Geri-EM Curriculum: Falls, Functional Assessment, Transitions of Care

Case A

82yo female comes to the ED, from home. She normally lives alone and is independent with ADLs/IADLs. She presents after a ground level fall.
Vitals as follows: HR 82, BP 120/70, O2 sats 100%, RR 16, T 37.1

PMHx: HTN, dyslipidemia, CAD, osteoarthritis, T2DM, hearing impairment, cataracts, peripheral neuropathy

Medications:
Metoprolol
Rosuvastatin
ASA
Gliclazide
Gabapentin

1. **Prior to going to take a H+P, what is your differential diagnosis for possible causes of her fall? List at least 10 possible causes.**

    - **Atypical presentation of disease** - infections/sepsis, acute abdomen, electrolyte abnormalities, hypoglycemia
    - **Cardiac** - dysrhythmia, ACS, orthostatic hypotension, carotid sinus hypersensitivity, CHF/peripheral edema
    - **Neuro** - CVA, seizure, hydrocephalus, encephalopathy (e.g. hepatic), movement disorders (Parkinson's), neuromuscular disease, spinal cord compression, peripheral neuropathy, balance issues, slowed reflexes, cognitive impairment
    - **Pulmonary** – COPD, pulmonary edema, pneumonia, hypoxia
    - **Vascular** – pulmonary embolus, GI bleed, anemia, peripheral vascular disease, dehydration
    - **MSK/Rheum** - Chronic pain, arthritis, joint replacements, decreased muscle mass, gait issues, polymyalgia rheumatica
    - **Genitourinary** – urinary incontinence, urinary retention
    - **Skin** – chronic wounds
    - **Medications** – antihypertensives (beta blockers, calcium channel blockers, alpha 2 agonists, diuretics), hypoglycemics (sulfonylureas, insulin), sedatives (benzodiazepines), opioids, muscle relaxants, antidepressants (TCAs, SSRIs) and antipsychotics (atypical antipsychotics cause orthostatic hypotension in addition to sedation)
    - **Tox** - alcohol, cannabis
    - **Sensory impairment** - vision, hearing, proprioception/vibration
    - **Environmental** – inappropriate footwear, poor lighting, loose rugs, mobility aids not being used or ill fitting, pets
    - **Other:** Vasovagal syncope or valsalva syncope (cough, micturition, defecation)
    - **Metabolic:** hypoglycemia, hyponatremia, hypoMg, hypoK, hypo/hyperCa

2. **What medications of this patient could contribute to falls?**

Answer:
Metoprolol – bradycardia, hypotension, postural hypotension
Pregabalin – dizziness, balance disorder
Gliclazide – hypoglycemia

3. **What would you ask on history?**

Answer:

- HPI
- PMHx
- Medications
- Previous falls
- Substance use
- Visual/hearing/neuro impairments
- Baseline cognitive and functional status
- About the fall*

Before the fall	During the Fall	After the fall
• What were they doing before the fall? • Prodromal symptoms • Presyncope, syncope, orthostasis • Recent illness/events – infectious sx, bleeding (melena/BRBPR), GI losses, etc. • Gait aids/footwear	• Mechanism • LOC • Witnessed?	• Time on floor • Able to get up? • Able to ambulate? • Associated injuries? Sites of pain.

4. **What aspects of physical exam should you do for this patient for post-fall assessment?**

- Head to toe trauma assessment – gown, full exposure
- Neuro exam
- Orthostatic vital signs
- Functional assessment*
    - Assessment of transfers, gait

5. **What investigations would you order?**

- ECG
- CBC, lytes, extended lytes, renal function, glucose

- Consider: trop, INR, DDimer, CRP, tox panel, liver function, etc based on clinical assessment
- Trauma imaging based on assessment

6. **What can we do for her to prevent future falls?**

- Modify or stop offending medications
- Individualized exercise program
- Tai Chi group exercise
- Treat visual impairment, cataracts
- Manage postural hypotension
- Manage HR and dysrhythmias
- Supplement vitamin D
- Address foot/shoe problems
- Address home environmental hazards
- Patient education and info about falls

Ref: Carpenter, C. R., Cameron, A., Ganz, D. A., & Liu, S. (2019). Older adult falls in emergency medicine: 2019 update. *Clinics in geriatric medicine*, *35*(2), 205-219.
AGS and BGS guidelines

7. **How can we prepare for safe discharge from ED to home?**

- ED PT/OT to assess proper use or need of assistive devices, transfer skills, fait training
- Home assessment via home care:
    - OT can assess bed height, uneven flooring, need for grab rails, elevated toilet seat, nonslip bathmats, improve lighting etc.
- Outpatient PT for exercise and rehabilitation programs
- Pharmacy to assess inappropriate or potentially contributing medications
- Referral to geriatrics clinic, or if available, a falls clinic
- Send letter to GP, may not be aware of frequent falls
- Consider recommending Vitamin D supplementation

8. **Through your comprehensive H+P, and workup you identify several potential causes for her fall including medications, vision impairment, peripheral neuropathy, environmental factors. On further history you discover that this is not her first fall and in fact she has had several syncopal events that occur both while upright and while sitting/supine. No prodromal symptoms. This is the first time she presented for medical care.**

Based on this, what other management would you suggest at this time?

Cardiology consult for concerning syncope

24 hr holter
Consideration for pacemaker

Case B

84 yo M presents with recurrent fall today. He was getting up from his couch to go get a snack in the kitchen and he fell. No LOC, no head impact. He has some pain to his left shoulder after the fall. His daughter encouraged him to come to the ED. On further questioning he states he was feeling lightheaded before he fell. His daughter is concerned as he has fallen 3 times in the past 6 weeks, and this is the first presentation to hospital.

He lives alone with home care weekly to help with bathing, and he was housekeeping help. He doesn't use any mobility aids currently.

PMHx:
Dyslipidemia, HTN, osteoarthritis, BPH, depression, GERD

Medications:
Atorvastatin 40 mg daily
Pantoloc 40mg daily
Amlodipine 10 mg daily
Trazodone 100mg BID
Flomax 0.4 mg daily

Initial vitals: RR16, BP 135/84, HR 86, 94% RA, GCS 15

1. **What investigations would you order for this patient?**

   ECG
   Postural vitals
   CBC
   Lytes, extended lytes
   Cr, BUN
   Consider troponin
   CK
   Xray of extremity pain, and other trauma imaging based on exam

2. **As part of your work-up you have asked the nurses to do postural vitals. There is a new grad nurse working who hasn't done it before. How do you advise them to perform postural vitals?**

The classic definition in guidelines is a postural reduction in systolic blood pressure (BP) of ≥ 20 mm Hg or diastolic BP of ≥ 10 mm Hg, measured within 3 minutes of rising from supine to standing;

There are studies looking at 1 minute after standing and found OH identified within 1 minute of standing to be more clinically meaningful than OH identified after 1 minute. Thus, you could argue to complete at the 1 minute mark and the 3 minute mark to ensure it isn't missed.

CDC recommendations:
1 Have the patient lie down for 5 minutes.
2 Measure blood pressure and pulse rate.
3 Have the patient stand.
4 Repeat blood pressure and pulse rate measurements after standing 1 and 3 minutes.

A drop in BP of ≥20 mm Hg, or in diastolic BP of ≥10 mm Hg, or experiencing lightheadedness or dizziness is considered abnormal

Ref:
1. CDC, STEADI
2. Phipps, D., Butler, E., Mounsey, A., Dickman, M. M., Bury, D., Smith, A., ... & Stevermer, J. J. (2019). PURLs: Best timing for measuring orthostatic vital signs?. *The Journal of Family Practice*, *68*(9), 512.

3. **The postural vitals return at:**

   Supine: 139/73, HR 87
   Standing: 92/63, HR 95, and patient reports feeling lightheaded

   Based on this what are your management strategies?

   For this patient, I would advocate for short admission to Geriatrics or HCT. He likely can return home after short hospital stay but that is a fairly pronounced postural drop and likely will cause ongoing falls.
   - Education on triggers
   - Teach physical maneuvers
   - PT/OT assessment for gait aid
   - Medication review with pharmacy for offending agents
   - Fluid repletion, salt intake
   - Compression stockings, abdominal compression garments – get home care to help
   - Head up sleeping
   - Avoid heavy carb meals – postprandial hypotension
   - Medications: fludrocortisone, midodrine

4. **What medications can cause postural hypotension? (list at least 8 classes of medications) And which medications is this patient taking that may contribute?**

- Alpha blockers
- Nitrates
- Diuretics
- Beta blockers
- CCB
- ACE-I, ARBs
- Levodopa
- Antipsychotics
- TCAs
- Benzos
- Trazodone
- Opioids
- SSRI, SNRI
- Memantine

In this case, the patient medications that can contribute: Flomax, amlodipine, escitalopram

Ref: Rivasi, G., Rafanelli, M., Mossello, E., Brignole, M., & Ungar, A. (2020). Drug-related orthostatic hypotension: beyond anti-hypertensive medications. *Drugs & Aging*, *37*, 725-738.

5. **If this patient was observed during his functional assessment with PT to have a shuffling gait with reduced step length and loss of arm swing, what other clinical findings would you look for to see if he may have Parkinson's Disease?**

- Bradykinesia
    - Slowing of initiation of voluntary movements (e.g. glued footedness when starting to walk)
    - Reduced speed and amplitude of repetitive movements (e.g. tapping index finger and thumb together)
    - Difficulty switching from one motor program to another (e.g. multiple steps to turn during gait testing)

  AND one of more of:
- Muscular rigidity (cogwheeling)
- Resting tremor
- Impaired righting reflex (pull test: pulling on their shoulder tries to make them fall backwards. If the patients are able to correct their center of gravity in just one or two steps, the test is negative for a balance abnormalities. The test is instead considered positive if the patients catch their balance in more than two steps or if they do not stabilize at all and tend to fall to the ground.)

Other clinical features:

Geri-EM Curriculum: Falls, Functional Assessment, Transitions of Care

- Postural instability, falls
- pulling on their shoulder tries to make them fall backwards. If the patients are able to correct their center of gravity in just one or two steps, the test is negative for a balance abnormalities. The test is instead considered positive if the patients catch their balance in more than two steps or if they do not stabilize at all and tend to fall to the ground.
- Hyposmia – dec sense of smell
- Hypophonia – soft speech
- Micrographia
- REM sleep behavior disorder
- Constipation
- Masked facies – expressionless
- Infrequent blinking
- Drooling
- Seborrhea of face and scalp
- Festinating gait
- Neuropsych later in disease course: anxiety, depression, dementia, visual hallucinations, dysthymia, psychosis, delirium

Ref:
AGS 2018 Geriatrics at Your Fingertips, pg231
https://stanfordmedicine25.stanford.edu/the25/parkinsondisease.html

Case C:

90 yo F from assisted living, presents after having unwitnessed fall on the way to the dining hall in her building. She presented via EMS with right wrist pain and swelling.
In her assisted living facility she gets meals provided, medication assist, and bathing assist once a week. She uses a walker to ambulate.

She states she was feeling fine prior to her fall, no prodromal symptoms. Her only voiced complaint is pain to her right wrist. She is right hand dominant.

Her last hospitalization was 1 year ago for hypoxia from influenza.

M1 GOC

PMHx:
Mild cognitive impairment, osteoarthritis, hypothyroid, diabetes, dyslipidemia, hearing impairment, cataracts

Medications:
Donepezil, Tylenol arthritis, Synthroid, gliclazide, rosuvastatin, quetiapine

Geri-EM Curriculum: Falls, Functional Assessment, Transitions of Care

Physical exam: GCS 14 (baseline disoriented to date), attentive, at cognitive baseline
H+N: no signs head trauma, no midline neck pain, full C-spine ROM
CVS: normal heart sounds, no signs chest trauma
Resp: clear AE=AE, no inc WOB
Abdo: soft NT, no bruising
Neuro: normal strength and sensation to all 4 extremities, normal CN, PERL 4
MSK: tenderness, bruising, swelling to right wrist; NV intact. No other joint pain/dec ROM

1. **What would be this patient's ISAR score?**

Answer:
ISAR-R/original ISAR score of at least 4 (memory problems, vision problems, regular help prior to event).

	No	Yes
1) Before the illness or injury that brought you to the Emergency, did you need someone to help you on a regular basis?	0	(+1)
2) In the last 24 hours, have you needed more help than usual?	(0)	+1
3) Have you been hospitalized for one or more nights during the past six months?	(0)	+1
4) In general, do you have serious problems with your vision that cannot be corrected with glasses?	0	(+1)
5) In general, do you have serious problems with your memory?	0	(+1)
6) Do you take six or more different medications every day?	0	(+1)
Positive test is 2 or more	Total	/6

2. **What are possible causes or contributing factors to the fall in *this patient?***

- Cognitive impairment
- Hearing impairment
- Vision impairment
- Possible improper use of gait aid
- Medications: donepezil, gliclazide, quetiapine
- Postural hypotension
- Arthritis/joint pain
- Acute illness – see DDx in case A

3. What investigations would you order on this patient?

ECG
Postural vitals
CBC
Lytes, extended lytes
Cr, BUN
Consider troponin
CK
Xray wrist

4. Your labs, ECG, postural vitals are normal. Review the xray provided.

a) What type of fracture is this?

Answer: Smiths fracture (Extra-articular fracture of the distal radius with associated palmar (volar) angulation of the distal fracture fragment) and distal ulnar fracture

b) What is your management for this?

Answer:
- Reduction under hematoma block or procedural sedation (fentanyl, propofol)
- Casting in thumb spica cast
- OCL ortho follow-up

c) How does management of this injury in this patient, differ from management in a 30-year-old with the same injury?

- Younger patient can likely go home and function OK without much additional assistance
- Older adults have additional challenges:
    - Mobility issues – how will they be able to use their walker or cane
    - Increased fall risk
    - Self-care: bathing, dressing, transferring, feeding
    - Transport to ortho follow-up

d)* How would you work towards finding a disposition for this patient? What are the disposition options for this patient? *(assuming this is the only injury and all remaining workup normal)

- PT/OT functional assessment in ED – to see how the patient will do with ADLs, mobilizing with gait aid. Likely won't be able to use their walker so may need forearm rollator walker. This functional assessment is very important in order to sort out disposition.
- Transition coordinator to get involved:

- Communicate with her assisted living facility to inquire if they have the ability to increase her care/support during this acute injury. I.e. can they dress her, help with safe transfers, toileting, feeding assistance, and mobility assistance?
    - If they can, you may be able to send her home to the assisted living facility with this increased aid in place
    - If they cannot provide this care, then she may require alternate care place in the interim
- If they cannot provide this care, then she may require alternate care place in the interim.
    - An option here is to have the TC look for a rehab bed at the Glenrose. There occasionally are open rehab beds at the Glenrose hospital that are available same day or within a few days. This focuses on recovery from injury, PT/OT, and works towards discharge.
    - If no rehab bed available right away, then you likely need to admit to HCT, Geri, or medicine.
- While patient in the ED, also consider pharmacy to review meds
- Discuss hearing/vision impairment

5. **If this patient can be discharged back to their facility, what information would you communicate to the facility/PCP?**

Answer:

- Diagnosis: fall and right wrist fracture (distal radius/ulnar fracture)
- Relevant labs/tests: remaining workup normal
- Medication changes: change Tylenol to q6h ATC, and any other suggestions pharmacy recommended.
- Care needs:
    - In the interim, patient will need care with transfers in/out bed, toileting transfers, dressing, bathing, and feeding assistance
- Any necessary follow-up:
    - Referral to OCL.
    - Contact number given to OCL: caregiver name/number
    - Patient will need transportation to their orthopedic appointment
    - Need f/u with PCP – to review fall risks, hearing and vision check
- RTED instructions
    - Recurrent falls/injury
    - Severe pain, numbness/parasthesias, or discoloration to the fingers beneath cast