M, Hrabovsk˘ V. [Endoscopic findings in upper gastrointestinal tract in patients with liver cirrhosis]. ***Vnitr Lek*** 2007; 53: 968-971. Czech
7. Piper JM, Ray WA, Daugherty JR, Griffin MR. Corticosteroid use and peptic ulcer disease: role of nonsteroidal anti-inflammatory drugs. ***Ann Intern Med*** 1991; 114: 735-740.
8. Zink DA, Pohlman M, Barnes M, Cannon ME. Long-term use of acid suppression started inappropriately during hospitalization. ***Aliment Pharmacol Ther*** 2005; 21: 1203- 1209.
9. Nardino RJ, Vender RJ, Herbert PN. Overuse of acid-suppressive therapy in hospitalized patients. ***Am J Gastroenterol*** 2000; 95: 3118-3122.
10. Mat Saad AZ, Collins N, Lobo MM, O'Connor HJ. Proton pump inhibitors: a survey of prescribing in an Irish general hospital. ***Int J Clin Pract*** 2005; 59: 31-34.
11. Walker NM, McDonald J. An evaluation of the use of proton pump inhibitors. ***Pharm World Sci*** 2001; 23: 116-117.
12. Naunton M, Peterson GM, Bleasel MD. Overuse of proton pump inhibitors. ***J Clin Pharm Ther*** 2000; 25: 333-340.
13. McEvoy GK. American Hospital Formulary Service (AHFS) Drug Information. Bethesda (Maryland): American Society of Health-System Pharmacists; 2008. p. 3025-3032.
14. Hanssens Y, Woods D, Alsulaiti A, Adheir F, Al-Meer N, Obaidan N. Improving oral medicine administration in patients with swallowing problems and feeding tubes. ***Ann Pharmacother*** 2006; 40: 2142-2147.

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Al-Homrany MA, Irshaid YM. Pharmacoepidemiological study of prescription pattern of analgesics, antipyretics, and nonsteroidal anti-inflammatory drugs at a tertiary health care center. ***Saudi Med J*** 2007; 28: 369-374.

Naseeb TA, Nasser MA. Drug prescribing indicators in primary health care centers in Bahrain. ***Saudi Med J*** 2005; 26: 1436-1438.