



Editor's Note: While the images presented here are authentic, the patient cases are hypothetical.

38-Year-Old Male With Knee Pain after a Fall



A 38-year-old otherwise healthy male presents to urgent care with acute right knee pain following a 6-foot fall from a ladder, landing directly on his right lower extremity 2 hours prior to arrival. He reports severe pain and the inability to bear weight since the injury. Physical examination reveals that he is afebrile with normal vital signs. Musculoskeletal exam is notable for moderate knee effusion with surround-

ing early ecchymosis, and medial joint line tenderness. There is pain with passive range of motion. Neurovascular assessment is unremarkable with normal sensation, brisk capillary refill, and no edema seen distal to the knee.

Review the images and consider what your diagnosis and next steps would be. Resolution of the case is described on the following page.

Acknowledgment: Images and case provided by Experity Teleradiology (www.experityhealth.com/teleradiology).



Differential Diagnosis

- Anterior cruciate ligament injury
- Tibial plateau fracture
- Meniscal injury
- Patellar dislocation
- Prepatellar bursitis

Diagnosis

The correct diagnosis is a tibial plateau fracture. The x-ray reveals an acute oblique fracture of the proximal tibia which traverses through the medial tibial plateau and extends to the intercondylar region. Involvement of the tibial spine is seen on the lateral view, as well as joint effusion and soft tissue swelling. There is also a visible fat-fluid level consistent with lipohemarthrosis, confirming that the fracture is intra-articular.

Tibial plateau fractures typically result from high-energy trauma such as motor vehicle collisions and falling directly down on the knee. The medial tibial plateau requires a higher force for fracture as it is the stronger side of the joint; an axial load such as landing on one's feet after falling from a height is a potential mechanism. A tibial fracture is the most common injury associated with extremity acute compartment syndrome (ACS).

What to Look For

- **History and physical:** Patients with tibial plateau fractures will report immediate inability to bear weight after

the injury. Exam findings include bony tenderness, decreased range of motion, soft tissue edema, and joint effusion.

- **Possibly limited exam:** Full examination of the knee may be limited by acute swelling and pain; injection of local anesthetic into the knee joint may facilitate evaluation of cruciate/collateral ligaments and meniscus.
- **Consider ACS:** Evaluate the neurovascular status of the distal extremity to evaluate for this emergent, limb-threatening complication.
- **Check the fibula:** Fibular head fracture accompanies tibial plateau injuries in about 30% of cases.

Pearls For Urgent Care Management

- **Priorities:** Knee immobilization in near-full extension, establishing non-weight bearing status, and pain management.
- **Emergency surgical referral:** Required for open fractures and those that cause vascular compromise or compartment syndrome.
- **Prompt orthopedic referral:** Most fractures, particularly those sustained from a high energy mechanism, require advanced imaging and surgical treatment with open reduction and internal fixation.
- **Home care:** Compression, icing, appropriate analgesics, intermittent elevation of the leg above heart level, and strict non-weight-bearing until orthopedic follow-up. ■



53-Year-Old Butcher With Red Rash Following a Cut to the Hand



A 53-year-old male butcher visits urgent care for a painful red rash that developed on his hand 3 days prior. There is no history of recent travel, but he accidentally cut himself when processing meat 1 week ago. Exam reveals that the patient is febrile at 100.2°F (38.4°C). Otherwise his vital signs are within normal limits, and he is well appearing.

On dermatologic examination, erythematous vesiculated papules, plaques, and associated edema are visible on the hand and fingers.

View the image taken and consider what your diagnosis and next steps would be. Resolution of the case is described on the following page.

Acknowledgment: Image and case presented by VisualDx (www.VisualDx.com/jucm).



Differential Diagnosis

- Angioedema
- Streptococcal cellulitis
- Staphylococcal cellulitis
- Arthropod bite or sting
- Erysipeloid
- Orf disease (contagious ecthyma)

Diagnosis

The correct diagnosis is erysipeloid, a skin infection caused by gram-positive bacillus *Erysipelothrix rhusiopathiae* that is transmitted when an open wound is in contact with an infected animal or animal meat. Slaughterhouse workers, butchers, fishermen, farmers, and veterinarians are at risk for infection with *E. rhusiopathiae*. It may also occur from a dog or cat bite. The clinical spectrum of human infection includes 3 major forms of disease:

- **Localized cutaneous infection** is most common – characterized by subacute erysipeloid cellulitis at the site of exposure, typically affecting the fingers or hands. Systemic symptoms are uncommon.
- **Diffuse cutaneous infection** – lesions progress to more widespread involvement and may be urticarial or bullous. Patients frequently have fever and arthralgia. Eating contaminated meat or seafood has also been associated with diffuse cutaneous disease.
- **Systemic infection** – bacteremia, relatively uncommon. Most patients have fever and concurrent diffuse erysipeloid skin lesions to the trunk and extremities, and may develop endocarditis.

What To Look For

- **History of exposure:** Symptoms typically develop 2 – 7 days following inoculation and are described as throbbing, itching, burning or tingling.
- **Skin lesions:** Begin as a small red macule and progress slowly to a well-developed violaceous lesion with central clearing and a raised border. Edema is minimal; stiffness and pain of the site is typical.
- **Check for lymphadenopathy:** local lymphangitis and adenitis occur in 30% of cases.

Pearls for Urgent Care Management

- **May be self-limited:** Localized erysipeloid skin lesions may resolve in the absence of specific therapy with spontaneous resolution typically occurring within 3 weeks.
- **Antibiotic treatment:** Typically shortens clinical illness and risk of relapse; Penicillin V potassium (500 mg every 6 hours) or amoxicillin (500 mg every 8 hours) should be prescribed. Seven days of therapy is usually curative.
- **Home care:** Local heat application may be helpful for patients with arthritis and painful lesions.
- **Emergency referral:** Consider referral to emergency department if evidence of diffuse cutaneous disease or systemic infection as parenteral antibiotics are indicated in those cases. ■



55-Year-Old With Frequent Falls

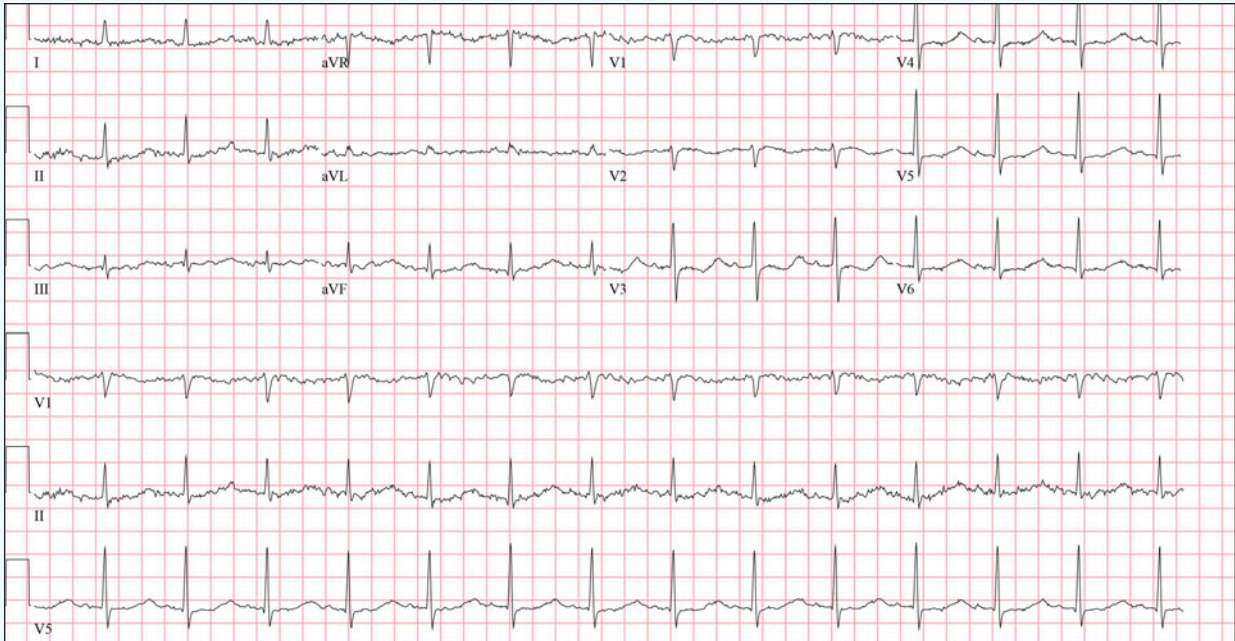


Figure 1: Initial ECG

A 55-year-old male with past medical history of alcohol use disorder presents to urgent care with frequent falls. He denies chest pain or shortness of breath. An ECG is obtained.

View the ECG and consider what your diagnosis and next steps would be. Resolution of the case is described on the next page.

Case presented by Shazia Malik, DO, and Catherine Reynolds, MD, McGovern Medical School at UTHealth Houston.

Case courtesy of ECG Stampede (www.ecgstampede.com).

ECG STAMPEDE



Figure 2: Lead V₃ demonstrates T-wave inversions (^) followed by U-waves (*), creating a wavy repolarization complex.

Differential Diagnosis

- Hypokalemia
- Hypocalcemia
- Atrial flutter
- Brugada syndrome
- Normal sinus rhythm with no other changes

The diagnosis in this case is hypokalemia. This ECG demonstrates normal sinus rhythm with a rate of 84 beats per minute. In V₃, there are T wave inversions with prominent U waves, creating a wavy repolarization pattern suggestive of severe hypokalemia (**Figure 2**).

Discussion

ECG findings in hypokalemia include U-waves, T-wave flattening or inversion, ST depression, prolonged PR interval, and prolonged QT interval.^{1,2} In severe hypokalemia, prominent U-waves may merge with inverted T-waves, producing a biphasic TU fusion complex that first deflects downward and then upward, as seen in this case (**Figure 2**). When the T wave and U wave fuse, the QT interval should encompass the entire, fused TU complex.

A prolonged QT interval increases the risk of Torsade de Pointes (TdP), a potentially fatal arrhythmia. TdP occurs when part of the ventricular myocardium depolarizes while other regions remain in the repolarization phase—an “early afterdepolarization” or “triggered activity.” This “R-on-T phenomenon” can precipitate the polymorphic ventricular tachycardia known as TdP. In acquired long QT syndrome (as with electrolyte disturbances such as hypokalemia), tachycardia is protective, and overdrive pacing—pharmacologic or electrical—can be an effective treatment.³ Other causes of acquired long QT include hypocalcemia, hypomagnesemia, hypothermia, and various QT-prolonging medications.⁴

Symptoms of hypokalemia vary depending on severity and etiology but may include muscle weakness, fatigue, cramping, palpitations, and constipation. Treatment includes oral and parenteral potassium supplementation,

along with identification and correction of the underlying cause. If the patient is symptomatic or has ECG changes, transfer to a telemetry-capable facility.

Hypocalcemia prolongs the QT interval by lengthening the ST segment. Atrial flutter produces a characteristic sawtooth pattern of atrial activity, most visible in the inferior leads. Brugada syndrome is a rare cause of sudden cardiac death and is characterized by a pseudo–right bundle branch block pattern with down-sloping ST-segment elevation in leads V₁ and V₂.

What To Look For

- Hypokalemia causes delayed repolarization, leading to broad T waves that may fuse with U waves and generate wavy repolarization complexes across the precordium.
- Ventricular ectopy can precipitate an “R-on-T” phenomenon, triggering Torsade de Pointes.
- Bradycardia in the setting of acquired long QT increases the risk of TdP.

Pearls For Initial Management, Considerations For Transfer

- Identify the underlying cause of hypokalemia and treat with oral and parenteral supplementation.
- Hypokalemia is often accompanied by hypomagnesemia; replace both electrolytes.
- Patients with a severely prolonged QT or QU interval (>500 msec) should be transferred for electrolyte repletion and monitoring. ■

References

1. Diercks DB, Shumaik GM, Harrigan RA, Brady WJ, Chan TC. Electrocardiographic manifestations: Electrolyte abnormalities. *J Emerg Med*. 2004;27(2):153-160. doi:10.1016/j.jemermed.2004.04.006
2. Chua CE, Choi E, Khoo EYH. ECG changes of severe hypokalemia. *QJM*. 2018;111(8):581-582. doi:10.1093/qjmed/hcy046
3. Al-Khatib SM, Stevenson WG, Ackerman MJ, et al. 2017 AHA/ACC/HRS Guideline for Management of Patients With Ventricular Arrhythmias and the Prevention of Sudden Cardiac Death. *J Am Coll Cardiol*. 2018;72(14):e91-e220. doi:10.1161/CIR.000000000000549
4. Isbister GK. Risk assessment of drug-induced QT prolongation. *Aust Prescr*. 2015;38(1):20-24. doi:10.18773/austprescr.2015.003