

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?
Diarrhea may cause absorption of an oral medication to not occur. This is because the medication moved through the GI system so quickly, it could not be fully absorbed in the GI tract.
2. How could the presence of food in the stomach affect the rate of absorption?
Medications taken with food may have a slower rate of intestinal absorption. Drug-food interactions may also affect metabolism and excretion, acting as a risk factor for medication toxicity.

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?
 - a. Distribution of the medication may be reduced or unequal with less than normal cardiac output.
 - i. Highly vascular areas may receive higher concentrations of the medication since they receive the greatest blood supply.

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?
Nutrients can either allow or prevent enzymes of the CYP system to function normally. The CYP enzymes play a role in medication metabolism by regulating the rate at which a med is broken down and the amount of time the medication stays in the body.
What kind of food is the client eating with their meds/ on a regular basis?
5. What factors influence the rate of medication metabolism?
 - Pediatric clients have a higher rate of metabolism

- Functioning of the kidneys, heart and liver.
- Food consumption (with the medication)
- Weight
- Male vs. female (pregnancy)
- Cultural and genetic factors; their culture's nutritional habits and susceptibility to various conditions.

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 a nurse for signs and symptoms of drug toxicity?
 - a. Pediatric clients must be closely monitored because they lack metabolizing enzymes
 - b. Geriatric clients must be closely monitored because they tend to have less muscle mass. They should also be monitored because of the declined functioning of the liver, heart, and kidneys.
 - i. "Medications are stored in the fatty tissue, resulting in decreased plasma levels and reduced efficacy."
7. How can the nurse assess kidney function?
 - a. UA, urine C&S, closely assess I&O, blood testing, possible US of the kidneys/ urinary organs.