

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?

The change in gastric pH levels and the hastened gastric emptying time would decrease the absorption of a medication administered orally. A difference in pH would change how the drug is metabolized and increased gastric emptying time would decrease the amount of time the drug would have to be absorbed.

2. How could the presence of food in the stomach affect the rate of absorption?

The chemical make up of certain foods might inhibit the absorption of certain foods, either through binding to them or impacting the function or amount of intestinal enzymes. Food might also slow the absorption rate by delaying the medication at its peak concentration.

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 is affected if a client has less than normal cardiac output?

Delayed or inhibited distribution. This is an event where blood flow is not optimal, therefore the medication that's been absorbed into the bloodstream might not reach it's full effect, or it might not make it to the site of pharmacologic action at all depending on different factors like food, solubility, drug concentration, etc.

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?

Clients who might not be meeting their nutritional needs may not have the proper medication metabolizing enzymes present which can leave medication unmetabolized and allow for it to accumulate. Clients not meeting nutritional needs might be lacking important micronutrients that aid in the breakdown and absorption of medication.

5. What factors influence the rate of medication metabolism?

Presence of metabolizing enzymes, age (infants and people in their older age have little medication-metabolizing ability therefore needing smaller doses of medications), decreased hepatic function, and when two medications might utilize the same metabolic pathway, decreasing absorption for either one or both of them.

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 nurses for signs and symptoms of drug toxicity?

Very young clients like infants and older clients have less medication metabolizing ability, whether it be because of an underdeveloped immune system, lack of metabolizing enzymes, or decreased hepatic function (more characteristic for older individuals), these groups are more likely to have medications accumulate in their system from their inability to metabolize medications, which could lead to them exhibiting some signs or symptoms of drug toxicity

7. How can the nurse assess kidney function?

Urine output (quantity, color, frequency, odor) and evaluating for any bladder distention.