



CLINICAL IMAGE CHALLENGE

X-RAY

Editor's Note: While the images presented here are authentic, the patient cases are hypothetical.

68-Year-Old Female With Swollen, Painful Hand



Figure 1: Initial X-rays

A 68-year-old woman presents to urgent care with her husband after tripping on a rug at home the previous day and falling onto her left hand. She has experienced persistent pain and swelling in the hand since the fall. Ibuprofen provided modest pain relief. Physical examination reveals normal vital signs with focal edema and tenderness over the dorsal surface of the 4th and 5th metacarpals. Decreased range of motion and knuckle contour at the 5th metacarpophalangeal (MCP) joint are noted, and ecchymosis is seen on the palmar surface of the 5th metacarpal area. Sensation is intact to the 4th and 5th digits, interphalangeal joints are mobile, and capillary refill is brisk.

View the image taken 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).



Differential Diagnosis

- Contusion
- Metacarpophalangeal dislocation
- Fifth metacarpal neck fracture
- Intra-articular fifth metacarpal head fracture

Diagnosis

Plain radiographs show an acute, mildly displaced 5th metacarpal neck fracture. Soft tissue swelling, severe osteoarthritis, and mild osteoporosis are also noted in the images. Fifth metacarpal neck fractures, commonly known as boxer's fractures, are among the most common hand injuries, accounting for 30% to 40% of all hand fractures. Fractures to the neck of the metacarpal are usually due to direct trauma to a clenched fist or direct blunt force trauma to the dorsum of the hand, often seen in falls among older populations. They most often involve the fifth and occasionally the fourth metacarpal neck.

What to Look For

- Thorough examination of the hand for signs of fracture angulation and rotational malalignment, impaired extensor function of the fingers, neurovascular compromise and loss of skin integrity should be performed.
- Plain radiographs including 3 views of the hand (anteroposterior, lateral, and oblique) adequately display metacarpal neck fractures; measurements of angulation should be performed on the lateral view.

- Ultrasound may also be used in evaluating fractures in the metacarpal bones; evidence suggests high sensitivity and specificity in diagnosing metacarpal fractures.

Pearls For Urgent Care Management

- Acute fracture reduction is indicated if there is hyperextension at the MCP joint and flexion at the proximal interphalangeal (PIP) joint with attempted extension of the finger. Reduction is also needed for significantly angulated 4th or 5th metacarpal fractures. If performed in the urgent care setting, post-reduction immobilization and repeat radiographs are recommended to ensure adequate reduction and alignment.
- An ulnar gutter splint may be used to immobilize fractures of the 4th and 5th metacarpal necks; however, growing evidence supports more minimalist interventions for uncomplicated 5th metacarpal neck fractures. Off-the-shelf Galveston splints allow for use of fingers while maintaining fracture position, which may be beneficial for older patients, and buddy taping and soft wrapping may also be appropriate.
- Complex metacarpal neck fractures that are severely comminuted, angulated > 30 degrees or have any rotational malalignment should be referred to a hand surgeon.
- Return to work should be expected when the patient's metacarpal joint is pain-free, non-tender, and has functional range of motion. Return to contact sports or heavy labor prior to 6 weeks post fracture requires orthotic protection. ■



CLINICAL IMAGE CHALLENGE

DERMATOLOGY

52-Year-Old Female With Extremely Itchy Dark-Ringed Bumps on Skin of Back



A 52-year-old woman visits the urgent care clinic for itchy bumps that have been present on her back for the past 3 months. The lesions are very itchy, and it is difficult for the patient to stop scratching. She has not tried any treatments for her symptoms since onset. On dermatological examination, pink scaly papules with dark exterior rims are seen on

her back, some of which appear excoriated. Laboratory results for complete blood count, comprehensive metabolic panel, and thyroid function tests are all within normal limits.

View the image taken 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).

**Differential Diagnosis**

- Lichen planus
- Nummular dermatitis
- Prurigo nodularis
- Pemphigoid nodularis
- Seborrheic dermatitis
- Nodular scabies
- Hypertrophic lichen planus
- Epidermolysis bullosa pruriginosa

Diagnosis

The correct diagnosis is prurigo nodularis (PN). PN is an uncommon, chronic skin disorder affecting primarily older adults. PN is characterized by symmetrically distributed, multiple, firm, pruritic nodules, typically localized to the extensor surface of extremities and trunk. PN is frequently associated with a history of atopic dermatitis and seems to be more common among African Americans than in other ethnic groups. Systemic diseases and psychiatric disorders have also been reported with high frequency in patients with PN.

The diagnosis of PN is clinical. The diagnosis is based upon a history of chronic, severe pruritus and the clinical finding of the characteristic excoriated, nodular lesions which are often symmetrically distributed. A skin biopsy is not routinely required to confirm the diagnosis. PN is a chronic and often intractable disease that may last for years, with a profound impact on the patient's quality of life. Complete resolution of lesions is rare, even after the itch-scratch cycle has been successfully interrupted. Recurrence is common.

What To Look For

- Exam reveals firm, dome-shaped, itchy nodules ranging in size from a few millimeters to several centimeters. The

nodules can be flesh-colored, erythematous, or brown/black and range in number from a few to hundreds.

- The extensor surfaces of the extremities are characteristically involved, but the upper back, abdomen, and sacrum may also be involved. The palms, soles, face, and flexural areas are rarely involved.
- Pruritus is always severe and distressing. It can be paroxysmal, sporadic, or continuous and is worsened by heat, sweating, or irritation from clothing.

Pearls for Urgent Care Management

- Symptomatic treatment of pruritus: recommend mild cleansers for bathing or showering and applying emollients multiple times per day; may try lotions that provide a cooling sensation on the skin, such as calamine lotion or lotions containing menthol and camphor. Keep nails short and recommend wearing gloves at night.
- Topical and intralesional corticosteroids: superpotent topical corticosteroids as first-line therapy—clobetasol dipropionate 0.05% ointment applied under occlusion with plastic wrap once at nighttime for at least 2-4 weeks. Topical corticosteroids can be tapered to once or twice weekly and continued as a long-term maintenance regimen.
- Treat the itch: first-generation antihistamines such as hydroxyzine or diphenhydramine administered at bedtime may help control nocturnal pruritus. Other topical treatments could be considered including capsaicin, calcineurin inhibitors or topical vitamin D analogues.
- Widespread or recalcitrant disease: Refer to primary care and/or dermatology as they may benefit from ultraviolet phototherapy, intralesional injection of corticosteroids, or tricyclic antidepressants to control pruritus. ■



CLINICAL IMAGE CHALLENGE

ECG

62-Year-Old With Acute Dyspnea

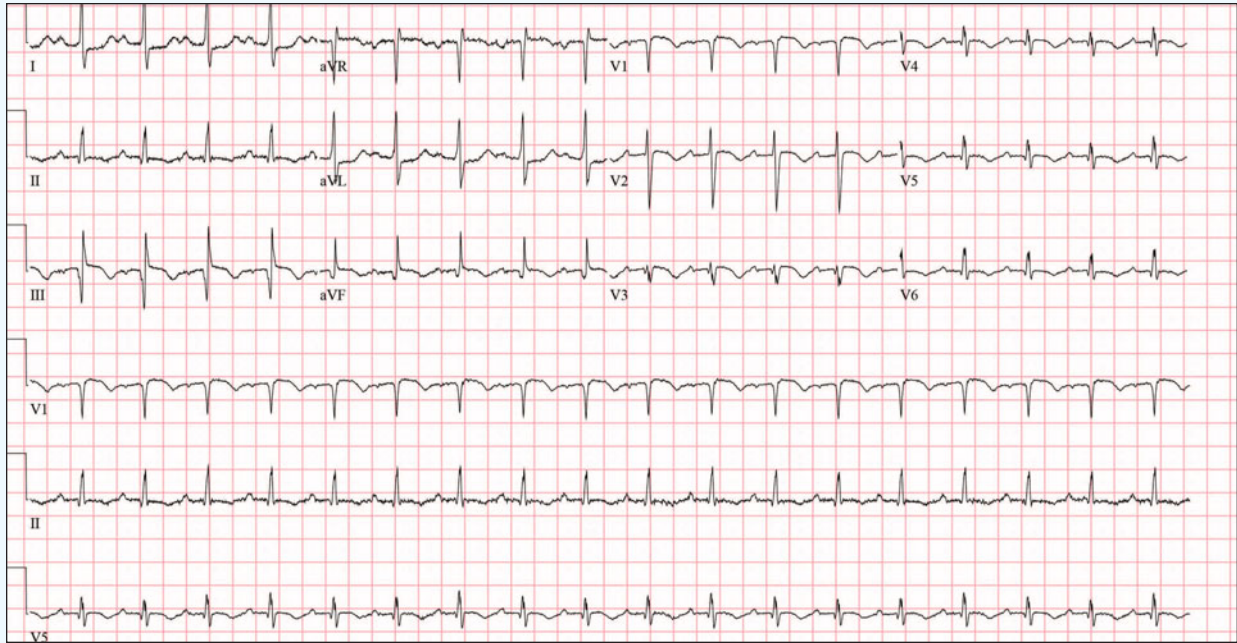


Figure 1: Initial ECG

A 62-year-old female presents to urgent care with acute dyspnea that worsened significantly 2 hours prior to arrival. She has noted progressive shortness of breath over the past week but now feels severely winded. She denies chest pain, cough, fever, leg swelling, or history of deep vein thrombosis.

On evaluation, the patient is tachycardic and tachypneic with a heart rate of 110 beats per minute and an oxygen saturation of 91% on room air. She is alert and speaking in short sentences. An electrocardiogram (ECG) is obtained.

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

Case presented by Jonathan Giordano, DO, MEd, Vagelos College of Physicians and Surgeons, Columbia University Irving Medical Center. Case courtesy of ECG Stampede (www.ecgstampede.com).

ECG  STAMPEDE



Differential Diagnosis

- Hyperkalemia
- Non-ST-segment elevation myocardial infarction (NSTEMI)
- Wellens syndrome
- Pulmonary embolism with acute right ventricular strain
- Hypertrophic cardiomyopathy

Diagnosis

The diagnosis in this case is pulmonary embolism with acute right ventricular strain. The ECG demonstrates sinus tachycardia at approximately 110 beats per minute with a normal axis and normal intervals. There is ST-segment elevation of approximately 1 millimeter in leads III and aVF with reciprocal ST-segment depression in lead aVL—a pattern consistent with inferior ST-segment elevation myocardial infarction (STEMI). In addition, there are T wave inversions in the right precordial leads V1 through V3, with deep T wave inversions visible throughout the V1 rhythm strip, as well as an S1Q3T3 pattern, all consistent with acute right ventricular strain.

Discussion

This case demonstrates an interesting phenomenon: a pulmonary embolism with right ventricular strain masquerading as an inferior STEMI. The ST-segment elevation in leads III and aVF with reciprocal ST-segment depression in lead aVL should prompt activation of the cardiac catheterization laboratory and/or immediate transfer to a cath-capable facility; however, there are additional clues that point to an alternative diagnosis.

While T wave inversions are often cited as a finding in acute coronary syndrome, alternative causes also exist. Electrocardiographic findings that support the diagnosis of pulmonary embolism over acute coronary syndrome include T wave inversions in leads V1 through V3, inferior T wave inversions, and an S wave in lead I. One study

suggests the pattern of simultaneous T wave inversions in lead III and V1 yields a specificity of 99% for pulmonary embolism.¹ This ECG not only suggests pulmonary embolism but identifies this patient as high risk.^{2,3} Additionally, the presenting symptom (acute dyspnea and hypoxia rather than chest pain) points to acute pulmonary embolism rather than acute coronary syndrome.

A large pulmonary embolism can mimic a STEMI by increasing right ventricular wall tension and oxygen demand. Because the right coronary artery supplies the inferior wall of the left ventricle in most patients (right-dominant circulation), right coronary artery hypoperfusion in pulmonary embolism can produce inferior ECG changes that range from T wave inversion to ST-segment depression to frank ST-segment elevation, as in this case.⁴ Regardless, immediate transfer to a cardiac care center is warranted.

Wellens syndrome refers to deeply inverted or biphasic T waves in leads V2 and V3 in a patient who is pain-free at the time of the ECG and reflects critical left anterior descending artery stenosis. This patient's presentation of acute dyspnea, tachycardia, and hypoxia does not fit. Hypertrophic cardiomyopathy produces deep asymmetric T wave inversions typically in the lateral leads often with voltage criteria for left ventricular hypertrophy. Neither is present on this ECG, and hypertrophic cardiomyopathy does not present acutely over hours. Findings of hyperkalemia—peaked T waves, bradycardia, junctional rhythm, widened QRS complex—are not visualized on this ECG.

Urgent care management of a suspected pulmonary embolism is focused on hemodynamic stabilization and immediate transfer. A thorough history should screen for symptoms of hypoperfusion, such as syncope or altered mental status, and risk factors (such as recent surgery, malignancy, or prolonged immobilization). Initial steps include establishing intravenous access, placing the patient on continuous cardiac monitoring, and ad-

ministering supplemental oxygen if hypoxic. Hemodynamically unstable patients (ie, presenting with hypotension or shock) require immediate resuscitation and transfer via advanced life support to the nearest emergency department.⁵

What To Look For

- Pulmonary embolism can produce inferior ST-segment elevation that mimics STEMI.
- Simultaneous T wave inversions in the inferior (II, III, aVF) and right-precordial leads (V1–V3) strongly favor pulmonary embolism over acute coronary syndrome.
- Sinus tachycardia is the most common ECG abnormality in pulmonary embolism.
- The classic S1Q3T3 pattern is specific but has low sensitivity (<20%) for pulmonary embolism and represents acute right ventricular strain.

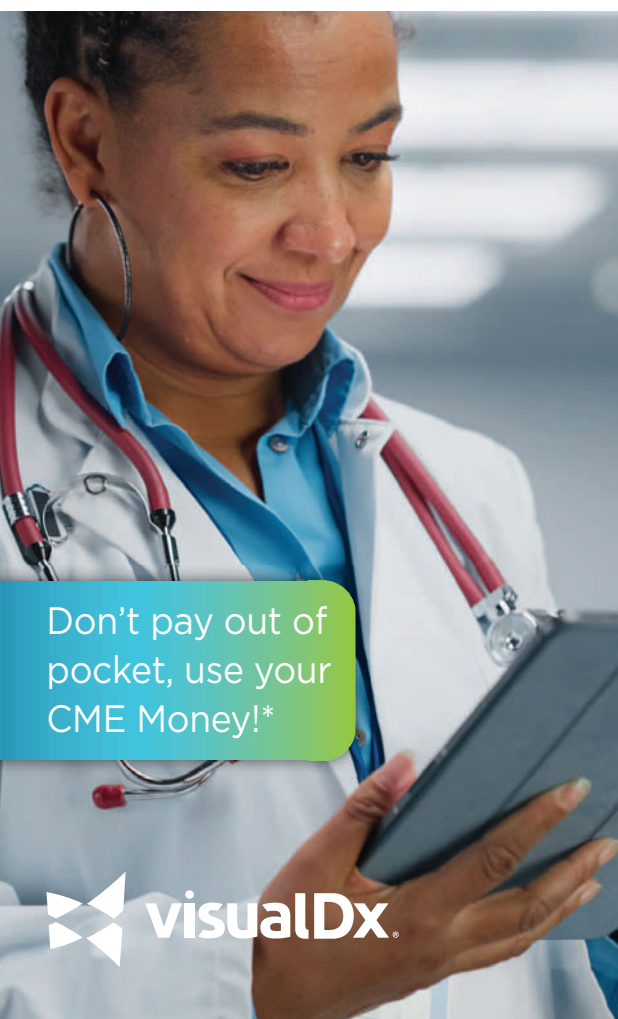
Pearls For Initial Management, Considerations For Transfer

- Establish intravenous access, initiate continuous cardiac monitoring, and administer supplemental oxygen immediately if the patient is hypoxic.

- Perform a rapid screening history for risk factors of deep vein thrombosis and pulmonary embolism, such as recent surgery or immobilization.
- Transfer the patient immediately via advanced life support to the nearest emergency department if the patient is hemodynamically unstable or if there is high clinical suspicion for pulmonary embolism.
- Do not delay transfer to obtain outpatient imaging or blood work when a massive pulmonary embolism is clinically suspected. ■

References

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