Medication Review: Ways to help the older adults you work with

NICOLETTE CENTANNI, PHARM.D, BCPS, CGP
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Purpose

- The purpose of this program is to provide a basic understanding of changes in the aging body that may relate to medication effects and discuss various assessment tools to aid in the evaluation of medications in the older population.

Objectives

- Explain age-related changes in the body that relate to medication effects
- Summarize American Geriatric Society’s 2015 updated BEERS Criteria
- List and describe other assessment tools including the Anticholinergic Brochure and Steadi Toolkit

Fun Facts & Stats

- Average life expectancy was 49.2 years at the turn of the 20th century...as of 2013, it is 78.8 years
- Maine is the oldest state in the nation
- More than 1/3 of elderly patients are on 5-9 medications and 1/8 are on >10 (polypharmacy)
- The use of inappropriate medications accounts for $7.2 billion in healthcare expenditures annually

Pharmacokinetics

- Definition
- How the body processes a specific drug after its administration
- What the “body does to the drug”
- Absorption
- Distribution
- Metabolism
- Excretion

ADME

The Associated Press “Maine is the nation’s oldest state and getting older” The Portland Press-Herald June 2013
Drug Absorption

- Oral medications are absorbed in the gastrointestinal (GI) tract
- Many factors are involved for a medication to enter the bloodstream after oral administration
- Most medications need to be absorbed into the bloodstream and delivered to their site of action

Absorption in the Older Adult

<table>
<thead>
<tr>
<th>Physiologic Changes</th>
<th>Effect on Drug Absorption</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gastric secretion, pH reduced</td>
<td></td>
</tr>
<tr>
<td>Gastric motility increased</td>
<td></td>
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<tr>
<td>Gastric blood flow reduced</td>
<td></td>
</tr>
<tr>
<td>First pass metabolism increased</td>
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</tbody>
</table>


Distribution

- Where the drug goes after it enters the bloodstream
- Volume of distribution
  - Small—remains mostly in the blood without much distribution to the central nervous system (CNS) or other body fluids
  - Large—widely distributed into tissues, body fluids, and CNS (crosses blood brain barrier)
- Influencing factors
  - Protein binding, pH, molecular size and water/lipid solubility

Drug Distribution in the Older Adult

- Muscle mass
  - Increase % fat: lipophilic drugs will have larger distribution (sticks around longer)
  - Decrease total body water: drug with low volume of distribution will have higher concentration
- Normal doses in younger patients could be toxic in the older adult


Metabolism

- Liver is organ mostly responsible for metabolism
- Turning a drug into a form more easily eliminated by the body
- Liver utilizes various types of reactions
  - Oxidation, reduction, hydrolysis, CYP450 (phase I)
  - Conjugation
- Hepatic blood flow decreased in elderly
  - Large decrease in phase 1 metabolism

Metabolism

Excretion

- Elimination of drugs from the body
- Primarily via kidney (renal)
- By age 75-80, a person’s renal function has declined by ~50% of previous function
  - ~1ml/min/1.73m2/year after age 30-35

Pharmacodynamics

- Definition: how the drug affects the body
- Changes in older adult can cause increase OR decrease sensitivity to certain drugs
- Leads to increase adverse reactions
  - Dizziness, altered mental status, falls
- Certain medication classes may have more toxic effects in the elderly
  - Anticholinergics, antipsychotics, antihypertensives, sedatives, anticoagulants, etc

Potentially Inappropriate Medications

- There are some medications classes that could have an increase side effect impact in the older adult

  - Anticholinergics
    - Confusion
    - Delirium
  - Antihypertensives
    - Orthostatic hypotension
    - Falls

Anticholinergics

- Medications with anticholinergic side effects include:
  - Antihistamines: diphenhydramine, loratadine*
  - Tricyclic antidepressants (TCAs): amitriptyline, nortriptyline*
  - Antipsychotics: clozapine, olanzapine, chlorpromazine
  - Paroxetine (SSRI with most)
  - Muscle relaxants: cyclobenzaprine
  - And many more!!!

  *safer alternative in class

Anticholinergic Side Effects

- Side effects:
  - Urinary retention/constipation
  - Dry mouth
  - Confusion
  - Blurred vision
  - Increased heart rate
Antipsychotics

- Typical: haloperidol, perphenazine, chlorpromazine, etc.
- Atypical (new)*: olanzapine, risperidone, ziprasidone, etc.
- Side effects:
  - Orthostatic hypotension, anticholinergic activity, cardiac conduction disturbances, sedation, cognitive slowing
  - For agitation and delirium, use should only occur when non-pharmacologic treatments have failed!

*Sedatives

- Benzodiazepines
  - Diazepam, alprazolam, temazepam, lorazepam, oxazepam, lorazepam, clorazepate

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Anti-hypertensives

- Many people need to be on a blood pressure medication
- Not all are equal in adverse effects—some cause more orthostatic hypotension than others
  - Alpha blockers: terazosin, doxazosin
  - Clonidine
  - Hydrochlorothiazide

Anticoagulants

- Heparin, enoxaparin (Lovenox)
- Warfarin (Coumadin)
- NOACs (novel oral anticoagulants)
  - Dabigatran (Pradaxa)
  - Rivaroxaban (Xarelto)
  - Apixaban (Eliquis)
  - Edoxaban (Savaysa)

  - Renally cleared, drug-drug interactions, increased bleeding risk
  - NON-REVERSIBLE (exception: dabigatran)

Mark H Beers, MD

- (1954-2009)

- 1982-graduated from University of VT with MD
- Geriatric fellowship, Harvard University
- Co-editor, Merck Manual of Geriatrics
- Faculty @UCLA

- Beers led a team from Harvard University that studied 850 residents of Boston-area nursing homes, looking at their medication history. This research found that many had symptoms of mental confusion and tremors that were caused by antidepressants, antipsychotics and sedatives. This research was published in JAMA in 1988.

Assessing Appropriateness

- Many of these medications are indicated and necessary
- Need to balance risk/benefit

- Many tools to help assess these risks in the older adult
  - BEERS
  - Iowa Cert
  - STEADI toolkit
Beers Criteria

- What is Beers criteria?
  - Tool for clinical care and quality improvement
  - Serves as a “warning light” to ID medications that may have unfavorable balance of benefits and harms in older adults
- Originally conceived by the late Dr. Beers
- Now updated by the American Geriatric Society
- Not for use in patients in hospice or palliative care

JAGS 2015; 63: 2227-2246

2015 Beers Criteria Update

- Last update 2012 (became evidence based)
- Includes list of PIMS (potentially inappropriate medications)
- New additions with 2015 update
  - Lists of select drugs that should be avoided
  - Drugs to be modified based on renal function
  - Select drug-drug interactions associated with harm in older adults
  - Alternative medication lists

JAGS 2015; 63: 2227-2246

BEERS Criteria

Example

JAGS 2015; 63: 2227-2246

Example

JAGS 2015; 63: 2227-2246

Example-DDI

JAGS 2015; 63: 2227-2246
Alternative List

Alternative Medications for Medications in the Use of High-Risk Medications. JAGS 2015.

How do I use Beers Criteria?

- Valuable tool but use caution not to misinterpret and implement in ways that cause harm
- There are situations when the drugs listed in Beers ARE appropriate
- The AGS convened to develop 7 principles to guide the optimal use of 2015 Beers Criteria

7 Guiding Principles

1. Meds in Beers Criteria are potentially inappropriate, not definitely
2. Read the rationale and recommendations for each criterion
3. Understand why meds are included in the list
4. Identify PIMS and offer safer non-pharm and pharm options when appropriate
5. Starting point for comprehensive process of identifying and improving med safety
6. Access to meds on list shouldn’t be restricted by PA
7. Not equally applicable to all countries

Role of Healthcare workers other than MD or PharmD

- Nurses often see and assess for medication problems in the home, hospital and long-term care settings
- PT/OT being aware of meds that cause orthostatic hypotension
- May often help in decision to give or not give as needed meds
- Important partners in identifying, addressing, and educating people about potential problems
- Start a conversation with provider if suspect patient is experiencing an adverse effect from a medication on the list

Iowa CERT

- Iowa CERT is a multidisciplinary center comprised of researchers within the University of Iowa Colleges of Public Health, Medicine, Pharmacy and Nursing, and the Veteran’s Administration Medical Center
- Their goals include research and dissemination of information and clinical tools to patients and providers
- Anticholinergic reference card
- Designed for clinician use to decrease anticholinergic burden on vulnerable elders
- Anticholinergic brochure/managing your medications guide
- Designed for patients regarding anticholinergics

University of Iowa College of Public Health

Example-renal dosing

[Table showing renal dosing information]
Anticholinergic Reference Card

Anticholinergic Brochure

STEADI Toolkit

STEADI-Stopping Elderly Accidents, Deaths, & Injuries

Fall Facts

Conditions Contributing to Falls
STOPP/START

- Originally conceived in 2008 and updated in 2014 by experts across Europe
- Aim to validate screening tool for older persons’ prescriptions
- Screening Tool for Older Persons’ Prescriptions (STOPP)
  - Identifies PIMS
- Screening Tool to Alert doctors to Right Treatment (START)
  - Identifies potentially indicated medications not prescribed

Int J Clin Pharmaco Ther 2008 Feb; 46(2): 72-83
Age and Ageing 2014; 0: 1-6
There's an APP for that!

- AGS iGeriatrics app on all mobile devices
- AGS Updated Beers Criteria
- Geriatric Cultural Navigator
- GetPsych Consult
- Guide to Common Immunizations
- Management of Atrial Fibrillation
- Prevention of Falls Guidelines
- Small cost

Take Away Points

- As the body ages, changes in how we absorb and metabolize medications occur which can increase unwanted effects of certain medications.
- All members of a patient's care team can play an important role identifying potentially inappropriate medications in the older adult.
- There are many tools to help with this process:
  - Beers Criteria - help identify PIMS and weigh risk/benefit.
  - Iowa Cert anticholinergic brochure - patient friendly.
  - STEADI Toolkit - fall risk assessments.

Questions???

"I'm bored. Want to see whose medications have more side effects?"