Medication Management in the Older Emergency Patient

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Objectives

To recognize common problem medications in the older patient;

To describe the physiologic changes of normal aging and the effect on pharmacokinetics and pharmacodynamics;

To describe common presentations of medication problems in the older patient;

To describe strategies for compiling a complete and accurate medication list for the older patient;

Polypharmacy

More than 5 medications

The problems with polypharmacy:

Drug-drug interactions

Drug-disease interactions

Duplicate medications

Futile medications

Irrational medications

Inappropriate medications

A few cases

Mrs. Waters

Mr. Klotz

Mr. E. Dema

Mrs. Waters

87 y.o. female presents to ED with K+ = 5.5 from routine outpatient lab; No ECG changes and feeling well and with a normal physical exam

PMHx: CAD, Htn, Chol, CRF (Cr 132), anemia, GERD, mild dementia, previous CVA (uses a walker), chronic leg edema, spinal stenosis

Meds: lisinopril, lasix, isosorbide, ASA, pantoprazole,

Disposition: Instructed to stop lisinopril & start amlodipine

Two weeks later the patient presents to ED in respiratory distress:

HR104, RR 22, BP 174/96, SaO2 94%

Exam: bilateral crackles

CXR: CHF w/ bilateral effusions

ECG: sinus tachycardia

Troponin: 8.7 c/w NSTEMI

Disposition: Cath Lab and admission to CCU

Mr Klotz

78 year old man. four months post angioplasty presents with post-prandial RSCP and epigastric tenderness;

Meds: Atenolol, diltiazem, clopidogrel, atorvastatin, glyburide

ED work up (serial enzymes) suggest no ACS or stent occlusion

Emerg Physician suggests omeprazole for GERD

Three weeks later Mr Klotz is back with NSTEMI and stent stenosis

Mr. E. Dema

84 y.o. male presents with fatigue, generalized weakness

PMHx: COPD, CRF (Cr 145), CHF, A fib, OA

Meds: furosemide, diltiazem, lisinopril, warfarin, Tiotropium (spiriva), bupropion, acetaminophen, glucosamine

He saw cardiologist 1 week ago who started him on spironolactone for ankle edema

On exam: HR 42; BP 94/40;

ECG: sinus brady; wide QRS; prolonged PR

Bloodwork: Cr 320; K 8.4

Physiology of Normal Aging

Pharmacokinetics

What the body does to the drug

Absorption

Distribution

Metabolism

Excretion

Normal Aging

Gastro-intestinal

- Decreased peristalsis: slowed gastric emptying and colonic transit
- Decreased gastric acid but decreased acid clearance → higher pH
- Decreased small bowel surface area

Normal Aging

Hepatic

- Decreased liver size and cellularity
- Decreased blood flow
- Enzyme systems maintained but activity decreased

Normal Aging

Renal

- Decreased renal cortical mass
- Decreased renal blood flow (GFR and CrCl)
- Less efficient clearance of medications
- Increased susceptibility to nephrotoxicity

Normal Aging

Nutrition/Metabolism

- Decreased body water
- Decreased lean body mass
- Increased fat
- Decreased basal metabolic rate (4% per decade after age 50)

Normal Aging

CNS

↓ brain mass/↓ nerve cells in brain

↓ cerebral blood flow (20%)

Altered neurotransmitters: esp

↓ acetylcholine

Blood-brain barrier more permeable

↓baro-receptor response

↓response to beta adrenergic stim

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Normal Aging

Cardiovascular

- Decreased cardiac output
- Increased resting heart rate
- Increased vascular tone
- Increased LV thickness/LA size

Impact of the physiology of aging

- Loss of physiologic reserve
- Diminished homeostatic mechanisms
- Altered metabolism

Pharmacokinetics

What the drug does to the body

Silent decline (normal aging)
→Challenged
→→ critical threshold
→→ organ dysfunction

Beers Criteria for Potentially Inappropriate Medication in Older Adults

Archives of Internal Medicine, 2003, (163), 2716-2724

Canadian Consensus on Inappropriate Prescribing Practices

McLeod, Huang, Tamblyn, Gayton, CMAJ, 1997; 156 (3) 385-391.

The Big Six

- Anti-coagulants: ASA, warfarin, clopidogrel
- Hypoglycemics: insulin and OHG
- Digoxin
- Benzodiazepines: short- and long-acting
- Antihistamines/anti-cholinergics
- NSAIDs: especially indomethacin and ketorolac but all non-COX2s

Budnitz et al. Medication use leading to emergency department visits for adverse drug events in older adults. *Annals of Internal Medicine 2007*; 147 (11): 755-65

Canadian Criteria: Most Common Problems

- Indomethacin and gout
- NSAIDs and warfarin
- NSAIDs and CHF
- NSAIDs and Hypertension
- NSAIDs and PUD/GERD
- NSAIDs and renal failure
- Long-acting benzodiazepines
- Muscle relaxants

Drug-Disease Interactions to Avoid

⇑ dementia+ benzodiazepines or anticholinergics

⇑ bladder outlet obstruction+ anticholinergics, TCAs, antispasmodics, antihistamines

⇑ CRF, CHF, PUD + NSAIDS

⇑ constipation + anticholinergics, TCAs, calcium channel blockers

⇑ falls +TCAs, benzodiazepines

Fick DM Arch Intern Med 2003;163:2716-2724
Beers MH Arch Intern Med 1997;157:1531-1536

Medication Appropriateness Index

- Is there an indication for the drug?
- Is the medication effective for the condition?
- Is the dosage correct?
- Are the directions correct?
- Are the directions practical?
- Are there clinically significant drug-drug interactions?
- Are the clinically significant drug-disease interactions?
- Is there unnecessary duplication with other drugs?
- Is the duration of therapy acceptable?
- Is this drug the least expensive alternative compared to others of equal utility?

Hanlon JT, et al J Clin Epidemiology 1992;45:1045-51

A few more cases

The Out-of-Towner

Mrs. D. Klein

Mr. Federer

Mr. Teow

Mrs. Vikan Tizzi

The Out-of-Towner

76 yo man sent from Walk-in to “r/o ACS” because of severe intermittent chest pain for six weeks; he has had two other admissions in two other hospitals in the past month; multiple stress tests all negative

Meds: ASA, metoprolol, (both new according to ODB record)

On careful review of medication history (which was never previously done): Ibuprofen was added in another WIC for a sore ankle three days before the onset of symptoms (patient had never mentioned this to his family or any of previous hospitals!)

Mrs. D. Klein

82 yo woman living with her daughter at home with progressive dementia; functioning; In ED on Saturday morning because “not doing well” -- eating poorly, and incontinent of urine.

Meds: donepezil (started three weeks ago), acetaminophen, alendronate, metoprolol, warfarin (for previous valve replacement)

On exam: VSS; looks well not significantly dehydrated; no acute findings, daughter says no acute change in mental status; CT head unchanged from previous; bloodwork unremarkable; INR therapeutic; good support available at home.

Emerg disposition: nutrition supplement and oxybutynin for urge incontinence and referral to CCAC for PSW support

Mr. Federer

79 yo man presented to Ambulatory Area after straining his right thigh while playing tennis

PMH: P. a. fib; cholecystectomy

Meds: Warfarin, (INR =2.1) ASA

Physical exam suggests partial quad tear

Disposition: Weight Bearing as tolerated; add ibuprofen, APAP/oxycodone

Four days later: returns with chest pain

INR: 6.2; Hgb: 71; BUN/Cr normal; no melena; Troponin: 6.8

Mr. Teow

79 yo man triaged to Ambulatory with apparent flare of great toe gout and urinary frequency/dysuria; disturbed sleep and fatigue

PMH: A Fib, CHF, Htn, Gout, Anxiety, COPD, BPH

Meds: furosemide, amiodarone, digoxin, allopurinol, dimenhydrinate, diazepam, erythromycin, salbutamol, Calcium

Mrs. Vikan Tizzi

80 yo woman living independently, brought by daughter because of one week of increasing fatigue, anorexia, poor oral intake, “too weak to get out of bed”; “still peeing all the time”

PMH: Htn, chol, recent UTI

Meds: Metoprolol, simvastatin, started MacroBid last week (finished today)

On exam: petite slim woman (=60 kg), normal vitals but quite dehydrated looking, listless, oriented

Bloodwork: Na 148, BUN 9.2, Cr 80 (do the math!)

Take Home Points

1. Take a scrupulous medication history: brown bag biopsy
2. Keep in mind the effect of physiology of normal aging
3. Remember variability in “normal” values
4. Think of “High risk/Low benefit” medications

5. Communicate and educate. Encourage safe medication use
6. Consider that the presenting symptom is a possible drug effect and not a symptom of a new disease
7. Start LOW and go SLOW: you can put more in but you can't take it out!

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