



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](mailto:editor@jucm.com).

## A 52-Year-Old Male with Upper Arm Pain and Swelling of No Known Origin



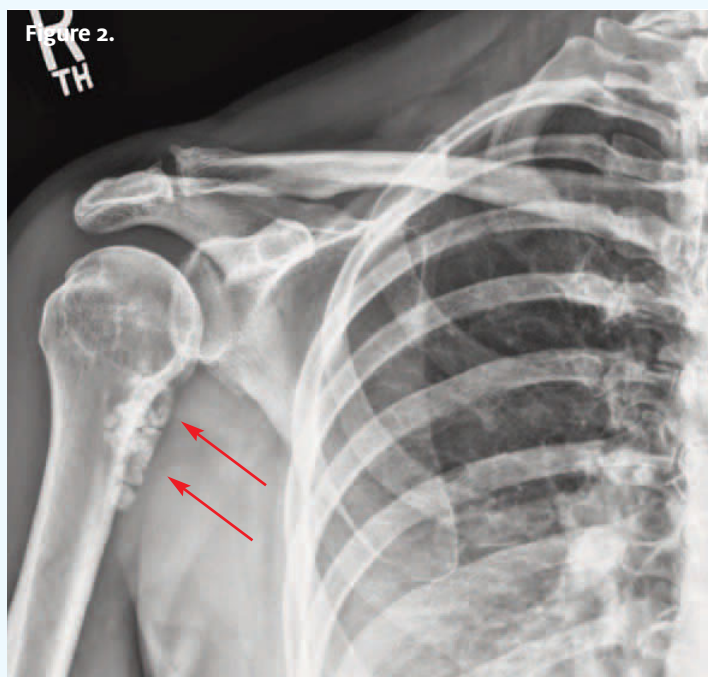
### Case

The patient is a 52-year-old male who presents with a chief complaint of 1 month of right shoulder pain.

He reports that the pain has gotten progressively worse since he first noticed it. He denies any trauma, and there is nothing remarkable in his history.

View the image taken and consider what your diagnosis and next steps would be.

## THE RESOLUTION

**Differential Diagnosis**

- Chondrosarcoma
- Osteoarthritis
- Osteochondritis dissecans
- Osteochondromatosis of the synovial sheath of the biceps tendon
- Synovial chondrosarcoma

**Diagnosis**

The x-ray shows multiple round or oval calcific/ossific bodies along the anterior surface of the humerus in the region of the bicipital groove and the biceps tendon. Also, single oval ossific body in the axillary recess of the shoulder.

This patient was diagnosed with osteochondromatosis of the synovial sheath of the biceps tendon and the axillary recess of the shoulder joint. Synovial osteochondromatosis is a proliferative disorder of the synovial lining of the joint, bursa, and tendon sheaths.

**Learnings/What to Look for**

- This diagnosis is characterized by synovial membrane proliferation and metaplasia, with development of multiple cartilaginous and osteocartilagenous bodies in the joint space, synovial bursa, or the tendon sheath
- Osteochondromatosis presents with painful swelling of the upper arm and a palpable tender mass in the region of the biceps tendon
- Radiographic findings include presence of multiple round or oval osteochondral bodies in the region of bicipital groove and the biceps tendon. There may or may not be accompanying shoulder joint osteochondromatosis with restricted joint movements

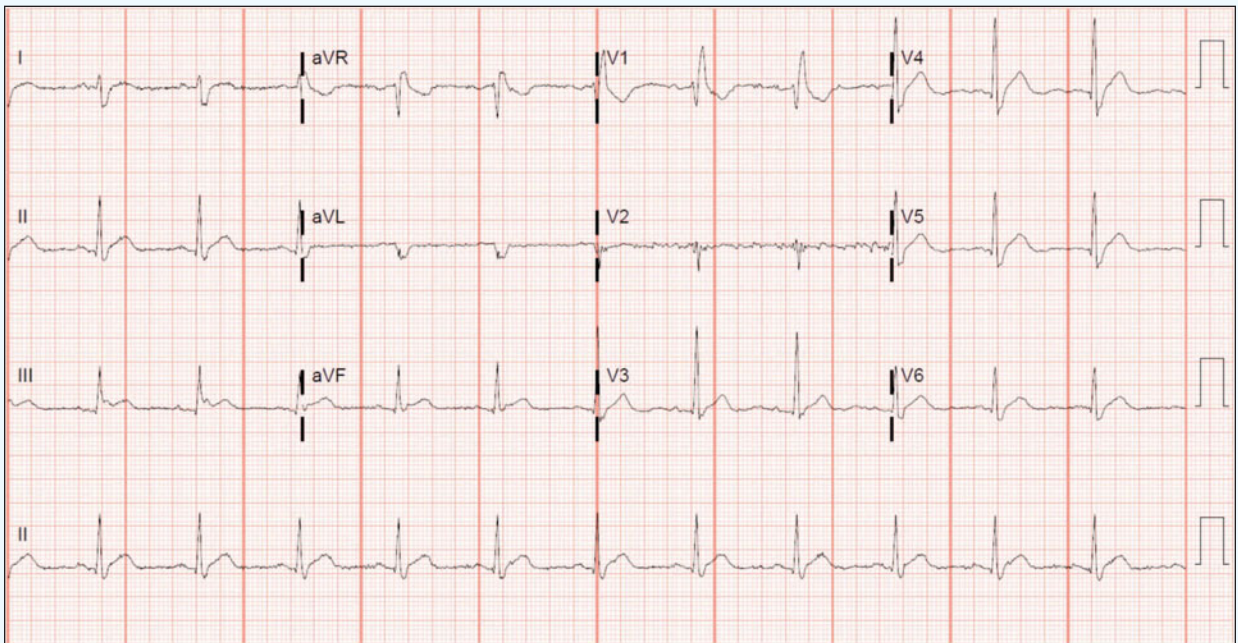
**Pearls for Urgent Care Management and Considerations for Transfer**

- Treatment is usually surgical, either open or arthroscopic with excision of the osteochondral bodies with or without resection of synovium. Recurrence is not uncommon

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



# A 48-Year-Old Female with Months of Fatigue, Nausea, and Body Aches—Including Chest Pain



## Case

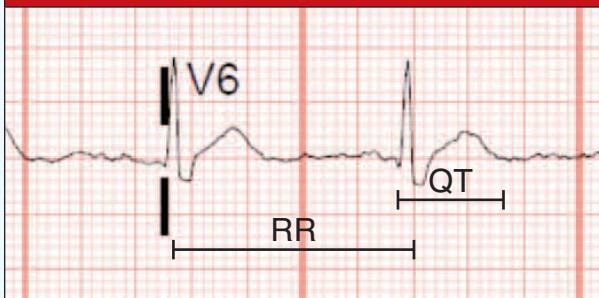
The patient is a 48-year-old female with a family history of breast cancer who complains of 2 months of fatigue, nausea, and generalized body aches, including chest pain. She reports 40 pounds of unintentional weight loss during this time.

View the ECG and consider what your diagnosis and next steps would be.

*(Case presented by Tom Fadial, MD, McGovern Medical School Department of Emergency Medicine.)*

## THE RESOLUTION

Figure 2.

**Differential Diagnosis**

- Hyperkalemia
- Hypercalcemia
- Acidosis
- Hyperthermia
- Digitalis toxicity
- Myocardial ischemia

**Diagnosis**

The ECG shows normal sinus rhythm at a ventricular rate of 75 bpm. The QT-interval, or the time between the start of the Q-wave and end of the T-wave, is shortened at 360 ms (nine small boxes at 40 ms each). This patient was diagnosed with hypercalcemia with shortened QT-interval.

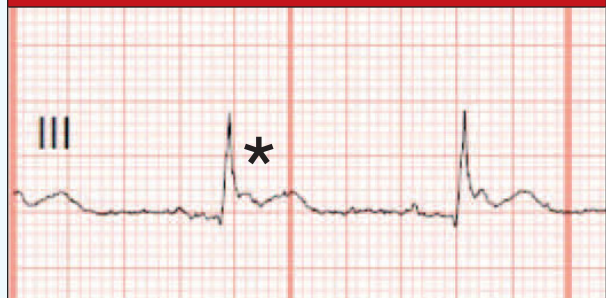
Shortening of QT interval ( $QT_c < 360\text{ms}$ ) and presence of Osborn J-waves are ECG findings commonly associated with hypercalcemia.<sup>1</sup>

The QT-interval varies based on the heart rate (lengthens at slower heart rates, shortens at faster heart rates) and should be corrected on this account. There exist several formulae for estimation of the corrected QT interval ( $QT_c$ ), of which the Framingham formula [ $QT_c = QT + 154 \times (1 - RR)$ ] may provide the most accurate estimation.<sup>2,3</sup> In this case, the  $QT_c$  is 391ms which is calculated as  $QT + 154 \times (1 - (60/HR))$ .

While other formulae exist for the estimation of lower bounds for normal  $QT_c$  intervals, a cutoff of around 360 ms is reasonable for distinction of abnormally shortened QT.<sup>4</sup> Though this patient's ECG does not yet meet this threshold, Osborn J-waves are present. The Osborn J-wave is a positive deflection at the J-point (junction point between QRS complex and T-wave). Osborn J-waves can also be seen in other conditions including hypothermia.<sup>5,6</sup>

Finally, the ECG demonstrates some ST-segment changes, including elevations most pronounced in lead III. Shortening of the QT interval can result in a "high-takeoff" of the ST-segment, mimicking myocardial ischemia or infarction. This finding is unreliable, however, and ST-segment changes can only be attributed to hypercalcemia after appropriate exclusion of an acute myocardial infarction.<sup>7-9</sup>

Figure 3.

**Learnings/What to Look for**

The identification of ECG changes associated with electrolyte derangements generally, and hypercalcemia specifically, is critical as these are manifestations of conduction abnormalities with a rare risk of progression to potentially fatal ventricular dysrhythmias (such as ventricular fibrillation).<sup>10</sup> The ECG findings commonly associated with hypercalcemia are:<sup>1</sup>

- Shortening of QT interval ( $QT_c < 360\text{ms}$ )
- Presence of Osborn J-waves
- In addition to ECG, appropriate laboratory tests include hemoglobin, chemistry panel, and cardiac enzymes

**Pearls for Urgent Care Management and Considerations for Transfer**

- In addition to emergency department transfer for symptomatic hypercalcemia with associated ECG abnormalities, initial management may include isotonic volume expansion

**References**

1. Diercks D, Shumaik G, Harrigan R, et al. Electrocardiographic manifestations: electrolyte abnormalities. *J Emerg Med.* 2004;27(2):153-160.
2. Vandenberg B, Vandael E, Robyns T, et al. Which QT correction formulae to use for QT monitoring? *J Am Heart Assoc.* 2016;5(6):e003264.
3. Sagie A, Larson M, Goldberg R, et al. An improved method for adjusting the QT interval for heart rate (the Framingham Heart Study). *Am J Cardiol.* 1992;70(7):797-801.
4. Viswanathan M, Page R. Short QT circulation. *Circulation.* 2007;116(7):686-688.
5. Otero J, Lenihan D. The "normothermic" Osborn wave induced by severe hypercalcemia. *Tex Heart Inst J.* 2000;27(3):316-317.
6. Asbeutah A, Salem M. Electrographic Osborn wave in severe hypercalcaemia. *Eur Heart J.* 2019;3(4):1-2.
7. Nishi S, Barbagelata N, Atar S, et al. Hypercalcemia-induced ST-segment elevation mimicking acute myocardial infarction. *J Electrocardiol.* 2006;39(3):298-300.
8. Turhan S, Kilickap M, Kilinc S. ST segment elevation mimicking acute myocardial infarction in hypercalcaemia. *Heart.* 2005;91(8):999.
9. Ashizawa N, Arakawa S, Koide Y, et al. Hypercalcemia due to vitamin D intoxication with clinical features mimicking acute myocardial infarction. *Intern Med.* 2003;42(4): 340-344.
10. Kiewiet R, Ponssen H, Janssens E, Fels P. Ventricular fibrillation in hypercalcaemic crisis due to primary hyperparathyroidism. *Neth J Med.* 2004;62(3):94-96.

**Acknowledgment:** JUCM appreciates the assistance of ECG Stampede ([www.ecgstampede.com](http://www.ecgstampede.com)) in sourcing content for electrocardiogram-based cases for Insights in Images each month.

ECG STAMPEDE





## A 24-Year-Old Man with Excessively Odorous and Itchy feet



### Case

The patient is a 24-year-old man who presents with excessive foot odor that he describes as “worse than anything I could have imagined.” He denies pain or burning, but reports that the soles of his feet itch occasionally. He also says his feet sweat heavily when he plays recreational ice hockey a few nights a week. Upon examination, several shallow rounded pits are found on the pressure-bearing areas of the soles.

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

## THE RESOLUTION

Figure 2.

**Differential Diagnosis**

- Tinea pedis
- Palmoplantar keratoderma
- Clavus
- Pitted keratolysis

**Diagnosis**

This patient was diagnosed with pitted keratolysis, also known as keratoma plantare sulcatum and ringed keratolysis. This is a noninflammatory bacterial infection of the plantar stratum corneum caused by *Kytococcus sedentarius* (formerly *Micrococcus sedentarius*), *Dermatophilus congolensis*, or species of *Corynebacterium* or *Actinomyces*.

**Learnings/What to Look for**

- Predisposing factors are excessive sweating and prolonged occlusion in a warm, humid environment
- Affected areas are generally asymptomatic, but can emit a foul odor due to the production of isovaleric acid by the bacterial metabolism in the leucine in sweat
- Rarely, pruritis, pain, or burning may be present

**Pearls Urgent Care Management and Considerations for Transfer**

- Topical antibacterial medications, including erythromycin, clindamycin, mupirocin, fusidic acid, or benzoyl peroxide
- Aluminum chloride 20% may be used to treat excessive sweating, which may be a contributing factor in pitted keratolysis
- Patients should be counseled to wash their feet with soap or antiseptic cleanser twice daily; wear absorbent cotton or wool socks; and to avoid wearing the same shoes on consecutive days

**Acknowledgment:** Images and case presented by VisualDx ([www.VisualDx.com/JUCM](http://www.VisualDx.com/JUCM)).