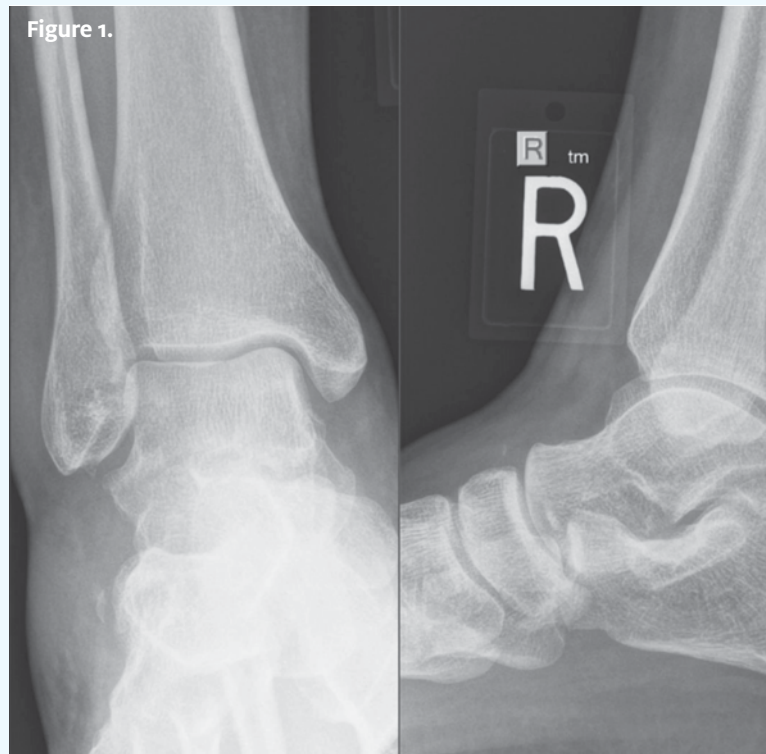




In each issue, *JUCM* will challenge your diagnostic acumen with a glimpse of x-rays, electrocardiograms, and photographs of conditions that real urgent care patients have presented with.

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

A 31-Year-Old with Pain After Twisting His Ankle

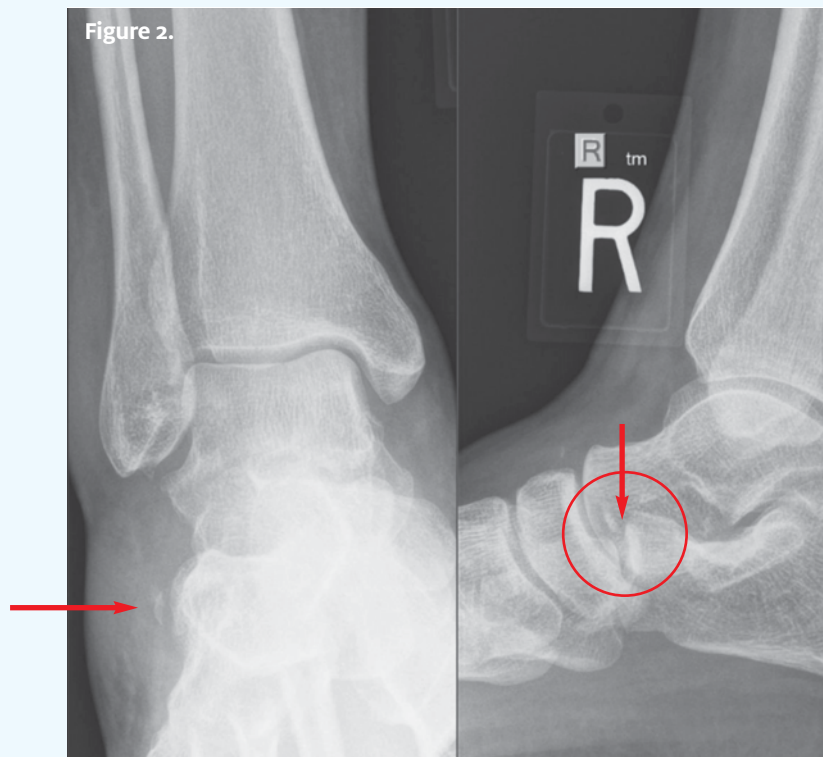


Case

The patient is a 31-year-old male who presents with lateral ankle pain after an inversion injury during a game of basketball.

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

THE RESOLUTION

**Differential Diagnosis**

- Calcaneus accessorius
- Fracture, anterior process of the calcaneus
- Fracture, dorsal navicular
- Fracture, tuberosity of the calcaneus

Diagnosis

This patient was diagnosed with an avulsion fracture of the anterior process of the calcaneus (and also likely of the dorsal navicular).

Learnings and What to Look for

- An irregular crescentic bony fragment projects lateral to the foot on the AP view, corresponding to an avulsion of the anterior process of the calcaneus on the lateral view
- These fractures are missed 88% of the time and can lead to nonunion, unrecognized associated ligamentous injuries, and persistent ankle or foot pain

Degan classification:

- Type I: Nondisplaced avulsion fractures with no calcaneocuboid joint involvement
- Type II: Displaced fractures but still no calcaneocuboid joint involvement
- Type III: Displaced fractures with calcaneocuboid joint involvement

Pearls for Urgent Care Management

- Types 1 and 2 are treated with plaster casting
- Type 3 is managed with open reduction internal fixation due to higher tendency for nonunion

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



A 60-Year-Old Woman with Dark, Painful Plaques on Her Legs



Case

The patient is a 60-year-old woman who presents to urgent care after developing dark areas over both legs over the course of the past few days. They are extremely painful. On examination, there were violaceous and dark brown, retiform plaques, some depressed and some crusted, over the legs. The patient has a history of diabetes, hypertension, and chronic renal insufficiency for which she required hemodialysis.

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

Published online ahead of print November 23, 2021.

THE RESOLUTION

**Differential Diagnosis**

- Polyarteritis nodosa
- Calciphylaxis
- Cryoglobulinemia
- Panniculiti

Diagnosis

The correct diagnosis is calciphylaxis, also known as calcific uremic arteriolopathy. This is a microvascular occlusion syndrome thought to occur due to diffuse deposition of insoluble calcium salts in cutaneous blood vessels with associated thrombosis. The process may be triggered by chronic hypocalcemia from decreased intestinal absorption of calcium, leading to increased levels of parathyroid hormone and subsequent recruitment of calcium and phosphate from bone. Hypercoagulable states are also thought to play a possible role.

Learnings/What to Look for

- Characteristic pathologic findings include progressive medial calcification of cutaneous blood vessels and subsequent ischemic necrosis of the skin
- Warfarin-associated nonuremic calciphylaxis tends to occur on the lower extremities about 2.5 years after warfarin initiation, does not have associated calcium abnormalities
- Early lesions are extremely painful, violaceous retiform patches and plaques, classically on fat-bearing areas such as

the thighs, buttocks, or abdomen. This is followed by necrosis, ulcers, eschar formation, and possibly gangrene. Induration of the surrounding tissues may be present

- Lesions have been reported to be triggered by local trauma, including from insulin or heparin injections, or a skin biopsy
- Incidence of calciphylaxis is increasing and is most commonly associated with chronic renal failure, hemodialysis, and secondary hyperparathyroidism. Other risk factors include female sex, obesity, Northern European descent, and hypoalbuminemia

Pearls for Urgent Care Management

- Mortality from calciphylaxis is high (60%-87%) and is largely secondary to sepsis from large, nonhealing ulcers
- A multidisciplinary approach is likely to be necessary and would include wound care, nephrology, dermatology, and pain management
- The most common intervention is off-label use of intravenous sodium thiosulfate¹
- Other treatments described in case reports include bisphosphonates, low-tissue plasminogen activator infusion, LDL-apheresis, vitamin K, and kidney transplant¹

Reference

1. Nigwekar SU, Kroshinsky D, Nararian RM, et al. Calciphylaxis: risk factors, diagnosis, and treatment. *Am J Kidney Dis.* 2015;66(1):133-146.

Acknowledgment: Images and case presented by VisualDx (www.VisualDx.com/JUCM).



A 46-Year-Old Male Who Presents Due to His Defibrillator Firing

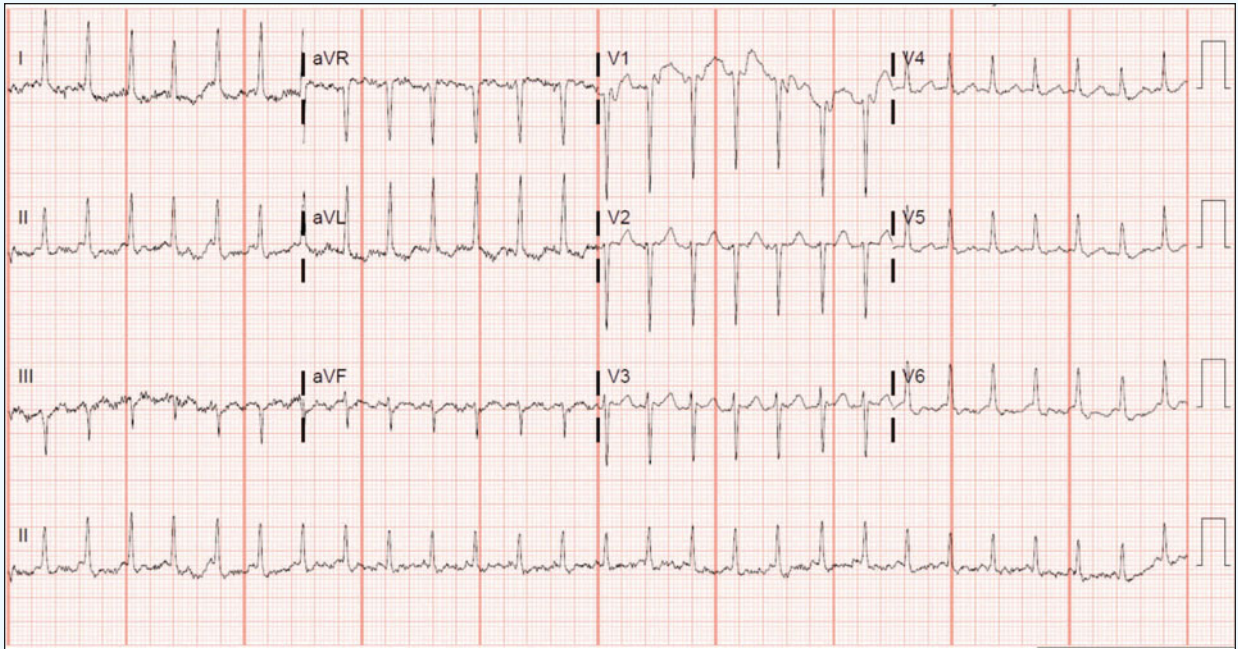


Figure 1. Initial ECG.

The patient is a 46-year-old male with a history of hypertension and congestive heart failure who presents complaining of his defibrillator firing—twice yesterday and once today. He denies chest pain, shortness of breath, fever, nausea or vomiting. He ran out of his carvedilol about 1 month ago.

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 Catherine Reynolds, MD, McGovern Medical School, Department of Emergency Medicine, The University of Texas Health Science Center of Houston.)

THE RESOLUTION

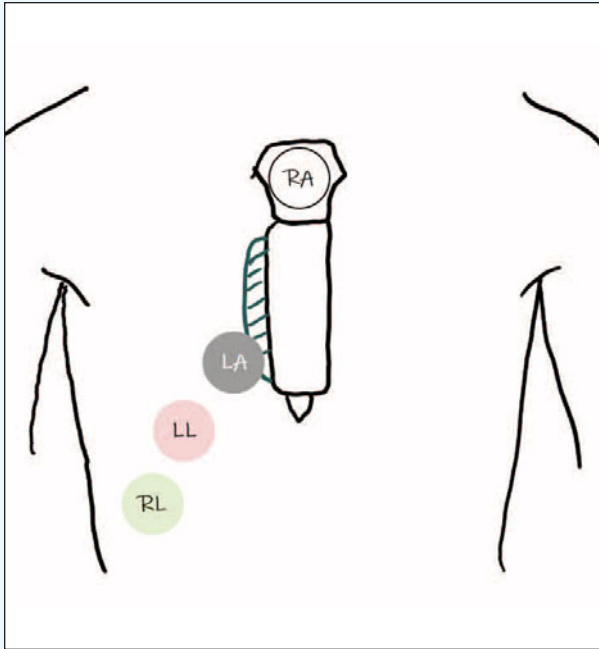


Figure 2. . Electrode placement for Lewis lead.¹ (Used with permission.)

- Atrioventricular nodal reentrant tachycardia (AVNRT)
- Atrioventricular reentrant tachycardia (AVRT)

Diagnosis

This patient was diagnosed with atrial flutter with 2:1 conduction. The ECG shows a regular narrow-complex tachycardia with a rate of 160 beats per minute. There is a left axis deviation with left ventricular hypertrophy (as evidenced by the tall R wave in aVL), and T-wave inversions in I and aVL consistent with a left ventricular strain pattern. (See the February 2020 issue of *JUCM* for further clarification of the left ventricular strain pattern).

On initial assessment of this ECG, atrial activity is not readily apparent, making it difficult to distinguish among atrial flutter, sinus tachycardia, and other supraventricular tachycardias such as AVNRT or AVRT. In this case, the astute clinician has two options:

1. A trial of an atrioventricular node blocker (eg, adenosine) will “unmask” atrial activity if present, or
2. A simple strategy to check “the Lewis lead,” which might reveal the underlying rhythm

Developed and described in 1913 by Sir Thomas Lewis, the Lewis lead is a unique configuration of the ECG electrodes over the atrium that allows for the amplification of atrial activity.²

To evaluate the Lewis lead on an ECG, move the right arm (RA) electrode to the manubrium, the left arm (LA) electrode to the fifth intercostal space on the right sternal border, and the left leg (LL) electrode to the right lower costal margin (Figure 2). With the electrodes in this position, lead I will best illustrate

Differential Diagnosis

- Atrial flutter with 2:1 conduction
- Atrial fibrillation with rapid ventricular response
- Sinus tachycardia

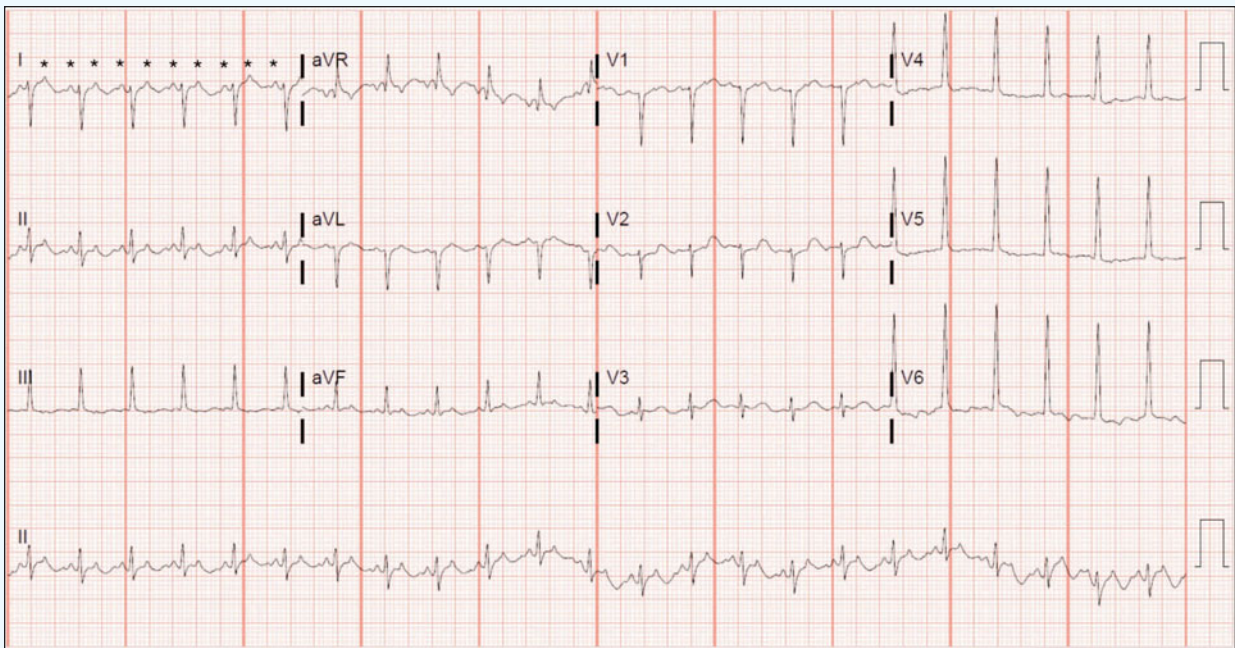


Figure 3. Lewis lead ECG with unmasked flutter waves (*) in lead I.

THE RESOLUTION

atrial activity.^{3,4} This positioning centers lead I over the right atrium, magnifying its activity.

When the Lewis lead was performed in our case, flutter waves were clearly present in lead I (and lead II), cinching the diagnosis of atrial flutter with 2:1 conduction (**Figure 3**).

While this article demonstrates the benefit of a Lewis lead to aid the diagnosis of undifferentiated regular, narrow-complex tachycardias, this technique may also be used with wide-complex tachycardias. In these cases, performing a Lewis lead ECG allows the clinician to identify atrioventricular dissociation and make the diagnosis of ventricular tachycardia in stable patients.⁵

Learnings/What to Look for

- Hidden P-waves in regular narrow-complex tachycardias can be unmasked by adenosine or a Lewis lead ECG
- After reorganizing electrodes in the Lewis lead configuration, obtain another ECG and look at lead I for clues about the underlying atrial activity

Pearls for Urgent Care Management

- In stable patients with no obvious atrial activity on ECG, a Lewis lead can help you make the diagnosis and treat accordingly
- Patients with atrial flutter with rapid ventricular response typically would benefit from transfer to a facility with cardiology services available, but making the diagnosis and stabilizing before transfer is paramount

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1. Cooper B, Giordano J, Fadiel T, Reynolds C. Lewis lead. In: *ECG Stampede: A Case-Based Curriculum in Electrocardiography Triage*. Houston, TX: Null Publishing Group; 2021:159-161.
2. Lewis T. Auricular fibrillation. In: *Clinical Electrocardiography*. 1913:86-97.
3. Bakker ALM, Nijkerk G, Groenemeijer BE, et al. The Lewis lead. *Circulation*. 2009;119(24).
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