

Use of Ranitidine and Omeprazole in a Public Hospital in Argentina

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SUMMARY. To assess the inpatients consumption of omeprazole and ranitidine in a provincial public hospital in Córdoba, Argentina, a transversal observational study was carried out showing the consumption of these drugs from June to November in 2004 and 2005, and checking out diagnosis of inpatients using such drugs during August, September and October 2006. Total consumption of antiulcer drugs was 3,261.33 defined daily doses (DDD) in 2004 and 3,154.17 in 2005, corresponding to ranitidine mostly. DDD/100 bed-days per clinical services were calculated at Intensive Care Unit, Internal Medicine, and General Surgery. Non clinical protocols had been established to promote and improve rational use of drugs. Most of inpatients had no explicit diagnosis to justify the prescription of antiulcer drugs. An antiulcer drug utilization study was carried out collecting useful information from pharmacy service by hand.

RESUMEN. "Uso de Ranitidina y Omeprazol en un Hospital Público de Argentina". Con el propósito de valorar el consumo de omeprazol y ranitidina de pacientes internados en un hospital público provincial en Córdoba, Argentina, se realizó un estudio observacional transversal sobre el consumo de estos medicamentos entre los meses de junio a noviembre de 2004 y 2005. Se revisaron los diagnósticos de los pacientes internados que utilizaban antiulcerosos durante Agosto, Septiembre y Octubre de 2006. El consumo total de ambos antiulcerosos fue 3261,33 DDD en 2004 y 3154,17 en 2005, correspondiendo mayoritariamente a ranitidina. Se calcularon DDD/100 est./día por servicio en UTI, Clínica Médica y Clínica Quirúrgica. No se han establecido protocolos clínicos para promover y mejorar el uso racional de medicamentos. La mayoría de los pacientes no poseía un diagnóstico justificando la prescripción de antiulcerosos. Se realizó un estudio de utilización de medicamentos antiulcerosos recolectando manualmente información del Servicio de Farmacia.

INTRODUCTION

Antiulcer drugs as therapeutic group are frequently used, not only by general population but also inpatients. In hospital settings, information related to drug consumption, indications and diagnosis are obtainable from Pharmacy Service registers and medical charts ¹⁻⁷. Notwithstanding, the lack of consumption data is a normal situation in Argentina. Both misuse and disvalue of drug supply information, which is related to quality issues, happen. Therefore, the existences of reliable sources and/or complete databases are isolated and exceptional when available ^{8,9}.

The defined daily dose (DDD) is an interna-

tionally accepted unit of measurement for drug consumption. It is defined as the assumed average maintenance dose per day for a drug used for its main indication in adults, and it allows comparisons to be made irrespective of the price, formulation or quantity of the prescription. DDD/100 bed-days are used for hospital inpatients ^{4,7,10-13}.

The profile of prescription habits influences drug utilization as well as costs associated to it. Clinical protocols and medication programs are expected to promote the rational use of drugs, including effectiveness, safety and efficiency ^{3,5,10-12,14-16}.

KEY WORDS: Drug Utilization, Inpatients, Omeprazole, Ranitidine.

PALABRAS CLAVE: Omeprazol, Pacientes Internados, Ranitidina, Utilización de Medicamentos.

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The Arturo Umberto Illia Hospital is a 79-bed high-complexity regional public general hospital, located in Alta Gracia city (Province of Córdoba, Argentina) and corresponding to a second referral level in a health system based on three levels of care ¹⁷. The main objective of this work is to assess the inpatients consumption of omeprazole and ranitidine in this provincial public hospital. Secondary objectives are: (a) describing global consumption of omeprazole and ranitidine and their net costs at institutional level, (b) quantifying drug consumption for inpatients in DDD/100 bed-days, (c) analyzing diagnosis and indications associated to omeprazole and ranitidine use for inpatients, and (d) registering other drugs utilized simultaneously with omeprazole and ranitidine and checking for published interactions between them or their pharmacological groups.

METHODS

Design & setting: transversal observational study in a small size public hospital

Consumption of omeprazole and ranitidine from June to November in 2004 and 2005 was calculated in DDD. Clinical services included in this study were Emergency Room, Intensive Care Unit (ICU), Internal Medicine and General

Surgery. DDD of ranitidine (ATC code A02BA02) and omeprazole (ATC code A02BC01) were 300 mg and 20 mg, respectively ¹³.

Drug utilization data was collected from restocking requirements of clinical services and pharmacotherapeutic charts of patients -the later only for Internal Medicine and General Surgery-at Pharmacy.

The net medication costs considered (in Argentinian pesos) for each DDD of ranitidine were \$ 0,10 per oral (PO) and \$ 1,80 intravenous (IV); for omeprazole they were \$ 0,18 PO and \$ 2,17 IV. In July 2006 the average exchange amount was U\$S 1.00 = \$ 3.08.

DDD/100 bed-days were calculated per clinical services for which occupancy index was available ^{10,12}: Intensive Care Unit, Internal Medicine and General Surgery.

During August, September and October 2006, diagnosis of inpatients using omeprazole or ranitidine was checked out, and other drugs being used simultaneously were listed. Bibliographic drug information search about indication (dosage and uses) and interactions was conducted for omeprazole And ranitidine ^{14-16,18-21}. Spreadsheets were generated in Microsoft Excel for processing data.

$$\text{DDD/100 bed-days} = \frac{\text{Drug consumption in the period (mg) x 100}}{\text{DDD (mg) x bed strength x occupancy index x days (period)}}$$

RESULTS

Global hospital consumption of ranitidine and omeprazole were expressed as percentage of DDD and Argentinian pesos (\$). Total amounts were: 3,216.33 DDD and \$ 2,448.74 in

2004, and 3,154.17 DDD and \$ 2,666.70 in 2005. Comparisons of ranitidine and omeprazole use between 2004 and 2005 are described in Figures 1 and 2.

Figure 3 displays drug consumption profile

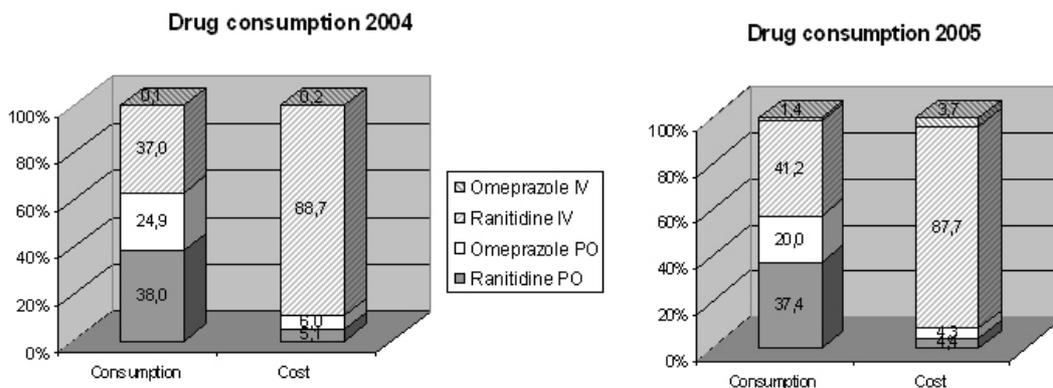


Figure 1. Percentage of drug consumption by period.

monthly by administering route during both periods.

Inpatients' drug consumptions in DDD/100 bed-day are presented in Table 1 for each whole period per year by clinical service. More in detail, monthly ranitidine consumption is shown in Figure 4 by administering route and also per service.

There are no written protocols at this hospital for inpatients care, but a few medication programs for ambulatory patients are provided from Pharmacy Service. Specifically, none clinical protocol at institutional level to promote and improve rational use of antiulcer drugs has been established.

Thirty-four cases of inpatients using ranitidine or omeprazole during August to October 2006 were analyzed, corresponding 24 to Inter-

nal Medicine, 6 to ICU and 4 to General Surgery. Only one (2.9%) had an explicit diagnosis (chronic gastritis) related to antiulcer drugs. Double dosing of ranitidine IV (300

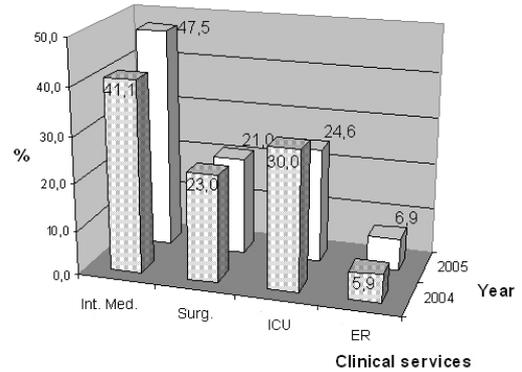


Figure 2. Global consumption by clinical service.

DDD/100 bed-days	2004			2005		
	Int Med	Surgery	ICU	Int Med	Surgery	ICU
omeprazole	9,11	7,52	37,66	11,96	5,19	14,20
ranitidine	34,21	23,45	67,49	33,79	20,98	64,99
omeprazole & ranitidine	43,32	30,97	105,15	45,75	26,16	79,19

Table 1. Drug consumption in DDD/100 bed-day by clinical service. Int Med: Internal Medicine; ICU: Intensive Care Unit.

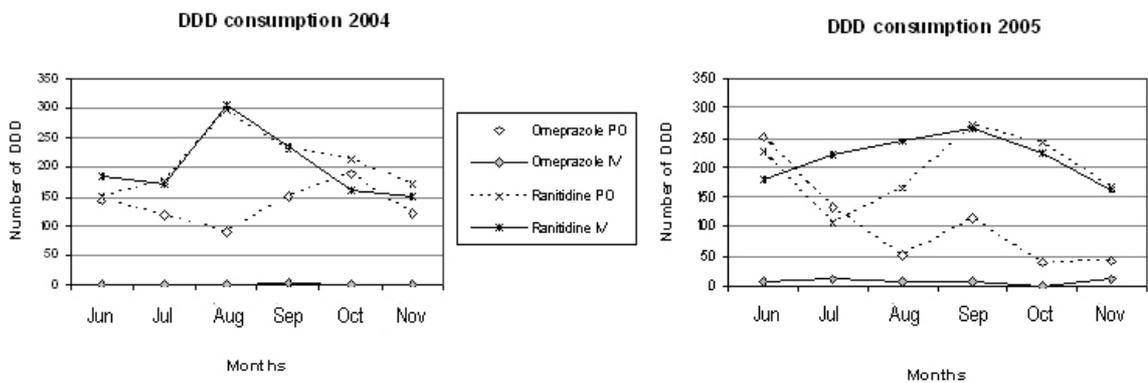


Figure 3. Global consumption profile by drug and administering route.

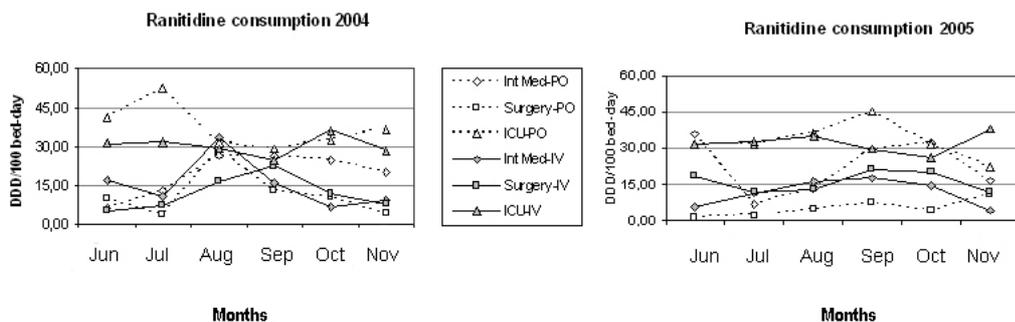


Figure 4. Ranitidine monthly consumption by administration route per clinical service.

mg/day) was observed as prescribed daily dose (PDD) assuming prophylaxis or prevention use in 7 cases (20.6%): 4 at Internal Medicine, and 3 at General Surgery.

Drug information research about indications for both drugs in prophylaxis use was as follows¹⁸⁻²¹. For stress gastritis prophylaxis in critically ill patients (adults): omeprazole, initially 40 mg PO, followed by 40 mg in 6-8 h on day 1, followed by 40 mg PO once daily for up to 14 days (the use beyond 14 days has not been evaluated); ranitidine: 50 mg IV (via intermittent infusion) or intramuscular (IM) every 6-8 h, or 6.25 mg/h via continuous IV infusion. For non-steroidal anti-inflammatory drugs (NSAID)-induced ulcer prophylaxis (adults): omeprazole: 20 mg PO once daily; ranitidine: 150 mg PO twice daily.

In 9 cases (26.5%) non interactions were described in revised literature, but a total of 45 interactions were found in the other ones, resulting in 1.3 potential interactions by inpatient considering all analyzed cases (n = 34)^{18,19,21}.

DISCUSSION AND CONCLUSIONS

Hand-written information was gathered manually and processed in work sheets for data analysis. The lack of an electronic database to register and document all drug supply process at hospital pharmacy is a great limitation to perform any kind of drug utilization studies or pharmacoepidemiological research^{8,10-12}.

omeprazole IV was incorporated in very few amounts during second half 2004 by ICU request. Likewise, Sucralfate was acquired since middle 2005. Nevertheless, the latter was not taken into account when this drug utilization study was planned.

ranitidine represented 75.0% and 78.6% of global consumption in 2004 and 2005 respectively, and more than 90% of net costs in both periods, with an uneven distribution per administering route in terms of costs. A 10% of ranitidine IV consumption was equivalent to more than 20% of costs, while 10% of PO consumption was around 1.3% of costs. Consequently, its monthly consumption profile expressed in DDD/100 bed-day was selected to be shown in Figure 4.

The proportion of IV via in general seemed to be higher than those reported by other authors for antiulcer drugs³⁻⁵. Considering just the medication cost, and excluding administering costs and risks associated to IV route, this via represented 12 to 18 times PO via costs depending on the drug.

During 2004 and 2005 periods, indications for antiulcer drugs were not explored. Anyway, available information from medical charts at clinical services offices during 2006 August-October was analyzed, but it was neither a representative sample nor total cases treated with omeprazole or ranitidine in the hospital. However, results disclosed the lack of diagnoses and specific indications to justify the use of antiulcer drugs. In preventive use, only omeprazole PO was an FDA-approved indication for stress gastritis prophylaxis in critically ill patients, while the others were unlabeled uses^{20,21}. Also the importance of potential interactions with omeprazole and ranitidine was exposed, requiring continuous evaluation of patient's condition and/or pharmacotherapy follow-up.

In summary:

A drug utilization study of omeprazole and ranitidine was carried out at the Arturo Umberto Illia Hospital collecting useful information from pharmacy service by hand. Unifying prescription criteria by consensus and development of clinical protocols at institutional level are required to improve the use of antiulcer drugs. In future works computerized data from other hospitals could be collected to compare the consumption of antiulcer drugs locally.

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