INSIGHTS IN IMAGES

CLINICAL CHALLENGE: CASE 1

Challenge your diagnostic acumen: Study the following x-rays, electrocardiograms, and photographs and consider what your diagnosis might be in each case. While the images presented here are authentic, the patient cases are hypothetical. Readers are welcome to offer their own patient cases and images for consideration by contacting the editors at editor@jucm.com.

55-Year-Old With Wrist Pain

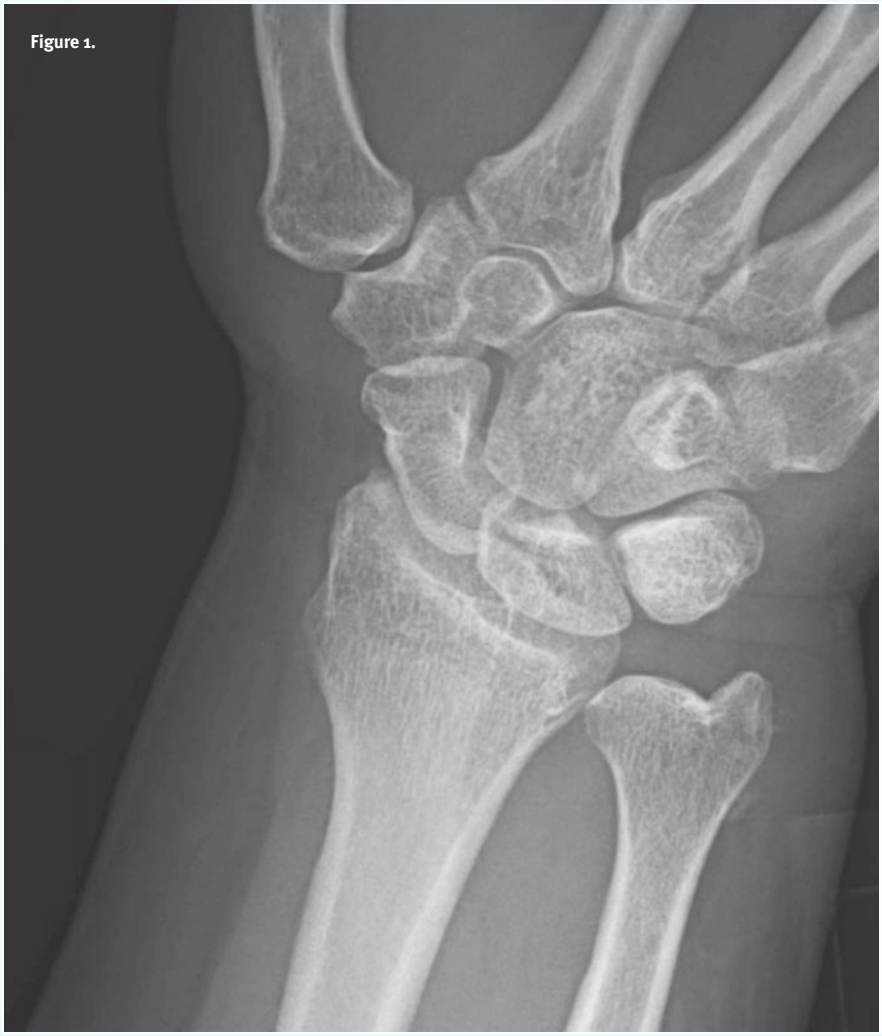


Figure 1.

A 55-year-old woman presents to urgent care complaining of pain when she moves her right wrist. She reports the pain began suddenly when she woke up that morning without any known trauma. An x-ray is ordered.

Review the image 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).

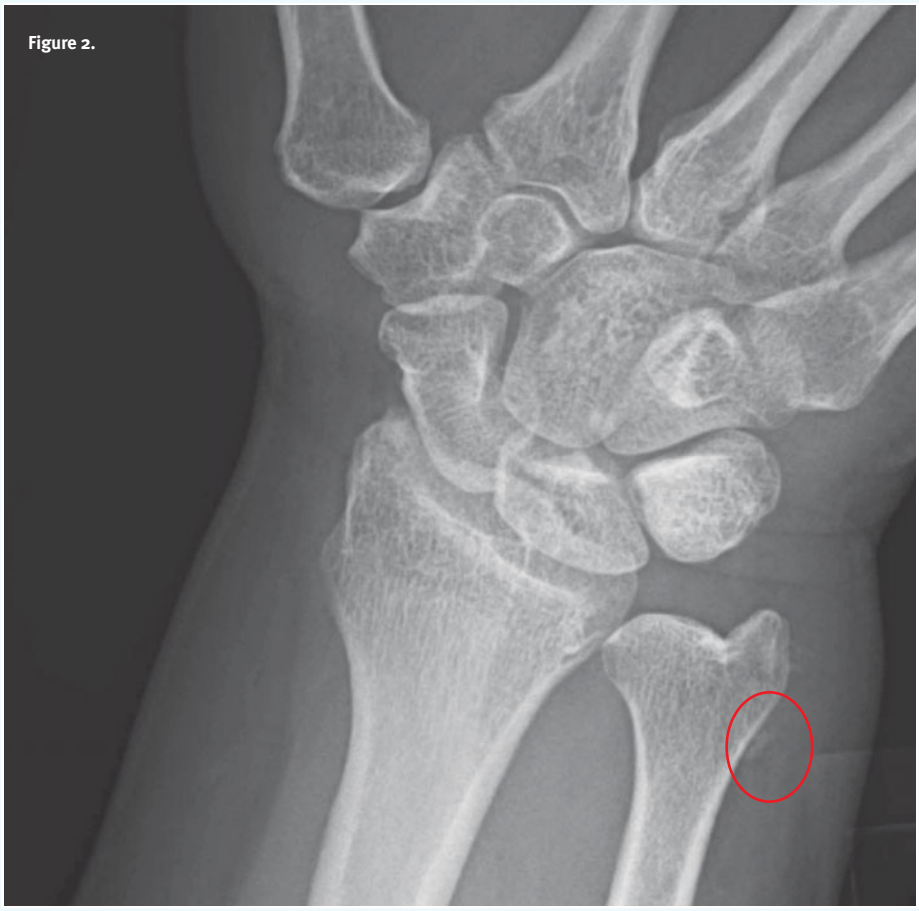


Figure 2.

Differential Diagnosis
- Acute calcific periarthritis
- Wrist sprain
- Scapholunate dissociation
- Wrist osteoarthritis

Diagnosis
The correct diagnosis in this case is acute calcific periarthritis as the x-ray shows a linear calcification alongside the distal ulna. It is a painful monoarticular condition identified with juxta-articular deposition of calcium hydroxyapatite crystals and local inflammation. It is a clinical subset of hydroxyapatite deposition disease and occurs when crystals are acutely deposited in the periarticular capsular structures: tendons (calcific tendonitis), bursa (calcific bursitis), or shoulder joint (Milwaukee shoulder). Acute calcific periarthritis occurs more frequently in females than males, most often at middle age. There are a few rare genetic risk factors but no proven acquired risk factors.

What to Look For
- Patient will have severe pain of a single joint with focal tenderness, which may not correlate with the typical location of a joint line
- Erythema, warmth, and swelling may or may not be present
- Imaging will show well circumscribed ovoid or curvilinear calcification adjacent to a joint (usually on one side)

Pearls for Urgent Care Management
- Attacks are self-limited, usually lasting a few weeks to a few months
- First line conservative management with non-steroidal anti-inflammatory drugs usually achieves acute symptom improvement within 48-72 hours
- Intralesional corticosteroid injection may be administered
- Typically, calcification decreases in 3-4 weeks with about 6-8 weeks to clear completely

CLINICAL CHALLENGE: CASE 2

15-Year-Old With Fever

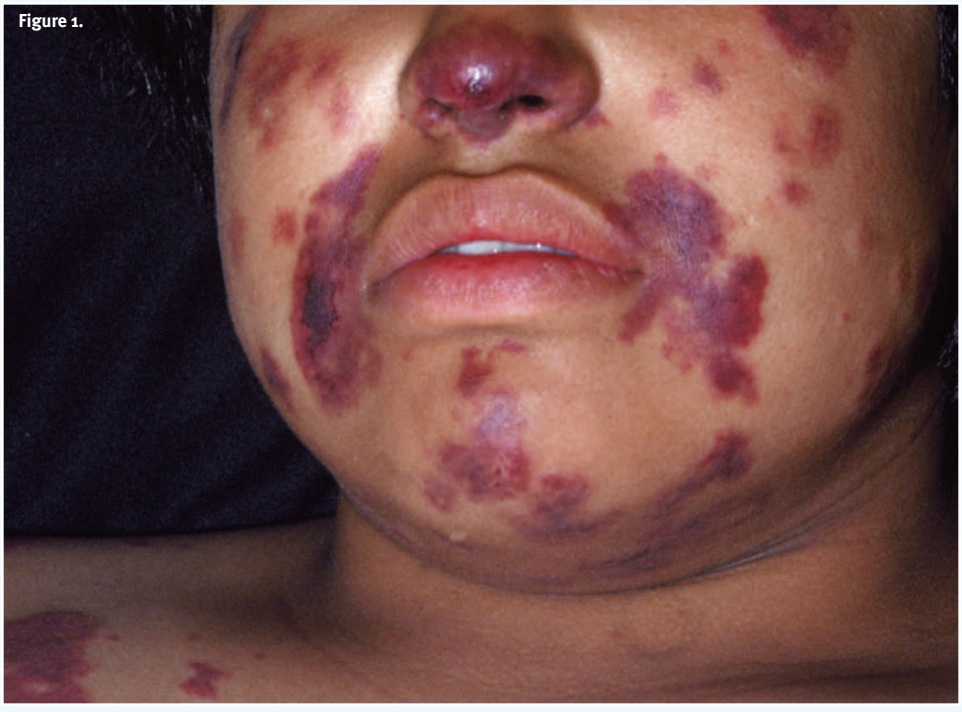


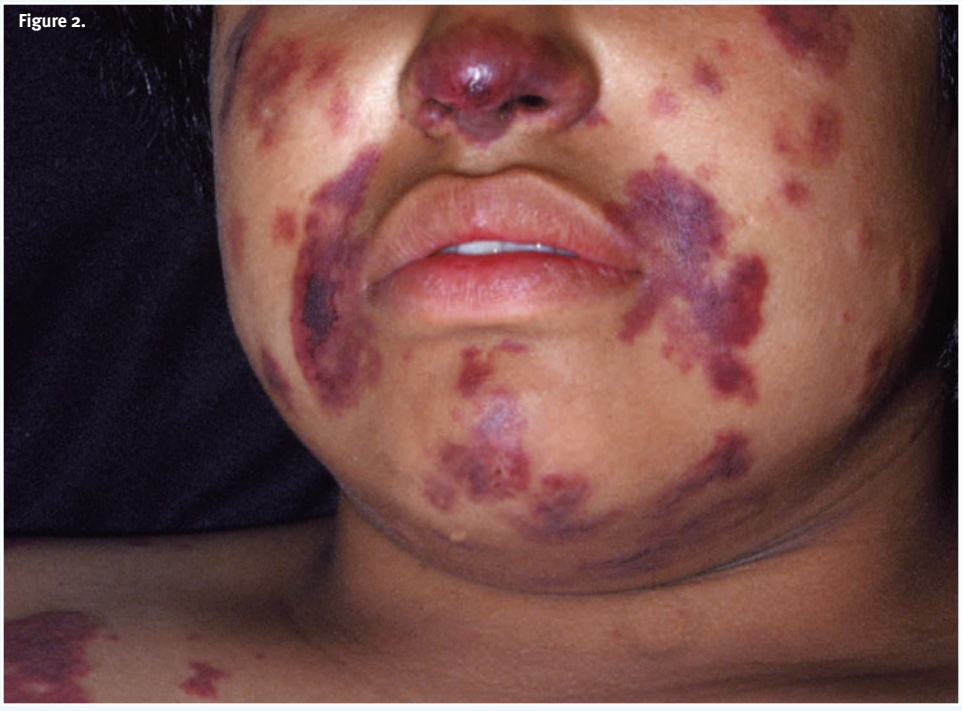
Figure 1.

A 15-year-old girl presents to urgent care with complaints of fever, arthralgia, abdominal pain, and a widespread rash that developed over the last 2 days. The patient says that the pain in her knees is severe and debilitating. On examination, the patient has a temperature of 100.3°F (37.9°C) as well as maroon and violaceous, purpuric papules and plaques on the legs, buttocks, and face. Laboratory examination shows elevated erythrocyte sedimentation rate and C-reactive protein, proteinuria, and hematuria.

View the image above 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).

Figure 2.



Differential Diagnosis

- Acute meningococcemia
- Erythema elevatum diutinum
- Immunoglobulin A vasculitis
- Systemic lupus erythematosus

Diagnosis

The correct diagnosis in this case is immunoglobulin A vasculitis (IgAV), formerly named Henoch-Schönlein Purpura. With unknown etiology, this necrotizing small-vessel vasculitis is the most common form of vasculitis in children aged younger than 10 years. IgAV is seen more frequently in males, White individuals, and those of Asian descent. It is characterized by IgA-immune complex, C3, and fibrin deposition in small vessels: primarily capillaries, postcapillary venules, and occasionally arterioles in affected organs. Almost all patients develop palpable purpura. Other skin involvement may include petechiae, bullae, edema, and necrosis. Joint abnormalities are the second most common symptom and may accompany skin eruptions with severe pain and sometimes swelling, warmth, and tenderness. Ankles and knees are most often involved; symptoms are often transient and migratory.

Severe abdominal pain, vomiting, hematemesis, diarrhea, and hematochezia occur in about 50% of children, and renal involvement occurs in 20%-50% of children but is usually self-limited.

What to Look For

- Episodes can often be preceded by an upper respiratory infection and thus are more common in the fall and winter seasons
- The classic tetrad of symptoms are palpable purpura, abdominal pain, arthritis, and kidney disease
- Prodromal symptoms of fever, malaise, headache, and arthralgias may be present
- No evidence of thrombocytopenia or coagulopathy

Pearls for Urgent Care Management

- A typical episode may persist for 3-6 weeks with spontaneous recovery, but recurrences may happen
- Treatment includes ensuring good oral intake and pain management with nonsteroidal anti-inflammatory drugs and acetaminophen
- Hospitalization is needed for severe disease: severe pain, decreased oral intake, kidney insufficiency, or other complications

INSIGHTS IN IMAGES

CLINICAL CHALLENGE: CASE 3

35-Year-Old With ESRD

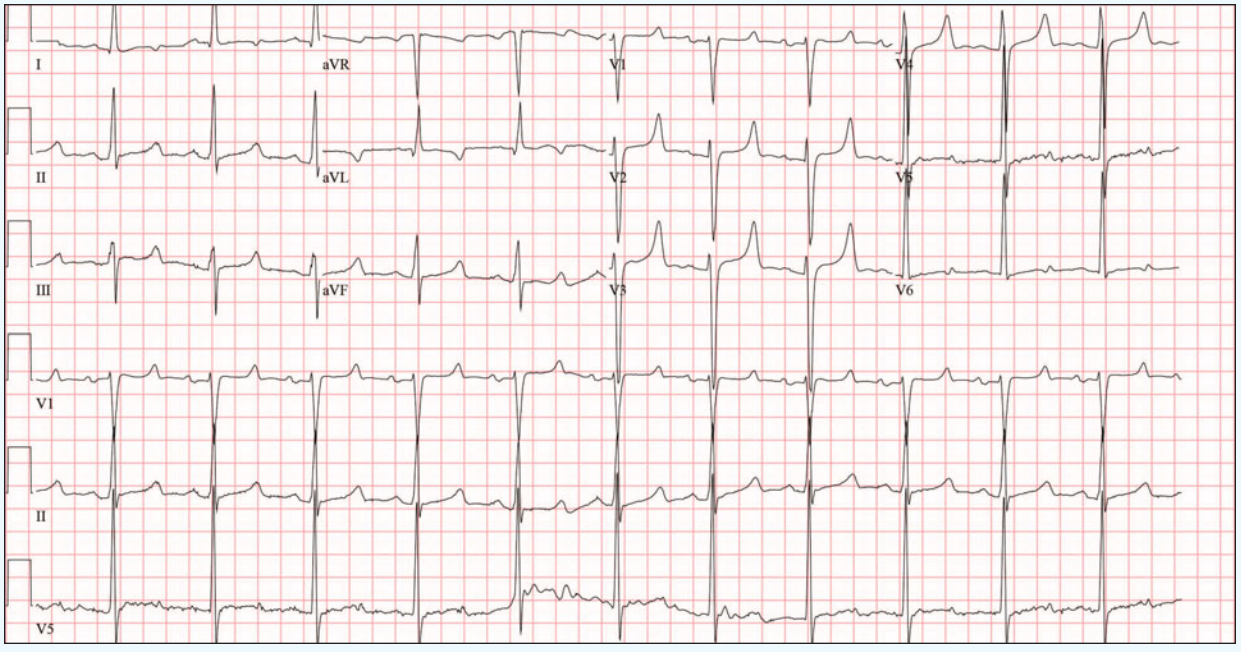


Figure 1: Initial ECG

A 35-year-old male with a history of end-stage-renal-disease (ESRD) presents to urgent care complaining of back pain. The patient missed his dialysis session today because of the pain. An ECG is obtained.

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

Case presented by Benjamin Cooper, MD, McGovern Medical School, The University of Texas Health Science Center at Houston, Department of Emergency Medicine.

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

ECG STAMPEDE

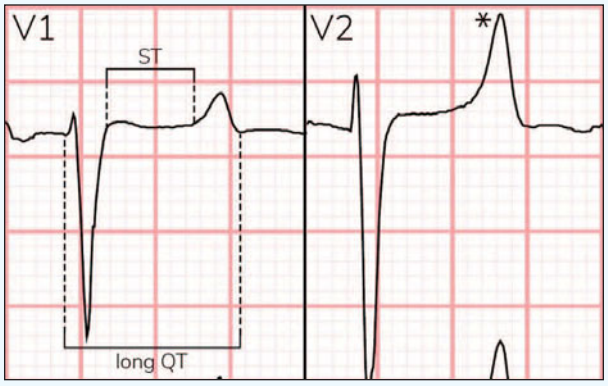


Figure 2: Lengthening of the ST-segment (ST) characteristic of hypocalcemia and peaked T wave of hyperkalemia (asterisk).

Differential Diagnosis

- Hypocalcemia *and* hyperkalemia
- Third degree heart block
- Digoxin toxicity
- Atrial flutter

Diagnosis

The diagnosis in this case is hypocalcemia, hyperkalemia, left ventricular hypertrophy. The rhythm is sinus with a ventricular rate of 70 beats per minute. There are large amplitude QRS complexes across the precordium consistent with left ventricular hypertrophy. There is QT prolongation and a peaked T wave morphology that suggests both hypocalcemia and hyperkalemia.

Discussion

Hypocalcemia characteristically increases the duration of the plateau phase of the cardiac action potential, manifesting as increased length of the ST-segment (**Figure 2**).[1,2] This form of QT prolongation is unique and distinctly different than the delayed repolarization phase experienced during hypokalemia or with QT-prolonging medications. The presence of peaked T waves also suggests hyperkalemia. Electrocardiographic findings of hyperkalemia tend to follow a progression as toxicity progresses. Often, the earliest finding is narrow-based, peaked T waves (ie, pointed on top). At the extreme end of the hyperkalemia spectrum, sine wave morphology is a harbinger of impending ventricular fibrillation.[3–5]

The combination of electrocardiographic findings of hypocalcemia (ie, lengthened ST-segment) and hyperkalemia (ie, peaked T waves) is a classic manifestation of end-stage renal disease. Risk factors for hyperkalemia include renal disease and medications like potassium-sparing diuretics, angiotensin converting enzyme inhibitors, angiotensin receptor blockers, and digoxin.

Patients with characteristic findings of hyperkalemia on electrocardiography should be immediately transferred to the nearest emergency center capable of dialysis by calling emergency medical services. As a temporizing measure, consider nebulizing albuterol (available in most urgent cares) to promote intracellular potassium shifting while awaiting transfer. This patient's total calcium level was 5.2 mg/dL, and the potassium level was 6.5 mEq/L.

What to Look For

- Narrow-based, peaked T waves are often the earliest sign of hyperkalemia
- Prolonged QT by way of ST-lengthening is a unique manifestation of hypocalcemia
- The combination of ECG changes of hyperkalemia and hypocalcemia is classic for end-stage-renal disease

Initial Management, Considerations for Transfer

- Patients with electrocardiographic findings of hyperkalemia should be immediately transferred to the nearest emergency center capable of dialysis
- Consider 10-20 mg of nebulized albuterol as a temporizing measure while awaiting transfer
- If available, intravenous calcium can help stabilize the cardiac membrane when there are electrocardiographic changes of hyperkalemia, particularly QRS widening
- Consider placing automated defibrillator pads while awaiting transport

References

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3. Durfey N, Lehnhof B, Bergeson A, et al. Severe Hyperkalemia: Can the Electrocardiogram Risk Stratify for Short-term Adverse Events? *Western Journal of Emergency Medicine*. 2017;18(5):963-971. doi:10.5811/westjem.2017.6.33033
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5. Mattu A, Brady WJ, Robinson DA. Electrocardiographic manifestations of hyperkalemia. *Am J Emerg Med*. 2000;18(6):721-729. doi:10.1053/AJEM.2000.7344