



Chapter 185 – Drug Therapy in the Geriatric Patient

Episode Overview

- Those with a chronologic age of 65 years or older are commonly referred to as older adults (or the elderly), but physiologic age is more indicative of a drug's therapeutic or toxicologic effect. Besides age, overall patient assessment should include organ function, comorbidity, and functional status to guide drug dosing.
- Pharmacokinetic and pharmacodynamic changes that occur with age need to be considered to optimize drug dosing and minimize toxicity in older adults. In most cases, a start low, go slow approach is recommended. Multiple or repeated dosing is more likely to lead to drug accumulation compared to single doses in the ED.
- Polypharmacy is common in older adults and predisposes them to adverse drug effects, drug interactions, and functional/cognitive impairment.
- There are published lists of potentially inappropriate medications, such as the Beers List and the STOPP and START criteria, but there are limited studies to enable extrapolation to the ED setting.
- Of all drug-related presentations to the ED, warfarin-induced bleeding has been shown to be the most common in older adults.
- The use of newer oral anticoagulants, such as direct thrombin inhibitors and factor Xa inhibitors, has been increasing. These newer agents undergo renal elimination; thus, drug accumulation is a concern in older adults.
- Older adults often present to the ED with altered mental status. Drug-related causes such as anticholinergic medication burden should be considered in the differential diagnosis.
- Geriatric patients with pain-related complaints are less likely to receive analgesics in the ED compared to younger adults, placing them at risk for poor pain control. Dosing of opioids should be cautious, with frequent monitoring and titration.
- A growing number of institutions have pharmacists practicing in the ED. In geriatric ED's, there is a great opportunity to integrate and consult with pharmacists, given the myriad drug therapy issues that can lead to suboptimal care.

Core Questions

1. List 4 factors altering pharmacokinetics in the elderly (ADME)
2. List 6 factors contributing to adverse events from medications in the elderly
3. Which 8 medications are most responsible for adverse events in the elderly?
 - a. Beers List
4. List 5 harmful drug interactions in the elderly
5. What are the top 10 STOPP criteria?

Rosen's In Perspective:

- The elderly are coming in droves!
- Drug therapy issues are particularly challenging in older adults because of altered pharmacokinetics and pharmacodynamics compared to younger adults.
- In addition, they take more medications, have more comorbidities, and are at increased risk for adverse drug effects because of the physiologic changes of aging
 - As a result, medication selection and dosing need to be age-adapted for optimal patient outcomes.



[1] List 4 factors altering pharmacokinetics in the elderly (ADME)

Please refer to Table 185.1 from Rosen’s 9th Edition for a more comprehensive summary of the factors altering pharmacokinetics in the elderly

Pharmacokinetic Changes in Older Adults	
Absorption	<ul style="list-style-type: none"> • Increased gastric pH, changing net absorption • Delayed gastric emptying, changing net absorption • Diminished splanchnic blood flow, delaying peak effects of ingested drugs • Diminished bowel motility, altering peak effects of ingested drugs
Distribution	<ul style="list-style-type: none"> • Increased adipose tissue, resulting in increased accumulation and duration of effect for lipophilic medications • Diminished total body water, resulting in a lower required loading doses for hydrophilic medications
Metabolism	<ul style="list-style-type: none"> • Diminished phase one metabolism, resulting in accumulation of phase-1-dependent medications • Diminished hepatic blood flow, resulting in altered metabolism
Elimination	<ul style="list-style-type: none"> • Diminished glomerular filtration rate, requiring clinicians to make VITAL drug dosage changes; CALCULATE THE CREATININE CLEARANCE in elderly patients regularly

[2] List 6 factors contributing to adverse events from medications in the elderly

- Polypharmacy / drug interactions
- Comorbidities
- All of the pharmacokinetic reasons:
 - Altered GI motility and perfusion
 - Decreased hepatic function
 - Decreased renal function
 - Decreased lean body mass
 - Increased adipose tissue
 - Changes in protein binding

[3] Which meds are most responsible for adverse events in the elderly?

REMEMBER: The Beers criteria are a consensus guideline published semi-regularly that provides clinicians with lists of medications that should be avoided in older adults.

Please refer to Table 185.3 from Rosen’s 9th Edition for a more comprehensive summary of the most common Beers List medications prescribed in the ED.

1. Promethazine
2. Diphenhydramine
3. Diazepam
4. Hydroxyzine
5. Amitriptyline



[4] List 9 harmful drug interactions in the elderly

Please refer to Table 185.2 from Rosen's 9th Edition for a more comprehensive summary of harmful drug interactions in older patients

Drug	Adverse Event
ACE Inhibitors/ARB's	Hyperkalemia
Benzos and Sedative-Hypnotics	Fractures, Falls
CCB's	Hypotension
Digoxin	Toxicity
Lithium	Toxicity
Phenytoin	Toxicity
Sulfonylureas	Hypoglycemia
Theophylline	Toxicity
Warfarin	Bleeding

[5] What are the top 10 STOPP criteria?

REMEMBER: STOPP (Screening Tool of Older Persons' Potentially Inappropriate Prescriptions) are newer criteria to identify potentially inappropriate medications in the elderly, including drug–drug and drug–disease interactions, drugs which increase risk the of falls, and drugs which duplicate therapy.

REMEMBER: Unlike the Beers List, the STOPP criteria have been significantly associated with avoidable adverse drug events in older people that cause or contribute to hospitalization.

Please refer to Table 185.4 from Rosen's 9th Edition for a more comprehensive summary of the top ten STOPP criteria

1. Long-term use of benzodiazepines
2. Duplicate prescriptions from the same drug class
3. Proton pump inhibitor for peptic ulcer disease at full dose for >8 weeks
4. NSAID's in patients with moderate to severe hypertension
5. Long-term use of opioids
6. Aspirin without adequate cardiovascular risk
7. Warfarin and NSAID used together
8. Beta blocker in patients with COPD
9. Prolonged use of first-generation antihistamines
10. NSAID use in patients with chronic renal failure