



In each issue, *JUCM* will challenge your diagnostic acumen with a glimpse of x-rays, electrocardiograms, and photographs of conditions that real urgent care patients have presented with.

If you would like to submit a case for consideration, please e-mail the relevant materials and presenting information to editor@jucm.com.

A 12-Year-Old Boy with a Crush Injury



The patient is a 12-year-old boy who presents with pain after his foot became wedged in an escalator at the mall.

The image on the left was taken upon presentation; the one on the right is from a 2-week follow-up. Review each and consider what your diagnosis and next steps would be. Resolution of the case is described on the next page.



Differential Diagnosis

- Occult second metatarsal fracture
- Peroneal tendon injuries
- Sesamoiditis
- Plantar fascia ruptures

Diagnosis

Initial imaging is unremarkable. However, the second image reveals focal periostitis at distal second metatarsal consistent with occult fracture.

Learnings/What to Look for

- The first metatarsal is most commonly fractured in children less than 4 years old, while the fifth metatarsal is the most commonly fractured in adults
- Third metatarsal fractures rarely occur in isolation; 68% are associated with fracture of second or fourth metatarsal
- Crush-type and direct-blow injuries are infrequently as-

sociated with pediatric foot fractures. The more common mechanism of metacarpal fracture is from a fall or foot inversion

- Direct blow injuries may be more associated with occult osseous injuries from compressive forces of adjacent bones against one another or by traction forces during an avulsion injury

Pearls for Urgent Care Management

- In the absence of Lisfranc injury, nondisplaced fractures of the first through fourth metatarsal can be managed initially with splinting and non-weightbearing, followed by application of a short leg cast and continued non-weightbearing
- In the absence of obvious findings on initial radiograph, patients should receive instructions to follow-up with orthopedics or sports medicine to evaluate for occult fractures if there is not significant improvement in pain and swelling in one week.

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



A 7-Year-Old Male with Lesions on His Knees



A mother brings her 7-year-old son to your urgent care center because she's concerned about asymptomatic lesions that have developed on his knees over the past couple of weeks. On examination, you observe smooth, crusted and scaly, erythematous and whitish papules and nodules on both knees. There was no history of recent trauma. The patient had a history of dermatomyositis.

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



Differential Diagnosis

- Epidermoid cyst
- Calcinosis cutis
- Cutaneous tuberculosis
- Furunculosis

Diagnosis

The correct diagnosis is calcinosis cutis, or cutaneous calcification—the deposition of insoluble calcium salts in the skin and subcutaneous tissue due to local dysregulation of calcium metabolism. In children, there is a male predilection with an earlier age of onset. Dystrophic calcification is typically seen in autoimmune connective tissue diseases, most commonly in juvenile dermatomyositis (DM) and the CREST form of systemic sclerosis, and usually arises in damaged skin in which local calcium metabolism is altered, allowing intracellular crystallization in the setting of normal serum calcium and phosphorus levels

Learnings/What to Look for

- The skin lesions are typically crusted, firm and jagged nodules from chalk-like calcium that can extrude through the skin, which may be painful or susceptible to secondary infection

- Approximately 50%-70% of children with juvenile DM will develop calcinosis cutis or some form of cutaneous calcification, in contrast to 10%-20% of patients with adult DM
- The most frequently affected sites in DM are the elbows, knees, buttocks, and shoulders
- In the CREST form of systemic sclerosis, the hands and upper extremities, often over bony prominences and tendons, are most commonly affected

Pearls for Urgent Care Management

- In the case of a child, advise the caregiver that the patient should minimize cold exposure and situations that may result in local trauma
- Depending on the size and severity of the lesions, diltiazem, bisphosphonates, probenecid, aluminum hydroxide, warfarin, ceftriaxone, and intravenous immunoglobulin have been found to be successful in treating calcinosis cutis
- Surgical excision and carbon dioxide laser can also be used

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



A 61-Year-Old Female with History of Hypertension and New Palpitations and Shortness of Breath

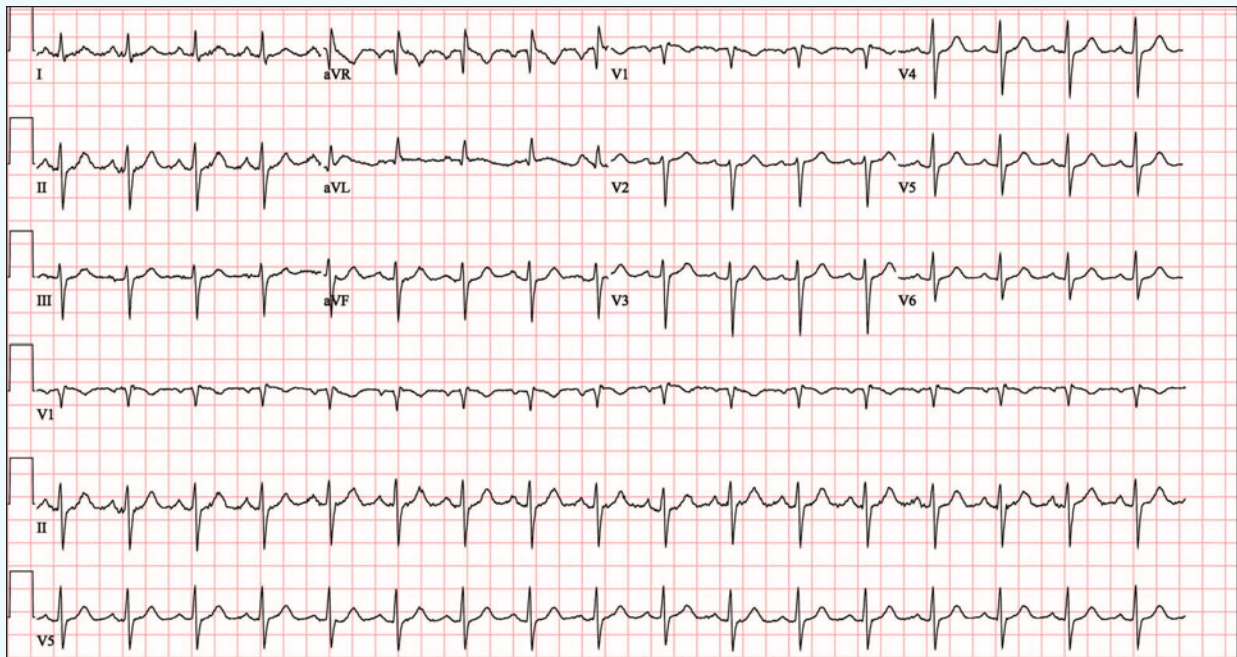


Figure 1. Initial ECG.

A 61-year-old female with a past medical history of hypertension presents to urgent care with palpitations and shortness of breath for 3 days. She also reports cough and fever, and denies nausea or vomiting.

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

(Case presented by Catie Reynolds, MD, McGovern Medical School at UTHealth Houston, Department of Emergency Medicine.)

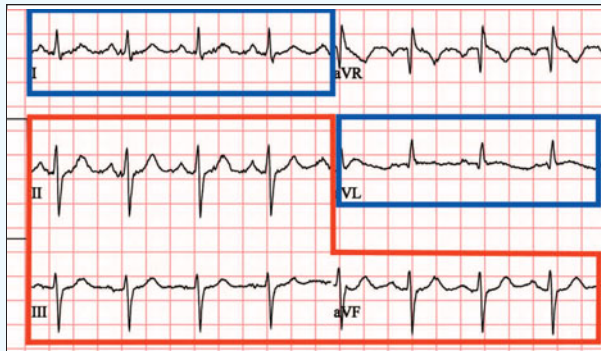


Figure 2: Left axis deviation. QRS complexes in leads II, III, and aVF are negative with rS complexes (shown in red boxes). QRS complexes in leads I and aVL are positive with qR complexes (shown in the blue boxes).

Differential Diagnosis

- Left ventricular hypertrophy (LVH)
- Left bundle branch block (LBBB)
- Left anterior fascicular block (LAFB)
- Pre-excitation
- Inferior myocardial infarction (MI)

Diagnosis

This patient was diagnosed with LAFB. The ECG shows a sinus tachycardia with a rate of 102 bpm. There is a left axis deviation (to learn how this was visualized quickly, see **Figure 2**) with normal PR/QT intervals. There are no overt signs of ischemia.

The His-Purkinje system is responsible for electrical conduction through the ventricles. During normal depolarization, a rapid electrical impulse travels through the ventricles and then splits into the right and left bundles. The left bundle branch is further subdivided into the anterior and posterior fascicles (**Figure 3**). Disruption of both fascicles produces an LBBB, but each can be affected individually as well, producing either an LAFB or LPFB.

When the left anterior fascicle is disrupted, current runs through the posterior fascicle to depolarize the left ventricle in a leftward and upward direction. This creates a left axis deviation. Alternatively, an LPFB causes the left ventricle to depolarize in a rightward and downward direction, producing a right axis deviation.

In evaluating this patient's ECG, we can see that there are no other causes of a left axis deviation. In the absence of LVH, LBBB, pre-excitation, or inferior q waves, the cause of the leftward axis deviation is LAFB.

Criteria for LAFB includes:

1. Left axis deviation (usually -45° to -90°)
2. Small q waves with large R waves in I and aVL (qR complexes)
3. Small r waves with large S waves in II, III, and aVF (rS complexes)

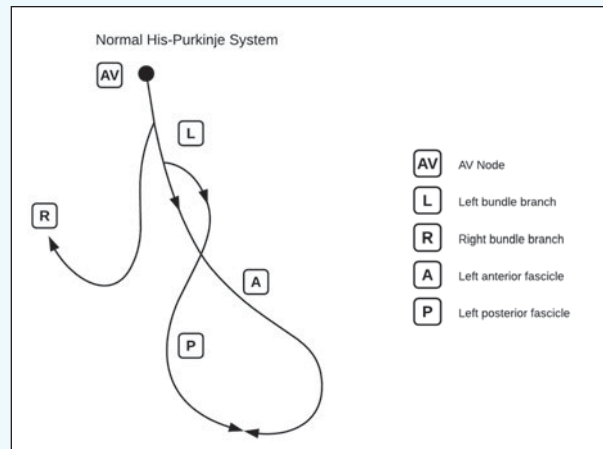


Figure 3: His-Purkinje system. (Illustration courtesy of Benjamin Cooper, MD, MEd, FACEP)

4. Normal or slightly prolonged QRS (80-110 ms)¹

In isolation, LAFB is not clinically significant. When the LAFB is seen in combination with other conduction system disease (ie, a right bundle branch block or first-degree atrioventricular block), it may signal intermittent complete heart block, especially in a symptomatic patient.

Learnings/What to Look for

- When assessing an ECG with left axis deviation, run through the differential including LVH, LBB, LAFB, pre-excitation, and inferior MI. This will help to identify cases of LAFB
- Consider the clinical context of the patient with conduction system disease

Pearls for Urgent Care Management

- Asymptomatic patients with LAFB do not require additional workup or treatment
- For patients with LAFB with another conduction delay, consider the patient's presentation and symptoms. If the patient is symptomatic with syncope or presyncope, consider transfer for telemetry monitoring, echocardiography, and possible electrophysiologic evaluation

References

1. Kusumoto FM, Schoenfeld MH, Barrett C, et al. 2018 ACC/AHA/HRS guideline on the evaluation and management of patients with bradycardia and cardiac conduction delay: a report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines and the Heart Rhythm Society. *Circulation*. 2019;140(8):e382-e482.
2. Surawicz B, Childers R, Deal BJ, et al. AHA/ACCF/HRS Recommendations for the standardization and interpretation of the electrocardiogram: part III: intraventricular conduction disturbances: a scientific statement from the American Heart Association electrocardiography and arrhythmias committee, council on clinical cardiology; the American College of Cardiology foundation; and the Heart Rhythm Society. Endorsed by the International Society for Computerized Electrocardiology. *J Am Coll Cardiol*. 2009;53(11):976-981.

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

ECG STAMPEDE