ISSN: 2230-9926

Available online at http://www.journalijdr.com

IJDR

International Journal of Development Research
Vol. 10, Issue, 12, pp. 43084-43086, December, 2020
https://doi.org/10.37118/ijdr.20153.12.2020

RESEARCH ARTICLE OPEN ACCESS

DRUG INTERACTIONS IN PATIENTS AFFECTED BY CARDIOVASCULAR DISEASE

[1]Lúcia Helena Almeida Gratão, [2]Natália de Barros Teles, [3]Sônia Lopes Pinto, [4]Bernardete Weber and [4],*Guilherme Nobre L. do Nascimento

[1]Graduate Program in Child and Adolescent Health, Federal University of Minas Gerais, Belo Horizonte, Brazil; [2]Laboratory of Basic and Health Sciences (LaCiBS), Nutrition Course, Federal University of Tocantins, Palmas, Brazil; [3]Nutrition Course, Federal University of Tocantins, Palmas, Brazil; [4]Hospital for the Heart, Superintendence of Quality and Social Responsibility, São Paulo, Brazil; [5]Laboratory of Basic and Health Sciences (LaCiBS), Nutrition Course, Federal University of Tocantins, Palmas, Brazil

ARTICLE INFO

Article History:
Received 20th September, 2020
Received in revised form
04th October, 2020
Accepted 28th November, 2020
Published online 31st December, 2020

Key Words:
Drug Interactions,
Drug-Related Side effects,
Adverse Reactions.

Corresponding author: Guilherme Nobre L. do Nascimento

ABSTRACT

This work aims to analyze the possible drug interactions in adults and elderly people with manifest atherosclerotic disease. Fifty patients were enrolled in the multi-center study of the Brazilian Cardioprotective Food Program, UFT, Palmas, Tocantins. The Drugdex (MicroMedex) and Med Tap software databases and the Drug Interactions website were used. We obtained an average of 6.4 medications per individual, and we observed the incidence of clinically relevant interactions such as Clopidogrel with AAS 38% and Enalapril with AAS 26%. Potentially dangerous interactions in clinical practice, such as Clopidogrel with ASA, can present health risks to patients and may even lead to death. Different interections were observed, from light to severe levels, thus requiring better care by the multi-professional health team with this type of patient, since these interactions may lead to greater appearance of side effects or loss effects of the drugs so necessary for the treatment of these individuals.

Citation: ***Lúcia Helena Almeida Gratão, Natália de Barros Teles, Sônia Lopes Pinto et al.*** "Drug interactions in patients affected by cardiovascular disease*", International Journal of Development Research*, 10, (12), 43084-43086.

INTRODUCTION

Aging is a natural process for every human being, of multifactorial origin differentiated by genetic predispositions and habits of life, characterized as a morph functional involution that affects all body systems, organs and tissues (Moraes, Moraes, Lima, 2010). As a result, adults and elderly people are more vulnerable to developing pathologies, especially chronic non-communicable diseases (CNCD) (Gotardelo *et al*., 2014). The physiological changes due to aging and the prevalence of diseases characterize a greater consumption of medicines (Laatikainen *et al*., 2016). CNCDs are among the main causes of death in Brazil (Malta *et al*., 2017) and a large part of health care expenditures, which impacts both the Unified Health System and family expenditures on these diseases. Among the CNCDs are cardiovascular diseases (CVD), which may have as an effect: acute myocardial infarction (AMI), cerebrovascular accident (CVA), peripheral vascular accident (PVA) and aortic aneurysm (Traebert *et al*., 2017). In this context there is an increase in the probability of drug interactions, considering some variables that may increase the chances of interactions such as: the presence of different pathologies; number of medications and quantities of physicians accompanying the same individual (Varallo, Costa, Mastroianni, 2013). Medications can interact with food, environmental chemicals and other drugs. In view of the above, it is understood that the increasing incidence of cardiovascular diseases reflects in the greater consumption of drugs that can interact with each other in an undesirable way, presenting health risks and being able to reflect on the quality of life and the mortality rate. Therefore, this work aims to analyze the possible drug interactions in adults and elderly with manifest atherosclerotic disease.

MATERIALS AND METHODS

The sample of subjects studied in this study was 50 patients who are 45 years-old or older, coming from the local cut of the multicenter study DICABr - Brazilian Cardioprotective Food Program (Weber *et al*., 2016), held in the city of Palmas, Tocantins, Brazil, through the Federal University of Tocantins. Inclusion criteria were individuals with indicators of cardiovascular disease in the last 10 years, such as: coronary artery disease; encephalic stroke and peripheral vascular disease. The exclusion criteria were: psychiatric or cognitive alterations; pregnancy or lactation; liver problems or history of

encephalopathy or anasarca; renal failure with indication of dialysis; organ transplantation or use of a wheelchair; Congestive heart failure; difficulties to receive oral diet. The medical prescriptions were evaluated individually and all drugs used by the patients were simultaneously listed and divided as to the number of interactions and the number of drugs consumed per patient. The DrugDex/ Micromedex® software (http://www.micromedexsolutions.com) and Drug Interaction Checker/MedTap, and the Drug Interactions website (http://interacoesmedicamentosas.com.br) were used to evaluate the interactions in each prescription/patient. In addition, the drugs were divided as to the clinical severity of the interaction effect according to data from the iFactsTM 2005 software version for Palm OS. Information regarding drug interactions was transposed into the Microsoft Office Excel program and an analysis including descriptive statistics was performed to evaluate the data obtained.

RESULTS AND DISCUSSION

The drugs used by 50 individuals were analyzed, with 80% (n= 40) males and 20% (n=10) females aged 50-59 years-old 48% (n = 24) and 60-85 years-old 52 % (n = 26) (Table I).In relation to the pathologies 78% (n=39) presented arterial hypertension; 46% (n=23) dyslipidemias and 26% (n=13) diabetes mellitus (Table I). Only 18% (n=9) presented only one diagnosed pathology, a fact also found in studies by Pimenta et al. (2015), reinforcing the need to strengthen public health promotion and prevention policies. Regarding the quantities of medicines, an average of 6.4 medications per individual was observed (Table II), which is lower compared to studies by elderly people of Loyola Filho et al. (2006), who obtained an average of 10.9 medications. The main factor for complications resulting from pharmacological treatments is the number of drugs used, and polypharmacy (defined as the use of more than 5 drugs) increases exponentially the chances of adverse reactions and drug interactions (Passarelli, Jacob-Filho, Figueiras, 2005). The maximum number per individual in the present study was eleven drugs 10% (n=5) and the ranges between five and ten drugs presented the highest percentage with 64% (n=32). The most commonly used drug was acetylsalicylic acid (ASA) used as an analgesic and/or in the primary prevention of ischemic events, 82% (n=41) (Table II). Although there is evidence on the benefit of the use of ASA in individuals with cardiovascular risks, prescription should be cautious and based on an anamnesis on the history of bleeding and medication used by the patient, since the use of ASA may increase the chances of bleeding both at the gastrointestinal and brain levels (Bibbins-Domingo, 2016). In addition, the drugs used to control cardiovascular disease and its complications were frequently observed by individuals: Simvastatin used in the control of dyslipidemias 58% (n =29); Clopidogrel used as antiplatelet agent 44% (n=22); Losartan, Enalapril and Atenolol were used in the control of blood pressure 42% (n=21), 16% (n=8), 28% (n=14) respectively (Table II). The use of these drugs is indispensable in some cases and reflects in the good adhesion to the treatment, directly influencing the therapeutic result (Dai, GE, 2012; Tavares *et* al., 2016).

In relation to the number of interactions per individual 50% (n = 25) have presented from zero to two interactions, 44% (n = 22) had three to six interactions and 6% (n = 3) have presented seven to fourteen interactions (Table II). According to studies, any individual who undergo pharmacological therapy with more than one drug is subject to drug interactions, but certain population groups are more likely, for example, the elderly people due to degeneration of the organic systems; or those with chronic diseases due to being exposed to various drug treatments (Secoli, 2010). Among the most frequent interactions is Clopidogrel with AAS 44% (n = 22), which increase the risk of bleeding and bleeding (such as gastrointestinal or intracranial haemorrhage) (Table III). The use of Clopidogrel in the outcome of ischemic events such as myocardial infarction or stroke is important, but the increased risk of bleeding associated with ASA is highlighted (Yusuf *et al*., 2001). In the literature, there is no evidence of safe use of the two medications concomitantly, but the risk of bleeding events can cause serious harm to patients, and may even lead to death (Bibbins-Domingo, 2016). Other frequent interactions in the present study are Enalapril with ASA 16% (n=8), Atenolol with ASA 24% (n=12), according to the literature the antihypertensive effects of ACE inhibitors and beta blockers can be reduced by Salicylates.

Table 1. Distribution of individuals according to age, gender and main pathologies of patients of the DicaBr program Palmas-TO, 2018

	Absolute frequency (n)	Relative frequency (%)
Age		
50 to 59	24	48
60 to 89	26	52
Gender		
Female	10	20
Male	40	80
Main pathologies		
Arterial hypertension	39	78
Dyslipidemia	23	46
Diabetes Mellitus	13	26

Table II - Relation among the numbers of medications used, the presence of interactions and medications that are most used by the patients of the DicaBr program.Palmas-TO. 2018

	Absolute frequency (n)	Relative frequency (%)
Number of drugs used		
0 – 2	2	4
3 – 6	23	46
7 – 10	20	40
>10	5	10
Number of interactions between drugs		
0 – 2	25	50
3 – 6	22	44
7 – 14	3	6
Most used drugs		
Acetylsalicylic acid	41	82
Simvastatin	29	58
Clopidogrel	22	44
Losartan	21	42
Atenolol	14	28
Enalapril	8	16

Table III. The most potentially dangerous interactions among individuals in the DicaBr program Palmas-TO, 2018

Medication A	Medication B	n (%)	Severity	Effect
Clopidogrel	Acetylsalicylic acid (ASA)	22 (44)	severe	Increased hemorrhage and bleeding.
Enalapril	Acetylsalicylic acid (ASA)	08 (16)	moderate	ASA may inhibit the effect of Enalapril.
Atenolol	Acetylsalicylic acid (ASA)	12 (24)	moderate	ASA may inhibit the effect of Atenolol.
Clopidogrel	Simvastatin	16 (32)	moderate	Simvastatin inhibits the metabolic conversion of Clopidogrel thus inhibiting its antiplatelet action.
Glibenclamida	Acetylsalicylic acid (ASA)	06 (12)	moderate	Increased hypoglycemic effect.
Ácido acetil-salicílico (AAS)	Omeprazol	16 (32)	light	ASA may increase gastric side effects.
Furosemida	Acetylsalicylic acid (ASA)	04 (8)	light	The diuretic response may be impaired in patients with cirrhosis and ascites.
Glibenclamida	Sinvastatin	06 (12)	light	The concentration of Glibenclamide may be elevated by increasing the hypoglycemic effect.

In addition, the effects of beta-blockers on left ventricular ejection fraction in patients with chronic heart failure may also be decreased. Another interaction of significance and frequent in the study is

Clopidogrel with simvastatin 32% (n=16) which due to competition for the CYP3A4 isoenzyme, statin can inhibit the metabolic conversion of the drug Clopidogrel in its active form, decreasing its antiplatelet action. All the interactions presented are also described in the Basic Attention Book: Strategy for the care of the person with chronic disease, as clinically relevant interactions, emphasizing still more the importance of identifying and monitoring interactions resulting from pharmacological treatments (BRASIL, 2014). The recurrent errors in the medication process, even the prescription of medications with risks of interactions, is a multi-professional problem (Oliveira, Camargo, Cassiani, 2005), since all health areas should know and articulate with each other about all variables of health-disease in favor of patients. The nutritionist has a fundamental role in the control and prevention of cardiovascular diseases, and through nutritional interventions can reduce the demand for the use of medications for continuous use, such as medicines for high blood pressure. As the number of drugs is an important variable in relation to drug interactions, nutritional practices based on adequate recommendations can help improve patients' quality of life (Schuster, Oliveira, Dal Bosco, 2015).

The use of herbal medicines, food supplements and even food can also interact with medications, so it is essential that the nutritionist knows about the medications used by each patient and their possible interactions (Heldt, Loss, 2013). In addition, the nutritional status of the patient may reflect the response to pharmacological treatments, since the distribution and metabolization processes are often dependent on plasma proteins, which are already diminished in the elderly population and may be even worse if nutrition is inadequate. Patients with low plasma protein levels are more susceptible to drug toxicity, leading to death. Some of the interactions presented directly reflect the patient's quality of life, more studies on the subject are recommended, and health professionals are more relevant to the topic presented, since some tools with databases on drug interactions, such as MedTap and the Drug Interactions website are easy to access and understand.

Conclusion

Different MIs were observed, from light to severe of severity levels, thus requiring better care by the multi-professional health team in the care of this type of patient, since these MI may lead to greater appearance of side effects or loss effects of the drugs so necessary for the treatment of these individuals.

Acknowledgements: We thank the Federal University of Tocantins and CNPq for the assistance and scholarships granted.

REFERENCES

Bibbins-Domingo K. U.S. 2016. Preventive Services Task Force. Aspirin Use Primary Prevention Cardiovascular Disease and Colorectal Cancer: U.S. Preventive Services Task Force. Recom. Stat. Annals of Intern. Med. 164 12 : 836-45.

Brasil 2014. Ministério da Saúde. Estratégias para o cuidado da pessoa com doença crônica. Cadernos de atenção básica, n. 35. p.162. Disponível em: http://bvsms.saude.gov.br/bvs/ publicacoes /estrategias_cuidado_pessoa_doenca_cronica_cab35.pdf.

Dai Y, GE J 2012. Clinical Use of Aspirin in Treatment and Prevention of Cardiovascular Disease. Thrombosis.

Gotardelo DR, Fonseca LS, Masson ER, Lopes LN, Toledo VN, Faioli MA, *et al* 2014. Prevalência e fatores associados a potenciais interações medicamentosas entre idosos em um estudo de base populacional. Rev. Bras. de Med. de Fam. e Com. 9 31 : 111-118.

Heldt T, Loss SH 2013. Interação fármaco-nutriente em unidade de terapia intensiva: revisão da literatura e recomendações atuais. Rev. Bras. de Terapia. Int. 25 2 : 162-167.

Laatikainen O, Sneck S, Bloigu R, Lahtinen M, Lauri T, Turpeinen M 2013. Hospitalizations due to adverse drug events in the elderly-a retrospective register study. Frontiers in Pharmacology. 07 358 : 1–8.

Malta DC, Silva MMA, Moura L, Morais Neto OL 2017. A implantação do Sistema de Vigilância de Doenças Crônicas Não Transmissíveis no Brasil, 2003 a 2015: alcances e desafios. Rev. Bras. de Epidem. 20 4 : 661-675.

Moraes EN, Moraes FL, Lima SPP 2010. Características biológicas e psicológicas do envelhecimento. Rev. Med. de Minas Gerais. 20 1 : 67–73.

Oliveira RC, Camargo AEB, Cassiani SHDB 2005. Estratégias para prevenção de erros na medicação no setor de emergência. Rev. Bras. de Enf. 58 4 : 399–404.

Passarelli MC, Jacob-Filho W, Figueiras A 2005. Adverse drug reactions in elderly hospitalised population – inappropriate prescription is a leading cause. Drugs Aging. 22 9 : 767-77.

Schuster J, Oliveira AM, Dal Bosco SM 2015. O papel da nutrição na prevenção e no tratamento de doenças cardiovasculares em metabólicas. Rev. Da Soc. de Card. do Est. do Rio Grande do Sul. 28 : 1–6.

Secoli SR 2010. Polifarmácia: interações e reações adversas no uso de medicamentos por idosos. Rev. Bras. de Enf. 35 1 : 28–34.

Tavares NUL, Bertoldi AD, Mengue SS, Arrais PSD, Luiza VL, Oliveira MA, *et al* 2016. Factors associated with low adherence to medicine treatment for chronic diseases in Brazil. Rev. de Saúde Pub. 50 supl 2 : 1–11.

Traebert J, Giacomello L, Santos Á, Martins DF, Traebert E, Lacerda JT, *et al* 2017. A carga das doenças cardiovasculares no estado de Santa Catarina no ano de 2009. Epidemiologia e Serviços de Saúde. 26 2 : 331–338.

Varallo FR, Costa MA, Mastroianni PC 2013. Potenciais interações medicamentosas responsáveis por internações hospitalares. Rev. de Ciências Farm. Bas. e Apl. 34 1 : 79–85.

Weber B, Bersch-Ferreira AC, Torreglosa CR, Ross-Fernandes MB, Da Silva JT, Galante AP, *et al* 2016. The Brazilian Cardioprotective Nutritional Program to reduce events and risk factors in secondary prevention for cardiovascular disease: study protocol The BALANCE Program Trial. *American Heart Journal.* 171 1 : 73–81.

Yusuf S, Zhao F, Mehta SR, Chrolavicius S, Tognoni G, Fox KK 2001. Effects of clopidogrel in addition to aspirin in patients with acute coronary syndromes without st-segment elevation. *The New Eng. J. of Med.* 345 7 : 494–502.

****