A Practical Approach to Drug Interactions

Tatyana Gurvich, Pharm.D.
Glendale Adventist FPRP
USC School of Pharmacy
UCI Medical Center Senior Health Clinic
Introduction

- 2 million cases of ADR’s occur in the U.S. annually
- 20% of hospital admissions are due to a missed drug interaction or an adverse drug reaction
- Fatal drug interactions always seem to make it on to the 6:00 pm news broadcast
- Patients are usually worried about drug interactions
- With hind sight being 20/20, physicians are always blamed for drug interactions
Introduction

- How much do we really know about drug interactions?
- How drug interactions are studied by the pharmaceutical industry
- Case reporting
- Potential for a drug interaction Vs. Actual occurrence
Types of Drug interactions

- Drug-Drug Interactions
- Drug-Vitamin/Supplement interactions
- Drug-Food Interactions
Mechanisms of Drug Interactions

- Absorption
- Metabolism
- Additive/Synergism/Potentiation
- Antagonism
Absorption Interactions

- Thyroid Hormone + Calcium or Tums

- Iron + Calcium or Tums

- Cipro/Levaquin+ Calcium or Tums

- Separate administration times to avoid interaction
Metabolism Interactions

- Where does the metabolism (break down) of drugs take place?
  - The liver
  - The P450 enzymatic pathways
Metabolism Interactions

- A drug slows down the breakdown of another medication

- A drug speeds up the breakdown of another medication

- A drug slows down the conversion of another drug to an active substance
Examples of Metabolism Interactions

- Coumadin + Bactrim or Cipro or Zpack
- Simvastatin and amlodipine
- Coumadin + St. John’s Wart
- Plavix+ Omeprazole
Time Course of an Interaction

- May occur within a few days of starting a combination of interacting medications
- May occur a week or more after the interacting drugs have been started
- Dependent on the half life of the 2 interacting drugs
Case report: Levaquin and Theophylline

- A patient with pre-existing lung disease has been taking Theophylline for years
- Develops an infection and is started on Levaquin
- Develops Theophylline toxicity over the next 7-10 days
- Dies of Theophylline toxicity
Sequence of Drug Administration

- Order in which drugs are added may determine a drug interaction occurrence
  - Amiodarone 1\textsuperscript{st} Coumadin 2\textsuperscript{nd}
    - VS.
  - Coumadin 1\textsuperscript{st} and Amiodarone 2\textsuperscript{nd}
Sequence of Drug Administration

- Drug interactions can occur when a medication is stopped
  - Pt is on an antidepressant and coumadin was recently started
  - Pt decides to stop an antidepressant on her own
  - Coumadin test comes back low: Risk of a clott
- Compliance is very important
Type of Interaction: Additive/Synergism/Potentiation

- Aldactone + Losartan or Lisinopril
  - High potassium
- Anti-inflammatory drugs + Coumadin
  - Increased bleeding
- Vitamin E or Gingko + Coumadin
  - Increased bleeding
Additive/Synergism/Potentiation: Serotonin Syndrome

- Occurs when medications which increase serotonin levels are prescribed
  - Symptoms: Severe anxiety and agitation, increase in blood pressure and temperature, rigidity, sweating, mental status change
  - Occurs in roughly 1 in 300,000 pts
Additive/Synergism/Potentiation: Serotonin Syndrome

- Two anti-depressants given together
  - Celexa, Effexor, Zoloft, Cymbalta, Prozac, Trazodone, Lexapro, Paxil
- An antidepressant and Tramadol
  - Same as above
- An antidepressant and anti-psychotic medications
  - Seroquel, Risperdal, Abilify
Dosing Considerations

- Drug interactions are usually dose related
- More likely at high doses
- Careful monitoring is advised at lower doses
Synergistic interactions

- Not all drug-drug interactions are bad

- Some drugs work better in combination than individually

  - Bactrim
  - Dyazide
Antagonism Interactions

- Dementia medications and urinary incontinence drugs
- Vitamin K and Coumadin
- Green leafy vegetables and Coumadin
Tips to avoid drug interactions: What should physicians do?

- Judicious prescribing
- Medication review at each visit
- Each medication must be carefully selected
- Within each class of medications some medications will interact less
- Close monitoring
- Patient education
Tips to avoid drug interactions: What should patients do?

- Carry a list of all prescribed medications with you at all times
- Make sure your doctor reviews the list before medication changes are made
- Go to a single pharmacy
- Get to know your pharmacist
Tips to avoid drug interactions: What should patients do?

- Know what to expect from each medication
- Learn what the common side effects are
- Learn signs of toxicity when appropriate
- Listen to your body and note any changes
- When side effects don’t go away or get worse, contact your doctor right away
Tips to avoid drug interactions: What should patients do?

- The best way to avoid drug interactions is to stay compliant and take as few medications as needed.

- Don’t panic: Most drug interactions are theoretical. Actual occurrence is relatively rare.