Adverse Drug Reactions in Geriatrics

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Objectives

- Define Adverse Drug Reactions (ADRs)
- Identify selected risk factors for ADRs in geriatric patients
- Discuss the role of pharmacokinetics and pharmacodynamics in ADRs in geriatric patients
- Identify strategies to prevent ADRs in geriatric patients
- Evaluate a geriatric patient case to identify and/or prevent potential ADRs

Adverse Drug Reactions (ADRs)

- Edwards IR, Aronson JK. Adverse drug reactions: definitions, diagnosis, and management. 2000 *Lancet*; 356: 1255-59.
  - "An appreciably harmful or unpleasant reaction, resulting from an intervention related to the use of a medicinal product, which predicts hazard from future administration and warrants prevention or specific treatment, or alteration of the dosage regimen, or withdrawal of the product."
  - ADRs are broadly classified based upon time to reaction and dose dependency of reaction
  - ADRs may be predictable or unpredictable in a given patient

Selected Risk Factors for ADRs in Geriatric Patients

- Medications in specific classes have been identified as high risk
  - 2019 AGS Beers Criteria
  - Shehab N, Lovegrowve MB, Geller AI, Rose K), Weidle NJ, Budnitz DS. US Emergency Department Visits for Outpatient Adverse Drug Events, 2013-2014 2016 *JAMA*;316(20):2115-2125. doi:10.1001/jama.2016.16201
    - "Among older adults (aged 65 years), 3 drug classes (anticoagulants, diabetes agents, and opioid analgesics) were implicated in an estimated 59.9% (95% CI, 56.8%-62.9%) of ED visits for adverse drug events; 4 anticoagulants (warfarin, rivaroxaban, dabigatran, and enoxaparin) and 5 diabetes agents (insulin and 4 oral agents) were among the 15 most common drugs implicated. Medications to always avoid in older adults according to Beers criteria were implicated in 1.8% (95% CI, 1.5%-2.1%) of ED visits for adverse drug events."
  - Oscanoa TJ, Lizaraso F, Carvajal A. Hospital admissions due to adverse drug reactions in the elderly. A meta-analysis. 2017 *Eur J Clin Pharmacol;* 73:759–770.
    - "the ten top classes of medicines associated with admission in this age were NSAIDS, beta-blockers, antibiotics, oral anticoagulants, digoxin, ACE inhibitors, calcium antagonists, anticancer drugs, opioids, and oral antidiabetics"

Selected Risk Factors for ADRs in Geriatric Patients

- Risk can also be attributed to the impact of aging on medication pharmacokinetics and pharmacodynamics
  - Pharmacokinetics
    - Absorption
    - Distribution
    - Metabolism
    - Excretion
  - Pharmacodynamics

Strategies to Prevent ADRs in Geriatric Patients

- In addition to considering drug interactions, the 2019 AGS Beers Criteria and The Geriatric 4Ms, consider the impact of pharmacokinetics and pharmacodynamics on medication choices (e.g. dose adjustments and/or product selection).
  - A pharmacist is a great resource on the healthcare team for helping to identify and manage medication related problems.
- Consider overall goals of therapy for treatment and/or if adjustments are appropriate based on age.

Case Study: Identifying and Preventing ADRs

80 year old female who presents to your clinic to establish care. She was last seen by a provider 5 months ago and diagnosed with urinary incontinence (stress). Today she reports dry mouth, and occasional dizziness when she stands or when it's been a while since she's eaten. As part of her visit today, her medications are reviewed for appropriateness.

Past Medical History

- Hypothyroidism, diagnosed April 1999
- HTN, diagnosed May 2002
- Dyslipidemia, diagnosed May 2002
- Diabetes, type 2, diagnosed May 2010
- Osteoporosis, diagnosed June 2015
- Urinary Incontinence (Stress) x 5 months

Case Study Continued

Vital Signs and Lab Values

- BP 132/86 mm Hg (sitting, L arm) BP 126/74 mm Hg (standing, L arm), P 81 bpm, RR 15, T 98.2°F, Wt. 58 kg, Ht 5'6"
- Chem 7 (today):
  - Na 138 mEq/L
  - K 4.1 mEq/L
  - Cl 103 mEq/L
  - CO_2 27 mEq/L
  - Glu 192 mg/dL
  - BUN 20 g/dL
  - SCr 1.3 mg/dL
- TSH (today): 2.1 milliunits/L
- HbA_1C (today): 6.8%

Current Medications

- Levothyroxine 112 mcg po once daily
- Hydrochlorothiazide 25 mg po daily
- Lisinopril 20 mg po daily
- Atorvastatin 40 mg po daily
- Metformin 1000 mg po BID
- Glyburide 1.25 mg po daily
- Aleeve 500 mg po once daily as needed for headaches
- Alendronate 70 mg po once weekly
- Oxybutinin ER 10 mg po once daily
- Nature Made Calcium made with D3 600 mg/400 IU po BID
- Centrum Silver Women Plus 1 tablet po daily
- ASA 81 mg po daily
- Omeprazole 20 mg po daily
- Motrin 200 mg po every 4-6 hours as needed for headaches

What are some questions you'd like to ask and/or recommendations to reduce or prevent ADRs in this patient?

References

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