

Pharmacokinetics Class Preparation

Nursing 101

GI SYSTEM: The oral medication reaches the systemic circulation through the GI system. As a result, numerous factors can affect the absorption of the pill.

Questions:

1. A client is experiencing diarrhea. How could this affect absorption of an oral drug?
If a patient is experiencing diarrhea, this would mean that there is a presence of stool in the rectum. With this in mind, this presence would limit tissue contact, which would affect the absorption of an oral drug.
2. How could the presence of food in the stomach affect the rate of absorption?
The presence of food in the stomach may be able to affect the rate of absorption by delaying the gastric/GI emptying time, and by the food then affecting the pH in the GI, which could have an indirect effect on the rate of absorption.

CARDIOVASCULAR SYSTEM: Once the pill is absorbed into the bloodstream, it is carried or delivered to the sites of pharmacologic action where the drug produces its effects.

Question:

3. How do you think the distribution of the oral medication affected if a client has less than normal cardiac output?

If a client has less than normal cardiac output, the individual may have a slower blood perfusion, which affects how the blood is being circulated through our bodies and our organs. With this in mind, the distribution of the oral medication may have a slower than normal absorption rate.

LIVER: Most biotransformation takes place in the liver. Any decrease in the ability of the liver to metabolize medication could lead to an accumulation of the active drug in the bloodstream.

This could put the client at risk for toxic effects and adverse reactions.

Questions:

4. How might nutritional status affect metabolism?

A client's nutritional status may affect metabolism because individuals who are malnourished can have some deficiencies with the factors needed to produce certain medication-metabolizing enzymes (which is what ultimately impairs and can affect the metabolism of medications).

5. What factors influence the rate of medication metabolism?

Some of the factors that influence the rate of medication metabolism include: peripheral vascular disease, medication-metabolizing enzyme levels, renal excretion [these 3 RFs lead to → INCREASED dosage]. Other risk factors include: liver failure, malnourishment, and different medications that use the same metabolization pathway [these RFs lead to → decreased dosage]

KIDNEYS: Drug excretion/elimination occurs mainly through the kidneys into the urine. If there is any impairment in kidney function, medications may not be excreted at the anticipated speed. Subsequent medication administration may lead to accumulation and potential toxicity.

Questions:

6. Why would very young and very old clients need to be closely monitored by nurse for signs and symptoms of drug toxicity?

Clients who are very young would have to be monitored closely by a nurse to watch for drug toxicity signs and symptoms due to the fact that infants have a limited medication-metabolizing capacity. Generally the capacities can vary from individual to individual, but normally as we age, our medication metabolism tends to decline. This is also why individuals who are also very old would need to be closely monitored by a nurse to watch for drug toxicity signs and symptoms.

7. How can the nurse assess kidney function?

The nurse can assess kidney function by monitoring BUN (Blood Urea Nitrogen) and creatinine levels, which can affect the duration and intensity of a medication's response (NOTE: if there is an increase of this, it can be a determining factor of kidney dysfunction). It is also important to note that kidney function affects the half-life of medications (as well as the liver), so it would be important to keep an eye out for this with our clients.