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BEHIND AND ON THE SCENE

Fragile & Fatal: The Hidden Dangers of Geriatric Low-Impact Trauma

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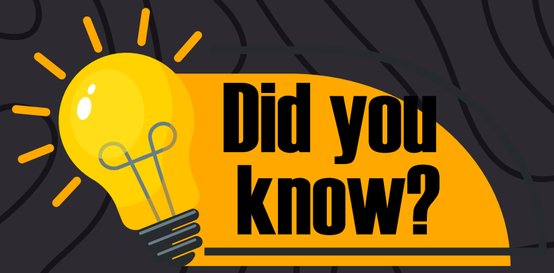


Trauma as a Leading Cause of Death: Trauma is the fifth leading cause of death among individuals aged 65 and older, accounting for up to 25% of all trauma admissions nationally.

National Center for Biotechnology Information. (2017). StatPearls. StatPearls Publishing.

Injuries from Falls: Approximately 37% of those who fall sustain injuries that require medical treatment or restrict their activity for at least one day, resulting in an estimated 9 million fall-related injuries annually.

Centers for Disease Control and Prevention. (n.d.). Falls data and statistics.

Mortality Rates: In 2021, falls among adults aged 65 and older caused over 38,000 deaths, making it the leading cause of injury death for that age group.

Centers for Disease Control and Prevention. (n.d.). Facts about falls.

Topics Covered

01

Physiology & Pathophysiology of Aging

02

Mechanisms of Low-Impact Trauma & High-Risk Injuries

03

Assessment Challenges & Atypical Presentations

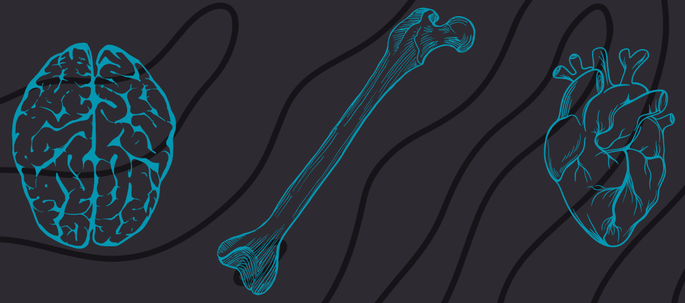
04

Prehospital & Hospital Management Strategies

1

Physiology & Pathophysiology of Aging

Changes in bone density, skin integrity, and organ function.



1. Increased Vulnerability to Injuries
• Weaker Bones: Osteoporosis makes bones brittle, increasing the risk of fractures, even from minor falls.
• Decreased Muscle Mass: Leads to weakness and balance issues, making falls more likely.

2. Slower Physiological Responses
• Delayed Shock Response: The heart and blood vessels don't respond as quickly, meaning signs of shock may be delayed or missed.

3. Greater Risk with Head Injuries
• Brain Shrinkage: Increases the risk of unnoticed, slow bleeding after head trauma, which can worsen over time.

4. Skin Fragility and Slow Healing
• Thinner Skin: Makes older adults more prone to injuries like cuts and bruises.
• Delayed Healing: Even minor injuries can progress into more serious complications.

5. Minor Injuries Can Become Major
• Due to these age-related changes, injuries that might be minor in younger individuals can quickly become serious or life-threatening in older adults.

Neurological

1. Brain shrinkage increases injury risk – As the brain shrinks with age, there is more space inside the skull, making older adults more prone to slow, delayed brain bleeds (like subdural hematomas) after even minor head trauma.

2. Slower reflexes and reaction times – Aging causes a decline in nerve conduction speed, leading to delayed reflexes and slower reaction times, increasing the risk of falls and injuries.

3. Reduced pain perception – Nerve function declines with age, which can cause diminished sensation, meaning older adults may not feel pain from an injury as acutely, delaying diagnosis and treatment.

4. Increased risk of cognitive impairment – Conditions like mild cognitive impairment (MCI), dementia, and delirium make it harder for elderly patients to recognize, communicate, or respond appropriately to injuries.

5. Greater susceptibility to head trauma complications – Even minor head injuries can lead to serious consequences, as the brain's ability to recover from trauma is slower, and older adults are often on blood thinners, increasing the risk of dangerous bleeding.

Organ Function

1. Heart and Blood Vessels: As we age, our cardiovascular system undergoes changes that can lead to increased stiffness in blood vessels and a decrease in the efficiency of the heart's pumping ability. This can result in higher blood pressure and a reduced capacity to respond to physical stress.

2. Lungs: Aging can cause a decline in lung function, characterized by decreased elasticity of lung tissue and weakening of respiratory muscles. This leads to reduced oxygen uptake and can make breathing less efficient, especially during physical activity.

3. Kidneys: Renal function tends to decline with age, resulting in a decreased ability to filter waste products from the blood. This can affect the body's fluid and electrolyte balance and influence how medications are processed.

4. Liver: The liver's capacity to metabolize substances diminishes over time, impacting the processing of medications and toxins. This decline can alter drug efficacy and increase the risk of adverse effects.

5. Digestive System: Aging can slow down the digestive process, leading to common issues such as constipation and decreased nutrient absorption. This slowdown is often due to reduced muscle contractions in the gastrointestinal tract and changes in digestive secretions.

Skin & Bones

1. Skin loses collagen and elasticity – As people age, collagen production decreases, making the skin thinner, more fragile, and prone to wrinkles, sagging, and easy bruising.

2. Oil production slows down – The skin produces less natural oil, leading to dryness, itching, and increased risk of skin tears or infections.

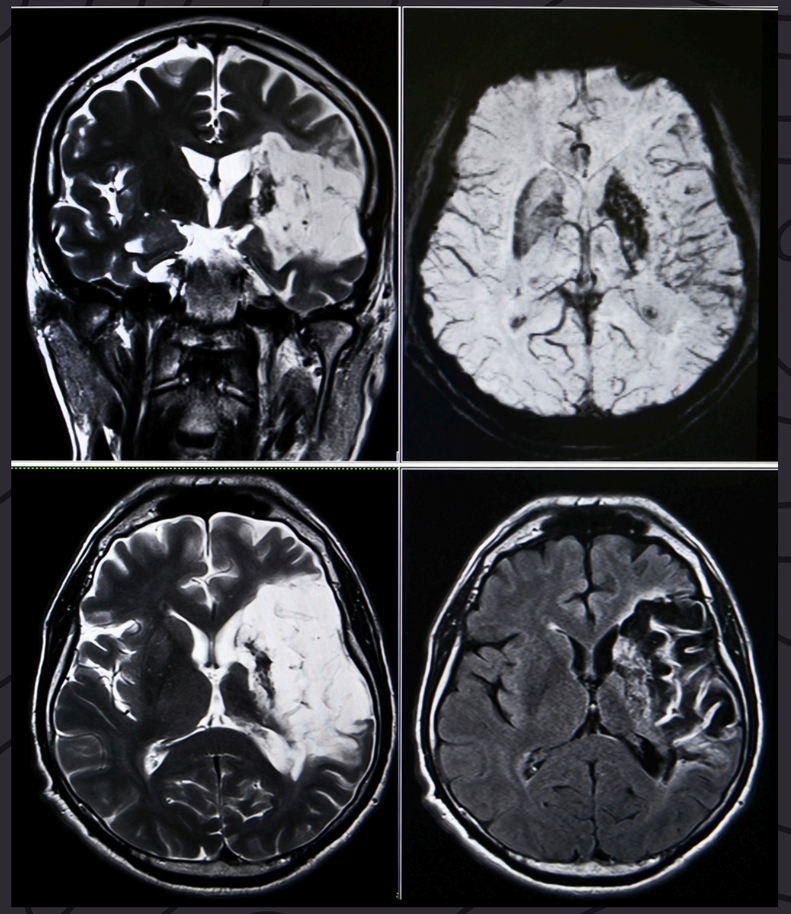
3. Bone density decreases – Aging causes bone loss, increasing the risk of osteoporosis and fractures, especially in the hips, spine, and wrists.

4. Calcium and vitamin D absorption declines – The body absorbs less calcium and vitamin D with age, making bones weaker and more susceptible to breaks.

5. Joints wear down over time – Cartilage that cushions joints gradually deteriorates, leading to stiffness, pain, and osteoarthritis, making movement more difficult.

Other Factors

Effects of comorbidities



2

Mechanisms of Low-Impact Trauma & High-Risk Injuries

Low-impact traumas, and the frail patient.

15 Variable Trauma Specific Frailty Index					
Comorbidities					
Cancer History	Yes (1)			No (0)	
Coronary Heart Disease	MI (1)	CABG (0.75)	PCI (0.5)	Medication (0.25)	None (0)
Dementia	Severe (1)	Moderate (0.5)		Mild (0.25)	No (0)
Daily Activities					
Help with grooming	Yes (1)			No (0)	
Help with managing money	Yes (1)			No (0)	
Help doing housework	Yes (1)			No (0)	
Help toileting					
Help walking	Wheelchair (1)	Walker (0.75)		Cane (0.5)	No (0)
Health Attitude					
Feel less useful	Most time (1)	Sometimes (0.5)		Never (0)	
Feel sad	Most time (1)	Sometimes (0.5)		Never (0)	
Feel effort to do everything	Most time (1)	Sometimes (0.5)		Never (0)	
Feel lonely	Most time (1)	Sometimes (0.5)		Never (0)	
Falls	Within last month (1)	Present not in last month (0.5)		None (0)	
Function					
Sexually active	Yes (0)			No (1)	
Nutrition					
Albumin	< 3g/dL (1)			> 3g/dL (0)	
SCORE					
SCORE		**FI (Score/15)**			**>0.25 = Frail**

1. High Risk from Low-Impact Events

• Ground-level falls are the leading cause of geriatric trauma, accounting for about 80% of admissions.

• Even low-speed car accidents can result in severe injuries due to increased fragility.

2. Common and Dangerous Injuries

• Subdural Hematomas: Minor head trauma can lead to slow, life-threatening brain bleeding.

• Hip Fractures: High risk of complications, prolonged immobility, and increased mortality.

• Rib Fractures: Can impair breathing, increase the risk of pneumonia, and lead to respiratory failure.

3. Injuries Can Escalate Quickly

• What appears to be a minor injury can rapidly progress to a life-threatening situation in older adults.

• Early recognition and intervention are critical for improving outcomes.

Low Mechanism?

1. Delayed symptoms can be deadly – Injuries like subdural hematomas (brain bleeds) may not show symptoms for hours or even days, leading to sudden deterioration if not caught early.

2. Weaker bones break easily – Even a simple ground-level fall can cause hip fractures, spinal fractures, or rib fractures, leading to serious complications and long-term disability.

3. Reduced pain perception hides injuries – Older adults may have nerve damage or cognitive decline, making them less aware of pain, which can delay diagnosis and treatment.

4. Minor injuries can cause major complications – A rib fracture from a small fall can make it painful to breathe, leading to pneumonia, respiratory failure, and death if not managed properly.

5. Frailty slows recovery – Aging bodies heal slower, so even a minor injury can lead to prolonged hospital stays, infections, immobility, and a higher risk of death compared to younger patients.

Delay in Symptoms & Down Time

1. Pressure Sores (Decubitus Ulcers): Extended immobility can cause continuous pressure on certain body areas, leading to skin breakdown and the development of pressure sores, which can become infected if not promptly treated.

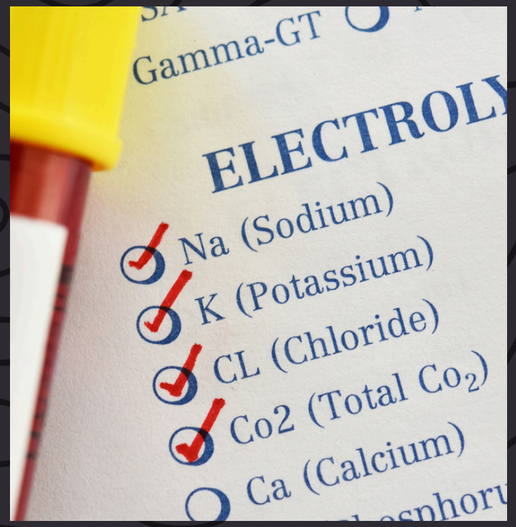
2. Rhabdomyolysis: Remaining on the floor for an extended time can result in muscle compression, leading to muscle breakdown (rhabdomyolysis). This condition releases muscle proteins into the bloodstream, potentially causing kidney damage.

3. Hypothermia: Lying on the floor for prolonged periods, especially on cold surfaces, can lead to a dangerous drop in body temperature, increasing the risk of hypothermia.

4. Dehydration and Electrolyte Imbalance: Inability to access fluids while immobilized can lead to dehydration. Combined with muscle breakdown, this can cause significant electrolyte imbalances, affecting heart and muscle function.

5. Delayed Medical Attention: Extended time on the floor may delay the recognition and treatment of injuries such as fractures or head trauma, leading to complications like internal bleeding or increased intracranial pressure.

Rhabdomyolysis



1. Cause - Prolonged Immobilization: Lying on the floor for too long after a fall can compress muscle tissue, leading to muscle breakdown and the release of muscle cell contents into the bloodstream.

2. Symptoms: Common signs include muscle pain, weakness, swelling, and dark-colored urine.

3. Complications: The release of muscle proteins like myoglobin can cause kidney damage, leading to acute kidney injury.

4. Treatment: Immediate medical attention is crucial. Treatment typically involves intravenous fluids to prevent kidney damage and, in severe cases, dialysis may be required.

5. Prognosis: With prompt treatment, many patients recover fully. However, delayed treatment can lead to serious complications, including permanent kidney damage or death.

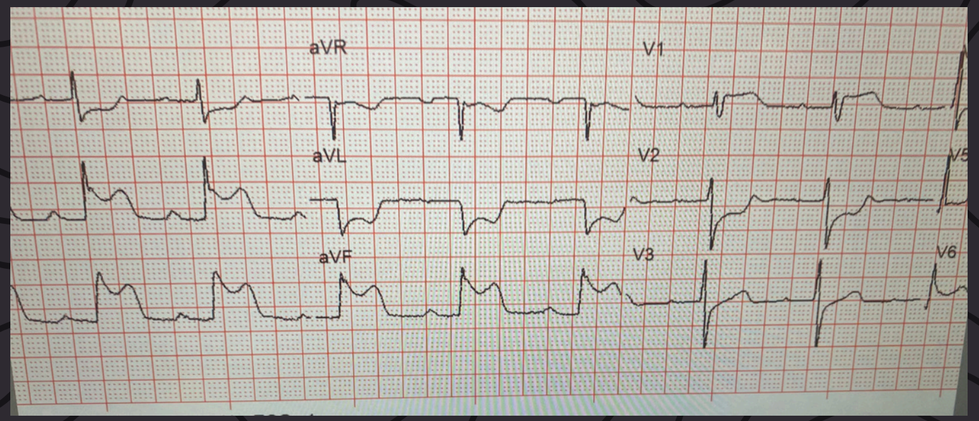
3

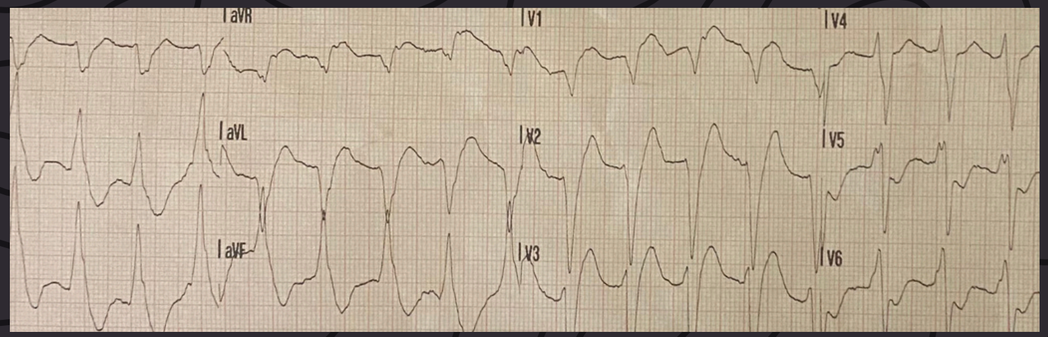
Assessment Challenges & Atypical Presentations

The elderly often present atypically, making assessment and diagnosis challenging.

1. Subtle or Delayed Symptoms
• Older adults may not show classic signs of shock, pain, or injury due to slower physiological responses.
• Symptoms like confusion, weakness, or fatigue may be the only indicators of serious trauma.
2. Blunted Pain Response
• Age-related nerve changes and medications (like analgesics or beta-blockers) can dull pain perception, masking the severity of injuries.
3. Altered Mental Status as a Red Flag
• Confusion, agitation, or lethargy may be early signs of internal bleeding, head injury, or hypoxia.
• Always consider trauma as a cause when assessing altered mental status.
4. Vital Signs May Be Misleading
• Medications (e.g., beta-blockers) can keep heart rates low, even in shock.
• Blood pressure may remain normal until significant decompensation occurs.
5. Pre-Existing Conditions Mask Injury Severity
• Chronic illnesses like diabetes or dementia can obscure or mimic injury symptoms.
6. Communication Barriers
• Hearing loss, cognitive impairment, or language barriers can hinder accurate history-taking and assessment.
7. High Index of Suspicion Required
• Providers must maintain a high level of suspicion and conduct thorough, head-to-toe assessments, even if injuries seem minor.

What Actually Caused the Fall?





1.Orthostatic Hypotension – A sudden drop in blood pressure when standing up can cause dizziness, lightheadedness, and falls. It's common in older adults due to medications, dehydration, or impaired cardiovascular responses.

2. Cardiac Arrhythmias – Irregular heartbeats (like atrial fibrillation or bradycardia) can lead to poor circulation, fainting, or sudden falls without warning.

3. Medication Side Effects – Sedatives, antihypertensives, diuretics, and certain pain medications can cause dizziness, confusion, and balance problems, increasing the risk of falls.

4. Neurological Conditions – Disorders like Parkinson's disease, stroke, or neuropathy can impair balance, coordination, and reflexes, making falls more likely.

5. Acute Illnesses – Infections such as urinary tract infections (UTIs) or pneumonia can cause weakness, confusion, or dizziness, especially in older adults, leading to a higher risk of falls.

What if it wasn't a fall at all?

1. Severe Pressure Ulcers (Bedsores) – Untreated or advanced pressure ulcers, especially in areas like the sacrum, heels, or hips, often indicate prolonged immobility without proper repositioning or care.

2. Malnutrition and Dehydration – Significant weight loss, dry skin, cracked lips, or sunken eyes may be signs of neglect due to inadequate food or fluid intake.

3. Poor Hygiene – Unclean skin, overgrown nails, matted hair, or soiled clothing and bedding suggest a lack of basic hygiene assistance and care.

4. Infections – Recurrent or untreated urinary tract infections, respiratory infections, or skin infections may indicate neglect in maintaining cleanliness and providing medical care.

5. Medication Mismanagement – Injuries or illnesses resulting from missed doses, incorrect medication, or expired prescriptions can be signs of neglect, especially if leading to worsening health conditions.

Memory & Behavioral Complexity

1. Impaired Communication Complicates Assessment – Memory loss, confusion, or hallucinations can make it difficult for patients to accurately describe their injuries, symptoms, or the events leading to the trauma, which may delay diagnosis or cause providers to miss critical injuries.

2. Agitation and Resistance to Care – Patients experiencing agitation or fear may resist physical exams, refuse treatment, or become combative, making it challenging to perform thorough assessments or provide necessary interventions.

3. Atypical Pain Responses – Cognitive impairment can affect pain perception and reporting, causing patients to either underreport pain or express it through agitation or aggression, which may lead to overlooked or underestimated injuries.

4. Risk of Misinterpreting Symptoms – Hallucinations or confusion can cause healthcare providers to misinterpret behavioral symptoms as psychiatric issues rather than indicators of underlying medical conditions like infections, head injuries, or hypoxia.

5. Increased Risk of Delirium – Trauma, combined with hospitalization and unfamiliar environments, can worsen delirium, especially in patients with dementia. This makes ongoing assessment challenging, requiring a calm environment, frequent reorientation, and family involvement when possible.

4

Prehospital & Hospital Management Strategies

Prehospital & Hospital Management Strategies when caring for geriatric trauma patients.

1. Thorough Assessment and Gentle Stabilization: Watch for atypical symptoms, gather information from caregivers, handle patients carefully, and provide early pain management.

2. Prioritize ABCs with Caution: Focus on airway, breathing, and circulation, but use fluids cautiously to avoid overload.

3. Monitor and Plan for Ongoing Care: Watch for delayed complications, prevent secondary injuries, and ensure proper discharge planning and follow-up care.

Early Identification and Assessment

1. Thorough Assessment – Perform a detailed primary and secondary assessment, understanding that symptoms in older adults may be atypical or delayed.

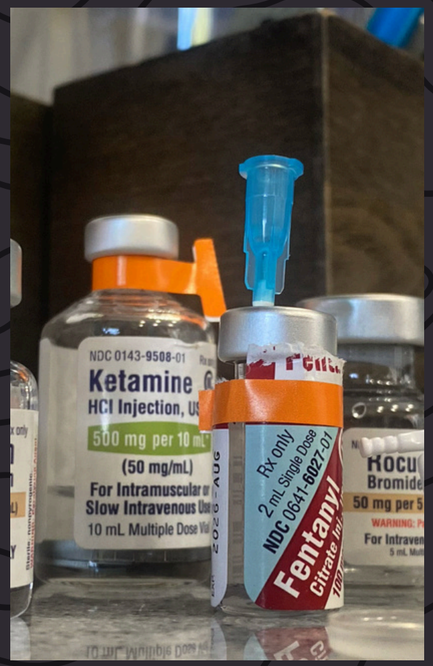
2. High Index of Suspicion – Always assume that even low-impact mechanisms (like ground-level falls) could cause significant injuries.

3. Screen for Cognitive Impairment – Identify memory issues, agitation, or signs of delirium early, as these can complicate assessments.

4. Use Assessment Tools – Utilize tools like the Glasgow Coma Scale (GCS) for neurological status or Confusion Assessment Method (CAM) for detecting delirium.

5. Gather Collateral Information – Involve family, caregivers, or bystanders to provide medical history and baseline cognitive status.

Stabilization and Immediate Care



1. Gentle Handling – Use careful and respectful immobilization techniques to prevent exacerbating fragile injuries.

2. Early Pain Management – Administer pain relief early, choosing options that minimize confusion or side effects (like low-dose opioids or non-opioid alternatives).

3. ABCs First – Prioritize airway, breathing, and circulation, using caution with fluid resuscitation to avoid overloading the cardiovascular system.

4. Minimize Environmental Stress – Provide calm, simple explanations and reduce overstimulation to ease agitation and confusion.

5. Activate Trauma Protocols – Treat all elderly trauma patients as high risk and initiate trauma team activation for early intervention.

Scenario

Patient: 82-year-old female, found on the floor by a neighbor after not being seen for two days.

History: Known history of hypertension, atrial fibrillation, osteoporosis, and Type 2 diabetes.

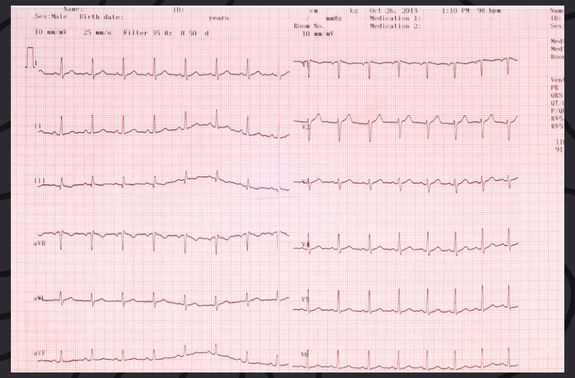
Mechanism of Injury (MOI): Possible mechanical fall after standing up from her recliner. Suspected prolonged time on the floor.

Chief Complaint: Confusion, generalized weakness, and hip pain.

Investigation/ Assessment

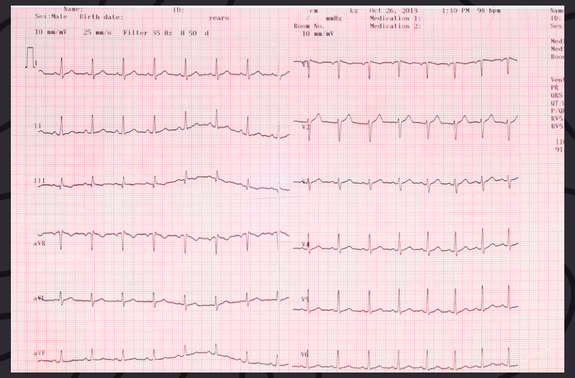
- Environment: Is the scene safe? Is there any clutter, rugs, or tripping hazards?
- Position of the Patient: How is the patient lying? Does her position suggest she was unable to move after falling?
- Signs of Struggle: Is there overturned furniture or signs that she tried to get up?
- Temperature of the Room: Was it cold? Is there evidence of hypothermia (e.g., pale or cold skin)?
- Access to Food/Water: Are there signs that the patient had water or food nearby? Any signs of dehydration?
- Medications: Are her medications visible? Has she missed any doses (like warfarin or diabetes medication)?
- Clues of Incontinence: Are her clothes or the floor soiled, suggesting she was unable to reach the bathroom?

Treatment and transport decisions.



Interventions and assessment?

Treatment and transport decisions.



Interventions and assessment?

Treatment and transport decisions.

Level 1 Trauma Center

1 hour

General Hospital with ICU

30 minutes

Critical Access ER

10 minutes

Where are you transporting to?

Treatment and transport decisions.

Level 1 Trauma Center
1 hour

General Hospital with ICU
30 minutes

Critical Access ER
10 minutes

Where are you transporting to?

Final Key Points

1. Low-Impact Trauma Can Be Fatal – Even minor injuries can lead to severe complications in older adults.

2. Delayed Symptoms Are Common – Always maintain a high index of suspicion for hidden injuries, especially in patients with memory issues or confusion.

3. Early Intervention is Critical – Quick, cautious treatment and early transport to an appropriate facility improve outcomes.

4. Gentle Handling and Pain Control Matter – Minimize movement and manage pain early to prevent worsening of injuries.

5. Comprehensive Assessment is Essential – Include environmental, social, and medical factors to identify potential causes and prevent future incidents.

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Questions?!

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