Comprehensive Assessment of a Fall

**History**

- As with most of medicine – and geratology in particular – history plays an important factor when performing an assessment of a patient who has fallen. The structure below is particularly important in the context of falls:

**Before the fall**
- Any pre-syncopal symptoms e.g. feeling dizzy, light-headed, palpitations?
- What were they doing?
  - Getting up from lying/sitting (postural hypotension?)
  - From the toilet (vasovagal?)
  - In the middle of walking (arrhythmia?)
  - Turning their head (carotid sinus hypersensitivity?)
- How is their general health? Any infective symptoms (e.g. dysuria, cough, cellulitis?)
- How do they usually mobilise? Do they walk independently or use a stick/sticks/frame/need supervision (implying underlying frailty and poor mobility?)

**During the fall**
- Do they remember falling?
- Was it witnessed?
  - If so, obtain a detailed collateral history
  - If not, assume that there may have been some loss of consciousness (LOC)
- Was there any LOC?
- Are they able to describe the mechanism of the fall?
  - If they say they ‘must have tripped’ this is not the same as remembering a definite mechanical reason for the fall!
- Where they able to put out their hands to prevent injury?
  - A fractured wrist where they have tried to protect themselves is consistent with no LOC
  - A significant head (e.g. black eye) is consistent with no attempt to protect themselves, and as such LOC (likely sudden onset – e.g. arrhythmia) prior to the fall.

**After the fall**
- Any limb jerking or urinary/faecal incontinence to imply seizure?
  - Some myoclonic jerking following a syncopal episode is not uncommon, so do not read too much into this
- Were they well-oriented following the fall?
  - Rapidly recovering orientation is in keeping with no LOC, or syncopal episode
  - Persistent confusion/drowsiness implies a post-ictal state and potential seizure as cause
- Were they able to mobilise independently following the fall?
  - If not, and secondary to pain, be on the lookout for bony injuries
  - Confused patients can often fail to localise pain
- How long were they on the floor for?
  - The longer the lie, the higher the risk of rhabdomyolysis: ensure as CK is checked

**Past Medical History**

- Diabetes Mellitus
  - Are they good at detecting hypoglycaemia?
  - Was a blood sugar checked at the time of the fall?
  - Any history/evidence of peripheral neuropathy that might be contributing to falls risk?

- Hypertension
  - Are they on multiple anti-hypertensives which might be leading to postural hypotension

- Epilepsy
  - Do they have a history of seizures?
• If so, how well controlled are the seizures and are they compliant with anti-epileptic medications?
  
• Previous falls
  • Have they had other falls (even “small” ones that didn’t require admission)?
  • How does this one compare to the previous ones? Is it a similar story?

• Cardiac History
  • History of palpitations/ECG-confirmed arrhythmias
  • Do they have a copy of an old ECG?
    ▪ If your patient as an abnormal ECG, giving them a copy to take home with them in future is useful, as they can show it to future admitting doctors to allow comparison
  • Ischaemic heart disease or other underlying cardiac problems that might mean the patient is on beta-blocker

• Other neurological History
  • Any previous stroke/neurological disorder that has left them with a persistent focal deficit, and hence frailty that might be contributing to the falls risk
  • History of tremor/shuffling gait/rigidity to imply Parkinsonism

• Continence History
  • Issues with incontinence/overactive bladder can lead to falls as patients often try to mobilise late at night to the toilet in the dark

• State of vision
  • History of glaucoma or age-related macular degeneration, which might leave them visually impaired?

• Cognitive Impairment?
  • Patients with dementia are at increased risk of falls, secondary to a lack of self-awareness over danger/obstacles to mobilisation
  • Evidence of recurrent visual hallucinations (LBD associated Parkinsonism)

• Bone Health
  • Evidence of previous fractures
  • Evidence of osteoporosis and risk of fragility fractures

• Drug History
  • Anti-hypertensives
    ▪ May lead to postural hypotension
  • Alpha-receptor blockers in male patients with prostatism
    ▪ E.g. tamsulosin
    ▪ Can cause a profound postural drop in BP
  • Antihyperglycaemics
    ▪ Use of insulin or sulphonylureas can cause hypoglycaemic events
  • Analgesia
    ▪ Side-effects of drowsiness can increase the risk of falls
    ▪ Evidence of poor-pain control can imply frailty and poor mobility
  • Bone Protection
    ▪ Vitamin D replacement
    ▪ Calcium replacement
    ▪ Bisphosphonates
  • Steroid Use
    ▪ E.g. long-term use in COPD with multiple exacerbations or in polymyalgia rheumatic (PMR)
    ▪ Associated with increased risk of fragility fracture secondary to effects on bone
    ▪ Long-term use associated with proximal myopathy, and subsequent frailty-associated falls risk
  • Diuretics
    ▪ Use of diuretics is associated with increased urinary frequency, and the associated issues with continence as discussed above
Check the timings of administration, and try not to prescribe your diuretics in the evening if possible (if BD dosing, give the second dose at lunchtime) – this will help to avoid nocturnal micturition

- Anti-epileptics
- Anti-cholinesterase inhibitors
  - Implies the diagnosis of dementia (if not already established from past medical history)
  - Associated with increased risk of syncope (and hence syncope-related falls)
- Anti-coagulants
  - Risk of bleed (e.g. subdural haematoma) if patient on warfarin or novel oral anticoagulant (NOAC)
  - Have a lower threshold for a CT head
- Psychotropic Drugs
  - E.g. SSRIs, benzodiazepines, dopamine antagonists can all increase the risk of falls

### Social History
- House/flat/bungalow
- Stairs and associated equipment (e.g. stair rails, stair lift)
- Upstairs/downstairs toilet/commode
- Who else is at home with the patient
- Any pre-existing package of care (POC)
- Level of independence for activities of daily living (ADLs)
- Alcohol history
  - Potential associated alcohol neuropathy
  - Intoxication-related falls
  - If history of dependence, offer support to help quit, and monitor for withdrawal
- Smoking history
  - Should always form part of every social history
  - Again, offer support to help quit
- Who does cooking/shopping/cleaning of house?
- Do they have a pendant alarm?
- Do they have a key safe?

### Systems Enquiry
- The multi-factorial nature of most geriatric falls means that a systems enquiry has already been performed during the above history

### Examination
- A full formal clerking should then be performed to assess for both any sign of injury as a result of the fall, but also to gain a better understanding into possible causes.
- On a system-by-system basis, here are a few things to keep in mind and look out for.

#### Cardiovascular
- Pulse
  - Regular/irregular to imply AF or intermittent heart block?
  - Strong or weak (weak may suggest underfilling)?
- Blood pressure
  - Always try to obtain 3 postural (lying to standing) blood pressure readings
  - Ensure they are taken correctly (do not settle for a “lying to sitting”)
- Murmurs
  - ESM to imply aortic stenosis as a cause of syncope?
  - PSM to imply MR and CCF/AF from atrial dilatation

#### Respiratory
- Evidence of LRTI/pneumonia as an underlying infection?
- Evidence of chronic respiratory problems leading to SOB and increased frailty?
- Equal, pain-free air entry?
  - Inspiration can be limited by the pain from fractured ribs from the fall
  - Hypoventilation (and associated atelectasis) due to pain is a risk factor for pneumonia

- **Abdominal**
  - Evidence of constipation that might be leading to a delirium?
  - Evidence of an enlarged bladder (urinary retention) leading to a delirium?

- **Neurological**
  - Please do not document neurology as “grossly normal”
    - “Grossly normal” equates to “couldn’t be bothered to examine”
  - Instead, do a formal neurological examination for:
    - Evidence of stroke/disability from previous stroke
    - Cerebellar signs to imply balance is impaired
    - Peripheral neuropathy from alcohol or diabetes that reduces proprioception and balance
    - Check their gait and use of walking aids

### Investigations

- **ECG**
  - Look for any evidence that could be predisposing them to syncope e.g. heart block, arrhythmia, over-treatment with beta-blockade

- **Blood glucose**
  - Evidence of diabetes or hypoglycaemia

- **Urine dip**
  - Evidence of UTI as source of infection
  - If legs are particularly oedematous (and hence contributing to the risk of falls) look for urinary protein

- **Blood tests**
  - **FBC**
    - Anaemia leading to shortness of breath on exertion
    - Raised white count to imply infection
    - High MCV to imply B12 deficiency (and potential associated peripheral neuropathy)
  - **Urea and electrolytes**
    - Uraemia or other metabolic disturbance leading to confusion
  - **CRP**
    - Underlying infection
  - **Calcium and phosphate**
    - Evidence of bone pathology e.g. myeloma which is causing pain, and hence increasing falls risk
  - **Liver function**
    - Evidence of alcohol abuse
  - **Clotting**
    - Especially if on warfarin
    - Abnormally high INR may increase your suspicion of causative or resultant intracranial bleeds
    - If low, be on the lookout for corresponding complications (e.g. stroke for AF, PE for VTE)
  - **Other blood tests** may be indicated based on your findings so far from history and examination
    - E.g. TFTs if evidence of hyper- or hypothyroidism

- The above list is not exhaustive, and should be tailored towards your suspected diagnosis

- **Imaging**
  - **Chest x-ray**
    - Evidence of infection as a cause of the fall
• Can also confirm rib fractures which will require adequate analgesia to allow good, deep respiration and hence reduce the risk of subsequent infection
  o CT Head
    ▪ Although there are national trauma guidelines over who should receive a CT head in the emergency department, it is reasonable to have lower threshold for a CT head in the elderly population
    ▪ Subdural haematoma is a not uncommon cause of confusion in the elderly (even without a clear history of trauma, especially if on anticoagulants)
    ▪ This is particularly important if the patient is frail and likely to be an in-patient on thromboembolic prophylaxis for several days

Management of patients with falls: In-patient, discharge, and follow-up

• Immediate inpatient management will clearly depend on findings of above history, examination and investigations.
• Management should be multidisciplinary: including doctors, nurses, physiotherapists and occupational therapists.
  General geriatric management strategies include:
• Inpatient
  o Identify those who are at high risk of further falls to help reduce the chance of an in-patient fall
    ▪ 1:1 nursing may be required for confused/delirious patients
    ▪ Low-rise beds and mattresses on the floor to reduce the risk of injury
    ▪ Non-slip socks
    ▪ Adjustment of medication regimens to reduce falls risk
  o Training how to use appropriate walking aids is very important to help reduce falls
• Additional support
  o POC if going back home
  o May require placement to ensure safety, either RH or NH based on level of dependence
• Outpatient
  o Home visits can be helpful in frail patients who might have cluttered houses with uneven floors
  o Modification of the home environment
    ▪ Downstairs living
    ▪ Commode
    ▪ Hand rails
    ▪ Stair lift
    ▪ Hospital bed
    ▪ Hoist
  o Pendant alarms
    ▪ Newer models have in-built impact sensors that are set-off as a fall happens
• Follow-up
  o Specialist geriatric clinic follow-up
  o Falls clinic
  o Balance classes