Medically Complex Older Adults: The Pharmacotherapeutic Challenge

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Presentation Objectives

1. Identify the most common chronic disorders in older adults that are managed by drug therapy.
2. Describe how pharmacotherapy for one disorder may complicate the management of another disease.
3. Develop a pharmacotherapeutic plan for treating co-morbid conditions that minimize risk and optimize outcomes.
Prescription Medication Use

Figure 2: Percentage of prescription drugs used in the past month, by age: United States, 2007–2008

Gu Q, et al., NCHS Data Brief No. 42, 2010

1Estimate is unstable; the relative standard error is greater than 30%.
SOURCE: CDC/NCHS, National Health and Nutrition Examination Survey.
Medication-related Problems

- Dose too high
- Dose too low
- Improper medication
  - Contraindication
  - Allergy
  - Inappropriate for patient’s age or function
- Drug interaction
- Adverse drug reaction
- Unnecessary medication
  - Duplicate
  - No indication
  - Problem resolved
- Untreated indication
- Patient not receiving medication
Medication Risk Assessment

- ≥ 5 medications
- ≥ 12 daily doses
- Narrow therapeutic index drugs
- Multiple prescribers
- Taking medicines for at least 3 problems
- Uses multiple pharmacies

- Someone brings medicines to the home
- Complex regimen
- At least 4 direction changes in 1 year
- Any medicine taken for an unknown reason

-Levy HB, Ann Pharmacother, 2003
Evidence-based Guidelines

• Geriatrics-focused
  – Alzheimer’s disease
  – Depression
  – Persistent pain
  – Diabetes (AGS)

• Geriatrics addressed
  – Hypertension
  – Heart failure
  – Diabetes (ADA)
  – Osteoarthritis

• No Geriatrics
  – GERD
  – COPD
Why Are We Concerned?

- Older adults account for 49.8% of hospital admissions due to adverse drug events\(^1\)
  - Rate is greatest for age 85+ years
  - 87% due to hypoglycemics, anticonvulsants, warfarin, digoxin, theophylline, lithium

- Adults age 50+ account for 51.1% of ED admissions for adverse drug events\(^2\)
  - CNS drugs (2.8%), blood modifiers (22.6%), cardiovascular meds (18.1%) are most common

\(^1\)Budnitz, et al, JAMA, 2006; \(^2\)The DAWN Report, 2011
Why Are We Concerned?

• Medicare hospital readmissions\(^1\)
  – 30 days (19.6%); 60 days (28.2%)
  – Heart failure, pneumonia, COPD, psychosis are most common discharge diagnoses

• Preventable medication errors\(^2\)
  – Renal and hepatic function
  – Drug interactions
  – Lack of individualized therapy

Percentage of people age 65 and over who reported having selected chronic conditions, by sex, 2005–2006

Note: Data are based on a 2-year average from 2005–2006.
Reference population: These data refer to the civilian noninstitutionalized population.
Source: Centers for Disease Control and Prevention, National Center for Health Statistics, National Health Interview Survey.
A Medically Complex Patient...

- 88 year-old woman who lives alone
- Legally blind due to macular degeneration
- Hearing-impaired (R acoustic neuroma)
- Fractured pelvis at age 83, with accompanying L rotator cuff tear
- Fall at age 88 with R rotator cuff tear
- Uses cane or walker for ambulation
Medical Problems

- Hypertension
- Diabetes Type 2
  - Pancreatitis history
- History of heart failure
- Hyperlipidemia
- Osteoarthritis
- Osteoporosis
- Spinal stenosis
- GERD
- Mild cirrhosis
- S/P hyperparathyroidism
- Intermittent asthma symptoms
Medications

- Furosemide 20 mg  2 tabs daily
- Benazepril 20 mg/Amlodipine 10 mg daily
- Metoprolol 12.5 mg BID
- Nateglinide 120 mg with meals
- Insulin detemir (Levemir)18 units at bedtime
- Rosuvastatin (Crestor) 5 mg daily
- Fenofibrate 145 mg daily
- Omega-3 (Lovaza) 1 gm  2 capsules BID
Medications

- Esomeprazole (Nexium) 20 mg daily
- Vitamin D3 4,000 units daily
- Conjugated estrogens (Premarin) 0.3 mg three times weekly
- Fluticasone (Flonase) 2 puffs daily
- Albuterol (ProAir HFA) BID PRN wheezing
# Fasting Lab Results

<table>
<thead>
<tr>
<th>LAB</th>
<th>RESULT</th>
<th>LAB</th>
<th>RESULT</th>
<th>LAB</th>
<th>RESULT</th>
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<tbody>
<tr>
<td>Na</td>
<td>142</td>
<td>Ca</td>
<td>10.0</td>
<td>TC</td>
<td>197</td>
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<tr>
<td>K</td>
<td>5.1</td>
<td>Phos</td>
<td>3.8</td>
<td>TG</td>
<td>178</td>
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<tr>
<td>Cl</td>
<td>106</td>
<td>Alb</td>
<td>4.8</td>
<td>LDL</td>
<td>118</td>
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<tr>
<td>HCO3</td>
<td>23</td>
<td>Protein (T)</td>
<td>7.3</td>
<td>HDL</td>
<td>35</td>
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<tr>
<td>FPG</td>
<td>202</td>
<td>T. Bili</td>
<td>0.3</td>
<td>RBC</td>
<td>3.91</td>
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<tr>
<td>HgbA1c</td>
<td>7.0%</td>
<td>AlkPhos</td>
<td>65</td>
<td>Hct</td>
<td>37.9</td>
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<tr>
<td>SCr</td>
<td>1.6</td>
<td>AST</td>
<td>27</td>
<td>Hgb</td>
<td>12.4</td>
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<tr>
<td>BUN</td>
<td>47</td>
<td>ALT</td>
<td>22</td>
<td>Plt</td>
<td>360K</td>
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<tr>
<td>BUN/SCr</td>
<td>29.4</td>
<td>Amylase</td>
<td>122</td>
<td>PTH</td>
<td>49.4</td>
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<tr>
<td>GFR</td>
<td>32</td>
<td>Lipase</td>
<td>82</td>
<td>Vit D</td>
<td>35.3</td>
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</table>
HYPERTENSION
## BP Classification: JNC-7

<table>
<thead>
<tr>
<th>Class</th>
<th>SBP (mm Hg)</th>
<th>DBP (mm Hg)</th>
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<tbody>
<tr>
<td>Normal</td>
<td>&lt;120</td>
<td>and &lt;80</td>
</tr>
<tr>
<td>Prehypertension</td>
<td>120-139</td>
<td>or 80-89</td>
</tr>
<tr>
<td>Stage 1 HTN</td>
<td>140-159</td>
<td>or 90-99</td>
</tr>
<tr>
<td>Stage 2 HTN</td>
<td>≥ 160</td>
<td>≥ 100</td>
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</table>
JNC-7 and Older Adults

• No changes based on age
  – <140/90 for most patients
  – <130/80 for diabetes or chronic renal disease

• Reference to declining renal function

• Many fall under “Compelling Indications”
## Compelling Indications

<table>
<thead>
<tr>
<th>Compelling Indication</th>
<th>Recommended Drugs</th>
<th>Clinical Trial Basis</th>
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<tbody>
<tr>
<td>Heart failure</td>
<td>Diuretic BB ACEI ARB CCB Aldo ANT</td>
<td>ACC/AHA Heart Failure Guideline, MERIT-HF, COPERNICUS, CIBIS, SOLVD, AIRE, TRACE, ValHEFT, RALES, CHARM</td>
</tr>
<tr>
<td>Postmyocardial infarction</td>
<td></td>
<td>ACC/AHA Post-MI Guideline, Bhat, SAVE, Capricorn, EPHESUS</td>
</tr>
<tr>
<td>High coronary disease risk</td>
<td></td>
<td>ALLHAT, HOPE, ANBP2, LIFE, CONVINCE, EUROPA, INVEST</td>
</tr>
<tr>
<td>Diabetes</td>
<td></td>
<td>NKF-ADA Guideline, UKPDS, ALLHAT</td>
</tr>
<tr>
<td>Chronic kidney disease</td>
<td></td>
<td>NKF Guideline, Captopril Trial, RENAAL, IDNT, REIN, AASK</td>
</tr>
<tr>
<td>Recurrent stroke prevention</td>
<td></td>
<td>PROGRESS</td>
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</table>
Complicating Factors

- Guidelines do not address fall risk in older adults
- Thiazides less effective with renal impairment, but loop diuretics carry risks
- Beta-blockers may reduce exercise tolerance
- Multiple medications
HYPERLIPIDEMIA
Lipids and Aging

- Total Cholesterol and LDL
  - increase CHD risk, especially for males
- LDL B pattern genotype
  - inherited
  - multiple contributory risk factors
    - visceral obesity
    - high-fat diet
    - sedentary lifestyle
    - DMT2
- NCEP-ATP III not revised since 2004
## Pharmacologic Inventions

<table>
<thead>
<tr>
<th>Drug</th>
<th>TChol</th>
<th>LDL-C</th>
<th>HDL-C</th>
<th>TG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fibrates</td>
<td>Dec</td>
<td>-10</td>
<td>+10</td>
<td>-35</td>
</tr>
<tr>
<td>Statins</td>
<td>-20-30</td>
<td>-20-30</td>
<td>+5-10</td>
<td>-15</td>
</tr>
<tr>
<td>Resins</td>
<td>-15</td>
<td>-15</td>
<td>±</td>
<td>±</td>
</tr>
<tr>
<td>Niacin</td>
<td>-20</td>
<td>-20</td>
<td>+10-20</td>
<td>-30</td>
</tr>
</tbody>
</table>
## Lipid-Lowering Agents

<table>
<thead>
<tr>
<th>Condition</th>
<th>Drug</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevated TG</td>
<td>Gemfibrozil (Lopid)</td>
<td>600 mg BID</td>
</tr>
<tr>
<td></td>
<td>Fenofibrate (TriCor)</td>
<td>48-145 mg qday</td>
</tr>
<tr>
<td>Low HDL, High LDL &amp; TG</td>
<td>Above + statin</td>
<td>As above</td>
</tr>
<tr>
<td></td>
<td>Niacin SR</td>
<td>150-2000 mg HS</td>
</tr>
<tr>
<td>Elevated LDL or nonresponse</td>
<td>Ezetimibe (Zetia)</td>
<td>10 mg qday</td>
</tr>
<tr>
<td></td>
<td>Ezetimibe + Simvastatin (Vytorin)</td>
<td>10/20 to 10/40 qday</td>
</tr>
</tbody>
</table>
Complicating Factors

• Potential statin interactions
• Niacin intolerance
• Restrictive diet in the presence of:
  – Age-associated taste alterations
  – Ability to prepare meals
• Multiple medications
DIABETES
Factors To Consider: AGS Guidelines

• Older patients with DM are at greater risk for common geriatric syndromes:
  – Polymedicine
  – Depression
  – Cognitive impairment
  – Urinary Incontinence
  – Injurious Falls
  – Persistent Pain
ADA/AGS Recommendations

• “Patients who can be expected to live long enough to reap the benefits of long-term intensive diabetes management and who are active, have good cognitive function, and are willing to undertake the responsibility of self-management should be encouraged to do so and be treated using the goals for younger adults with diabetes.”

ADA/AGS Recommendations

• “For patients with advanced diabetes complications, life-limiting comorbid illness, or substantial cognitive or functional impairment, it is reasonable to set less intensive glycemic target goals. These patients are less likely to benefit from reducing the risk of microvascular complications and more likely to suffer serious adverse effects from hypoglycemia.”

Goals for Diabetes Care

- Glycemic control
- Reduce cardiovascular risk:
  - Hypertension management
  - Lipid management
  - Smoking cessation
  - Aspirin use
- Eye care
- Foot care
- Diabetes education

Recommendations for Glycemic Control

• Target A1C should be individualized:
  – In healthy individuals with good functional status $\leq 7\%$.
  
  – For frail older adults and persons with life expectancy $<5$ years less stringent target is appropriate, $\leq 8\%$.

2012 AGS/ADA Update

- Encourage physical activity
- Pharmacotherapy considerations
  - Avoid glyburide
  - Metformin, up to Stage IV CKD
    - eGFR for renal function evaluation
  - Hypoglycemia risk is more critical than A1c
  - Consider treatment burden and adherence
- Periodic screen for functional capacity

Kirkman, et al. JAGS 2012;60:2342-2356. DOI: 10.1111/jgs.12035
ADDITIONAL CONSIDERATIONS
Treatment Choices

• Aspirin for primary prevention
  – Risk for worsening renal impairment
  – GI-related risks

• Osteoporosis
  – Renal and GI considerations with bisphosphonates
  – Patient preferences for other treatments
Treatment Choices

• Pain management
  – NSAID risk
  – Acetaminophen risk with cirrhosis
  – Fall and cognition risk with opiates

• General considerations
  – Medication burden
  – Interaction and adverse reaction risk
Optimizing Outcomes

• Take a risk management approach to pharmacotherapy
  – What is the evidence for efficacy?
  – Is the evidence inclusive of older adults?
  – What adverse effects pose the lowest risk for an individual patient?
  – Can (or will) the patient adhere to the regimen?

• Recognize and respect patient goals
Summary

• Use of clinical guidelines can be very helpful in guiding treatment for older adults
• In the absence of specific guidelines, it is important to look for discussion of special populations, such as geriatrics
• Guidelines that do not address older adults at all may lead to false or misleading assumptions, and result in negative outcomes, or at least less-than-optimum treatment