INSIGHTS IN IMAGES

CLINICAL CHALLENGE: CASE 1

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 email the relevant materials and presenting information to *editor@jucm.com*.

A 6-Year-Old Boy with Foot Pain After Tripping a Day Earlier


Figure 1.


Figure 2.

Case

The patient is a 6-year-old boy who cried out in pain after jumping off the fourth step of the stairs in his house yesterday, landing hard on his feet. His mother reports that he has been limping ever since. She applied ice at home, hoping the pain would resolve overnight. It did not.

On exam, you note the pain is located at the base of the first/second metatarsal.

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

THE RESOLUTION


Figure 1.


Figure 2.

Differential Diagnosis

- Salter type II fracture
- Cuboid fracture
- Navicular compression fracture
- Compartment syndrome
- Impacted fracture at the base of the first metatarsal

Diagnosis

This patient was diagnosed with an impacted fracture at the base of the first metatarsal, with buckling of cortex on AP view and impacted cortical discontinuity noted on oblique view. This injury is also known as a bunk bed fracture (pediatric Lisfranc).

Learnings/What to Look for

- This is a common pediatric fracture, but one that is often overlooked due to the subtle deformity of the proximal first metatarsal
- Mechanism of injury is typically a fall from a sufficient height, resulting in a flexion force that wedges the oblique first cuneiform-first metatarsal epiphysis into the first metatarsal-second metatarsal interspace
- The injury is more severe than indicated by the bone injury, in that ligaments are involved in subluxation
- The pathogenesis of adult Lisfranc tarsometatarsal dislocation is the model for the pediatric equivalent

Pearls for Urgent Care Management and Considerations for Transfer

- If the injury is limited to a nondisplaced fracture, management is conservative (immobilization and appropriate pain management)
- Displaced fractures (or any more complex injury involving tarsometatarsal joints) often require surgery with closed or open reduction, internal fixation, and immobilization

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

A 69-Year-Old Man with a 2-Month History of Shortness of Breath and Mild Chest Pain

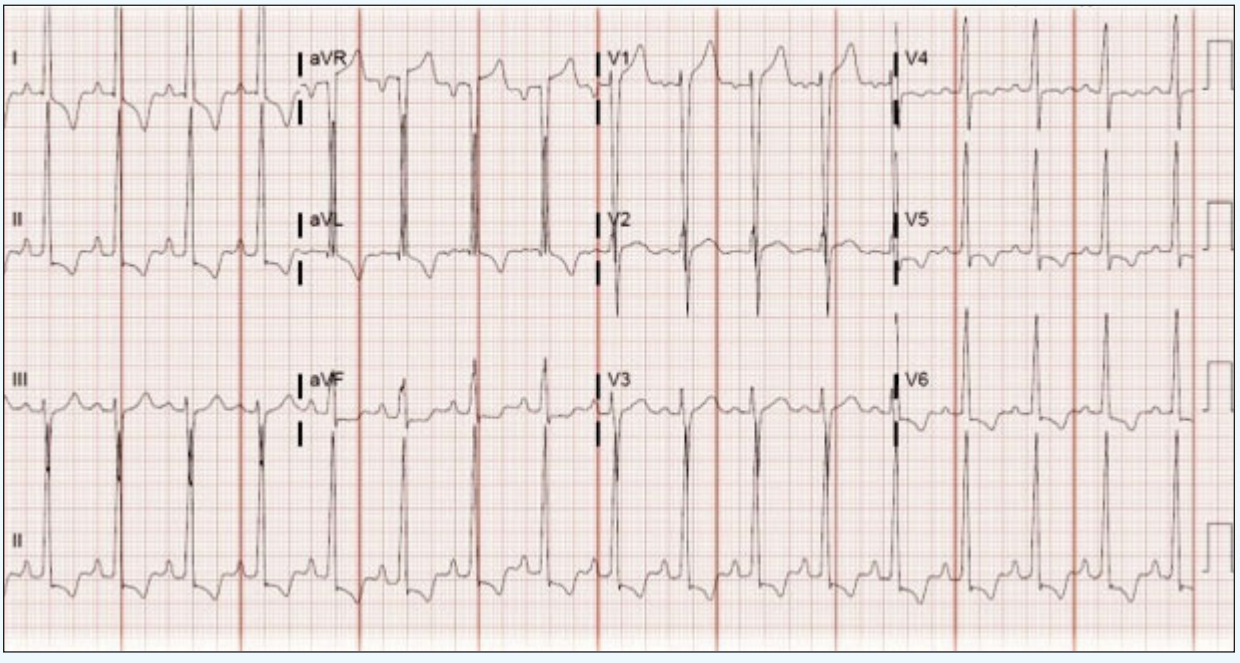


Figure 1.

Case

The patient is a 69-year-old man with shortness of breath and mild chest pain of 2 months duration. He has felt it unnecessary to see his "regular doctor" because his complaints haven't gotten worse, but conceded to visit urgent care today at the insistence of his family.

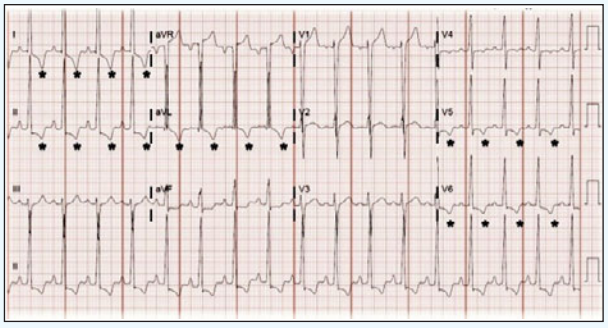
When asked, he acknowledges a history of congestive heart failure and hypertension.

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

THE RESOLUTION

Differential Diagnosis

- Diffuse subendocardial ischemia
- Left ventricular hypertrophy (LVH) with strain
- ST-elevation myocardial infarction (STEMI)
- Non—ST-elevation myocardial infarction (NSTEMI)
- Wellens syndrome



*Leads with "strain" pattern of ST-depressions and asymmetric t-wave inversions.

Diagnosis

This patient was diagnosed with left ventricular hypertrophy (LVH) with strain. The ECG reveals sinus tachycardia with a rate of 102 beats per minute, large amplitude QRS complexes, and prominent t-wave inversions primarily in the lateral leads (I, aVL, V5, V6). The morphology and distribution of the t-wave inversions are particularly important to note, as this distinction can help differentiate between more chronic, stable changes and acute changes that require more immediate attention.

Several electrocardiographic criteria exist for left ventricular hypertrophy, and none of them are particularly sensitive (~50%), but they are quite specific (85%–90%). Two of the more commonly cited criteria are shown below:

Select Electrocardiographic Criteria for Left Ventricular Hypertrophy (QRS Amplitude)	
Sokolow-Lyon Criteria	S V1 + R V5,6 > 35 mm OR R aVL > 11 mm
Cornell Criteria	R aVL + S V3 > 28 mm for men OR > 20 mm for women

Repolarization abnormalities are commonly associated with left ventricular hypertrophy, namely asymmetric t-wave inversions and ST-depressions that predominate in the lateral leads—the so-called "strain" pattern, as with this ECG. It is not uncommon to see discordant ST changes associated with LVH, meaning ST changes in the opposite direction as the QRS complex. Notice that ST-depressions are seen in leads with up-going QRS complexes (I, II, aVL, V5, V6), and ST-elevations are seen in leads with down-going QRS complexes (aVR, V1). In fact, while multilead ST-depression and aVR ST-elevation have been described as a pattern strongly associated with left main or triple vessel disease (ie, diffuse subendocardial ischemia), it is also commonly seen with LVH.

T-wave inversions can also indicate acute ischemia, but the t-wave inversions of acute ischemia tend to be symmetric. When deep and symmetric t-waves are seen in the anterior precordial leads while the patient is chest-pain free, it may indicate critical stenosis of the left anterior descending artery—Wellens syndrome.

While ST-elevations are seen in V1 and aVR, they do not represent STEMI. ST-elevations associated with STEMI are more commonly straight or convex upward in appearance (ie, "tombstone" morphology). If STEMI were the diagnosis, one would expect the presentation to be more acute, as opposed to 2 months of symptoms without an acute change. Most importantly, if an old ECG is available for comparison (as it was with this patient), one could confirm the unchanged presence of the ST/T changes. NSTEMI cannot necessarily be ruled out based on the ECG; it requires a rise and/or fall in serial cardiac biomarkers, but the subacute to chronic presentation is not consistent with NSTEMI.

Learnings/What to Look for:

- Electrocardiographic findings of LVH include large-amplitude QRS complexes (see text for definitions)
- LVH can be associated with repolarizations abnormalities including ST-depressions and asymmetric t-wave inversions in the lateral leads (I, aVL, V5, V6)
- When in doubt, compare to prior ECGs

Pearls for Urgent Care Management and Considerations for Transfer

- If the patient is acutely symptomatic with either chest pain, shortness of breath, or with unstable vital signs (ie, hypoxia) then immediate referral to the emergency department is indicated
- If the ECG reveals classic LVH findings but the patient is not acutely symptomatic, consider blood pressure control as hypertension is the most likely culprit; however, acute control is not necessary

Acknowledgment: *Images and case provided by Benjamin Cooper, MD, FACEP, assistant professor and associate program director, McGovern Medical School, Department of Emergency Medicine, The University of Texas Health Science Center at Houston.*

A 70-Year-Old Man with Hand Numbness and Pain

Figure 1.

Case

The patient is a 70-year-old male who presents to urgent care with numbness, pain, and difficulty opening his hands. His son, who drove his father to the appointment, notes that the skin also looks "bunched up in places." The physician also observes what look like raised scars. The thumb and index finger seem unaffected.

Upon questioning, the patient says he started noticing smooth nodules "a couple years ago." He attributed that to his many years as a carpenter. He also reports a decades-long tobacco habit and that he is an alcoholic who has been in recovery for 3 years.

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

THE RESOLUTION

Differential Diagnosis

- Dupuytren's contracture
- Rheumatoid arthritis
- Carpal tunnel syndrome
- Trigger finger

Diagnosis

This patient was diagnosed with Dupuytren's contracture, a fibroproliferative condition involving the palmar aponeurosis. At present, the pathophysiology of the disorder is not entirely understood, although several factors are believed to contribute to fibroblastic proliferation and altered collagen profiles, including specific platelet-derived fibroblast growth and transforming growth factors. White men of northern or eastern European descent aged 60 years or older are most commonly affected.

Learnings/What to Look for

- Initial symptoms include thickened nodules or plaques (Grade 1), followed by fibrous band development (Grade 2)
- With progression and increased fibrosis, flexion contractures develop (Grade 3)
- Patients may also present with similar findings in the plantar fascia
- Presentation can be unilateral or bilateral, with one hand typically being more severe than the other.
- Risk factors include alcohol abuse, tobacco use, and certain family history; evidence supports an autosomal dominant pattern of inheritance
- Research has identified nine loci associated with genetic susceptibility to Dupuytren's contracture; six of the loci contain genes that encode proteins in the Wnt-signaling pathway; it is postulated that aberrations in this signaling pathway are related to the process of fibromatosis in the disease

Pearls for Urgent Care Management and Considerations for Transfer

- Treatment of Dupuytren's contracture varies according to severity
- Nonsurgical options that may be administered in the urgent care center, depending on the severity of the condition, the provider's experience, and available resources include enzyme injections and steroid injections
- Low-energy radiation therapy may provide symptom relief and prevent worsening of the condition
- Open surgery or needle aponeurotomy may be necessary
- A small portion of patients with Dupuytren's contracture also develop Peyronie's disease

Acknowledgment: *Images and case courtesy of VisualDx (www.VisualDx.com/JUCM).*