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Herbal drug interactions

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ABSTRACT :

The use of herbal medicines has surged globally, leading to increased co-administration with conventional pharmaceuticals. While often considered safe, herbs may interfere with drug metabolism, leading to altered pharmacokinetic and pharmacodynamic profiles. This review explores the mechanisms and clinical significance of herbal drug interactions. Key interactions involving herbs like St. John's Wort, Ginkgo biloba, Garlic, and Ginseng are discussed. The paper highlights the importance of awareness among healthcare providers and patients to minimize adverse events and optimize therapeutic outcomes.

Introduction

An herb is a plant or plant part used for its scent, flavour, or therapeutic properties. Herbal medicines are one type of dietary supplement. They are sold as tablets, capsules, powders, teas,extracts, and fresh or dried plants. People use herbal medicines to try to maintain or improve their health. Herbal medicines are an integral part of the healthcare and healing practices in many ethnic and cultural communities today. In addition, a growing number of people are turning to herbal medicines when pharmaceutical medicines do not meet their needs. A problem arises for physicians and pharmacists when they are unaware of herbal medicines that patients are taking, and prescribe pharmaceutical drugs as part of treatment. Unexpected interactions between medicines can occur. Even if the medical professional is aware of the patient's use of herbal medicines, s/he is rarely knowledgeable about the interaction of these

two types of medicines.

Herb-drug interactions refer to the effects that herbs or herbal supplements can have on the metabolism, absorption, or effectiveness of pharmaceutical drugs. These interactions can either increase or decrease the effectiveness of the drug, cause side effects, or even lead to toxic reactions. As herbal products are widely used for health promotion and treatment of various ailments, understanding these interactions is essential to ensure safe and effective use of both herbal remedies and prescription medications.

Benefits of herbal drug interaction

1. Synergistic Effects

Herbal drugs may enhance the effects of prescription medications. For example, certain herbs like St. John's Wort may support mood stabilization when used with antidepressants.

• Some herbs can amplify the action of conventional drugs, making them more effective at lower doses, which might reduce the likelihood of side effects.

2. Support for Liver Health

• Certain herbs, such as Milk Thistle (Silybum marianum), are known to support liver function and might help metabolize medications more efficiently, especially those metabolized by the liver.

• This can lead to enhanced elimination of waste products and potentially reduce drug toxicity in some cases

3. Reduced Side Effects

• Herbal supplements like ginger can help reduce nausea or gastrointestinal discomfort caused by certain drugs, providing complementary support for managing side effects.

• Turmeric and other anti-inflammatory herbs can aid in managing chronic pain or inflammation, helping people reduce their dependence on anti-inflammatory medications that have harsher side effects.

4. Improved Circulation

• Certain herbs like Ginkgo biloba can improve circulation and blood flow, which may enhance the absorption of specific medications or improve overall cardiovascular health, particularly when used alongside anticoagulant drug.

Classification of herbal drug interaction
The Drug interaction may be classified as per follows

HERB-HERB INTERACTION:
This type of interaction is also known as Drug-Drug interaction. These are common type
of drug interaction. When more herbal medicine are administered together, greater chance of herbal drugs interaction with each other. One drug may increase activity of other drug or inhibit its activity or may cause side effects. Eg: Vicodin is a pain killer when taken with sedating antihistamine medicaments, Benadryl produce an additive effect of drowsiness.

2. HERB-FOOD INTERACTION:
It is also known as food-drug interaction. In this type of interaction drugs interact with
food/beverages present in the stomach and may cause various side effects. Eg: combination of mils preparation and Mantha (gruel) is contraindicated, grape juice reduces enzyme activity in liver which are responsible for metabolism of drugs. it may cause side effects or may produce toxic effects.

3. HERB-DISEASE INTERACTION:
It is also known as drug-disease interaction. In some few cases drug also interact with
disease where disease alter drug activity. It may occur when an existing medical condition makes certain drugs potentially harmful. For example, if you have high blood pressure you could experience an unwanted reaction if you take a nasal decongestant. Oral decongestant like phenylephrine may increase blood pressure and can be dangerous to patient having hypertension.

Factors Affecting Drug Interaction

Mainly two types of factor affecting drug interaction, which are:

1) Drug-Related Factors

• Low bioavailability
• Drug formulation (presence of interacting excipients)
• Drug stereochemical and physiochemical properties

2) Patient-Related Factors

• Body weight, composition, and size
• Quantity and activity of specific drug-metabolizing enzymes)
• Age
• Gender
• Race
• Tobacco use
• Alcohol use (acute or chronic)
• Diet
•Underlying disease states and their severity
• Malfunction and disease of organs of drug elimination
• Polypharmacy (particularly with enzyme inhibitors or inducers)

Mechanism of Drug Interaction

Drug interaction can occur in different ways starting from its absorption to its elimination from the body. Following two types of mechanism of drug interaction which are:

1)Pharmacodynamic interaction: The term “pharmacodynamic interactions” refers to
interactions in which drugs influence each other’s effects directly. It occurs when two or more drugs administered together which act at the similar receptor site leading increase or decrease effects. As a rule, for example, sedatives can potentiate each other. The same is true of alcohol, which can potentiate the sedative effects of many drugs. Eg: chlorpromazine given to prevent nausea and vomiting, when interact with antipsychotic drugs like haloperidol and produce serious and possible fatal irregular cardiac rhythm. In pharmacodynamic interactions, it is not possible to demonstrate a simple systematics as it is in pharmacokinetic interactions; instead, they require a careful weighing up of which drug groups cause desired and which undesired effects which can in turn either potentiate or weaken each other.

2. Pharmacokinetic interaction: Pharmacokinetic interactions occur during the process of ADME & alter the absorption, distribution, metabolism, excretion or transport of a drug.Corresponding or independent changes in pharmacological response or therapeutic outcome may or may not occur. Bioavailability can be affected by physicochemical factors such as complexation and nonspecific adsorption of the drug and by physiological factors such as gastrointestinal motility, gastrointestinal pH, presence of gastrointestinal disease, gastric emptying time, intestinal blood flow, intestinal metabolism, and inhibition /induction of transport proteins. In infectious diseases, changes in extent are more clinically important than
changes in rate of absorption.

Here are some common herbs and their potential interactions:

1. St. John's Wort (Hypericum perforatum)
   - Interacts with: Antidepressants, blood thinners, HIV medications, and more

- Effect: Induces CYP3A4 enzyme, reducing drug efficacy
2. Ginkgo Biloba
   - Interacts with: Blood thinners, diabetes medications, and more
   - Effect: Increases bleeding risk, affects blood sugar control
3. Ginseng
   - Interacts with: Blood thinners, diabetes medications, and more
   - Effect: Increases bleeding risk, affects blood sugar control
4. Grape Seed Extract
   - Interacts with: Blood thinners, diabetes medications, and more
   - Effect: Increases bleeding risk, affects blood pressure
5. Turmeric/Curcumin
   - Interacts with: Blood thinners, diabetes medications, and more
   - Effect: Increases bleeding risk, affects blood sugar control
6. Kava
   - Interacts with: Sedatives, antidepressants, and more
   - Effect: Increases risk of sedation, liver damage
7. Valerian Root
   - Interacts with: Sedatives, antidepressants, and more
   - Effect: Increases risk of sedation
8. Garlic
   - Interacts with: Blood thinners, diabetes medications, and more
   - Effect: Increases bleeding risk, affects blood sugar control

Summary

This review has provided an overview of the issues that herbal drugs are safe when ingredients are pure and prescribed by physician. Life-threatening events reported from them are rare, compared to pharmaceutical products. However, there are always risks when appropriate regulations do not mandate the appropriate formulation of the remedies, or when self- medication fosters abuse. Using examples from four commonly used herbal medicines, we have demonstrated that conclusive evidence of herb-drug interactions is often lacking, and where clinical observations have been made or studies conducted. This review has provided an overview of the issues that contribute to the difficulty in assessing the significance of herb-drug interactions. Research into these interactions is crucial for improving patient safety and optimizing therapeutic strategies.

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