# Evaluation of Older Adults in the Emergency Department Following a Fall

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**KEYWORDS**

• Falls • Geriatric trauma • Fall interventions • Fall prevention

**KEY POINTS**

- Falls syndrome refers to the increased risk for falls and the higher rates of injury and worse outcomes that result from it.
- Falls are often multi-factorial and can result from acute changes such as acute coronary syndrome (ACS), stroke, or non-accidental trauma and are also the top cause of trauma-related morbidity and mortality in older adults.
- The emergency department (ED) evaluation following a fall should focus on looking for acute causes of the fall and for acute injuries and can consider chronic contributors to the fall to help refer the patient for further care to address their underlying falls syndrome.
- Physical therapy (PT)/occupational therapy (OT) evaluations in the ED can help reduce future visits for falls and can help determine the patient's ambulatory ability and outpatient needs without increasing the ED length of stay.

## CASE VIGNETTE

Mrs Edith Farrington is an 86-year-old woman with a history of hypertension and atrial fibrillation on apixaban, who presents after a ground-level, non-syncopal fall. She was walking from her bedroom to her bathroom at 2 AM, when she lost her balance and fell, hitting her left hip and the left side of her head on the ground. She had no immediate loss of consciousness but was unable to get up on her own. She called for help and her husband called Emergency Medical Services (EMS), who transported her to the Emergency Department (ED). On further questioning, she notes that her dose of metoprolol was recently increased. On initial examination, her vital signs were: 37°C, 62, 110/55, and 98% on room air. She reported left-sided hip pain, and the left leg is shortened

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and internally rotated. She had a 3 cm hematoma to her left forehead, but no other external signs of trauma.

## INTRODUCTION

Ground-level falls are one of the most common reasons older adults seek care in the Emergency Department (ED), comprising, approximately 3 million visits to US EDs annually.[1,2] About 25% of individuals over the age of 65 fall each year.[3] This increases to 50% of individuals over age 80.[4]

Falls are a major source of morbidity and mortality for older adults. Falls are the number 1 reason for trauma-related admissions and the primary cause of trauma-related mortality among older adults. Seventy-eight percent of older adults admitted for traumas are there following a fall, and 70% of patients admitted for trauma are female. In the Center for Disease Control (CDC) Web-based Injury Statistics Query and Reporting System for 2021, the percentage of injury-related deaths due to a fall in all ages, > 65 years, > 75 years, and > 85 years were 15%, 48%, 62%, and 72%, respectively.[5].

The direct medical cost for older adults with fall-related injuries is around $20 billion per year.[2,6] The number of ED visits for falls among the older adult population and the associated hospital admissions and costs are all expected to increase in the coming years due to the growth in this population.

Emergency Physicians need to understand the syndrome of falls in older patients and how to evaluate and intervene for patients who present after a fall. In this article, the authors will discuss the common causes of falls in older adults, the ED evaluation following a fall, the most common injuries sustained, and potential interventions both in the ED and on discharge to help prevent future falls.

## FALLS SYNDROME

When an older individual falls, it may appear to be due to a simple accidental trip or slip, what some may call a “mechanical fall.” The vast majority (>90%) of falls occur on ground level which is often misleading as it evokes a benign and low-impact mechanism of injury.[7–9] However, the etiology and morbidity of the fall are likely more complex, and multi-factorial.

Falls syndromes occur when there are multiple accumulated impairments in different organ systems that leave the patient more vulnerable to loss of balance and with an inability to prevent a fall or catch themselves.[10] The term Falls Syndrome has been coined to describe the increased fall risk, need for medical care, hospitalization, morbidity, and increased injuries and injury severity associated with falling as someone ages.[1,11–13] When an older person falls, this syndrome may represent a red flag in which that person’s co-morbidities, cognitive state, and level of frailty portend to likely death within a short period of time.[12–14]

Patients who are at high risk for falls or who display frequent falls often have accumulated impairments that may include slowed reflexes, sarcopenia, frailty, limited joint mobility, vision deficits, hearing deficits, chronic pain, and/or orthostasis. They may also have cluttered living spaces or unsafe environments due to difficulty in performing their activities of daily living (ADLs) or inadequate care. While no 1 factor can be said to have caused a specific fall, all of those factors contribute to the falls syndrome and increased falls risk. **Table 1** illustrates factors that may contribute to falls syndrome. These can be considered factors that are chronically present and place the patient at a higher risk for falls and at a higher risk for injury or slower recovery following a fall. The falls syndrome has significant overlap with other geriatric syndromes such as frailty, delirium, dehydration, and cognitive decline.

**Table 1**
**Chronic contributors to falls syndrome and worse outcomes**

| System | Examples |
|---|---|
| Medication or toxicologic | Greater risk of polypharmacy and medication side effects. |
| Cardiopulmonary | Decreased pulmonary reserve and cardiac function. |
| Vascular | Calcification of vessels and higher risk of orthostasis. |
| Metabolic | Higher tendency to electrolyte abnormalities (hypo/hypernatremia, hypo/hyperglycemia, hypo/hyperkalemia) or dehydration (eg, from diuretics). Higher risk of orthostasis due to medications. |
| Neurologic | Parkinson's disease, cognitive dysfunction, prior cerebrovascular accident (CVA) or baseline weakness. |
| Hematologic | Chronic anemia or leukemia. Use of anti-coagulants. |
| Musculoskeletal | Frailty, arthritis, sarcopenia, slowed reflexes, and movement. Osteoporosis/osteopenia. |
| Other | Environmental clutter, need for assistive devices, poor wound healing, or greater skin breakdown. Higher risk for infections. |

## SECONDARY FALLS

In addition to falls that occur from the accumulated effects of impairments in different systems that lead to a fall risk syndrome, falls can occur due to an acute medical change. Patients who are brought in by EMS or who are triaged with a chief concern of "fall" may, in fact, have suffered another acute event that led to the fall and that could be more serious than the fall-related traumatic injuries. Because of the multiple factors that may have led to a fall, a thorough evaluation for the potential causes is critical. The differential diagnosis is very broad and includes almost every body system. However, the most common acute causes include medications, dehydration, cardiac, and neurologic.[15]

Some examples of primary events that could lead to a fall as a secondary event include entities such as those shown in **Table 2**.

**Table 2**
**Acute primary causes of a fall**

| System | Examples |
|---|---|
| Medication or toxicologic | Acute accidental or intentional overdose of a prescribed medication, alcohol, or drug of abuse. Polypharmacy and acute medication side effects. Acute electrolyte abnormalities. |
| Cardiopulmonary | Dysrhythmia, cardiomyopathy, acute coronary syndrome, syncope. |
| Vascular | Aortic dissection or rupture, carotid dissection or occlusion, aortic stenosis. |
| Metabolic | Dehydration, hypo/hyperglycemia, hypo/hypernatremia, hypo/hyperkalemia, other electrolyte abnormalities |
| Neurologic | Acute CVA or TIA, intra-cranial hemorrhage, vertigo, seizure. |
| Hematologic | Acute blood loss. |
| Musculoskeletal | Pathologic fracture. |
| Other | Non-accidental trauma. Accidental trauma. |

## EMERGENCY DEPARTMENT EVALUATION FOR FALLS

For patients who present following a fall, the Emergency Physician should perform a thorough history and physical examination to assess for potential causes of the fall as well as any injuries sustained during the fall.

Targeted questions (**Box 1**) can help elicit potential acute causes of the fall and clues to key components of the patient's underlying falls syndrome. In addition, questions about what happened before, during, and after the fall can give clues to possible injuries. For patients who live in a care facility or who have a family member who witnessed the fall, it is important to get collateral information from them. The facility or family member may be able to give more information about the patient's baseline status and capabilities, as well as their recent state of health and what happened during, immediately before, and after the fall. It is especially critical to get collateral information for patients who have cognitive impairment, or who present with an acute alteration in mental status.

**Box 1**
**Targeted questions to identify potential acute causes of a fall and contributors to an underlying falls syndrome**

Questions to determine the situation surrounding the fall
- How and where did the fall happen?
- Do you remember all the events surrounding the fall?
- Did anyone see you fall?
- What happened during the fall (eg, did you hit your head, neck, or other part of your body)?
- What happened after the fall?

Questions to identify any acute contributors to the fall
- Were you feeling in your usual state of health, or have you had any new symptoms in the last few days?
- Have you started any new medications, or had any other changes in your medications?
- Before the fall, had you just changed position, such as going from sitting to standing?
- Before or after the fall, did you have any chest pain, shortness of breath, weakness, numbness, or slurred speech?
- Were you dizzy or was the room spinning?
- Were you choking, coughing, or vomiting?
- Did you lose control of your bowel or bladder?

Questions to help determine potential injuries
- When you fell, how did you land?
- Did you lose consciousness for any amount of time?
- Were you able to get up and walk after the fall?
- Since the fall, have you had any pain anywhere?
- Since the fall, have you had any head pain, nausea, or vomiting?
- Since the fall, have you had any weakness or numbness?

Questions to ask a witness
- What did you see as the patient fell?
- Did they lose consciousness?
- Were they confused before or after the fall?
- Did they have any apparent droop of their face or difficulty speaking before or afterward?
- Did they have any shaking or seizure-like activity?

Questions to ask the facility or caregiver
- What is the patient's baseline mental status and abilities?
- Is the patient usually able to walk unassisted, or do they use a cane or walker?
- What is the patient usually able to do on their own, such as walking, getting dressed, cooking, or taking care of things?
- Is there a history of falls in the past?

It is also important to do a thorough physical examination. If the injury is severe, then Advanced Trauma Life Support procedures should be followed to address immediate life threats. In less severe injuries, a head-to-toe examination including the back is still important. The patient may not know or may not recall hitting a part of their body or could have injuries to areas of their body that they cannot see, such as the back of their head, the back, or legs. The patient should be rolled to examine the back and neck. The examination should include a range-of-motion assessment for all joints. If there are no signs of acute fractures or injuries, then the patient can be helped to stand, to assess their ability to bear weight and ambulate.

If the patient has any alteration in mental status, or the initial questioning pointed to potential acute causes of the fall, then in addition to evaluating for potential injuries, the Emergency Physician should perform a workup to determine the acute cause of the fall, with labs, electrocardiogram, and/or imaging targeting the potential causes.

Injuries from falls due to non-accidental trauma can be very similar to those from accidental trauma. When concerned about potential non-accidental trauma, the first step is to interview the patient and caregiver separately to describe what occurred, and to ask simple, specific questions to the patient, such as "Did anyone push you, kick you, or hit you?"

## MOST COMMON INJURIES AND SEQUELAE

About 20% of older adult falls lead to an ED evaluation equating to approximately 3 million US ED visits per year.[1,2] Most commonly, the fall results in a superficial injury such as abrasions, lacerations, and contusions.[16] However, about 30% result in some type of fracture, and approximately 20% have a head wound or more severe head injury.[16,17]

Of patients presenting to a level 1 trauma center after a ground level fall, 50% sustained a hip fracture and 3% an intracranial hemorrhage.[13] Other fractures that are seen after a fall include upper extremity (15%), rib (10%), pelvic (7%), thoraco-lumbar spine (5%), cervical spine (5%), and facial (3%). Two percent of patients suffered a hemothorax or pneumothorax, while solid organ injury was uncommon at less than 1%.[13]

Head injury after a fall from standing can cause traumatic brain injury or intracranial hemorrhage.[8] Many of these patients are taking anticoagulants and/or antiplatelet agents that can complicate management and worsen outcomes.[18] A highly quoted 2012 prospective study anticoagulated head trauma patients with a negative initial head computed tomography (CT) scan, reported a 7.2% rate of delayed intracranial hemorrhage.[19,20] Some have recommended follow-up assessments or routine repeat CT scans.[21] However, subsequent studies have not been able to validate this work.[18,22] At present, it is unclear if routine assessment for delayed intracranial hemorrhage (ICH) is necessary for anticoagulated head trauma patients and the practice is not standard.

Hip fractures are the most common fractures in patients admitted for trauma after a fall and are associated with high rates of morbidity and mortality.[23,24] One study reported 1-year, 2-year, and 3-year mortality of 23%, 40%, and 50%, respectively.[23] Despite operative repair, many of these patients remain bedridden or need mobility aides, 57% at 5 years in a study.[24] Patients with co-morbidities and frailty have worse functional outcomes with increased need for skilled nursing facility.[24,25]

Of patients who seek care at a hospital, most are not admitted (75%).[1,2,26] Patients that are admitted are older, more frail, more likely to have cognitive impairments, and have more co-morbidities.[12,27–29] After hospital discharge, about 55% of these admitted patients are discharged to a skilled nursing facility and 40% are discharged home with 15% needing home health care.[14,29]

After hospital discharge, this group is at high risk (13%) for hospital readmission over the next 30 days. Patients with cognitive impairment are at even higher risk (16%). Further, subsequent repeat fall and fall-related injury rates are increased. Approximately 25% of individuals discharged from a hospital will have a recurrent fall-related injury within 1 month.[13,16]

In addition, older individuals that have fallen have a lower quality of life and less physical capabilities compared to those that have not experienced a fall.[20,30] This may be due to the fall-related injury or the co-morbidities, frailty, or poor physiologic reserve that predisposed them to the original fall event.

Finally, mortality as a sequalae after a fall is not uncommon.[12–14] Of older patients presenting to a Level 1 trauma center after a fall, the in-hospital mortality was 9%. Of patients discharged from a hospital, the 1-year mortality was 24%.[14] For patients that had a hip fracture, it was 23%.[23] Further, patients discharged to a skilled nursing facility had a 3-fold increase in mortality.[14]

## EMERGENCY DEPARTMENT INTERVENTIONS FOR FALLS

The initial role of the ED physician is to assess for acute injuries and any acute, reversible causes or inciting factors that led to the fall, such as those in **Table 2**. The workup and disposition will then be guided by the findings and patient needs.

If no acute injuries or inciting events are found, then the focus can turn to measures to help prevent future falls. A rapid assessment of gait can help the ED physician determine whether the patient is safe to be discharged, and what other measures may help prevent future falls. For example, if the patient may benefit from a cane or walker, this should be provided for them.

If physical and/or occupational therapy (PTOT) consultations are available, studies have found that an evaluation in the ED after a ground-level fall can help reduce fall-related revisits at 30 and 60 days by approximately 30%.[31] ED consultation by OT or PT has also been shown to decrease hospital admission rates and decrease recurrent falls.[32,33] OT or PT consultation is perceived to take additional time to accomplish and to lead to increase ED length of stay. However, several studies have actually shown better workflow and decreased ED length of stay, in addition to the other improved outcomes.[34]

The PT/OT consultation may determine that the patient is not safe for discharge, recommend mobility aids, or recommend outpatient or home PT/OT. The therapist can also train the patient on ways to avoid falls.

Depending on the ED and community resources, the Emergency Physician can help connect the patient to outpatient resources such as referral to a geriatrics clinic, falls clinic, physical therapist, community elderly center, community meals service, home health, or home physical therapy.

## DISCHARGE PLANNING

Older patients discharged from the ED directly to home following a fall are at high risk for adverse events. This could be due to an acute injury causing some disability, or the fall-related ED visit representing a sentinel red flag for functional decline.[35] Over the next month after ED discharge, these patients are at an increased risk for recurrent fall-related injury, readmission, and death.[13,16,36]

Almost all patients prefer avoiding hospital admission and returning to their home.[37] However, the key issue in the transition from the ED to home is whether the patient has the capability to perform their ADLs or has a caregiver to help ensure the patient is cared for.[36–38] Obtaining input from family, friends, or caregivers is essential in determining

whether the patient has these abilities. In addition to the patient's functional status, information should be obtained about the level of social support and any environmental factors that might preclude a safe discharge home.[36] The patient and family often overestimate the patient's capabilities, especially in the setting of a recent injury.

Another important aspect of ED discharge planning is follow-up. Appropriate follow-up is essential to ensure recovery from the fall and for assessing recurrent fall risk and initiating fall prevention strategies. A number of clinical guidelines exist describing geriatric fall prevention.[39,40] Almost all of these strongly recommend fall-risk assessment, gait and balance evaluation, osteoporosis management, footwear review, vision assessment, medication review, and home fall-risk evaluation.[40]

Unfortunately, most primary care physicians (PCPs) do not have the resources and time to implement fall prevention recommendations.[41] Further, many ED patients that have suffered a fall-related injury often do not have a PCP, do not follow-up with their PCP, and do not adhere to discharge instructions.[17,42] Communication with the patient's PCP regarding the patient's fall-related ED visit may help encourage follow-up and initiation of fall prevention guidelines.[43] Another option is for the patient to be referred to a Falls Clinic, if available. Falls Clinics focus on fall-risk assessment and fall prevention and have been shown to decrease recurrent fall, fall-related injury, and ED revisits.[44–46]

## SUMMARY

Falls are a common reason for ED visits among older adults and are the leading cause of trauma-related admissions and mortality. When evaluating a patient following a fall, it is important to consider acute causes of the fall, as well as chronic contributors to the falls risk syndrome. The first task of the ED physician is to assess for any acute severe injuries, or potentially dangerous causes of the fall, such as stroke, seizure, or acute coronary syndrome. If there are no acute injuries or underlying causes found, then the focus of the visit can shift to implementing measures and referrals to reduce future falls and fall-related injuries.[31,47] These measures may include a PT/OT consult in the ED, provision of a mobility device, or referral to outpatient, home, or community services.

## CASE VIGNETTE CONCLUSION

In the ED, Mrs Farrington received a head CT, chest X-ray, and X-ray of the right hip. The imaging demonstrated a right hip fracture and 2 rib fractures. She received a femoral nerve block to manage the hip pain. She was started on analgesia as needed and incentive spirometry for the rib fractures. A non-invasive urinary wick device was placed instead of an in-dwelling catheter; she was started on maintenance intravenous fluids, and made nil per os (NPO) for operative intervention of the hip. Following her surgery, she began working with PT, and was discharged shortly after to a rehab facility and then returned home.

## CLINICS CARE POINTS

- Falls are often multi-factorial, due to impairments in different systems.
- Falls syndrome refers to the increased risk for falls and the higher rates of injury and worse outcomes that result from it.
- Falls are the top cause of trauma-related morbidity and mortality in older adults.

- Falls can also result from acute changes such as ACS, stroke, or non-accidental trauma.
- The ED evaluation following a fall should focus on looking for acute causes of the fall and for acute injuries.
- In addition, the ED evaluation can consider chronic contributors to the fall to help refer the patient for further care to address their underlying falls syndrome.
- PT/OT evaluations in the ED can help reduce future visits for falls and can help determine the patient's ambulatory ability and outpatient needs without increasing the ED length of stay.

## DISCLOSURE

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