Drug-drug interaction

Authors
Marcus Gomes Bastos[1]

[1] School of Medicine, Federal University of Juiz de Fora.

Considered by many as the most significant epidemic of the new millennium, chronic kidney disease (CKD) has a reported mean prevalence of 11% in developed country populations. Unfortunately, definitive data on the prevalence of CKD in Brazil is not available. Nonetheless, a study with 24,248 adult individuals using two glomerular filtration rate (GFR) measurements under 60 mL/min/1.73 m^2 within at least three months as a criterion for CKD revealed that 2.3% of the included subjects had GFR under 45 mL/min/1.73 m^2.[1] When extrapolated for the adult Brazilian population, this data indicates that approximately three million people have a third or less of residual renal function.

The course of CKD is characterized by numerous complications (anemia, altered calcium and phosphorus levels, metabolic acidosis, hypovitaminosis D, among others) and comorbidities (cardiovascular disease, dyslipidemia, diabetes) that favor the occurrence polypharmacy and drug interactions. Drug interactions occur when the therapeutic effect of a drug is modified by the concurrent administration of other medications,[2] depending on the chemical nature of the drug, the number of medications in use, and the occurrence of kidney or liver function disorders.[3] It is important to remember that drug interactions may be beneficial or harmful, and that the quality of the drug regimen is affected by the process used to choose medications based on the nature of the targeted disease. In turn, the choice of the most appropriate drug is based on factors such as route of administration, dosage, contraindications, potential side effects, and cost. Additionally, the possibility of a medication affecting the safety or effectiveness of other drugs must always be considered by the prescribing physician, particularly when treating individuals with diminished renal functional reserve.

In this issue of the Brazilian Journal of Nephrology, Marquito *et al.*[4] discuss the 'Potential drug interactions in patients with chronic kidney disease.' The study was carried out at the HIPERDIA MINAS Center in Juiz de Fora (established by the Minas Gerais State Department of Health) within the scope of secondary prevention program 'Real Life,' designed to cater to the needs of Brazilian Public Health Care System patients with CKD stages 3b, 4 and 5 enrolled in non-dialysis therapies. The authors referred to the MICROMEDEX® database to assess the potential interactions between the drugs prescribed to the patients included in the study. The most commonly prescribed drugs by order of frequency were furosemide, simvastatin, losartan, aspirin, captopril, hydrochlorothiazide, omeprazole, enalapril maleate, amlodipine besylate, and nifedipine.

Potential drug interactions were observed in two thirds of the prescriptions. Twenty percent of these interactions were severe, and in 0.4% of the cases there were absolute contraindications for the drug combinations used by the patients. The authors also noted that the probability of drug interactions increased 2.5 fold for each medication added to the patient's prescription, and that individuals

Submitted on: 01/16/2014.
Approved on: 01/16/2014.

Correspondence to:
Marcus Gomes Bastos.
Internal Medicine Department, School of Medicine, Federal University of Juiz de Fora.
Rua Ivan Soares de Oliveira, nº 234, Parque Imperial. Juiz de Fora, MG, Brazil. CEP: 36036-350.
E-mail: marcusbastos7@gmail.com

DOI: 10.5935/0101-2800.20140003

with obesity, diabetes, hypertension, and lower GRF were more prone to facing adverse effects from drug interactions.

Drug interactions increase morbidity, mortality, and may lead to hospitalization.[5] It is important to realize that both inpatients[6] and outpatients[7] may be affected by drug interactions. For example, it has been reported that in primary health care settings 9% to 70% of the patients are exposed to the risk of drug interactions, and that 1% to 23% of these interactions are clinically relevant.[7-9] A study performed with outpatients in France reported an incidence of 27 per 10,000 for prescriptions containing drugs with undesired interactions.[10]

The management of patients with CKD is often accompanied by a number of biopsychosocial factors, and ideally requires a multidisciplinary team. In this context, the presence of a pharmacist on the team gains additional relevance, whether to reinforce with the patient the pharmacological guidance provided by the prescribing physician or to monitor the potential undesired drug interactions using resources such as the ones described by Marquito *et al*.[4] Despite the many different sources of information on drugs and their interactions (e.g.: summaries of product characteristics, inserts, textbooks and online publications), the use of software programs such as MICROMEDEX® should be incorporated into the management of patients with CKD for the rapid and reliable acquisition of information on potential drug interactions they provide, thus adding significant value to the quality of care.

References

1. Bastos RM, Bastos MG, Ribeiro LC, Bastos RV, Teixeira MT. Prevalência da doença renal crônica nos estágios 3, 4 e 5 em adultos. Rev Assoc Med Bras 2009;55:40-4.
2. Pirmohamed M. Drug-drug interactions and adverse drug reactions: separating the wheat from the chaff. Wien Klin Wochenschr 2010;122:62-4. PMID: 20213370 DOI: http://dx.doi.org/10.1007/s00508-010-1309-1
3. Gagne JJ, Maio V, Rabinowitz C. Prevalence and predictors of potential drug-drug interactions in Regione Emilia-Romagna, Italy. J Clin Pharm Ther 2008;33:141-51. DOI: http://dx.doi.org/10.1111/j.1365-2710.2007.00891.x
4. Marquito AB, de Paula RP, Fernandes NMS, Colugnati FAB. Interações medicamentosas potenciais em pacientes com doença renal crônica. J Bras Nefrol 2014;36:26-34
5. McDonnell PJ, Jacobs MR. Hospital admissions resulting from preventable adverse drug reactions. Ann Pharmacother 2002;36:1331-6. PMID: 12196047 DOI: http://dx.doi.org/10.1345/aph.1A333
6. Juurlink DN, Mamdani M, Kopp A, Laupacis A, Redelmeier DA. Drug-drug interactions among elderly patients hospitalized for drug toxicity. JAMA 2003;289:1652-8. PMID: 12672733 DOI: http://dx.doi.org/10.1001/jama.289.13.1652
7. Bjerrum L, Andersen M, Petersen G, Kragstrup J. Exposure to potential drug interactions in primary health care. Scand J Prim Health Care 2003;21:153-8. DOI: http://dx.doi.org/10.1080/02813430310001806
8. Jankel CA, Speedie SM. Detecting drug interactions: a review of the literature. DICP 1990;24:982-9.
9. Bergendal L, Friberg A, Schaffrath A. Potential drug--drug interactions in 5,125 mostly elderly out-patients in Gothenburg, Sweden. Pharm World Sci 1995;17:152-7. DOI: http://dx.doi.org/10.1007/BF01879709
10. Guédon-Moreau L, Ducrocq D, Duc MF, Quieureux Y, L'Hôte C, Deligne J, et al. Absolute contraindications in relation to potential drug interactions in outpatient prescriptions: analysis of the first five million prescriptions in 1999. Eur J Clin Pharmacol 2003;59:689-95. DOI: http://dx.doi.org/10.1007/s00228-003-0684-1