CME

An outpatient pain plan and ED pain pathway for adults with sickle cell disease

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ABSTRACT

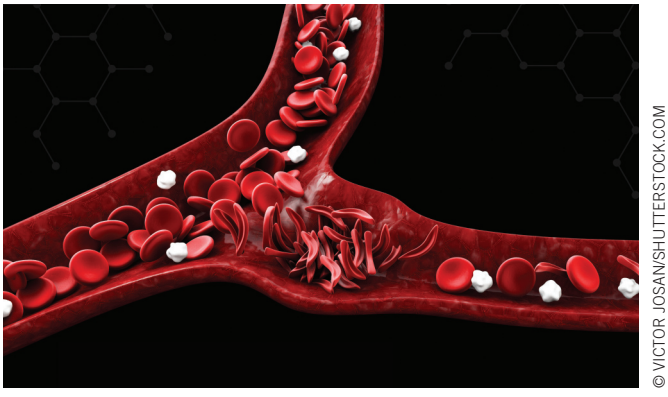
Sickle cell disease (SCD), one of the most common inherited diseases, is associated with lifetime morbidity and reduced life expectancy. In the United States, SCD primarily affects Black patients and, to a lesser degree, those of Hispanic descent. These populations are known to have healthcare disparities related to lower socioeconomic status, limited access to healthcare, and racial bias. The quality-adjusted life expectancy of patients with SCD is less than 35 years, because of progressive complications of the disease. The most common complication is severe episodic pain related to vaso-occlusive ischemic events. Despite guidelines, pain management often is delayed as patients struggle with resistance from clinicians based on concerns over opioid use or abuse, overdose, or drug-seeking behavior. Effective pain management can be accomplished with collaboration between clinicians and patients, a documented outpatient pain management plan, and when necessary, an ED clinical pain pathway for acute SCD pain management.

Keywords: sickle cell disease, vaso-occlusion, pain crises, health disparity, ED, pain management

Learning objectives

- List the risks of no treatment, poor treatment, delayed treatment, and undertreatment of acute vaso-occlusive pain on the quality of care for adults with SCD.
- Describe the disparities in adequate opioid pain care for adults with SCD pain crisis.
- Describe standardized procedures for chronic and acute pain management care for adults with SCD in outpatient settings and EDs.

Sickle cell disease (SCD) is a common inherited monogenic disease with many genotypes. The life-altering genotypes causing the most complications include hemoglobin (Hb) SS, HbSC, and HbS beta-thalassemia.[1-3] These genotypes lead to significant lifetime morbidity and early mortality with a reduced life expectancy of about 54 years.[1-3] SCD affects primarily Black patients and, to a lesser degree, Hispanic patients, affecting more than 100,000 patients in the United States.[2,4,5] Many of these patients are from lower socioeconomic backgrounds, have limited access to care, and are exposed to racial bias.[5-10] Because of their recurrent pain crises, patients with SCD may be labeled as drug-seeking and may not receive necessary care when presenting to the ED.[11,12] In addition, patients with SCD have less access to comprehensive team-based healthcare than patients with other genetic disorders such as hemophilia or cystic fibrosis.[10]



To highlight SCD and improve the lives of patients with chronic and acute pain, in 2014, the National Heart, Lung, and Blood Institute (NHLBI) developed the seminal guidelines for managing chronic and acute SCD pain.[13] In 2020, the American Society of Hematology (ASH) updated the SCD pain management guidelines in an increased effort to enhance clinician education.[14] Additionally, in 2021, the American College of Emergency Physicians (ACEP) created an effective pain management plan to provide ED clinicians with evidence-based acute pain management guidelines.[11,14,15] Despite these practical pathways for managing vaso-occlusive pain in SCD, studies show that healthcare disparities continue.[3,5,8,11,15-17] The disparities may be attributed to a lack of clinician confidence, knowledge, or experience with acute pain crises or the unique clinical needs of patients with SCD.[3,9,11,12,18] Although major healthcare organizations have created

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Key points

- Because of their recurrent pain crises, patients with SCD may be labeled as drug-seeking and may not receive necessary care when presenting to the ED.
- Standardized procedures for chronic and acute pain management care for sickle cell disease patients in outpatient settings and EDs may lead to more efficient diagnosis and treatment.
- Integrating an outpatient pain management plan or ED clinical pain pathway may reduce ED wait times.

guidelines, they do little to overcome barriers to pain management for patients with SCD because they are not widely implemented by EDs or used by clinicians.[8,11,15,17,18] To improve quality of life for patients with SCD, continued efforts are needed to better educate clinicians about SCD and its associated pain crises, instill confidence in them about treatment, and help them to gain experience using SCD-specific standardized procedures and evidence-based pain management guidelines.[3,5,6,9-12,16,18]

PATHOPHYSIOLOGY

Typical red blood cells (RBCs) undergo physical transformations and oxidative stress while traveling through the endovascular circulation, and have a lifespan of 110 to 120 days.[19-22] SCD causes RBCs to lose their flexible disc shape, transforming them into a rigid sickle shape with a lifespan of 10 to 20 days, resulting in hemolytic anemia.[19-22] These abnormally shaped RBCs can stick together, increasing viscosity, impeding blood flow, and causing microvascular end-organ damage and vaso-occlusive pain.[19-22] The sickle-shaped cells also can adhere to vascular walls, increasing the risk for vaso-occlusive events.[1,19,20,22]

TABLE 1. Outpatient pain management plan[15,23]

- Chronic pain management—oral hydration, nonopioid, opioid, and adjuvant therapies
- Outpatient pain management plan
  - Short-acting opioids—hydrocodone, morphine immediate-release (IR), oxycodone, oxymorphone IR
  - Long-acting opioids—methadone, morphine extended-release (ER), oxycodone ER, oxymorphone ER
  - NSAIDs
  - Antiemetics
  - Gabapentin, pregabalin
  - SSRIs, SNRIs, tricyclic antidepressants
- Mild pain flareup
  - Oral hydration, rest, warm shower, heating pad, acetaminophen, or ibuprofen
- Moderate pain flareup
  - Oral hydration, rest, warm shower, heating pad, hydrocodone or oxycodone, ibuprofen
- Severe pain flareup (typical SCD vaso-occlusive pain crisis)
  - Outpatient IV fluid rehydration, morphine, or hydromorphone—if the patient has no relief, an ED evaluation is recommended

In a person with one of the life-altering SCD genotypes (HbSS, HbSC, and HbS beta-thalassemia), numerous triggers can cause RBCs to sickle, resulting in progressive vaso-occlusion, pain, and complications.[1,19,20,22] These triggers may include dehydration, sudden change in body temperature, strenuous or excessive exercise, infection, stress, alcohol, and high altitude.[1,19,20,22] RBC sickling can be triggered by smoking, pregnancy, or medical conditions such as diabetes.[1,19,20,22]

CLINICAL FEATURES

The quality-adjusted life expectancy of patients with SCD is 33 years, and the standard life expectancy is only 54 years because of the many disease-related complications.[2,9] The most common complication is an acute pain crisis, which is a severe pain episode related to vaso-occlusive ischemic events that can last from hours to several days. Acute pain crises generally begin in early childhood and can recur throughout adulthood.[1,19,20] The pain episodes may be precipitated by known and unknown triggers. They may begin with attacks of sudden, severe pain but often have prodromal, crescendo, and resolution phases.[6,11,16]

PHYSICAL EXAMINATION FINDINGS

The physical examination findings of patients with acute pain crises are highly variable, and no specific findings or laboratory studies correlate with an acute pain crisis.[1,6,11,12,14,23] Patients commonly present with pain in their bones, joints, abdomen, lower back, or upper thighs.[15,19] Physical examination of the painful area may be normal. Most patients are experienced at managing chronic and acute SCD pain at home and present to the ED if their home regimen cannot control their pain or their pain is different than usual.[11,15,16,19] If patients report that their pain is *different*, perform rapid assessments for life-threatening SCD complications, focusing on acute chest syndrome (ACS), stroke, sepsis, pulmonary embolism (PE), and splenic sequestration.[11,14,15,19]

Patients with cough, fever, chest pain, tachypnea, or hypoxemia must be rapidly assessed for PE, pneumonia, and especially ACS, which is the leading cause of death in patients with SCD.[6,15,19,20] Patients with altered mental status, atypical headache, focal neurologic findings, or new seizures should be evaluated for stroke, because patients with SCD are at higher risk.[6,15,19,20] Patients with hypotension, tachycardia, and fever raise concern for sepsis, aplastic crisis, or splenic sequestration. Rapidly evaluate patients reporting unusual symptoms because they are at high risk for SCD-related complications that can cause them to decompensate quickly.[6,15,19,20] However, there is no reason to delay treatment for an

extensive investigation in a patient with an acute pain crisis.[6,14,15,20]

COMPLICATIONS

Complications of SCD that must be quickly assessed to streamline care in the ED include acute pain crisis, ACS, stroke, PE, and avascular necrosis.[1,11,14,15,20] As mentioned earlier, because of their multiple visits to the ED for pain crises, patients with SCD may be perceived as drug-seeking, leading to inadequate and suboptimal pain management.[5,11,12,15] The delay in pain management may be complicated by the known racial and ethnic healthcare disparities among minority groups mainly affected by SCD.[6,8-10,12] Although electronic medical records (EMRs) have improved the identification of patients with SCD, disparities remain and pain management during an acute pain crisis can vary.[7,18,21] To mitigate the disparities and variability of care, evidence-based guidelines must be widely implemented and consistently followed.[7,11,14,15,18,21]

Disease-modifying therapies are meant to reduce adverse reactions such as acute pain episodes, ACS, and stroke. However, these management strategies are limited if the patient has adverse reactions and cannot reach a therapeutic dose.[1,6,19-21] Still, some patients suffer from chronic pain requiring daily management. Improving access to pain management by consistently following an outpatient pain plan or an ED clinical pain pathway may improve the timeliness of care, reduce variation in the care provided, and improve patient trust.[8,11,14,15,17] **Table 1** shows an effective outpatient pain plan to reduce pain-related morbidity by empowering patients and clinicians.[14,15,23] **Table 2** shows a practical ED pain pathway for use when pain cannot be managed for an outpatient.[11,13-15,23] The ED pain pathway is a guideline that may reduce time to treatment and improve outcomes when patients present for emergency care.[8,11,14,15,17]

DISCUSSION

Many patients with SCD are acutely aware of how and when a pain crisis is triggered.[6,11,12,15] They are well versed in treating chronic and acute pain episodes with their home pain management regimens. Their requests for specific pain medications or doses are most commonly due to experience and not drug-seeking behaviors.[6,11,12,15] Most likely, they have attempted opioid, nonopioid, and adjuvant pain relief measures before seeking an evaluation in the ED.[6,11,12,15] However, when their outpatient pain management fails, their only option is to seek treatment in the ED.[6,11,12,15] Therefore, providing EDs with practical pain pathway guidelines may empower clinicians to care for patients with SCD quickly and effectively.[6,11-13,15,23]

Because SCD pain treatment is multifactorial, outpatient strategies are essential for managing chronic SCD pain.[6,11-13,15,23] In addition to medications, clinicians can encourage an integrative approach to lessening the burden of chronic pain. For example, educating patients about outpatient modalities to alleviate pain will empower them to make informed decisions before presenting to the ED.[6,11-13,15,23] Discussions should include adjuvant therapies such as warm compresses, hot showers, modalities for stress relief and hydration, plus nonsteroidal anti-inflammatory drugs (NSAIDs).[13,14,19-21] When these measures fail, add chronic opioid administration to optimize SCD pain treatment.[14,18-20] Again, with the opioid crisis and clinician reluctance to prescribe opiates, many patients with pain crises do not receive timely pain mitigation.[11,15,17,18]

TABLE 2. ED clinical pain pathway[15,23]

Typical SCD pain episode—rapid assessment of pain within 60 minutes of ED arrival

- Insert peripheral IV or access implanted port
- Obtain CBC count, complete metabolic panel, and reticulocyte count
- Monitor vital signs, continuous pulse oximetry, and telemetry
- Initiate the individualized outpatient pain plan or initiate empiric pain
  - 1 L of 0.9% sodium chloride solution, if clinical evidence of dehydration
  - First dose—**EITHER** morphine 0.1 mg/kg (maximum 10 mg) **OR** hydromorphone 0.02 mg/kg (maximum 1.5 mg)
  - Second dose—reassess 30 to 60 minutes after first dose
    - Yes, pain improved—repeat the same dose and plan to discharge home
    - No, pain not improved—increase second dose by 50%
      - Second dose—morphine 0.15 mg/kg (maximum 15 mg) **OR** hydromorphone 0.03 mg/kg (maximum 2.25 mg)
      - Consider one dose of ketorolac 30 mg IV, if renal function permits
  - Third dose—reassess 60 to 120 minutes after second dose
    - Yes, pain improved—repeat the same dose as second dose and plan to discharge home
    - No, pain not improved—consider admission

Atypical SCD pain episode or **uncontrolled pain** after third ED pain management dose

- Admission recommended
- Insert peripheral IV or access implanted port
  - Obtain CBC count, complete metabolic panel, reticulocyte count, and blood type and screen
  - Blood culture x 2—if febrile
  - Urinalysis—if the patient is symptomatic or has a history of asymptomatic urinary tract infection
- Chest radiograph—if the patient has chest pain, shortness of breath, or clinical indication
- CT chest—if the patient is hypoxic, to assess for PE
- Initiate the standard stroke protocol if the patient has neurologic symptoms
  - Call hematology department BEFORE lytic administration OR initiation of procedural intervention
- Initiate hematology consult—consider RBC exchange or simple transfusion
- Initiate the individualized outpatient pain plan or initiate empiric pain management

ED pain pathways for SCD are essential to managing acute pain crises. Generally, patients should have a rapid assessment within 60 minutes of arrival.[6,8,11,14,15] If the patient has an individualized outpatient pain plan, the pain management dose based on this documented information can be initiated.[6,8,11,14,15] If the patient does not have an individualized outpatient pain plan, initiate an empiric pain management plan according to the evidence-based standard of care. Reassure all patients that their pain will be addressed, and use a collaborative approach to optimize pain management.[6,8,11,14,15] In addition to managing pain with a short-acting opioid, rapidly assess the patient for life-threatening SCD complications, including ACS, stroke, PE, sepsis, and splenic sequestration.[6,15,19,20] This information must be quickly gathered because life-threatening complications can cause the patient to decompensate quickly.[6,15,19,20]

CONCLUSION

SCD is a longstanding chronic illness with progressive complications. Acute pain crises cost an estimated $1.7 billion to $3 billion annually in hospitalizations and ED visits.[24,25] The insight from describing chronic and acute pain management will improve medical care by providing clinicians with more in-depth knowledge of SCD. Working with patients to create individualized outpatient pain plans and clinicians to build ED pain pathways may alleviate the obstacles to providing prompt and effective pain management. **JAAPA**

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