Interaction between Food and Anticoagulants in Patients with Cardiovascular Diseases

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Abstract

Cardiovascular diseases are one of the most common diseases in the world. Anticoagulants and other drugs are prescribed as a treatment for these diseases. However, polypharmacy may increase the risk of drug-drug or food-drug interactions and decrease patient compliance. Food-drug interactions may put the patient at risk for serious adverse effects and reduce the safety and efficacy of treatment. Food-drug interaction is a common problem that has occurred as a result of the concomitant use of multiple drugs with food. Food-drug interaction is the term used to describe how food affects a medication in the body. Food can alter the effectiveness of the medication, make unwanted side effects better or worse, or even bring on brand-new negative effects. Drugs may alter how the body processes food. Consumption of foods that contain vitamin K makes anticoagulant therapy less effective. On the other hand, patients should be careful when consuming foods like garlic, ginseng, ginger, and ginkgo to avoid the undesirable effect of hemorrhage. Among the medical records examined, no advice or recommendations were provided regarding anticoagulant-food interactions, no details about the time of taking anticoagulant drugs and the exact time of eating meals were given and there were few instances in which medicine dosage was altered due to a food association. A majority of patients who completed an anonymous survey in community pharmacies were not informed about food-drug interactions.

Healthcare professionals should advise patients taking anticoagulants to be careful with the food they consume and clinicians should manage the time and dose variability of the medicine so a successful therapy can be achieved.

Keywords: Interaction, food, drugs, anticoagulants

Introduction

Many health issues can be treated and resolved with medicine. To guarantee their effectiveness and safety, they must be taken properly.

Medications should be extremely specific in their effects, have the same predictable effect for all patients, never be affected by concomitant food or other medications, exhibit linear potency, be non-toxic in any dosage, and require only a single dose to affect a permanent cure. However, this ideal drug is still to be discovered. (Rabia Bushra, Nousheen Aslam, and Arshad Yar Khan, D. (2011). Food-Drug Interactions. https://pubmed.ncbi.nlm.nih.gov/22043389/)

Taking medicine is a normal routine for many people, but there are many aspects to think about to avoid unwanted interactions. Age, weight, sex, medical conditions, the dose of medicine, other medications, vitamins, and herbal supplements can affect any drug taken. (Jacqueline Boucher, n.d. Common Food-Drug Interactions. https://www.bvhealthsystem.org/expert-health-articles/common-food-drug-interactions)

Drug use can occasionally be significantly impacted by diet and lifestyle choices. A drug interaction occurs when another substance changes the activity of a drug, either by enhancing or weakening its effects or by creating a new effect that neither can produce on its own. Frequently consumed fruits, herbs, and alcohol can seriously harm the patient's health and cause the therapy to fail. Generally, most clinical food-drug interactions are caused by food-induced changes in the drug's bioavailability. The therapeutic impact of the majority of drugs is related to bioavailability, an important pharmacokinetic parameter.

Food intake exerts a complex influence on the bioavailability of drugs. It may interfere not only with tablet disintegration, drug dissolution, and drug transit through the gastrointestinal tract, but may also affect the metabolic transformation of drugs in the gastrointestinal wall and the liver. (A Melander, D. (1978). Influence of food on the bioavailability of drugs. https://pubmed.ncbi.nlm.nih.gov/81118/)

Food-drug interactions share the same pharmacokinetic and pharmacodynamic principles as drug-drug interactions. The effects of a drug's pharmacodynamic interaction may be antagonistic, synergistic, or additive. Some interactions are more significant than others.

Grapefruit is the most well-known example, but also Sevillian orange, pomelo, and star fruit contain agents that inhibit cytochrome P450 3A4 (CYP3A4), which is the most important enzyme in drug metabolism. Patients should always be wary of mixing any medication with alcohol. (B J Kirby & J D Unadkat, D. (2007). Grapefruit juice, a glass full of drug interactions? https://pubmed.ncbi.nlm.nih.gov/17438537/)

The aim of the study: Apprehending frequent food-drug interactions and coming to know various ways to prevent or minimize food-drug interactions to achieve a successful treatment.

Methods

Data from 2015 through 2019 were obtained from the patient files archived in the Statistics Department of Mother Teresa University Hospital. This retrospective study took under observation a total of 100 patients: 50 medical records selected from the Clinic of Cardiology, at Mother Teresa University Hospital Centre and 50 cases of cardiopathic patients who received treatment in community pharmacies.

Disease conditions were identified by the International Classification of Disease (ICD-9) code. This study uses ATC/ DDD methodology known by the World Health Organization as a standard for drug treatment.

For outpatients, a brief survey was formulated to identify food-drug interactions. Medical records were studied for patients admitted to the Cardiology Clinic.

The selection criteria for patients were: patients who suffered from cardiovascular diseases (Coronary Artery Disease; Myocardial Infarction etc.) and patients who were treated with anticoagulant drugs.

Data like age, disease and commodities, past medical history, length of hospital stay, medication prescribed, and diet. were gathered from the medical records.

Patients who visited the pharmacy, anonymously, answered questions such as: "Have you been informed by the doctor about the diet you should follow while taking anticoagulants?" and "Have you personally inquired about the diet you should follow while using anticoagulants by searching for medical articles on the Internet or medical books?". These patients agreed to fill out the survey and deposited them in a box.

Results

The selected patients from the Clinic of Cardiology, at Mother Teresa University Hospital Centre, suffered from cardiovascular diseases and other comorbidities from which, hypertension (41.3%) was the most common comorbidity followed by diabetes (36,1%), kidney disease (9.2%) and others (13.4%).   (Fig.1)All patients taken into study (50) were hospitalized in

Intensive Unit Care (ICU) at Mother Teresa University Hospital Centre and were diagnosed with acute myocardial infarction. They were all treated with an anticoagulant drug. In their medical records, there were no specific instructions about the unique diet that should be followed by these patients. There were prescribed only two types of diets (diet 1 and diet 2) one being prescribed for diabetic patients, and the other for nondiabetic patients without any other explanations.
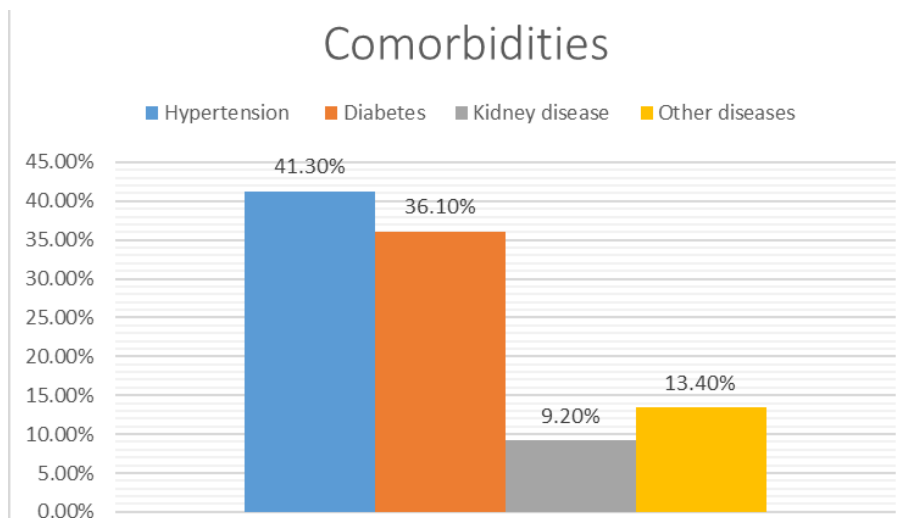
Fig.1 Most common comorbidities in patients with cardiovascular disease.

There were no recommendations and/or advice documented in the 50 medical records selected from the Clinic of Cardiology, at Mother Teresa University Hospital Centre regarding drug interactions, especially anticoagulants, with food, or adverse effects observed during therapy related to food. Additionally, the exact time when the anticoagulant drugs should be taken and the exact time of meal consumption was not determined in all medical reports.

Cases of interventions in the dosage of medicine because of its association with a certain food were very rare and nearly non-existent.Of the patients which completed the anonymous survey at community pharmacies, 29% aged between 50-60 years old, and 39% aged older than 60 (in total 68%), were not aware of food-drug interactions. 21% aged between 50-60 years old and 11% older than 60 (32%) were informed about food-drug interactions. (Fig.2)
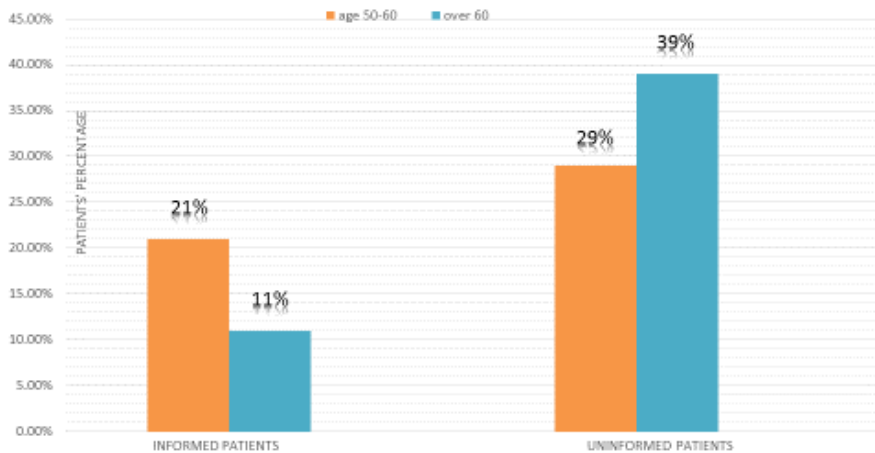
Fig.2 Percentage of patients who were informed/uninformed about food-drug interactions and their age.

We noticed that the age group 50-60 y old was more informed than the age group older than 60 y because it is easier for this age group to find information on the Internet, travel abroad for examinations and treatment, find and read medical literature, etc.

Of the patients that were informed, 39% were treated in clinics abroad and 61% were informed through the Internet, medical literature, etc. (Fig.3) (Fig.3)
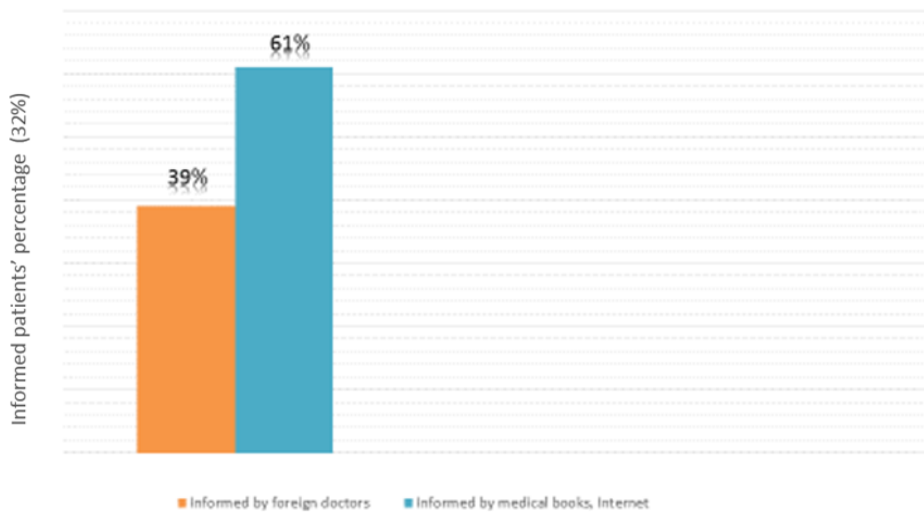
Fig.3 Graphical display of the information-gathering methods used by patients about food-drug interactions.

Discussion

Vitamin K is one of the main ingredients of green vegetables such as broccoli, peas, spinach, green salad, etc. Therefore, their consumption makes anticoagulant therapy less effective. Healthcare professionals should advise patients taking anticoagulants to maintain a consistent intake of vitamin K from foods and avoid consuming kale, spinach, and other leafy greens, cranberry juice, etc., or clinicians should manage the time and dose variability of the medicine to achieve a successful therapy.

Patients should be cautious in consuming foods like garlic, ginseng, ginger, and ginkgo to avoid the undesirable effect of hemorrhage.

Conclusion

Among the 50 medical records examined from the Clinic of Cardiology, at Mother Teresa University Hospital Centre, no advice or recommendations were provided regarding drug interactions with food, especially anticoagulants with food. In addition, none of the medical reports provided details on the exact time of taking anticoagulant drugs and the exact time of eating meals.

There were very few instances in which medicine dosage was altered due to a food association.

A majority of patients who completed an anonymous survey in community pharmacies, especially patients older than 60, were not informed about food-drug interactions.

Due to the ease of access to the Internet, traveling for examinations and treatment in clinics abroad, and finding and reading medical literature, the age group 50-60 y old were more informed about food-drug interactions than the elderly.

Recognition of the problem is an important first step in developing strategies to minimize its occurrence. Raising awareness about food-drug interactions (especially food-anticoagulant interactions) and the use of a personalized diet during the medication period is necessary. Advising post-hospital patients about their diet and the attentiveness they should have throughout their treatment is one of the main obligations of healthcare professionals. Continuous information and training of health workers (doctors, pharmacists, nurses) regarding possible food-drug interactions lead to the optimization of therapy and improvement of patients' health.

A very small number of patients were taken in this study, therefore a more extended study is needed.

More research has to be done on these potential interactions. Healthcare professionals should be aware of food-drug interactions and carefully inform and monitor any patient taking anticoagulants.

References:

1. Ansell J, McDonough M, Zhao Y, Harmatz JS, Greenblatt DJ. The absence of an interaction between warfarin and cranberry juice: a randomized, double-blind trial. J Clin Pharmacol 2009. Jul;49(7):824-830 10.1177/0091270009337510 [PubMed] [CrossRef] [Google Scholar]

2. Boucher, J. n.d. Common Food-Drug Interactions

3. Bushra, R., Aslam, N., Khan, A. Y. (2011). Food-drug interactions, Oman Med J.;26(2):77-83.doi: 10.5001/omj.2011.21.

4. Choi, J. H., and Ko, Ch. M.(2017). Food and Drug Interactions, PMID: 28261555, DOI: 10.15280/jlm.2017.7.1.1

5. Fleisher D, Li C, Zhou Y, Pao L-H, Karim A. Drug, Meal and Formulation Interactions Influencing Drug Absorption After Oral Administration. Clin Pharmacokinet. 1999;36:233–54. DOI: 10.2165/00003088-199936030-00004. [PubMed] [CrossRef]

6. Genser D. Food and drug interaction: consequences for the nutrition/health status. Ann Nutr Metab 2008;52(Suppl 1):29-32 10.1159/000115345 [PubMed] [CrossRef]

7. Hornsby LB, Hester EK, Donaldson AR. Potential interaction between warfarin and high dietary protein intake. Pharmacotherapy 2008. Apr;28(4):536-539 10.1592/phco.28.4.536 [PubMed] [CrossRef]

8. Kirby, B. J., Unadkat, J. D. (2007). Grapefruit juice, a glass full of drug interactions? , Clin Pharmacol Ther.;81(5):631-3.doi: 10.1038/sj.clpt.6100185.

9. Lourenco R. Enteral feeding: drug/nutrient interaction. Clin Nutr. 2001;20:187–93. DOI: 10.1054/clnu.2000.0155. [PubMed] [CrossRef]

10. McCabe BJ, Frankel EH, Wolfe JJ. (2003). Monitoring nutritional status in drug regimens. In: Handbook of food-drug Interactions, McCabe BJ, Frankel EH., Wolfe JJ (Eds.). CRC Press, Boca Raton. pp 73-108 [Google Scholar]

11. Melander, A. (1978). Influence of food on the bioavailability of drugs, PMID: 81118, DOI: 10.2165/00003088-197803050-00001.

12. Rodriguez-Fragoso L, Martinez-Arismendi JL, Orozco-Bustos D, Reyes-Esparza J, Torres E, Burchiel SW. Potential risks resulting from fruit/vegetable-drug interactions: effects on drug-metabolizing enzymes and drug transporters. J Food Sci. 2011;76:R112–24. doi: 10.1111/j.1750-3841.2011.02155.x. [PubMed] [CrossRef]

13. Wittkowsky AK. Dietary supplements, herbs, and oral anticoagulants: the nature of the evidence. J Thromb Thrombolysis 2008. Feb;25(1):72-77 10.1007/s11239-007-0110-0 [PubMed] [CrossRef]

14. Grześk, G., Rogowicz, D.,Wołowiec, Ł., Ratajczak, A., Gilewski,W., Chudzińska, M., Sinkiewicz, A., and Banach, J. D. (2021). The Clinical Significance of Drug–Food Interactions of Direct Oral Anticoagulants, PMID: 34445237, doi: 10.3390/ijms22168531