# Developing an Emergency Department Order Set for Sickle Cell Disease Acute Pain

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### Background



- Sickle cell disease (SCD) is a life-threatening, multifaceted, debilitating disease
- Recurrent vaso-occlusive episodes (VOEs) are the hallmark of SCD
  - Patients with SCD have 2.59 emergency department (ED) visits per year on average, the majority of which are for VOEs<sup>2,3</sup>
  - Inequity in ED care exists<sup>4-6</sup>
- Guidelines recommend treatment within 30 minutes of triage, but this is rarely achieved in practice
- There has been some success with implementing ED protocols to manage VOEs in both adults and children with SCD<sup>3,7,8</sup>

## Objective



- Our goal was to develop an evidence-based order set that could be implemented in New York City (NYC) EDs to expedite and standardize emergency care for SCD patients presenting with acute pain
  - Similar to the Community Care of North Carolina Sickle Cell Task Force local protocol<sup>9</sup>
- Improve the quality and consistency of care provided to patients with SCD

# Used a RAND/UCLA modified Delphi panel method



- A valid, reliable, and reproducible method that can be used to generate consensus
- Convened 10 clinicians practicing in NYC with an average of 11 years' experience caring for patients with SCD
- Provided clinicians with a review of evidence primarily based on the National Heart, Lung, and Blood Institute (NHLBI) guidelines on how to best manage SCD pain in the ED



5 emergency medicine



2 emergency medicine & internal medicine



2 hematology



1 pain & palliative care

# Rated 202 items that could be included in an order set



A. Triage (e.g., initiate SCD protocol, assign ESI level 2)		
B. Initial medical encounter (e.g., implement individualized plan)		
C. Targeted evaluation (i.e., rule out other complications)		
D. Initial pain management		
E. First pain reassessment		
F. Second pain reassessment		
G. Third pain reassessment		
H. Preventive care (e.g., vaccinations, referrals)		
I. Discharge (e.g., prescriptions, follow-up appointments)		
J. Other considerations (e.g., non-pharmacologic approaches)		

#### A. TRIAGE

- Identify SCD patient and initiate SCD protocol
- Assess vitals, including oxygen saturation (O<sub>2</sub> sat)
- Assess pain using VAS or verbal scale (1-10)<sup>i</sup>
- □ Confirm allergies to medications (opiates, NSAIDS, antibiotics, etc.)
- Assign ESI level 2
- Begin implementation of rapid protocol (initiate analgesic therapy <30 minutes after triage)</p>

#### **B. INITIAL MEDICAL ENCOUNTER**

- Review vitals (including O<sub>2</sub> sat)
- Assess pain using VAS or verbal scale (1-10)
- Note treatment prior to coming to ED or in triage (opioids, NSAIDS)
- Note baseline hemoglobin\*
- Note date of and reaction to last transfusion\*

Assess if patient has a documented SCD treatment plan:

- If yes, review with patient and integrate with items in sections E [INITIAL PAIN MANAGEMENT] and F, G, H [PAIN REASSESSMENTS]
- If no, attempt to find analgesic history during previous ED visits in medical record
- Confirm usual analgesic type and dose with patient

C. DRAW LABS			
Draw lab	os as appropriate:		
	CBC with differential		Bilirubin
	Reticulocyte count		Type and screen (if no active type and screen)
	Electrolytes (CHEM-7)		Hemoglobin fractionation/electrophoresis*
	ALT and AST*		Iron studies (Fe, TIBC, Ferritin) if not performed in the past
	LDH		90 days

\*The majority of the panel rated as likely to improve outcomes, with at least two panelists disagreeing.

D. PERFORM TARGETED EVALUATION		
Evaluate if patient experiencing their typical VOE symptoms:		
If yes, confirm usual analgesic type and dose with pat	ient	
If O <sub>2</sub> sat <95%, provide oxygen (not indicated if O <sub>2</sub> sat	t ≥95%)	
If concerned for PE:	If concerned for MI:	
Confirm adequate renal function	Order EKG	
Order CT angiogram	Send troponin	
If concerned for acute chest syndrome:	If concerned for <b>stroke</b> (e.g., patient reports headache):	
Order chest radiograph	Implement SCD stroke protocol, if available	
Hematology consult, consider:	Order brain imaging	
Adding hemoglobin fractionation/	Hematology consult, consider:	
electrophoresis to labs	Adding hemoglobin fractionation/	
Exchange transfusion	electrophoresis to labs	
	Exchange transfusion	
If concerned for worsening anemia:	If concerned for sequestration or acute cholecystitis (e.g.,	
Notify blood bank for phenotype matched red cells	patient reports abdominal pain):	
Add the following to labs:	Order abdominal ultrasound	
CBC with differential	Add the following to labs:	
Type and screen	CBC with differential	
Hemoglobin fractionation/electrophoresis	Type and screen	
Reticulocyte count	ALT and AST	
LDH	Total and direct bilirubin	
Total and direct bilirubin		
Iron studies (Fe, TIBC, Ferritin)		
Assess SIRS criteria:	If ≥2 SIRS criteria present:	
T >38°C (100.4°F) or <36°C (96.8°F); HR >90; RR >20 or	Implement sepsis protocol	
PaCO <sub>2</sub> <32mmHg; WBC >12,000/mm <sup>3</sup> , <4,000/mm <sup>3</sup> , or >10% bands	Consider empiric treatment	
Danus		

E. INITI	IAL PAIN MANAGEMENT: Initiate	analgesic therapy within 30 minutes of tria	age	
	If the patient has a documente	d individualized SCD pain plan, integrat	e here	
	If opioid is administered, initiate	-		
If the pa	atient has an <b>opioid allergy</b> , provi	de alternative (assess renal/liver function a	is needed):	
For children: For adults: Alternative for adults:				
	PO acetaminophen 15mg/kg	PO acetaminophen 975mg	PO acetaminophen 650mg*	
	PO ibuprofen 10mg/kg	PO ibuprofen 600mg	IV ketamine 0.25mg/kg*	
	If >2 years IV ketorolac	IV ketorolac 30mg	IV ketorolac 15mg	
	0.5mg/kg			
	If <2 years IV ketorolac			
	0.25mg/kg			
		or central line), administer opioid IV (1 <sup>st</sup> dos		
For pati	ients who are <b>not</b> opioid naïve:		<b>e</b> opioid naïve or with no available	
	Calculate and administer patient			
	dose (IV route preferred) <sup>ii</sup>		0.1mg/kg <sup>iii*</sup>	
			phone 0.02mg/kg <sup>4*</sup>	
	□ Ketamine 0.25mg/kg <sup>iv*</sup>			
		Avoid meperidine*		
		inister opioid via other routes (1 <sup>st</sup> dose):		
For pati	ients who are <b>not</b> opioid naïve:	For patients who <b>are</b> opioid naïve or with	no available analgesic history,	
		administer:		
	Calculate and administer	For children:	For adults:	
	patient-specific opioid dose	PO hydromorphone 0.05mg/kg	SQ morphine 0.1mg/kg	
	(SQ if no IV access) <sup>2</sup>	PO morphine 0.3mg/kg	SQ hydromorphone 0.02mg/kg	
		Avoid IN fentanyl in patients under <7	PO morphine 30mg*	
		years old or <10kg <sup>5</sup>	PO hydromorphone 5mg	
			IN fentanyl 2-3 doses 5	
			minutes apart (max single	

F. FIRST PAIN REASSESSMENT: Within 30 minutes (60 minutes after triage)		
Assess pain using VAS or verbal scale (1-10):		
If VAS ≥5:	If VAS ≤4 see G [SECOND PAIN REASSESSMENT]	
If no hypoxia or sedation:		
Repeat initial dose of IV opioid (2 <sup>nd</sup> dose) if route is		
available (if route is not available, consider other routes)		
Escalate initial dose of IV opioid by 25%		
If signs of excessive sedation:		
Decrease dose of IV opioid		

G. SECOND PAIN REASSESSMENT: Within 30 minutes (90 minutes after triage)			
Assess vitals	Assess vitals		
Perform follow up lab tests* or review lab results and address abnormalities			
Re-evaluate for serious complications (see D [TARGETED EVALUATION])			
Assess pain using VAS or verbal scale (1-	-10):		
If VAS ≥7: If VAS 5-<7: If		If VAS ≤4:	
<ul> <li>If no hypoxia or sedation:</li> <li>Repeat 2<sup>nd</sup> dose IV opioid (3<sup>rd</sup> dose) if route is available (if route is not available, consider other routes)</li> <li>Escalate 2<sup>nd</sup> dose of IV opioid by 25%</li> <li>If signs of excessive sedation: <ul> <li>Decrease dose of IV opioid</li> </ul> </li> <li>Consider adjunctive NSAIDS or acetaminophen (assess renal/liver function as needed):</li> </ul>	<ul> <li>If no hypoxia or sedation:</li> <li>Repeat 2<sup>nd</sup> dose IV opioid (3<sup>rd</sup> dose) if route is available (if route is not available, consider other routes)</li> <li>Escalate 2<sup>nd</sup> dose of IV opioid by 25%</li> <li>Consider switching opioid*</li> <li>If signs of excessive sedation:</li> <li>Decrease dose of IV opioid</li> </ul>	<ul> <li>Offer short-acting oral opioid Assess if long-acting oral pain med prescribed as outpatient:</li> <li>If yes, restart long-acting oral pain med</li> <li>If no, call for pain service consult or SCD provider team*</li> <li>Ready for discharge (see J</li> <li>[DISCHARGE])</li> <li>Call hematology/SCD expert about patient being readied for discharge*</li> </ul>	

I. PREVENTIVE CARE		
Consider vaccinations:		
Consult CDC vaccination schedules <sup>vii</sup>		
If under age 5, twice-daily prophylactic penicillin*		
□ Pneumovax (wait ≥8 weeks since prior Prevnar)*		
Inquire about access to behavioral health/psychiatric	Consult Case Management and social work:	
services:	<ul> <li>Support enrollment in appropriate services (e.g.,</li> </ul>	
Order psychiatric referral*	disability)	
J. DISCHARGE		
Confirm patient's pain is adequately controlled Schodule autoritient follow up with DCD, hometology	or other SCD expert within 1 week	
□ Schedule outpatient follow-up with PCP, hematology,	or other SCD expert within 1 week	
Determine the patient's current supply of pain medication		
	ent does not have adequate supply of pain medication:	
not prescribe		
	Prescribe 3-day supply of opioids.* Consider 5-7-day supply.	
	Prescribe adjunctive NSAIDS (consider renal function;	
	should not be prescribed alone)	
	Prescribe constipation prophylaxis	
Provide and review SCD Pain Home Management discharge in		
Discuss signs of serious complications and instruct patient to return to ED if experience (e.g., acute chest syndrome,		
stroke, sepsis, fever, etc.)		
Discuss addiction awareness		
Discuss overdose signs		
□ Prescribe Naloxone kits (for self and family members) if receiving ≥50 mg/day morphine equivalent dose		
Consider recommending that the patient discusses other disease modifying treatments with hematologist:		
Hydroxyurea		
□ L-glutamine <sup>ix*</sup>		
Discuss setting up individualized treatment plan with S	CD provider	

### Limitations



- The order set was developed by and for NYC clinicians and may not be generalizable to SCD care across the United States
- Whether this order set improves outcomes has not yet been demonstrated
- Despite high median ratings, some panelists disagreed on some items the order set should be adapted to individual clinic settings
- Only 10 clinicians were involved, who brought their individual judgement and experience to the process

#### Conclusions



- A valid, reliable, and reproducible method was used to develop an order set to help standardize care for patients experiencing VOEs in NYC EDs
- Items in the order set have been shown to improve outcomes:
  - Implement or establish a patient's SCD plan
  - Implement rapid triage (ESI level 2)
  - Initiate analgesic therapy within 30 minutes of triage
  - Assess pain repeatedly throughout the visit
  - Schedule follow-up appointments at discharge
- Consistent with the National Heart, Lung, and Blood Institute (NHLBI) Guidelines
   and Community Care of North Carolina Sickle Cell Task Force local protocol
- Implementation of this order set in NYC EDs is ongoing

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