

Timothy P. Moran
Patient H&P #14

CC: Bilateral knee pain

HPI:

The patient is a 24 yo African-American man with h/o sickle cell disease who presented to the ED with a 2 day h/o bilateral knee pain. The pain began Thursday morning at approx 4:00 am while the patient was working the night shift at a department store. The pain was described as aching and had a gradual onset. The patient had difficulty sleeping Thursday because of the pain. The pain continued to gradually increase in severity to an 8/10 today. The pain was exacerbated with walking or standing and was not significantly relieved with Percocet that the patient had by prescription. The knee pain is unlike any prior episode of pain crisis. The patient reports some chills and mild SOB, but denies fever, N/V, cough, chest pain, abdominal pain or recent trauma to the knees. In the ED, the pain was primarily localized to the right knee and was 8/10 in intensity. The patient was started on NS at 125ml/hr and received two doses (6mg and 8mg) of morphine.

PMH

Medical/Surgical History:

1. Sickle cell disease: Last pain crisis was while living in [REDACTED] over 1 year ago. Followed by Dr. Ataga in Heme clinic at UNC.
2. Hospitalization at Wake Hospital in July for chest pain after being hit with basketball, but subsequently developed increased difficulty in breathing and fevers requiring hospitalization for approximately one week and received 3U PRBCs. Patient unclear whether he had pneumonia or acute chest syndrome.
3. h/o of stuttering priapism
4. h/o lower extremity ulcers

Family History:

The patient has two siblings with sickle cell disease. No family h/o arthritis, heart disease, DM, HTN, liver or kidney disease.

Social History:

Patient lives in [REDACTED] with mother and four siblings. Patient originally from [REDACTED] but moved to US about 1.5 years ago. Patient works at [REDACTED] department store. The patient denies tobacco or IV drug use, but reports occasional EtOH use with last time in August. No recent travel or sick contacts.

Allergies: NKDA

Medications:

1. folic acid 5mg qd
2. Percocet (5/325mg) 1 tab q4-6hr PRN for pain

Review of Systems:

Constitutional: Intermittent chills with decreased appetite. No fevers, night sweats or weight loss.

Eyes: No vision changes.

ENT: No URI symptoms, mouth ulcers or dysphagia.

Skin: Jaundice and scaly silver nonpruritic rash on right flexor surface of elbow.

Cardiovascular: Mild SOB. No chest pain, DOB or edema.

Pulmonary: No cough (dry or productive), colored sputum, or wheeze.

Endocrine: No polyuria, polydipsia, skin /hair changes, heat/cold intolerance.

GI: No N/V/C/D, BRBPR, GER, abd pain or bowel changes.

GU: No frequency, urgency, dysuria, or hematuria.

MSK: See HPI. Intermittent left hand pain.

Neurologic: No weakness or numbness.

Psychology: No depression, anxiety, or insomnia.

Heme/Lymph: Transfusion in July (3U PRBCs)

Physical Examination

VS: T: 36.3; HR: 96; RR: 16; BP: 108/70; O2sat: 89% RA (h/o upper 80s-low 90s)

General: Patient lying in bed in obvious discomfort but NAD. Thin appearance.

Eyes: PERRL, EOMI. Significant scleral icterus.

ENT: No nasal d/c. MMM. Oropharynx clear with no lesions/erythema.

Neck: Supple with no LAD or masses.

Lymph Nodes: No cervical or inguinal LAD.

Cardiovascular: RRR. Prominent heart sounds, S1 and S2 normal, no m/g/r. Pulses 2+ equal on both sides.

Lungs: Diffusely decreased breath sounds bilateral. No crackles/rhonchi/wheezes. Good air movement.

Skin: Silver scaly rash on flexor surface of right elbow.

Psychiatry: Alert and oriented to person, place, and time

Abdomen: Normoactive bowel sounds. Abdomen muscular and tense, NT, ND. Liver palpable 1-2 cm below costal margin. Difficult to palpate spleen due to rigidity of abdomen. No rebound or guarding.

Extremities: No bilateral cyanosis, clubbing or edema. No petechiae. Capillary refill <3 sec.

MSK: Right knee mild swelling and small effusion. No erythema. Not tender to palpation but painful upon full extension of knee. Left knee exhibited no significant swelling or tenderness.

Full ROM of knees bilaterally.

Neurological: Cranial nerves II-XII grossly intact, normal sensation throughout, normal cerebellar function. DTR 2+ symmetrical.

Pertinent Diagnostic Tests

CBC pending. Chem10 WNL (see WebCIS).

Assessment and Plan

24 yo African-American man with h/o of sickle cell disease and hypoxia who presents to the ED with bilateral knee pain and minor right knee effusion. DDX includes vasoocclusive disease (VOD), periarticular infarct, septic arthritis gout.

KNEE PAIN/EFFUSION: Unclear etiology with DDx including VOD, periarticular infarct, septic arthritis, or gout. VOD or periarticular infarct most likely given afebrile presentation. Radiographs are usually of low yield and therefore not warranted. Consider NSAID treatment with morphine for breakthrough pain. If patient spikes fever or CBC demonstrates marked leukocytosis, will obtain blood cultures and begin empirical Abx treatment with coverage for Staph and Salmonella.

SICKLE CELL DISEASE: Previously asymptomatic. Monitor closely for acute chest syndrome (CXR pending), splenic sequestration or aplastic crisis.

HYPOXIA: Patient normal O2 sats are 80s-90s per Clinic note. Will obtain CXR to r/o new infiltrates. Consider O2 treatment if patient becomes symptomatic.

DISPO: d/c tomorrow if pain improves.

Discussion

Sickle cell disease (SCD) is an autosomal recessive disorder that involves a point mutation in the β -globin gene (Glu6Val). The mutation alters the structure of the hemoglobin molecule (HbS), causing aggregation of hemoglobin under conditions of deoxygenation. Aggregation and polymerization of HbS distorts erythrocyte structure into a “sickle” shape. Sickled cells have a reduced lifespan, resulting in chronic hemolytic anemia. Sickled cells also have an increased propensity to attach to the endothelium of postcapillary venules and cause vascular occlusion. The vascular obstruction and resulting ischemia are responsible for the recurrent episodes of acute pain that are characteristic of sickle cell disease. More life-threatening complications of sickle cell disease include acute chest syndrome, splenic sequestration and aplastic anemia (1).

The severe knee pain in the patient is likely secondary a vasoocclusive event leading to periarticular infarction. Microvascular occlusion most often occurs within bone marrow, but can arise in practically any anatomical location. The pathophysiology involves the attachment of sickle cells to endothelium, resulting in the formation of heterocellular aggregates composed of sickle cells, leukocytes and platelets. Vascular occlusion by the heterocellular aggregates results in infarction and the release of inflammatory mediators, which induce pain through activation of nociceptive afferent nerve fibers (2). Management of painful vasoocclusive crises involves hydration, warm packs on the affected areas, and a combination of opioid or nonopioid analgesics and NSAIDs. Painful crises that result in a visit to the ER should be treated promptly with high-dose morphine, as early pain management can decrease the likelihood of costly hospitalization (3). For patients with recurrent vasoocclusive events, treatment with hydroxyurea has been shown to decrease the rate of pain crises (4). Hydroxyurea has also been shown to cause a modest decrease in mortality for patients with SCD (5).

The patient also presented with chronic hypoxia and dyspnea, which are frequent manifestations of chronic lung disease associated with SCD. SCD is frequently associated with pulmonary hyperreactivity, restrict lung disease and pulmonary hypertension (6). A recent study found that approximately 90% adult patients with SCD exhibited abnormal PFT functions, including decreased total lung capacities and diffusion capacity for carbon monoxide (7). Unfortunately, pulmonary complications of SCD account for 20-30% of the mortality in patients (5).

Investigational treatments for the pulmonary complications of SCD include inhalational nitric oxide (NO) and its precursor oral L-arginine. NO induces pulmonary vasodilation, thus alleviating pulmonary hypertension. NO also acts as inhibits expression of cell adhesion molecules involved with binding of sickle cells to endothelium and decreases production of proinflammatory mediators. While transgenic mouse models have suggested a beneficial role of NO and L-arginine for pulmonary complications of SCD, clinical trials are currently lacking (2).

References

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