Polypharmacy in Elderly Patients

Sunny Linnebur, Pharm.D., FCCP, BCPS, CGP

Associate Professor, Department of Clinical Pharmacy
University of Colorado School of Pharmacy
Clinical Pharmacist, UCH Seniors Clinic

Objectives

1. Describe polypharmacy, and how it negatively impacts older adults
2. Identify ways to balance prescription and over-the-counter medications
3. Implement a plan to increase appropriate medication use in older adults
4. Provide resources to patients regarding polypharmacy
Percentage of U.S. Population Over 65 Years of Age

Year
Percent
0 5 10 15 20 25


Projected Increase from 1993 to 2020 in the Number of People Aged 65 Years or Older, by State

<50% 50%-74.9% 75%-99.9% >100%

Medications and Older Adults

- 13% of population
- 30% of all Rx drugs
- 50% of OTCs
- 40% Drug-related hosp
- 50% of drug-related deaths
Polypharmacy

• Definition
  – Use of multiple, concurrent medications
  – Use of medications that are clinically unwarranted

• Common in the elderly
  – 40% take ≥5 drugs/wk
  – 12% take ≥10 drugs/wk
  – Underuse of medications also common

Causes of Polypharmacy

• Patients
  – Multiple illnesses, physicians, and pharmacies
  – Hospitalization
  – Impairments in vision/dexterity
  – Patient expectation/acknowledgement of ailment
  – Reluctance to discontinue meds
  – Self medication with OTCs/borrowing meds

Drugs & Aging 2003; 20(11): 817-832

Opinions of an Older Adult

• goldiema
• 9:52 PM on 12/12/2010
• I take only supplements and no prescription drugs, other than Fortical which is a nasal spray that is used to prevent or inhibit osteoporosis, along with calcium and vitamin D3.
• The nasal spray has no serious side-effects because it is not ingested into the system, but enters the bloodstream immediately through the nasal membranes. This has proven to be an effective bone builder and preventative for bone loss.
• I do not believe in most prescription drugs, since they have serious side-effects and are extremely costly, even with insurance plans. To me it's like paying a very high price for something that could possibly kill or seriously harm.
Causes of Polypharmacy

• Healthcare providers
  – Multiple physicians and pharmacies
  – No regular review of medication list
  – Treating ADRs with other drugs
  – Reluctance to discontinue meds

Drugs & Aging 2003; 20(11): 817-832

Consequences of Polypharmacy

• Increased
  – Prescribing errors
  – Cost
  – Incidence of ADRs and drug interactions
    • 27.6% preventable
    • In 2000, $133 billion spent on drugs, $177 billion spent on managing drug-related problems

J Am Board Fam Pract 1998;11(2):140-44.
Adverse Drug Events

- 7-fold increased risk for elderly
- For every $1 spent on drugs, at least $1 spent on ADRs
- 95% considered predictable
- Factors predisposing older adults
  - Multiple drug use
  - Multiple disease states
  - Misuse of medication
  - Physiologic changes in drug disposition

Summary of Age-Related Pharmacokinetic Changes

| Absorption | ↑ gastric pH | ↓ GI motility |
|            | ↓ absorptive surface | ↓ gastric emptying rate |
|            | ↓ splanchnic blood blow |            |
| Distribution | ↓ cardiac output | ↓ TBW & LBW |
|              | ↓ hepatic/ renal blood flow | ↓ relative tissue perfusion |
|              | ↓ body fat | ↓ albumin |
| Metabolism | ↓ liver mass |            |
|             | ↓ hepatic blood flow |            |
|             | ↓ enzyme activity |            |
| Excretion | ↓ renal blood flow |            |
|            | ↓ GFR (CrCL) |            |
|            | ↓ Tubular secretion |            |
|             | ↓ renal mass |            |
Pt. with insomnia

Rx. diazepam

Morning lethargy

Fall

Hip fracture

**Older Adults Example: Increased Distribution and Reduced Clearance**

**Drug Interactions**

Predictors of Drug Interactions

- **Age**
  - 47% of patients >75 years old are on ≥ 5 drugs
- **Severity of disease**
- **Chronic diseases**

Drug Interactions

- Drug/Drug, Drug/Disease, Drug/Food, Drug/Alcohol
  - Includes prescriptions, over-the-counter medicines, vitamins, supplements, herbals
- Examples:
  - Warfarin and antibiotics (e.g., levofloxacin, SMX/TMP)
  - Calcium and antibiotics (doxycycline)
  - Antidepressants (e.g., sertraline and amitriptyline)
  - Anticholinergic drugs (e.g. oxybutynin or diphenhydramine) and dementia
  - Warfarin and green leafy vegetables
  - Grapefruit Juice and multiple medicines (e.g. simvastatin or sildenafil)
  - Alcohol and pain medicines (e.g., tramadol, hydrocodone)

Polypharmacy: Other Possible Negative Outcomes

- Increased incidence of
  - Depression/confusion/falls
  - Nursing home placement
- Decreased
  - Adherence to meds
  - Social activity
Polypharmacy: Other Possible Negative Outcomes

- Additional medication
- No treatment
- Additional healthcare encounter
  - ER visit
  - Hospital admission
  - Allied HCP visit (PT, dietician, social worker, dentist)
  - Additional lab or radiological procedure
- Death

“Inappropriate” Drugs in the Elderly

- Beers’ drugs
- STOPP drugs
- Medication Appropriateness Index
The Beer’s Criteria

- Consensus criteria for safe medication use in elderly patients
- Based on expert consensus developed through modified Delphi technique
- Originally published in 1991
- Updated in 1997 and in 2002
- Addresses inappropriate drugs regardless of diagnoses or conditions, or drug use in certain diagnoses or conditions

Beer’s List

- 48 individual medications or classes of medications to avoid
  - Most common offenders: amitriptyline, diazepam, propoxyphene, doxepin
- 20 diseases or conditions and medications to be avoided in older adults with these conditions
  - Examples:
    - Hypertension: pseudoephedrine, diet pills, amphetamines
    - Syncope or falls: BZDs, TCAs

Arch Int Med 2003;163:2716
STOPP Criteria

- “Newer Beers Criteria” from Ireland
- Identified a higher proportion of patients requiring hospitalization due to PIM-adverse events than Beers
- Appendix is a great reference

Excerpts from STOPP

**CV System**
- Digoxin >125 mcg/day with CrCl <50ml/min
- HCTZ with history gout
- Furosemide for edema without HF
- ASA > 150mg/day
- ASA without PPI or H2RA and hx of PUD
- Warfarin + ASA without PPI or H2RA

Gallagher P, O'Mahoney D. Age and Aging 2008:1-7 and supplementary data
### Excerpts from STOPP

**CNS**
- TCAs with dementia, constipation, glaucoma, dental problems, urinary retention, falls, QT prolongation
  - If must use: nortriptyline/desipramine
- Benzodiazepines (esp long-acting)
  - If must use: lorazepam/oxazepam/temazepam
- SSRIs with hyponatremia
- 1st generation antihistamines

**Musculoskeletal System**
- NSAIDs with hx PUD/GI bleeding, uncontrolled HTN, chronic kidney disease, heart failure, in combination with warfarin
- Long-term corticosteroids for RA or OA
- Long-term NSAID or colchicine for prevention of gout
Excerpts from STOPP

GI
✓ Prochlorperazine or metoclopramide and Parkinson’s disease
✓ Antispasmodic drugs (e.g. dicyclomine) and constipation

Respiratory
✓ Theophylline use for COPD
✓ Long-term systemic corticosteroids instead of inhaled

Urogenital System
✓ Antimuscarinic drugs (e.g. oxybutynin) and dementia, glaucoma, constipation
✓ Alpha blockers with incontinence
✓ Alpha blockers with long term catheter use
Excerpts from STOPP

High risk of falls
✓ Benzodiazepines
✓ Antipsychotics
✓ Opioids
✓ Vasodilators
✓ 1\textsuperscript{st} generation antihistamines

Drug-Induced Diseases: Incontinence

- **Stress**
  - Alpha-blockers
- **Overflow**
  - Anticholinergics, diphenhydramine
- **Urge**
  - Dementia drugs
- **Functional**
  - Sedatives, hypnotics, antipsychotics
Principals of Prescribing: Consider BEFORE Prescribing

- Is this new symptom a side effect of any medication the patient is currently taking?
- If not, is the problem/symptom treatable with drugs?
- Have the risks versus the benefits of drug therapy been weighed for this patient?

Principals of Prescribing: Consider DURING Prescribing

- Is this the right drug for this illness?
  - Are there any non-drug alternatives which can be tried before drug therapy?
- Is this the right drug for this patient?
  - Can this drug interact with any other diseases a person may have?
  - Can this drug interact with any other drugs this person is taking?
  - Can the patient afford the drug?
- Is this the right dose for this elderly patient?
  - Has the dose been adjusted for age, renal function, hepatic function or other parameter?
  - Start with a low dose and increase slowly
- How will age-related changes in drug disposition and response affect this drug in this patient?
Principals of Prescribing: 
Consider AFTER Prescribing

- Has both the patient and/or caregiver been educated about the proper use and side effects of this drug?
- Is this drug having the desired therapeutic effect?
- Is this drug causing an unwanted adverse effect?
- What is the appropriate duration of treatment?
- When can the drug be stopped?
- Does the patient need all of these drugs?
  - Can I talk them out of any of the OTCs/herbals?

Patient Case: 81 yr old

**Problem List**
- Dyslipidemia
- HTN
- Chronic Low Back Pain
- Spinal stenosis
- Constipation
- Hypothyroidism
- Depression
- Insomnia
- Fatigue
- Mild cognitive impairment

**Medication List**
- Amlodipine 10 mg daily
- HCTZ 12.5 mg daily
- Lisinopril 40 mg daily
- Levothyroxine 150 mcg daily
- Venlafaxine 75 mg daily
- Atorvastatin 40 mg daily
- Gemfibrozil 600 mg one tablet BID
- Ibuprofen 400 mg TID
- Diazepam 10 mg at bedtime
- Gabapentin 900 mg TID
- APAP 500 mg one tablet 1-2x/wk
- Tylenol PM one tablet 1-2x/wk
- Docusate one capsule BID
- Diphenhydramine PRN allergy symptoms
Combating Polypharmacy: Mild Cognitive Impairment

You perform a Mini-Mental State Examination on this patient and she has some mild cognitive impairment. Which of the following medications could be contributing?

A. Diazepam  
B. Gabapentin  
C. Diphenhydramine  
D. All of the above

Combating Polypharmacy: Constipation

You discuss constipation with this patient and she states it is still bothering her. Which of the following drugs may be contributing?

A. Amlodipine  
B. HCTZ  
C. Ibuprofen  
D. Diphenhydramine  
E. All of the above

Which drugs could you stop or change?
Combating Polypharmacy: Dyslipidemia

You review the patient’s FLP, and her LDL is 98, her TGs are 110, and her HDL is 50. Which of the following plans is appropriate for this patient’s dyslipidemia?

A. Continue atorvastatin and gemfibrozil
B. Continue atorvastatin and discontinue gemfibrozil
C. Continue gemfibrozil and discontinue atorvastatin
D. Discontinue both atorvastatin and gemfibrozil

Combating Polypharmacy: Back Pain

You discuss her back pain and she is not well controlled (pain 6/10, all day long). Which of the following changes would be the best for this patient?

A. Change acetaminophen to scheduled TID or QID
B. Change acetaminophen to acetaminophen/codeine
C. Increase ibuprofen to 600 mg TID
D. Increase gabapentin to 1200mg TID

What other drug changes would be helpful here?
Combating Polypharmacy: Insomnia and Fatigue

You discuss her insomnia and she thinks she is doing ok, but has some daytime fatigue. Which of the following changes would be appropriate for her?
A. Change diazepam to temazepam
B. Stop diphenhydramine/apap (Tylenol PM)
C. Reduce gabapentin dose to renal dose
D. All of the above

Resources

• American Geriatrics Society
  – Foundation for Health in Aging
  – Aging in the Know
  – http://www.healthinaging.org/agingintheknow/

Questions?

Email: sunny.linnebur@ucdenver.edu
303-724-2621