Medications & Falls in Older Adults

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Objectives

- Describe the factors that increase the risk of medication-related falls in older adults.
- List the most common medications and medication classes associated with falls in older adults.
- Suggest areas for future research to improve the management of medication-related falls in older adults.

Falls

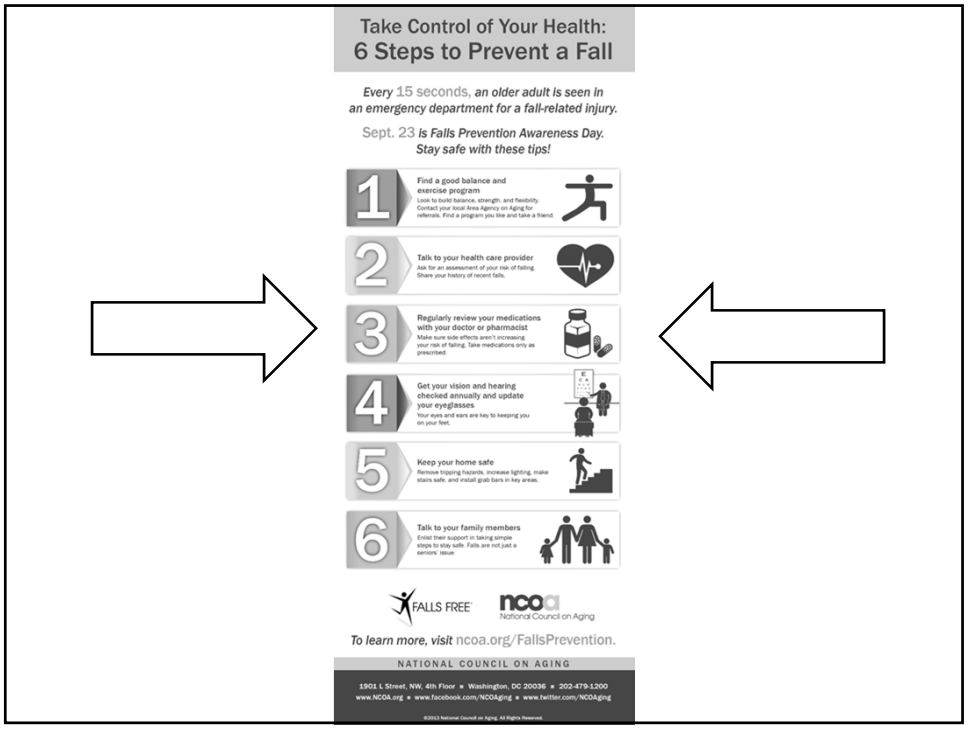
- More than **one-third** of community-dwelling older adults fall each year
- Approximately 10% of falls result in a major injury such as a fracture, serious soft tissue injury, or traumatic brain injury
- Falls are a major contributor to functional decline and health care utilization
- Falling is classified as a geriatric syndrome with multiple contributing factors

Falls Prevention Awareness Day
September 23, 2015

ncoa
National Council on Aging

FALLS FREE®

http://www.ncoa.org/improve-health/center-for-healthy-aging/falls-prevention/falls-prevention-awareness.html



Risk Factors for Falls

- Intrinsic to the patient
  - Example: leg weakness
- Extrinsic to the patient
  - Example: cluttered home with poor lighting
- Modifiable
  - Example: **medications**
- Non-modifiable
  - Example: female sex

Risk Factors for Medication-Related Falls

- Polypharmacy
  - What is it?
- Drug-disease interactions
  - History of falls/fracture
- Recent start of medication
  - Dose too high, titration too fast
- Inappropriate withdrawal of medication
  - Adverse Drug Withdrawal Event (ADWE)

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Current Gaps in Literature

- Falls extensively studied in older adults
  - Drugs commonly assessed
- GAPS: Limited ability to assess:
  - Dose/duration-response relationship
  - Confounding by indication
  - Risk of exposure longitudinally
  - OTC medication use

American Geriatrics Society (AGS) Beers Criteria

- To identify drugs to avoid in older adults:
  - 1) Independent of diagnosis
  - 2) Considering diagnosis
- To reduce adverse drug events and drug-related problems and improve medication selection and use in older adults
- Designed for use in any clinical setting; also used as an educational, quality, and research tool

AGS Beers Criteria

- History of falls or fractures
  - Anticonvulsants
  - Antipsychotics
  - Benzodiazepines (BZD)
  - Nonbenzodiazepine, BZD receptor agonist hypnotics
  - Tricyclic Antidepressants (TCAs)
  - Selective Serotonin Reuptake Inhibitors (SSRIs)
  - Opioids *(*new in 2015 criteria*)*

AGS Beers Criteria

- History of falls or fractures
  - **Rationale**: May cause ataxia, impaired psychomotor function, syncope, additional falls; shorter-acting BZDs are not safer than long-acting ones
  - If one of the drugs must be used, consider reducing use of other CNS-active medications that increase risk of falls and fractures and implement other strategies to reduce fall risk

AGS Beers Criteria

- History of falls or fractures
  - **Recommendation**: Avoid unless safer alternatives are not available; avoid anticonvulsants except for seizure and mood disorders
  - Opioids: Avoid, excludes pain management due to recent fractures or joint replacement

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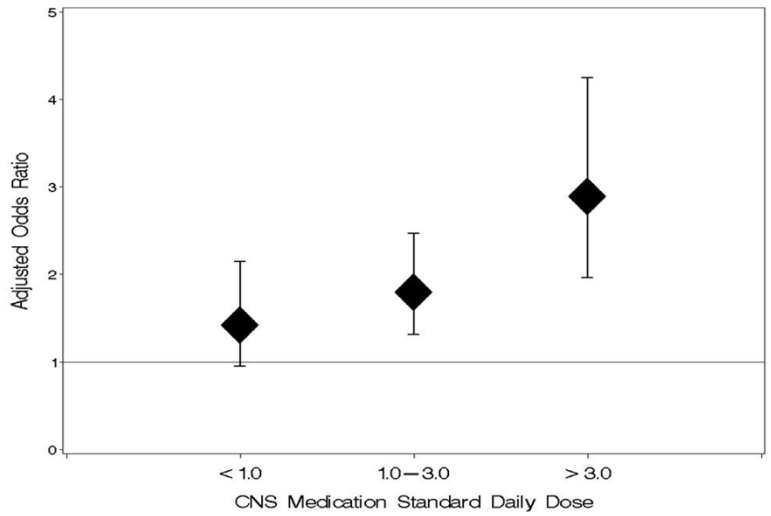
CNS Medications

CNS Medication Dosage and Risk of Recurrent Falls in Elderly Persons



Hanlon JT, et al. J Gerontol 2009;64A:492-498.

Antidepressants & Falls

- Prevalence of mild depressive symptoms in older adults ~ 15% in community populations
- Depressive symptoms and antidepressants (AD) both shown to be associated with falls
- Beers criteria drug-disease interaction
  - History of falls/fractures: SSRIs and TCAs

Data Source – I

- Health, Aging and Body Composition (Health ABC) Study
  - 3,075 black and white men and women aged 70-79 years and enrolled in 1997-98
  - Community-dwelling older adults living in Pittsburgh and Memphis
  - Initially reported no difficulty walking at least ¼ mile or up a flight of stairs
  - Followed at least annually from baseline visit
  - Utilized year 1 – year 7 data

Data Source – II

- Physiologic and performance measuresments
- Questionnaire materials regarding sociodemographic characteristics, physical health, and medication use
- Medication use: years 1, 2, 3, 5, and 6
- Falls: years 2, 3, 4, 6, and 7
- Covariates: sociodemographics, health status, and access to care variables

Methods

- Independent variable: AD drug use
  - 3 sub-classes of AD drugs
  - Standardized daily dose
- 1º outcome: 2+ falls in previous 12 months
- Stats: GEE controlled for covariates selected via forward selection process
- Sensitivity analysis:
  - Stratified by history of falls/fracture at baseline

Results

- Main finding
  - Any AD use: AOR 1.48, 95% CI 1.12-1.96
  - Short duration use: AOR 1.47, 95% CI 1.04-2.00
  - SDD 1-2: AOR 1.59, 95% CI 1.15-2.18
- Of the sub-classes, only SSRIs showed a significant association
  - Any SSRI use: AOR 1.62, 95% CI 1.15-2.28
- Sensitivity analyses
  - History of falls/fracture:
    AOR 1.83, 95% CI 1.28-2.63

Conclusion & Discussion

- AD use overall, SSRI use, short duration of use, and moderate dosage were associated with recurrent falls after adjusting
- Those with a history of falls/fracture had an even greater risk for recurrent falls
- Future research needed with larger sample sizes using newer medication data

AGS Beers Criteria: Other Medications of Concern

- Anticholinergics
  - First-generation antihistamines
    - Diphenhydramine
  - Antiparkinsonian agents
    - Benztropine
  - Antispasmodics
    - Hyoscyamine
  - Skeletal muscle relaxants
    - Carisoprodol

Anticholinergics & Falls

- Reducing anticholinergic use is feasible
  - Non-pharm interventions and non-anticholinergic alternative medications exist

Condition	AC Drug(s)	Non-pharm	Alternative
Depression	TCA, paroxetine	CBT	SSRI/SNRI

Previous Literature

- Prospective cohort studies
  - Mixed results
    - Self-reported vs. claims measurement
    - Single vs. multiple falls
- Evidence has been surprisingly weak
  - Lack of OTC medication data
  - Inability to adjust for important confounders
  - Cross-sectional
  - Select populations and often non-US

Anticholinergic Medication Use and Falls in Postmenopausal Women: Findings from the Women's Health Initiative

Zachary A. Marcum, PharmD, PhD, Heidi S. Wirtz, PharmD, PhD, Mary Pettinger, MS, Andrea Z. LaCroix, PhD, Ryan Carnahan, PharmD, MS, Jane A. Cauley, DrPH, Jennifer W. Bea, PhD, Shelly L. Gray, PharmD, MS

**Manuscript Under Review*

Study Methods

- Postmenopausal women aged 65-79 yrs
- N=67,006
- Outcome: self-reported number of falls in past 12 months (≥2 falls)
- Medications: collected at baseline and year 3 visits, including Rx + OTC
- Covariates (confounding by indication)
- GEE models

Results

- Baseline: 11.3% anticholinergic users
  - Multiple anticholinergic use: 8.8% of users
- Any anticholinergic use
  - Adjusted OR: 1.51 (1.43-1.60)
- Multiple anticholinergic use
  - Adjusted OR: 2.00 (1.73-2.32)
- Each sub-class associated with falls
  - Antidepressants/psychotics: 1.81 (1.66-1.97)

Limitations

- No gold standard for anticholinergic measurement
- No data on medication dose
- Unable to assess dynamic patterns of use
- Unmeasured confounding

Conclusion

Use of strong/moderate anticholinergic medications in older women was associated with a higher likelihood of multiple falls, especially in those taking multiple agents.

Antihypertensives & Falls

Original Investigation

Antihypertensive Medications and Serious Fall Injuries in a Nationally Representative Sample of Older Adults

Mary E. Tinetti, MD; Ling Han, MD, PhD; David S. H. Lee, PharmD, PhD; Gail J. McAvay, PhD; Peter Peduzzi, PhD; Cary P. Gross, MD; Bingqing Zhou, PhD; Haiqun Lin, PhD

CONCLUSIONS AND RELEVANCE Antihypertensive medications were associated with an increased risk of serious fall injuries, particularly among those with previous fall injuries. The potential harms vs benefits of antihypertensive medications should be weighed in deciding to continue treatment with antihypertensive medications in older adults with multiple chronic conditions.

JAMA Intern Med. 2014;174(4):588-595. doi:10.1001/jamainternmed.2013.14764
Published online February 24, 2014.

Well

Blood Pressure Drugs Tied to Risk of Falls

By ANAHAD O'CONNOR FEBRUARY 24, 2014 4:00 PM

Older adults who

greater risk of se

Researchers look

age 70 during a t

those who were taking antihy

percent greater likelihood of

injuries like hip fractures and

A majority of older adults hav

antihypertensive medications

drugs nationwide. Though the

and heart attacks, the size of

the increase in risk of serious

Tinetti, chief of geriatrics at Y

author of the new study, publ

"The question is, are we tradi

prevention for the increased

The study shows only that th

antihypertensive medications

falls. But Dr. Tinetti said they

alertness or by causing blood

stand up.

REUTERS EDITION U.S.

HOME BUSINESS MARKETS WORLD POLITICS TECH

Blood pressure meds may ra

fall risk

BY KATHRYN DOYLE

NEW YORK | Wed Feb 26, 2014 11:29am EST

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(Reuters Health) - Older people who

medications had more serious injuries

taking medications, according to a ne

The added risk with blood pressure meds for falls that cause seri

suggested before, but older people shouldn't stop taking their me

these results, the authors say.

"It is important to remember that no single study, and particula

such as ours, can give a definitive answer," said Dr. Mary E. Tin

"We cannot say definitively that antihypertensive medications led to serious fall injuries such as hip fractures," said Tinetti, a geriatrics researcher at Yale School of Medicine in New Haven, Connecticut.

Most people over 70 years of age have high blood pressure, or hypertension, which increases the risk for heart attacks and stroke. Currently, antihypertensive medications including diuretics like Tenoretic, beta blockers like Lopressor and ACE inhibitors, often taken together, are the best way of managing the health risks of high blood pressure.

Among U.S. adults with high blood pressure in 2012, 83 percent were aware of their condition and 76 percent were taking medications to treat it, according to a Centers for Disease Control and Prevention Survey.

For the new study, the researchers used existing, publicly available data on hospitalizations

The New Old Age

Caring and Coping

Are Blood Pressure Drugs Worth the Falls?

By PAULA SPAN APRIL 16, 2014 1:05 PM 69 Comments

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BIRDMAN

For older Americans, high blood pressure is a fact of life. By one common estimate, more than 70 percent of those over age 70 contend with it. That means medication to lower blood pressure has become a fact of life, too.

Diuretics, beta blockers, calcium channel blockers, the unpronounceable renin-angiotensin system blockers — in a study looking at a national sample of almost 5,000 Medicare beneficiaries with hypertension, more than 85 percent were taking at least one of these classes of blood pressure drugs. Most took two or three, or more.

They did so because randomized clinical trials, the supposed gold standard of medical research, have shown that these drugs reduce heart failure, heart attacks and stroke without scary side effects. "The prevailing notion is that these medications are safe, with very few adverse effects," said Dr. Mary Tinetti, chief of geriatrics at the Yale School of Medicine, and lead author of the study.

But the people enrolled in clinical trials, she pointed out, are typically healthier than older adults in general. Investigators often exclude people who have other medical problems — "co-morbidities," in doctor-speak — or who are taking several other medications. Yet the great majority of the older people who show up at doctors' offices do have multiple chronic conditions and are taking lots of prescription drugs.

So Dr. Tinetti and her team have been looking into whether

Background

- Over 50% of US older adults have hypertension (HTN)
- Prior research has found an association between some anti-HTN drugs and falls
- Little is known about the association between multiple classes of anti-HTN drugs and recurrent falls over time

Methods

- Independent Variable: anti-HTN drug use
  - 8 sub-classes of anti-HTN drugs
  - Standardized daily dose
- 1º outcome: 2+ falls in previous 12 months
- Stats: GEE controlled for covariates selected via forward selection process
- Sensitivity analyses
  - Subset to only those with HTN (controlled/uncontrolled)
  - Stratified by any falls history at baseline
  - Propensity score adjustment

Results

- Main finding
  - Any anti-HTN use: AOR 1.13, 95% CI 0.88-1.46
- Of the sub-classes, only loop diuretics showed a significant association
  - Any loop use: AOR 1.50, 95% CI 1.11-2.03
- All sensitivity analyses led to similar results

Conclusion

- Anti-HTN use overall was not associated with recurrent falls after adjusting
- Smaller point estimates than previous literature (which remains mixed)
- Loop diuretic use was associated with falls

Another Study

- 598 community-dwelling elders with HTN
  - Aged 70 to 97 years
- Followed prospectively for self-reported falls via monthly postcards/phone for 1 yr
- Antihypertensive use was **not** associated with an increased risk of falls

Lipsitz LA, et al. *Hypertension* 2015.

Discussion

- Future research needed with larger sample sizes in both community and long-term care settings
- Screen for high-risk patients (orthostatic hypotension, history of falls)
- Conflicting data may lead to inappropriate undertreatment of hypertension in an effort to prevent falls

Other Medications & Falls

- Hypoglycemics
- Many, many others…
- Any medication, depending on its potential to cause an adverse drug event, can lead to a fall

Now that we know which medications might be associated with fall risk in older adults, what do we do first?

The Medication History

- An accurate medication history is critical
- The current medication list should include:
  - Prescription medications
  - Over-the-counter medications
  - Dietary supplements and herbal products
  - Alcohol
- For each medication, record the dose, time(s) taken each day, frequency of use for “as needed” medications, and indication

The Medication History (II)

- Little evidence to support any one specific method of medication review
- Discrepancies between patients' understanding of what they should be taking, what they actually are taking, and what prescribers record on the medication lists are common
- "Brown bag" review offers an opportunity to determine how the patient is actually taking medications and to inquire about medication effectiveness and possible side effects

Screening for Medication-Related Fall Risk

- Taking more than 4 medications?
- Taking psychotropic medications?
- Taking medications that can cause orthostatic hypotension?
  - Antihypertensives
  - TCAs
  - Anti-Parkinsonian drugs
  - Diuretics

AGS/BGS Clinical Practice Guideline *: Prevention of Falls in Older Persons (2010)*
www.geriatricsatyourfingertips.org

Screening for Medication-Related Fall Risk

- Experiencing symptoms that might be an adverse drug event?
  - Blurred vision
  - Dizziness or lightheadedness
  - Sedation, decreased alertness
  - Confusion, impaired judgment
  - Compromised neuromuscular function
  - Anxiety

http://www.cdc.gov/HomeandRecreationalSafety/images/CDC_Guide-a.pdf

Avoid Hypoglycemia

- Two large studies (ACCORD and ADVANCE) have recently shown ***no benefit*** from tight control of Type II diabetes in older patients
- Particularly in nursing homes
  - Avoid short acting medications at night
  - Decrease the intensity of monitoring and treatment
  - Accept less tight control to avoid hypoglycemia
  - Carefully review regimens coming from hospitals

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- Describe the factors that increase the risk of medication-related falls in older adults.
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Deprescribing

- Little is known about how best to ***deprescribe*** medications in older adults
- Small studies have shown that reducing psychotropic medications can reduce falls
- Guidelines needed for deprescribing

"NIH, PCORI announce major award to prevent falls injuries in older people"

Large, multi-site, multi-intervention trial will test new patient-centered strategies

KEY FACTS:

- $30 million over 5 years
- To focus on those at risk for injuries from falls to develop individualized care plans
- To enroll 6,000 older adults age 75 and older, living in the community, with one or more modifiable risk factors for falls
- 10 trial sites

CDC

- Research to Advance Primary Care-Pharmacy Linkage for Medication Review to Reduce Older Adults Falls
  - *The purpose of this research is to investigate models for linking community pharmacists (e.g., independent, chain, franchise, mail order, retail) to primary care providers to enhance medication review and management in older adults, and examine the potential health benefits of primary care-pharmacy linkages.*

Multidisciplinary Approaches

- Falling is a *geriatric syndrome*
- Multiple disciplines needed
  - Medicine
  - Nursing/NP
  - PA
  - Pharmacy
  - PT/OT
  - Psychology
  - Social Work

Remaining Issues

- Shared risk factors between falls and fractures
- Mechanisms for medication-related falls
- Need for comparative effectiveness research using newer data of antidepressant use (and other classes)
- Feasible and scalable interventions to reduce medication-related falls

"By eliminating unnecessary medications and reducing the dose of necessary medications, it is often possible to treat coexisting conditions while minimizing risk of medication-related fall or injury."

- Mary Tinetti, MD 2010

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