



## OHSU HEALTH SYSTEM OFFICE OF CLINICAL INTEGRATION AND EVIDENCE-BASED PRACTICE

### GUIDELINE FOR PATIENTS WITH SICKLE CELL DISEASE AND A VASO-OCCLUSIVE EPISODE

#### **Background:**

Sickle Cell Disease (SCD) is a genetic disorder that results in the formation of sickled red blood cells.<sup>1</sup> People living with SCD include those who are homozygous for sickle hemoglobin (HbSS or HbS<sup>0</sup>-thalassemia, also called sickle cell anemia) and those with one sickle hemoglobin gene plus a gene for another abnormal hemoglobin type (e.g., HbS<sup>β</sup>-thalassemia, HbSC).<sup>1</sup> People living with SCD can have acute complications, known as vaso-occlusive episode (VOE), that require rapid interventions to avert or lessen the risk of life-threatening consequences.<sup>1</sup> Treatment of VOE frequently fails to provide adequate relief when dealing with SCD-related pain.

#### **Prevalence:**

It is estimated that between 70,000 and 100,000 Americans have SCD.<sup>2</sup> Nearly all people living with SCD will have a VOE in their lifetime, sometimes as early as six months of age.<sup>3,4</sup>

#### **Risks:**

New clinical approaches and treatments have increased the survival of people with SCD, but the average lifespan still remains 25-30 years less than the black American population.<sup>2, 5-9</sup> Even without overt chronic organ failure, a large proportion of patients die during a VOE, acute chest syndrome or stroke.<sup>8</sup> During a VOE, Pain is intensified and can be difficult to manage.<sup>3</sup> Although mostly treated at home, people living with SCD sometimes seek a higher-level of care in order to manage the pain.

The purpose of this guideline is to help people living with SCD receive appropriate pain management during a VOE by providing the best evidence-based recommendations to guide inpatient practice decisions. Additional recommendations are included for the outpatient setting to prepare home management.

#### **Definitions:**

Vaso-occlusive episode (VOE) (sometimes known as crisis): A VOE manifests as acute excruciating pain, most commonly in the extremities, chest, and back. Onset is typically sudden sometimes gradual. Duration may be from hours to days. Common triggers include stress, exposure to cold, and infectious illnesses.

Patient-controlled analgesia (PCA): A method of safely administering intravenous opioids which is controlled by the patient.

Mild Pain: Noticeable but tolerable, does not interfere with sleep or activities (able to cough, deep breath and ambulate)

Moderate Pain: Strong, deep, distressing, interferes with sleep and activities (coughing, deep breathing, ambulation)

Severe Pain: Very intense, dominates thought, prevents sleep and movement

#### **Guideline Eligibility Criteria:**

-All patients with SCD

#### **Guideline Exclusion Criteria:**

-None



## **Clinical Practice Recommendations:**

### **1) Individualized assessment at presentation**

Treat a VOE as an acute medical emergency.<sup>10</sup> **(Consensus-Adapted)**

Throughout a VOE, regard the patient (and/or their caregiver) as an expert in their condition, listen to their views and discuss with them the planned treatment regimen for the episode, treatment received during previous episodes, any concerns they may have about the current episodes, and any psychological and/or social support they may need.<sup>10</sup> **(Consensus-Adapted)**

#### **PRACTICE IMPLICATION:**

Assess pain and use an age-appropriate pain scoring tool approved by OHSU; Numeric Pain Rating Scale (NPRS), Non-verbal scale, and CPOT (ICU) (Appendix A) for adults and Faces Pain Scale Revised (FPSR), FLACC Numbers (Appendix B), and NPASS (Appendix C) for Pediatrics.

Rapidly assess the patient's recent analgesic use (opioid and nonopioid).<sup>2</sup> **(Consensus-Adapted)**

Rapidly initiate analgesic therapy within 30 minutes of triage or within 60 minutes of registration.<sup>1,2,10</sup> **(Consensus-Adapted)**

#### **PRACTICE IMPLICATION:**

Use other routes if intravenous is not available

Determine characteristics, associated with symptoms, location, and intensity of pain based on patient's report and clinical assessment.<sup>2</sup> **(Consensus-Adapted)**

Clinically assess all patients presenting with a VOE, including monitoring of:<sup>10</sup> **(Consensus-Adapted)**

- Blood pressure
- Oxygen saturation on air (if oxygen saturation is 95% or below, offer oxygen therapy)
- Pulse rate
- Respiratory rate
- Temperature

Initiate diagnostic evaluation of causes of pain to determine whether their pain is caused by a VOE or whether an alternative diagnosis is possible.<sup>2,10</sup> **(Consensus-Adapted)**

If the vaso-occlusive pain is atypical, investigate other possible etiologies of pain.<sup>2</sup> **(Consensus-Adapted)**

#### **PRACTICE IMPLICATION:**

Involve hematology as soon as possible during assessment

For pregnant women with a VOE, seek advice from the obstetrics team and refer when indicated.<sup>10</sup> **(Consensus-Adapted)**

Use an individualized prescribing and monitoring protocol (written by the patient's primary SCD or pain provider) or an SCD-specific protocol whenever possible to promote rapid, effective, and safe analgesic management and resolution of the VOE.<sup>2</sup> **(Consensus-Adapted)**

### **2) Management of VOE in adults and children:**

#### **Pharmacologic Interventions:**



## Opioids

*For all adults and children with SCD and a VOE:*

Fear of addiction should not restrict adequate opioid administration.<sup>11</sup> **(Consensus-Adapted)**

Rapidly initiate treatment with parenteral opioids for patients with a VOE.<sup>2</sup> **(Strong Recommendation, High-Quality Evidence)**

### Parenteral Opioids:

- Calculate the parenteral (IV or subcutaneous) opioid dose based on total daily short-acting opioid dose currently being taken at home to manage the VOE.<sup>2</sup> **(Consensus-Adapted)**
- Administer parenteral opioids using the subcutaneous or intranasal route when intravenous access is difficult.<sup>2</sup> **(Consensus-Adapted)**
- Reassess pain and re-administer opioids if necessary for continued severe pain every 15-30 minutes until pain is under control per patient report.<sup>2</sup> **(Consensus-Adapted)**
- Maintain or consider escalation of the dose by 25 percent until pain is controlled.<sup>2</sup> **(Consensus-Adapted)**
- Reassess after each dose for pain relief and side effects.<sup>2</sup> **(Consensus-Adapted)**
- Initiate around-the-clock opioid administration by patient-controlled analgesia (PCA) or frequently scheduled doses versus “as requested” (PRN) administration.<sup>2</sup> **(Moderate Recommendation, Low-Quality Evidence)**

If ordering around-the-clock, carefully consider whether there is a need to withhold long-acting oral opioids to prevent over-sedation.<sup>2</sup> **(Consensus-Adapted)**

- If demand dosing only is ordered via the PCA, continue use of long-acting oral opioids.<sup>2</sup> **(Consensus-Adapted)**

Do not use meperidine unless it is the only effective opioid for an individual patient.<sup>2,10</sup> **(Consensus-Adapted)**

OHSU Health System’s Opioid Prescribing Guideline excludes patients living with SCD due to their needs to manage a life-threatening VOE. However, it is also necessary to apply the standard practice of prescribing opioids to SCD patients including:

- Receiving informed consent annually.
- Prescribing and subsequent refills ownership by a single clinician.
- Accounting for all prescribed opioids.

### Nonsteroidal Anti-inflammatory Drugs (NSAIDS)

Consider use of nonsteroidal anti-inflammatory drugs (NSAIDS) ketorolac and ibuprofen, if there are no contraindications to the use of NSAIDS.<sup>2</sup> **(Moderate Recommendation, Low-Quality Evidence)**

- The use of NSAIDs should be avoided during pregnancy, unless the potential benefits outweigh the risks. NSAIDs should be avoided for treating a VOE in women in the third trimester.<sup>10</sup> **(Consensus-Adapted)**

### Other

Currently, there is a lack of high-quality research studies to provide evidence on additional medications effectiveness during a VOE. However, adjunct medications to opioid therapies may be effective for your patient and should be considered using a multidisciplinary team and a shared-decision making process with your patient and/or family that is based on the pathophysiology and duration of pain.

Adjunctive medications to consider: **(Consensus)**

- Low-dose, sub-anesthetic ketamine



- Topical analgesia (e.g., Lidoderm, topical diclofenac)
- Regional anesthesia
- Antiepileptics (e.g., gabapentoids, topiramate)
- Serotonin–norepinephrine reuptake inhibitors (SNRIs, e.g., duloxetine, venlafaxine)
- Dopamine/Norepinephrine-Reuptake Inhibitor (e.g., bupropion)
- Low-dose dexmedetomidine

PRACTICE IMPLICATION:

- If possible, before starting adjunctive medications, check patient’s insurance in order to prevent starting a therapy that cannot be continued long-term

There is currently incomplete data to recommend for or against cannabis and cannabinoids.

**Non-pharmacologic Interventions**

Use adjunctive nonpharmacological, age-appropriate interventions to treat pain.<sup>2</sup> **(Consensus-Adapted)**

- Do not use ice packs since cold causes vasoconstriction which can worsen pain

<b>Infants Explanations: Caregiver teaching</b>
<ul style="list-style-type: none"> <li>- <u>Distractions</u>: Singing, music, mobiles, soothing talk, soft or a novel voice, calm demeanor, oral-motor stimulation (pacifiers, non-nutritive sucking, oral sucrose)</li> <li>- <u>Containment</u>: Holding/cuddling/swaddling, positioning, pacifier, breastfeeding</li> <li>- <u>Physical</u>: Massage (applicability/efficacy being determined), skin-to-skin contact, heat pack application</li> <li>- Approved Pet Therapy</li> </ul>
<b>Toddlers/Preschoolers</b>
<ul style="list-style-type: none"> <li>- <u>Distraction</u>: Pop-up books, telling stories, medical play, television/games magic circle/magic game, puppets, kaleidoscopes, counting ABCs, music-sing-along songs, squeezing on koosh ball</li> <li>- <u>Distraction with breathing</u>: Pinwheel, blowing bubbles, “meow-woof” breathing, party blowers</li> <li>- <u>Breathing/relaxation</u>: “Go limp as a ragdoll,” or “You’re blowing hurt away,” or ask the child to yawn, choo-choo like a train</li> <li>- <u>Imagery</u>: Stories-use images familiar to the child</li> <li>- <u>Explanations</u>: Before procedure, provide concrete and brief explanations to caregiver and child; during procedure, provide sensory information and emphasize informational affective aspects of the experience; after procedure, use therapeutic play</li> <li>- <u>Physical</u>: Yoga, massage, heat, acupuncture, acupressure, Hand holding, heat pack application</li> <li>- <u>Biofield therapy</u>: Reiki, healing touch and therapeutic touch</li> <li>- Approved Pet Therapy</li> </ul>
<b>School-Age/Adolescents</b>
<ul style="list-style-type: none"> <li>- <u>Modeling/desensitization</u>: Explanations to child and family</li> <li>- <u>Distraction</u>: Art therapy, music, reading, TV/movies, video games, reading, telling stories, deep breathing techniques, Medical play, television/games, guided imagery</li> <li>- <u>Imagery (older)</u>: meditation, mindfulness, pain switch, familiar images with stories, biofeedback,</li> <li>- <u>Physical</u>: Yoga, massage, heat, acupuncture, acupressure, Transcutaneous Electrical Nerve Stimulation (TENS), hand holding, heat pack application</li> <li>- <u>Biofield therapy</u>: Reiki, healing touch and therapeutic touch</li> <li>- Approved Pet Therapy</li> </ul>

**Adults**

- Modeling/desensitization: Explanations to patient and family
- Distraction: Art therapy, music, reading, TV/movies, video games, reading, deep breathing techniques, television/games, guided imagery
- Imagery (older): meditation, mindfulness, pain switch, biofeedback,
- Physical: Yoga, massage, heat, acupuncture, acupressure, Transcutaneous Electrical Nerve Stimulation (TENS), heat pack application
- Biofield therapy: Reiki, healing touch and therapeutic touch
- Approved Pet Therapy

**PRACTICE IMPLICATION:**

-Encourage appropriate movement and early ambulation to decrease risk of thromboembolic complications and acute chest syndrome and to help with pain management. Consider physical therapy if strengthening, stretching, or movement exercises may help.

**3) Managing opioid side effects**

In patients who require antihistamines for itching secondary to opioid administration, prescribe agents orally, and do not re-administer with each dose of opioid in the acute VOE management phase. Re-administer every 4 to 6 hours if needs.<sup>2</sup>

**(Consensus-Adapted)**

Offer all patients who are taking an opioid<sup>10</sup>: **(Consensus-Adapted)**

- Laxatives on a regular basis
- Anti-emetics as needed
- Anti-pruritics as needed
  - Consider offering naloxone as a continuous infusion to mitigate opioid induced pruritics

*In patients being treated with opioids*

- Monitor for excessive sedation by measuring sedation with an objective measurement sedation scale and oxygenation levels.<sup>2</sup> **(Consensus-Adapted)**
- Gradually titrate down parenteral opioids as the VOE resolves.<sup>2</sup> **(Consensus-Adapted)**

Monitor patients on PCA for adverse events every hour for the first 6 hours and at least every 4 hours thereafter.<sup>10</sup>

**(Consensus-Adapted)****4) Reassessment**

Assess the effectiveness of pain relief every 30 minutes until pain is stabilized initially, and every four hours thereafter.<sup>10</sup>

**(Consensus-Adapted)**

If the patient does not respond to standard treatment for a VOE, reassess them for the possibility of an alternative diagnosis.<sup>10</sup>

**(Consensus-Adapted)****5) Preventing Acute SCD Complications**

*To reduce the risk of acute chest syndrome in adults and children hospitalized for VOE,*



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- Encourage use of incentive spirometry while awake.<sup>2</sup> **(Strong Recommendation, Moderate-Quality Evidence)**
- Encourage ambulation and activity as soon as possible.<sup>2</sup> **(Consensus-Adapted)**

#### *Oxygen Saturation*

In adults and children with SCD and a VOE with an oxygen saturation <95 percent on room air, administer oxygen.<sup>2</sup> **(Consensus-Adapted)**

#### PRACTICE IMPLICATION:

-Use stationary bike if patient is unable to leave room

#### *In euvolemic adults and children*

- Provide intravenous hydration at no more than maintenance rate to avoid over-hydration.<sup>2</sup> **(Consensus-Adapted)**

### **6) Management of underlying pathology**

#### *Blood transfusion*

Do not administer a blood transfusion unless there are other indications for transfusion.<sup>2, 13</sup> **(Moderate Recommendation, Low-Quality Evidence)**

#### PRACTICE IMPLICATION:

-If other indications are present, consult hematology

Do not use corticosteroids in the management of an uncomplicated VOE.<sup>10</sup> **(Consensus-Adapted)**

### **7) Readiness to discharge and transition to outpatient**

When the PCA dose has been weaned adequately, provide equianalgesic oral medication using the opioid conversion chart. The patient should remain in the hospital for the next 2-24 hours to ensure that the pain is controlled with adequate amount of oral opioids and/or NSAIDs and thus avoid the need for a possible re-admission to the hospital.<sup>12</sup> **(Consensus-Adapted)**

At discharge, evaluate inpatient analgesic requirements, wean parenteral opioids prior to conversion to oral opioids, and adjust home dose of long- and short-acting opioid prescriptions to prevent opioid withdrawal after discharge.<sup>2</sup> **(Consensus-Adapted)**

Before discharge, provide the patient (and/or their caregiver) with information on how to continue to manage the current episode, including<sup>10</sup>: **(Consensus-Adapted)**

- How to obtain specialist support (such as pain specialist)
- How to obtain additional medication
- How to manage any potential side effects of the treatment they have received in hospital

#### PRACTICE IMPLICATION:

Upon discharge, if needed, the patient should be given a prescription for enough pain medication until the date of the next clinic appointment. The patient should be followed-up with, by appointment, phone or myChart, and this date should be within 1-2 weeks after discharge from the hospital. Provider managing VOE should communicate with patient's pain specialist, hematology or other primary providers.

### **8) Outpatient**



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Where available, use outpatient settings in which staff have specialist knowledge and training for the initial assessment and treatment of patients presenting with a VOE.<sup>10</sup> **(Consensus-Adapted)**

Assess and develop a plan of care for episodes of pain<sup>11</sup>: **(Consensus-Adapted)**

1. Online “Pain profiles” that are accessible or transferable, regardless of site of care.
2. Summarizes pain history and details the pain care plan based on child and family input and past experiences. Plan should include both non-pharmacologic and pharmacologic details. Plan is modified and updated on a real-time basis.
3. Life records: Eliminates the need for repeated questioning of child/parents(s), particularly as they enter different hospital areas (ER, clinic, inpatient, OR).
4. A pain problem list should be instituted so that pain stemming from the disease and its treatment can be isolated and treated appropriately.
5. Hand-held records: Empowers child and family.

Consider multidisciplinary team to help manage pain including: **(Consensus)**

- Social worker
- Physical therapy with expertise in age appropriate pain management
- Age appropriate comprehensive pain program and/or palliative care team

#### PRACTICE IMPLICATION:

Ongoing outpatient resources to consider:

- Acupuncture
- Massage
- Comfort Ability
- Coping clinic
- Sickle Cell Anemia Foundation of Oregon
- Physical Therapy

Outpatient team should create and maintain a comprehensive plan for in- and outpatient pain management that can be easily located by other OHSU providers. **(Consensus)**

- This may include:
  - A step-wise analgesic plan developed with patient that may include opioids, NSAIDS and other modalities
  - A plan for patient and/or caregivers maintaining adequate analgesic medications

## 9) Training and setting

All healthcare professionals who care for patients with a VOE should receive regular training, with topics including:<sup>10</sup> **(Consensus-Adapted)**

- Pain monitoring and relief
- The ability to identify potential acute complications
- Bias and preconceptions about patients presenting with a VOE.



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**Quality Measures:**

Process:

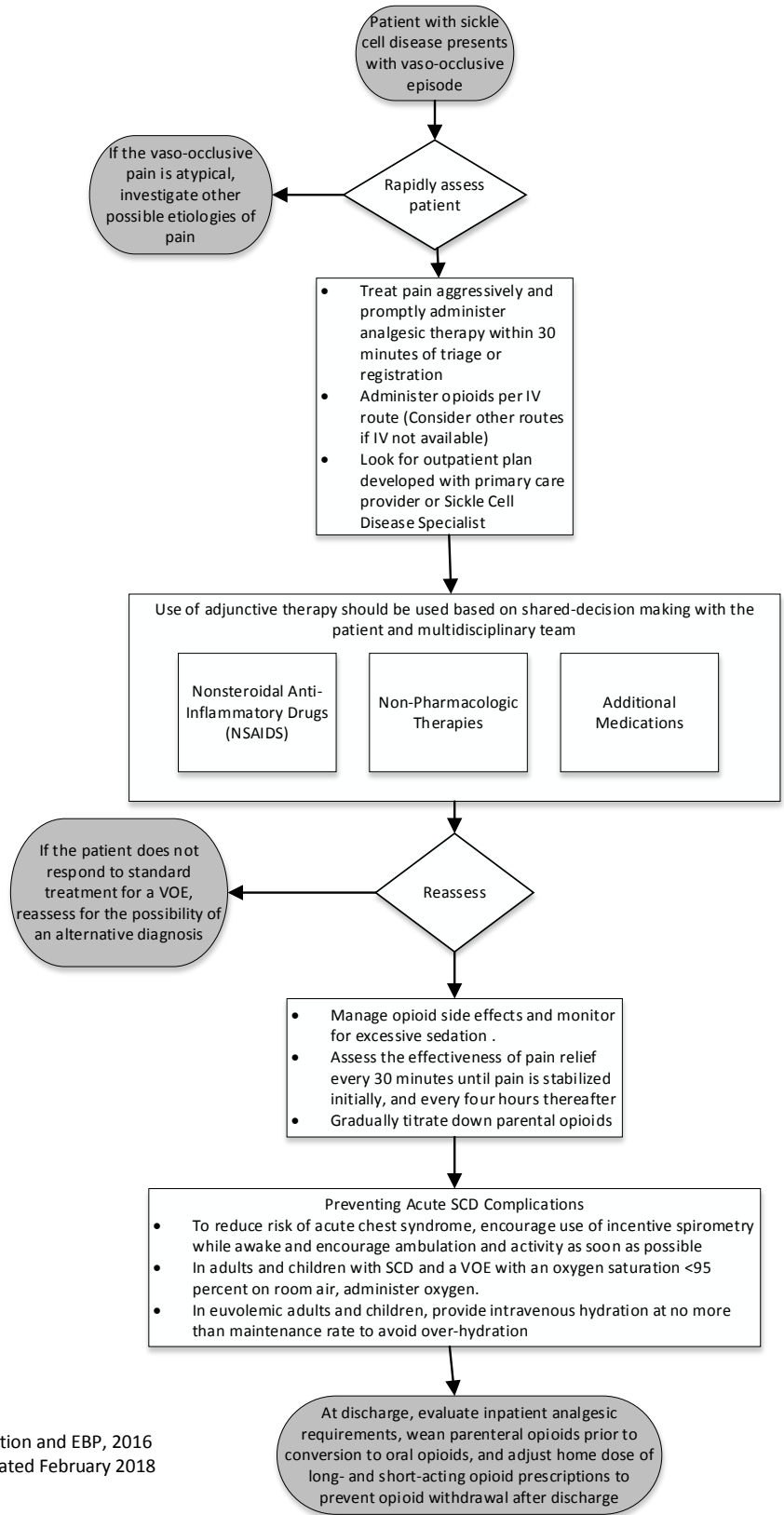
- Time to first opioid
- Time to bed
- Time to pain relief
- Time to analgesia
- Time to fluids (IV)
- Pain Scores
- Sedation Scores

Outcome:

- Development of Acute Chest Syndrome
- Length of stay
- Readmissions
- Patient Satisfaction



**OHSU Office of Clinical Integration and EBP  
Vaso-Occlusive Episode Management Overview**





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## **References**

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### **Guideline Preparation**

This guideline was prepared by the Office of Clinical Integration (CI) and Evidence-Based Practice (EBP) in collaboration with content experts at Oregon Health and Science University.

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### **Development Process**

This guideline was developed using the process outlined in the CI and EBP Manual (2016). The review summary documents the following steps:

1. Review Preparation
  - PICO questions established
  - Evidence search confirmed with content experts
2. Review of Existing Internal and External Guidelines
  - Literature Review of Relevant Evidence
3. Critically Analyze the Evidence
4. Summarize the Evidence by preparing the guideline, and order sets
  - Materials used in the development of the guidelines, review summaries and content expert team meeting minutes are maintained in a Managing Patients with Sickle Cell Disease and a Vaso-occlusive Episode EB review manual with the Office of CI and EBP.

### **Evaluating the Quality of the Evidence**

Published clinical guidelines were evaluated for this review using the **University of Pennsylvania's Trustworthy Guideline Rating Scale**. The summary of these guidelines are included in the evidence summary. The rating scale is based on the Institute of Medicine's "Standards for Developing Trustworthy Clinical Practice Guidelines" (IOM), as well as a review of the AGREE Enterprise and Guidelines International Network domains. This scale evaluates a guideline's transparency, conflict of interest, development group, systematic review, supporting evidence, recommendations, external review and currency and updates. The purpose of this scale is to focus on the weaknesses of a guideline that may reduce the trust a clinical user can have in the guideline, and distinguish weaknesses in documentation (e.g. guideline does not have a documented updating process) from weaknesses in the guidance itself (e.g. recommendations are outdated).



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The **GRADE (Grading of Recommendations, Assessment, Development and Evaluation)** criteria were utilized to evaluate the body of evidence used to make clinical recommendations. The table below defines how the quality of the evidence is rated and how a strong versus conditional recommendation is established. The evidence summary reflects the critical points of evidence.

Recommendation	
<b>STRONG</b>	Desirable effects clearly outweigh undesirable effects or vice versa
<b>WEAK</b>	Desirable effects closely balanced with undesirable effects
<b>Quality</b>	<b>Type of Evidence</b>
<b>High</b>	Consistent evidence from well-performed RCTs or exceptionally strong evidence from unbiased observational studies
<b>Moderate</b>	Evidence from RCTs with important limitations (e.g., inconsistent results, methodological flaws, indirect evidence, or imprecise results) or unusually strong evidence from unbiased observational studies
<b>Low</b>	Evidence for at least 1 critical outcome from observational studies, from RCTs with serious flaws or indirect evidence
<b>Very Low</b>	Evidence for at least 1 critical outcome from unsystematic clinical observations or very indirect evidence

**Recommendations**

Recommendations for the guidelines were directed by the existing evidence, content experts, and consensus. Patient and family preference were included when possible. When evidence is lacking, options in care are provided in the guideline and the order sets that accompany the guideline.

**Approval Process**

Guidelines are reviewed and approved by the Content Expert Team, Office of CI and EBP, Knowledge Management and Therapeutics Committee, Professional Board, and other appropriate hospital committees as deemed appropriate for the guideline’s intended use. Guidelines are reviewed and updated as necessary every 2 to 3 years within the Office of CI and EBP at OHSU. Content Expert Teams will be involved with every review and update.

**Disclaimer**

Guideline recommendations are made from the best evidence, clinical expertise and consensus, in addition to thoughtful consideration for the patients and families cared for within the Integrated Delivery System. When evidence was lacking or inconclusive, content experts made recommendations based on consensus. Expert consensus is implied when a reference is not otherwise indicated.

The guideline is not intended to impose standards of care preventing selective variation in practice that is necessary to meet the unique needs of individual patients. The physician must consider each patient and family’s circumstance to make the ultimate judgment regarding best care.

## Appendix A. The Critical-Care Pain Observation Tool (CPOT)

### The Critical-Care Pain Observation Tool (CPOT)

(Adapted from Gélinas et al., AJCC 2006; 15(4):420-427)

Indicator	Score	Description
Facial expressions	Relaxed, neutral 0	No muscle tension observed
	Tense 1	Presence of frowning, brow lowering, orbit tightening and levator contraction or any other change (e.g. opening eyes or tearing during nociceptive procedures)
	Grimacing 2	All previous facial movements plus eyelid tightly closed (the patient may present with mouth open or biting the endotracheal tube)
Body movements	Absence of movements or normal position 0	Does not move at all (doesn't necessarily mean absence of pain) or normal position (movements not aimed toward the pain site or not made for the purpose of protection)
	Protection 1	Slow, cautious movements, touching or rubbing the pain site, seeking attention through movements
	Restlessness/Agitation 2	Pulling tube, attempting to sit up, moving limbs/thrashing, not following commands, striking at staff, trying to climb out of bed
Compliance with the ventilator (intubated patients)	Tolerating ventilator or movement 0	Alarms not activated, easy ventilation
	Coughing but tolerating 1	Coughing, alarms may be activated but stop spontaneously
	Fighting ventilator 2	Asynchrony: blocking ventilation, alarms frequently activated
OR Vocalization (extubated patients)	Talking in normal tone or no sound 0	Talking in normal tone or no sound
	Sighing, moaning 1	Sighing, moaning
	Crying out, sobbing 2	Crying out, sobbing
	Muscle tension	Relaxed 0
Evaluation by passive flexion and extension of upper limbs when patient is at rest or evaluation when patient is being turned	Tense, rigid 1	Resistance to passive movements
	Very tense or rigid 2	Strong resistance to passive movements or incapacity to complete them
<b>TOTAL</b>	___ / 8	

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For more information about the CPOT use, contact the author at [celine.gelinas@mcgill.ca](mailto:celine.gelinas@mcgill.ca)





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### **Brief description of each CPOT behavior:**

*Facial expression:* The facial expression is one of the best behavioral indicators for pain assessment. A score of 0 is given when there is no muscle tension observable in the patient's face. A score of 1 consists of a tense face which is usually exhibited as frowning or brow lowering. A score of 2 refers to grimacing, which is a contraction of the full face including eyes tightly closed and contraction of the cheek muscles. On occasion, the patient may open his or her mouth, or if intubated, may bite the endotracheal tube. Any other change in facial expression should be described in the chart, and given a score of 1 if different from a relaxed (0) or grimacing (2) face.

*Body movements:* A score of 0 is given when a patient is not moving at all or remains in a normal position as per the nurse's clinical judgment. A score of 1 refers to protective movements, meaning that the patient performs slow and cautious movements, tries to reach or touch the pain site. A score of 2 is given when the patient is restless or agitated. In this case, the patient exhibits repetitive movements, tries to pull on tubes, tries to sit up in bed, or is not collaborative. Of note, body movements are the less specific behaviors in relation with pain, but are still important in the whole evaluation of the patient's pain.

*Compliance with the ventilator:* Compliance with the ventilator is used when the patient is mechanically ventilated. A score of 0 refers to easy ventilation. The patient is not coughing nor activating the alarms. A score of 1 means that the patient may be coughing or activating the alarms but this stops spontaneously without the nurse having to intervene. A score of 2 is given when the patient is fighting the ventilator. In this case, the patient may be coughing and activating the alarms, and an asynchrony may be observed. The nurse has to intervene by talking to the patient for reassurance or by administering medication to calm the patient down. It is important that the nurse auscultates the patient to check for the position of the endotracheal tube and the presence of secretions as these factors may influence this item without being indicative of pain.

*Vocalization:* Vocalization is used in non-intubated patients able to vocalize. A score of 0 refers to the absence of sound or to the patient talking in a normal tone. A score of 1 is given when the patient is sighing or moaning, and a score of 2 when the patient is crying out (Aïe! Ouch!) or sobbing.

*Muscle tension:* Muscle tension is also a very good indicator of pain, and is considered the second best one in the CPOT. When the patient is at rest, it is evaluated by performing a passive flexion and extension of the patient's arm. During turning, the nurse can easily feel the patient's resistance when she is participating in the procedure. A score of 0 is given when no resistance is felt during the passive movements or the turning procedure. A score of 1 refers to resistance during movements or turning. In other words, the patient is tense or rigid. A score of 2 consists of strong resistance. In such cases, the nurse may be unable to complete passive movements or the patient will resist against the movement during turning. The patient may also clench his/her fists.



DATE: January 2019

### CPOT Directives of Use

1. The patient must be observed at rest for one minute to obtain a baseline value of the CPOT.
2. Then, the patient should be observed during nociceptive procedures known to be painful (e.g. turning, wound care) to detect any changes in the patient's behaviors to pain.
3. The patient should be evaluated before and at the peak effect of an analgesic agent to assess whether the treatment was effective or not in relieving pain.
4. For the rating of the CPOT, the patient should be attributed the highest score observed for each item during the observation period.
5. The patient should be attributed a score for each behavior included in the CPOT and muscle tension should be evaluated last, especially when the patient is at rest because the stimulation of touch alone (when performing passive flexion and extension of the arm) may lead to behavioral reactions.

Free teaching CPOT video available at:

<http://pointers.audiovideoweb.com/stcasx/il83win10115/CPOT2011-WMV.wmv/play.aspx>

Funded and created by Kaiser Permanente Northern California Nursing Research (KPNCR)

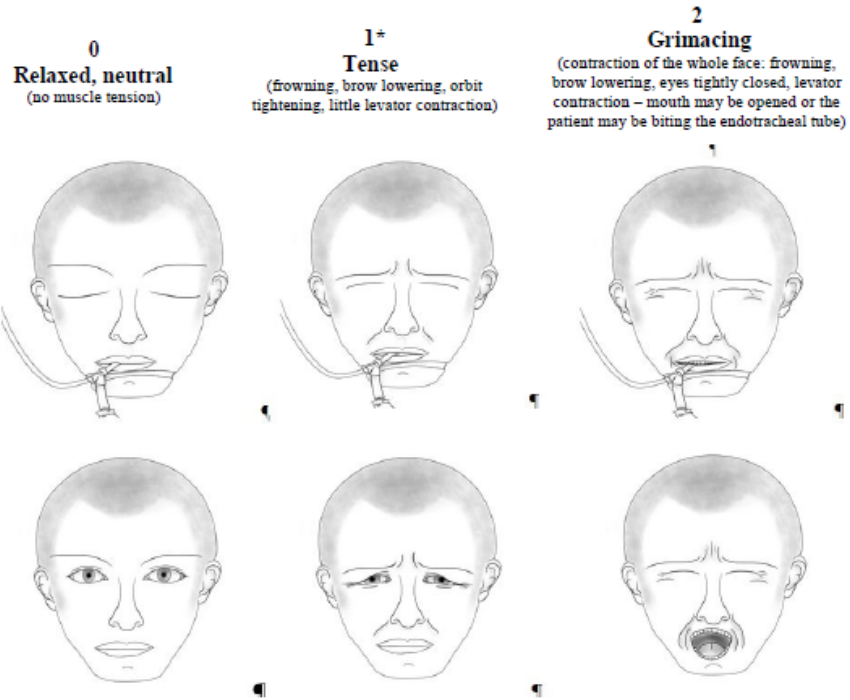
#### **Observation of patient at rest (baseline).**

The nurse looks at the patient's face and body to note any visible reactions for an observation period of one minute. She/he gives a score for all items except for muscle tension. At the end of the one-minute period, the nurse holds the patient's arm in both hands – one at the elbow, and uses the other one to hold the patient's hand. Then, she/he performs a passive flexion and extension of the upper limb, and feels any resistance the patient may exhibit. If the movements are performed easily, the patient is found to be relaxed with no resistance (score 0). If the movements can still be performed but with more strength, then it is concluded that the patient is showing resistance to movements (score 1). Finally, if the nurse cannot complete the movements, strong resistance is felt (score 2). This can be observed in patients who are spastic.

#### **Observation of patient during turning.**

Even during the turning procedure, the nurse can still assess the patient's pain. While she/he is turning the patient on one side, she/he looks at the patient's face to note any reactions such as frowning or grimacing. These reactions may be brief or can last longer. The nurse also looks out for body movements. For instance, she/he looks for protective movements like the patient trying to reach or touching the pain site (e.g. surgical incision, injury site). In the mechanically ventilated patient, the nurse pays attention to alarms and if they stop spontaneously or require that she/he intervenes (e.g. reassurance, administering medication). According to muscle tension, the nurse can feel if the patient is resisting to the movement or not. A score 2 is given when the patient is resisting against the movement and attempts to get on his/her back.

### Facial expressions



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\* A score of 1 may be attributed when a change in the patient's facial expression is observed compared with rest (e.g. eye opening or weeping).

Inspired by: Prikachin, K. M. (1992). The consistency of facial expressions of pain: a comparison across modalities. *Pain*, 51, 297-306.



## Appendix B. FLACC Non-Verbal Pain Scale

# FLACC Non-Verbal Pain Scale

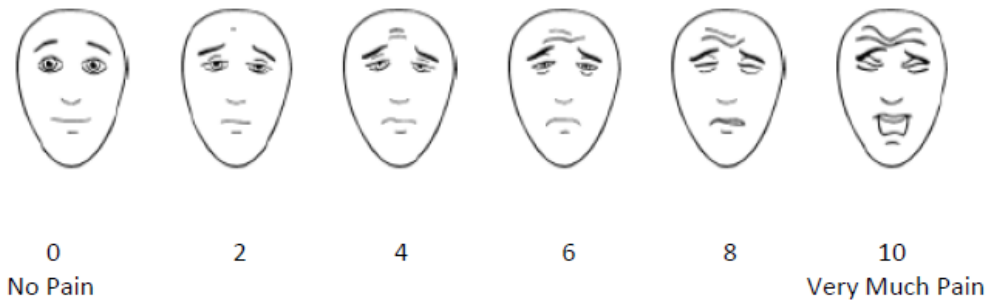
*This tool is recommended for children under 3 years or other non-verbal children.*

- ☑ Assign a numerical score to the designated observations. (Low score indicates minimal pain.)
- ☑ Record the score on the pain assessment record or designated place in the documentation system.

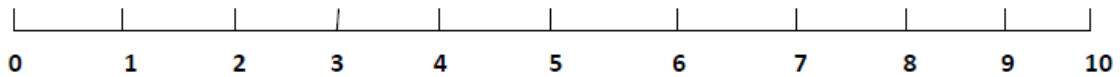
<b>Face</b>	0 No particular expression or smile.	1 Occasional grimace or frown, withdrawn, disinterested.	2 Frequent to constant frown, clenched jaw, quivering chin.
<b>Legs</b>	0 Normal position or relaxed.	1 Uneasy, restless, tense.	2 Kicking, or legs drawn up.
<b>Activity</b>	0 Lying quietly, normal position, moves easily.	1 Squirming, shifting back and forth, tense.	2 Arched, rigid, or jerking.
<b>Cry</b>	0 No cry (awake or asleep).	1 Moans or whimpers, occasional complaint.	2 Cries steadily, screams, sobs, frequent complaints.
<b>Consolability</b>	0 Content, relaxed.	1 Reassured by occasional touching, hugging or talking to, distractible.	2 Difficult to console or comfort.



### Faces Pain Scale Revised




### Numeric Scale



## Appendix C. N-PASS

Assessment Criteria	Sedation		Sedation/Pain	Pain / Agitation	
	-2	-1	0/0	1	2
Crying Irritability	No cry with painful stimuli	Moans or cries minimally with painful stimuli	No sedation/ No pain signs	Irritable or crying at intervals Consolable	High-pitched or silent-continuous cry Inconsolable
Behavior State	No arousal to any stimuli No spontaneous movement	Arouses minimally to stimuli Little spontaneous movement	No sedation/ No pain signs	Restless, squirming Awakens frequently	Arching, kicking Constantly awake or Arouses minimally / no movement (not sedated)
Facial Expression	Mouth is lax No expression	Minimal expression with stimuli	No sedation/ No pain signs	Any pain expression intermittent	Any pain expression continual
Extremities Tone	No grasp reflex Flaccid tone	Weak grasp reflex ↓ muscle tone	No sedation/ No pain signs	Intermittent clenched toes, fists or finger splay Body is not tense	Continual clenched toes, fists, or finger splay Body is tense
Vital Signs HR, RR, BP, SaO <sub>2</sub>	No variability with stimuli Hypoventilation or apnea	< 10% variability from baseline with stimuli	No sedation/ No pain signs	↑ 10-20% from baseline SaO <sub>2</sub> 76-85% with stimulation - quick ↑	↑ > 20% from baseline SaO <sub>2</sub> ≤ 75% with stimulation - slow ↑ Out of sync/fighting vent

 + 1 if <30 weeks gestation / corrected age

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 (Rev. 2/10/09) Pat Hummel, MA, APN, NNP, PNP