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 e-mail the relevant materials and presenting information to *editor@jucm.com*.

A 12-Year-Old Boy with Knee Pain After a Baseball Game

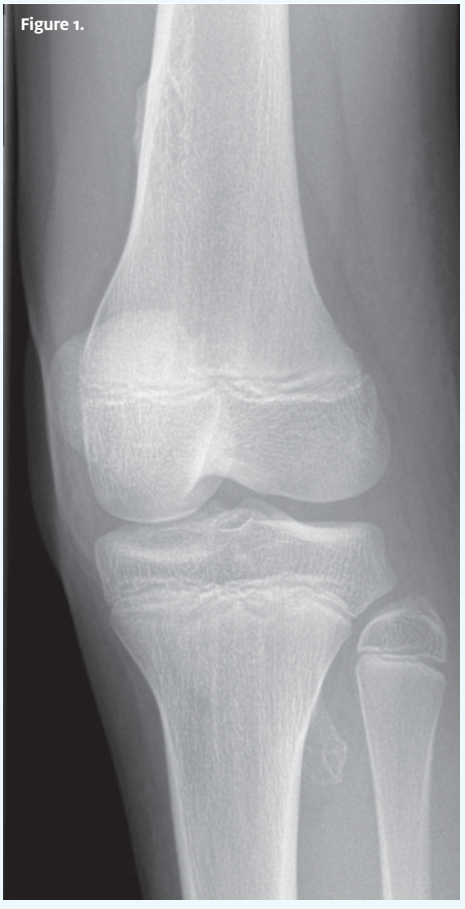

Figure 1.

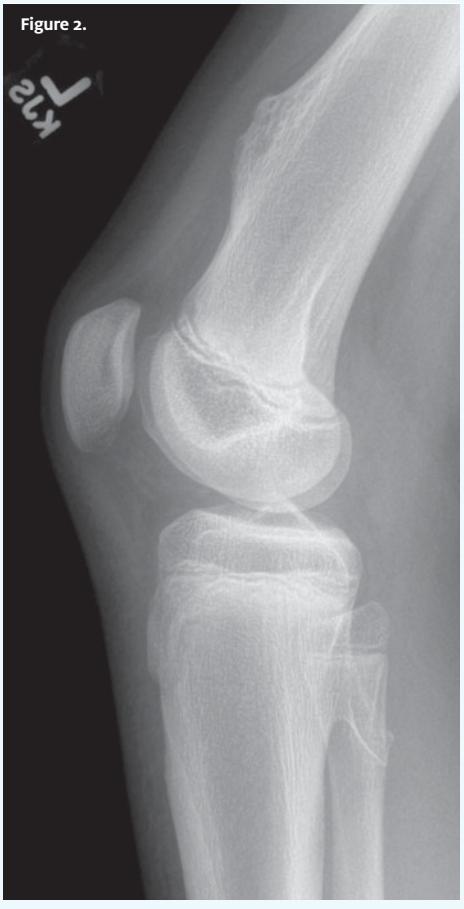

Figure 2.

Case

The patient is a 12-year-old boy who presents with pain in his left knee. His mother reports that during a baseball game earlier in the day he slid hard into a base and came up limping.

Review the x-rays taken and consider what your diagnosis and next steps would be. Resolution of the case is described on the next page.

THE RESOLUTION

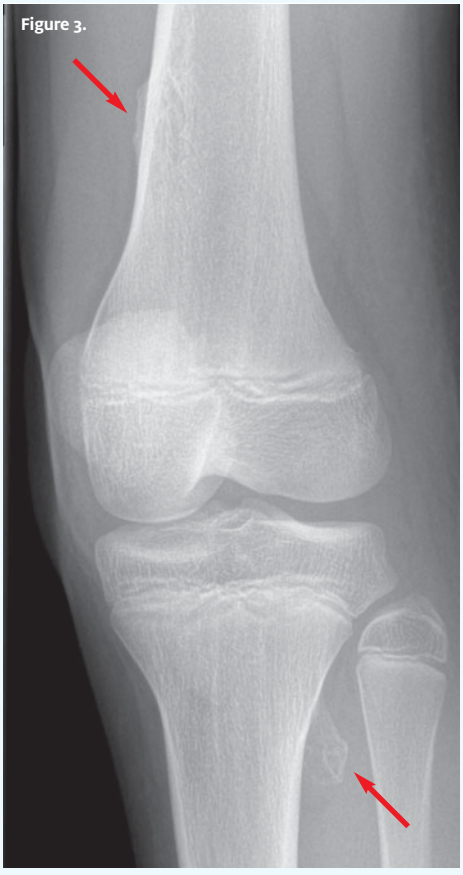
Figure 3.

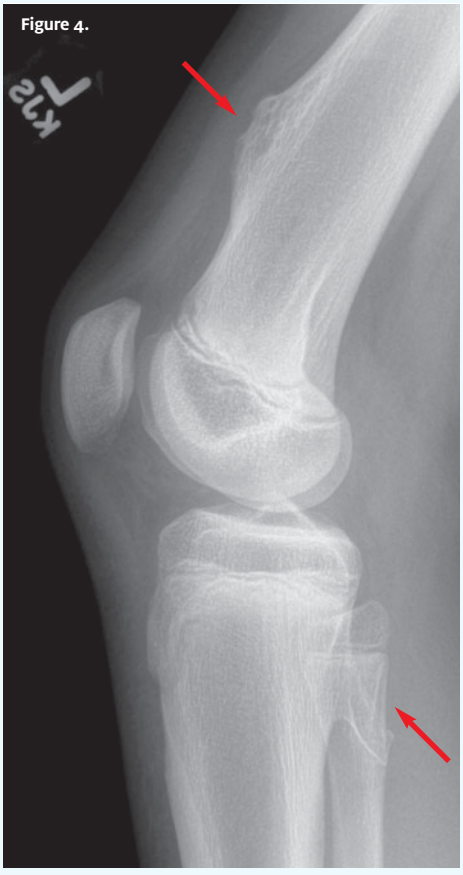
Figure 4.

Differential Diagnosis

- Heterotopic ossification
- Osteosarcoma
- Multiple osteochondromas
- Osteomyelitis

Diagnosis

The images reveal irregular prominence of the distal femoral cortex and downward angulated osteophyte at lateral margin proximal tibia and posterior fibula. This patient was diagnosed with multiple osteochondromas.

Learnings/What to Look for

- Osteochondromas are cartilage-capped bony spurs on the external surface of a bone. They grow throughout childhood (while growth plates are open) and the distal femur is the most common location
- Multiple osteochondromas suggests hereditary multiple exostoses (HME), which follows an autosomal dominant inheritance pattern
- Osteochondromas are typically asymptomatic and incidental. They can be palpable and cause pain if associated with local trauma. An osteochroma can be a lead point for a pathologic fracture
- Larger exostoses may impinge on nerves, tendons, or blood vessels, causing extreme pain
- Rarely, osteochondromas can have malignant transformation into a chondrosarcoma

Pearls for Urgent Care Management

- Small exostoses are often incidental, cause no symptoms, and require no treatment, although they can be lead points for pathologic fractures
- Differentiating these exostoses from osteosarcomas and other lytic bony lesions is most important
- Follow-up with a bone specialist is recommended to guide whether monitoring is necessary or to discuss excision if the exostoses are causing impingement symptoms

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

CLINICAL CHALLENGE: CASE 2

A 43-Year-Old Woman with a New Ulcer on One Hand

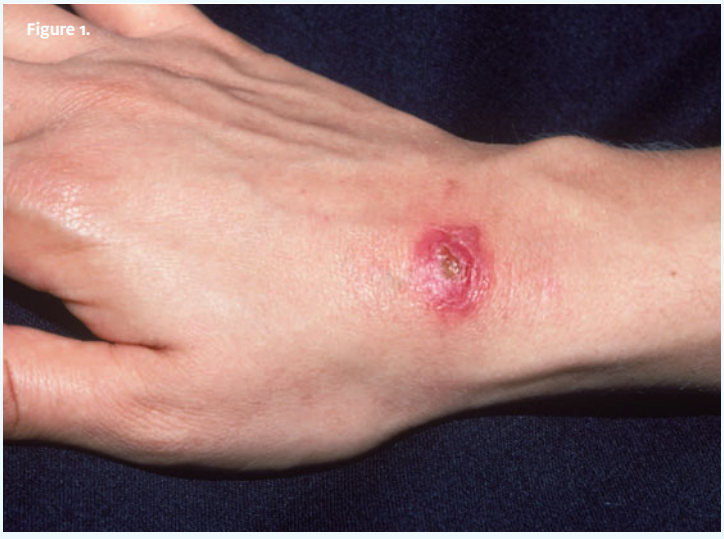
Figure 1.

Case

A 43-year-old woman presents with 2 weeks of a smooth nodule on her right hand. The patient denies recent travel but recalls that she "banged up" her hand while cleaning out a fresh-water fish tank prior to noticing the nodule. Past medical history is significant for renal transplantation.

Exam reveals a tender, erythematous plaque with an ulcer on dorsal aspect of her hand.

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

THE RESOLUTION

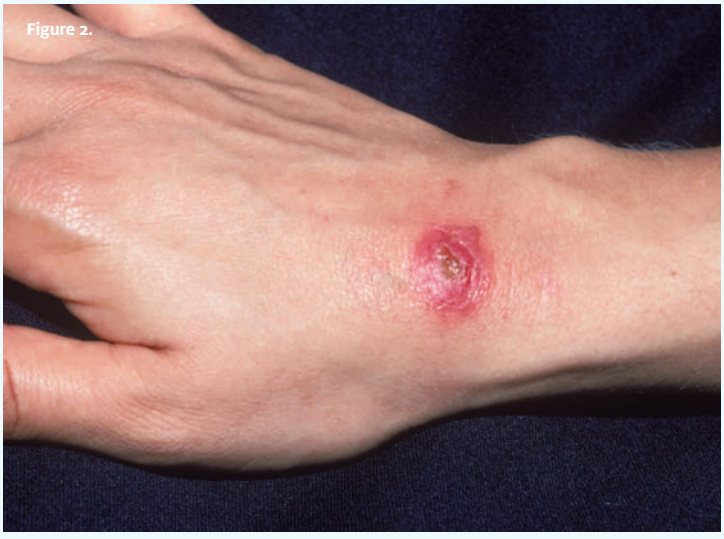

Figure 2.

Differential Diagnosis

- *Mycobacterium chelonae* infection
- *Mycobacterium marinum* infection
- Cutaneous phaeohyphomycosis infection
- Foreign body granuloma

Diagnosis

This is *Myobacterium marinum* infection. *M marinum* is an atypical mycobacterial skin infection contracted from contaminated fish tanks, swimming pools, lake water and salt water. Minor trauma is a predisposing factor.

Men are affected more commonly than women.

Learnings/What to Look for

- The typical skin lesion consists of a pustule or nodule and develops 2–3 weeks after exposure
- Nodules may ulcerate, suppurate, and spread via lymphangitic spread (about 25% of cases)
- In more severe infections, deeper manifestations such as tenosynovitis, arthritis, bursitis, or osteomyelitis may be seen
- In immunosuppressed patients, disease can disseminate to the lungs or other systems; bacteremia is rare

Pearls for Urgent Care Management

- Infection is usually mild and self-limited, with lesions healing over 1 to 2 years if left untreated
- Treatments found to expedite healing include minocycline, clarithromycin, doxycycline, and trimethoprim-sulfamethoxazole
- While *M marinum* is naturally multidrug-resistant, drug resistance varies. As such, combination therapy may be required
- Cryotherapy, x-ray therapy, electrodesiccation, photodynamic therapy, and local hyperthermic therapy have also been reported to be effective

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

CLINICAL CHALLENGE: CASE 3

An 87-Year-Old Male with Chest Pain, SOB, and a History of Valvular AFib, Stroke, and Heart Failure

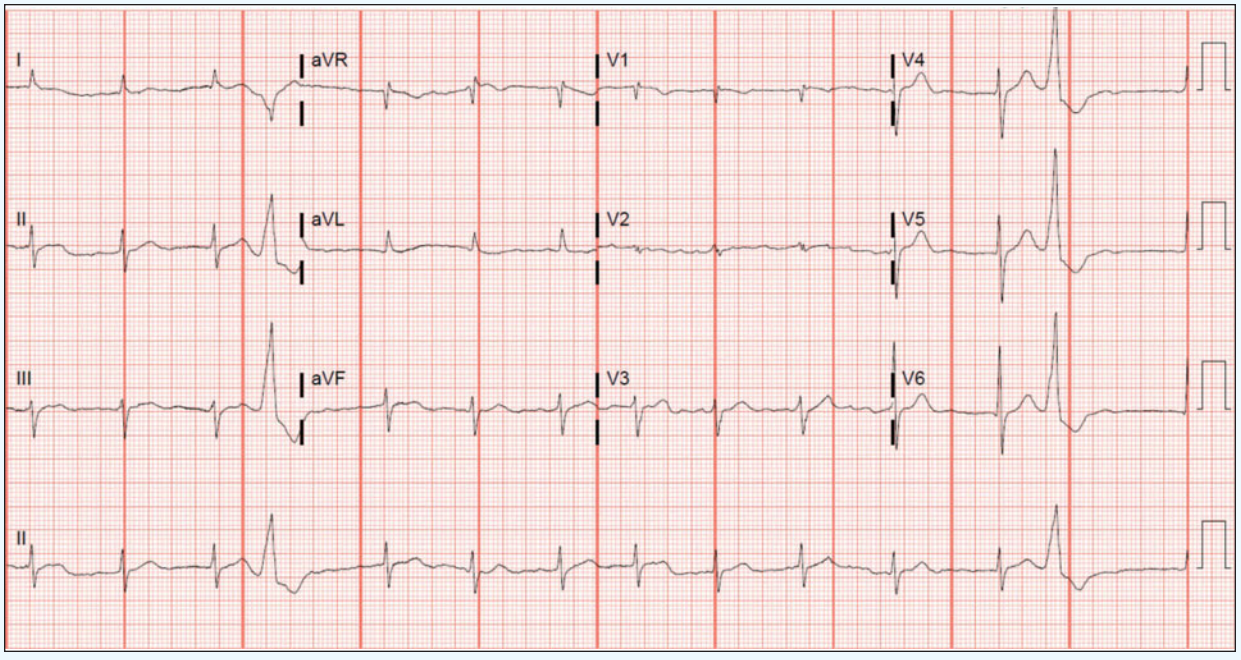

Figure 1.

An 87-year-old male with past medical history of valvular atrial fibrillation, prior stroke, and heart failure presents to urgent care with chest pain and shortness of breath for 3 days. The pain and difficulty breathing are associated with bilateral lower extremity swelling for 1 week.

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 Whitney Skidmore, MD, PGY2 McGovern Medical School, Department of Emergency Medicine, UTHealth Houston with assistance from Catie Reynolds, MD, McGovern Medical School, Department of Emergency Medicine, UTHealth Houston.)

THE RESOLUTION

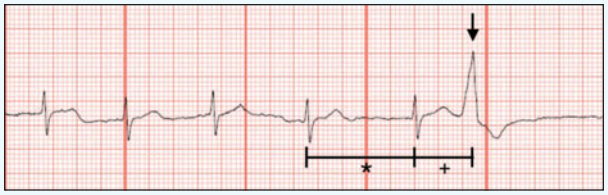

Figure 2. Prolonged RR interval (*) followed by short RR interval (+) terminating in an aberrantly conducted beat (↓)

Differential Diagnosis

- Premature ventricular contraction (PVC)
- Third-degree heart block
- Ashman phenomenon
- Atrial fibrillation with rapid ventricular response
- Nonsustained ventricular tachycardia

Diagnosis

This patient was diagnosed with Ashman phenomenon. This ECG shows an irregularly irregular rhythm with a rate of 83 bpm and a normal axis. There are no p waves present, the QRS complex is generally narrow, and there are no signs of ischemia in the ST segments. There are two aberrantly conducted beats with wide QRS complexes and unifocal morphology. In both instances, a prolonged R-R interval is followed by a relatively short R-R interval, which is then terminated by an aberrant beat. This is consistent with Ashman phenomenon.

Ashman phenomenon was first described by Drs. Gouaux and Ashman in 1947 and is a result of the variability in the refractory periods of the myocardium with varying heart rates.[1] The refractory period of the His-Purkinje system is proportional to the length of the preceding R-R interval, so longer R-R intervals result in longer refractory periods and vice versa.

When a long R-R interval precedes a short R-R interval, parts of the His-Purkinje system are still refractory, and the resultant beat appears abnormal (**Figure 2**). Commonly, this aberrant beat will have a right bundle branch block (RBBB) morphology because the right bundle has a longer refractory period than the left.[2]

This pattern is typically seen in atrial fibrillation, where a short R-R interval can frequently follow a longer one. However, it can also be seen in other supraventricular arrhythmias.

Ashman phenomenon can be diagnosed by the Fisch criteria, first described by Dr. Charles Fisch. The criteria include: a relatively long R-R interval preceding an R-R terminated by the aberrant QRS complex, a RBBB-like aberrancy with normal orientation of the QRS vector, irregular coupling of aberrant QRS complexes, and the lack of a fully compensatory pause following the aberrant beat.[3]

Ashman phenomenon is often confused for a PVC if a single aberration is present, and less commonly mistaken for nonsustained ventricular tachycardia when a series of aberrant beats are present. It can be differentiated from both by the lack of compensatory pause following the aberrantly conducted complex. PVC action potentials initiate in the ventricles and result in a compensatory pause during which the ventricles repolarize; however, Ashman phenomenon beats are supraventricular in origin and lack a compensatory pause. It is important to differentiate Ashman phenomenon from wide complex tachycardias of ventricular origin and other cardiac dysrhythmias to avoid unnecessary diagnosis and interventions.

Third-degree heart block, a condition in which complete atrioventricular dissociation leads to a slower, escape rhythm, is not present on this ECG; nor is atrial fibrillation with rapid ventricular response.

Learnings/What to Look For

- Ashman phenomenon is an aberrantly conducted supraventricular beat that results from the variability of refractory periods within the conduction system
- Identification of this phenomenon will help distinguish it from an ectopic beat or ventricular tachycardia
- While commonly seen in atrial fibrillation, Ashman phenomenon can be seen in any supraventricular arrhythmia

Pearls for Initial Management

- No treatment is required for isolated complexes seen in Ashman phenomenon[3]
- Identifying Ashman phenomenon and differentiating it from ectopic beats and ventricular tachycardia will prevent unnecessary transfers and consults
- While there is no treatment necessary for Ashman phenomenon, always consider the underlying cardiac condition and initial presentation when determining the need for transfer or cardiology consult

References

1. Gouaux, JL, Ashman R. Auricular fibrillation with aberration simulating ventricular paroxysmal tachycardia. *Am Heart J*. 1947;34(3):366–373.
2. Singla V, Singh B, Singh Y, Manjunath CN. Ashman phenomenon: a physiological aberration. *Case Reports*. 2013(May24 1), bcr2013009660–bcr2013009660.
3. Lakusic N, Mahovic D, Slivnjak V. Ashman phenomenon: an often unrecognized entity in daily clinical practice. *Acta Clin Croat*;2010;2013:99–100.

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