Drug Interactions

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What is a Drug Interaction?

- A Drug interaction is an interaction between a drug and some other substance, such as another drug or a certain type of food, which prevents the drug from working correctly.

- An interaction can either increase or decrease the effectiveness and/or the side effects of a drug, or it can create a new side effect not previously seen before.

Who is at Risk?

- People who are taking multiple medications for extended periods of times
- Patients with renal or hepatic impairments because their metabolism and excretion will be impaired
- Determining who will experience an interaction is largely unpredictable because various factors (age, lifestyle, diet, underlying disease) of an individual can affect the likeliness that the drug will interact.

Mechanisms by Which Drug Interactions Occur

- When there is an increase or decrease in:
  - The absorption of a drug into the body
  - Distribution of the drug in the body
  - Changes made to the drug through the body's metabolism
  - Elimination of the drug from the body
- When two drugs that have either additive or canceling effects on the body are taken at the same time.
- When one drug alters the concentration of a substance that normally occurs in the body thus reducing or enhancing the desired effects of another drug.

Consequences

- Drug Interactions can:
  - Reduce the desired effects of a drug
  - Increase the adverse effects of a drug
  - Result in unnecessary pain and suffering
  - Increase the beneficial effects of a drug
  - Decrease the adverse effects of a drug

Top 10 Drug Interactions

- Warfarin ~NSAIDs
- Warfarin ~ Sulfa Drugs
- Warfarin ~ Macrolides
- Warfarin ~ Quinolones
- Warfarin ~ Phenytoin
- ACE Inhibitors ~ Potassium Supplements
- ACE Inhibitors ~ Spironolactone
- Digoxin ~ Amiodarone
- Digoxin ~ Verapamil
- Theophylline ~ Quinolones

Top 10 Drug Interactions cont.

The Multidisciplinary Medication Management (M3) Project Advisory Committee identified this list of top ten drug interactions in long-term care. The purpose of this list is to alert people that there is a possibility for drug interactions so that the proper precautions can be taken such as using alternative medications, adjusting doses, carefully monitoring patients, or taking other appropriate actions.

The medications chosen for this list were based on their frequency of use in older adults, and on the likeliness for negative consequences if the drugs were taken together.

Warfarin

- Coumadin
- Used as an oral anticoagulant to prevent blood clot formation, prevent extension of clots already formed, and minimize the risk of blood clot embolization in vital organs (lungs, brain).
- Some medications can interact to enhance the actions of Warfarin causing excessive blood thinning that can result in life-threatening bleeding.

Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)

- Used to treat inflammation, mild to moderate pain, fever, headaches, arthritis, and menstrual cramps.
- Examples: Aspirin, Ibuprofen (Motrin), Naproxen (Aleve), Oxaprozin (Daypro), RofeCoxib (Vioxx), CeleCoxib (Celebrex)
- Interacts with Warfarin resulting in a potential for serious gastrointestinal bleeding.

Sulfa Drugs

- Used as antibiotics to treat bacterial and some fungal infections.
- Most commonly used to treat urinary tract infections (UTIs).
- Examples: Bactrim DS, Bactrim SS, Gantanol, Sulfatrim, Thiosulfil Forte
- Interacts with Warfarin by increasing the effects with a potential for excessive bleeding.

Macrolides

- Used as an antibiotic to treat common bacterial infections.
- Examples: Erythromycin, EES, Pediazole, Zithromax
- Interacts to increase the effects of Warfarin with a potential for excessive bleeding.

Quinolones

- Used as a primary agent in the treatment of UTIs.
- Examples: ciprofloxacin, norfloxacin, Cipro, Levaquin, Noroxin, Penetrex
- Interacts with Warfarin to increase its effects and potential for bleeding.

Phenytoin

- Used either orally or through injections as anti-seizure medication (anticonvulsant).
- Particularly used to prevent grand mal seizures and psychomotor seizures.
- Example: Dilantin
- Interaction can increase the effects of Warfarin and/or Phenytoin.

Angiotensin Converting Enzyme (ACE) Inhibitors

- Used for controlling blood pressure, preventing kidney damage and treating heart failure in patients with diabetes and/or hypertension.
- Examples: Lotensin, Aceon, Altace and Accupril
- Interacts with Potassium supplements and spironolactone by increasing the blood concentrations.

Digoxin

- Used to treat congestive heart failure, and to slow the heart rate down if there is a disturbance in rhythm.
- Example: Lanoxin
- Interacts with amiodarone and verapamil by causing great toxicity in the body and slowing the heart rate down too much.

Theophylline

- Used to provide relief and prevention of airway narrowing in asthmatic patients.
- Examples: Theo-Dur, Respbid, Uniphyl
- Interacts with Quinolones and increases the chances of having a higher toxicity level in the blood.

Spironolactone

- Used as a diuretic to remove excess fluid caused by many different diseases.
- Examples: Aldactone
- Interacts with ACE inhibitors by lowering the blood sodium levels while raising blood potassium levels.

Amiodarone

- Prescribed for many serious arrhythmias of the heart
- Examples: Cordarone
- Interacts with Digoxin by excessively lowering the heart rate

Verapamil

- Prescribed for chest pain that occurs due to insufficient oxygen in the heart muscle, also used for high blood pressure.
- Examples: Calan, Isoptin, Verelan
- Interacts with digoxin by increasing the blood levels of this medication.

Cost

- The cost of medication can be extremely high
- Costs of healthcare can be adversely affected because of the medical costs required to treat drug interactions

Ways of Preventing Drug Interactions

- A list of all medications that they are currently taking or have used in the last few weeks (3 ~ 4) to the healthcare providers. This list should include over-the-counter medications, vitamins, food supplements, and herbal remedies.
- Keep the list of medications current and inform healthcare providers when any drug is added or discontinued.
- Report any changes in lifestyle to healthcare providers (i.e. diet, exercise).
- Ask healthcare providers about any possible drug interaction that may occur with a medication.
- Work with healthcare personnel to eliminate any unnecessary medications since the chance of experiencing an interaction increases with the number of drugs being taken.
- Pay attention and record time of day when medications are taken.
- Be aware, be comfortable, and be actively involved in the treatment/drug therapy process.

Where to find more information:

- Talk to a healthcare provider (ask the doctor about the prescribed medications).
- Talk to a pharmacist.
- Read the information that accompanies the medication.
- Research at a local library or on the internet with reliable and valid sources (i.e. drugs.com).

References:

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- The Pill Book. 10th edition 2002.