

Pain Management/Sedation

(Incorporates elements of an evidence-based guideline for prehospital analgesia in trauma created using the National Prehospital Evidence-Based Guideline Model Process)

Aliases

Analgesia, pain control, acute pain, acute traumatic pain, acute atraumatic pain, sedation

Patient Care Goals

The practice of prehospital emergency medicine requires expertise in a wide variety of pharmacological and non-pharmacological techniques to treat acute pain resulting from myriad injuries and illnesses. Approaches to pain relief must be designed to be safe and effective in the dynamic prehospital environment. The degree of pain and the hemodynamic status of the patient will determine the urgency and extent of analgesic interventions.

Patient Presentation

Inclusion Criteria

Patients who are experiencing pain

Exclusion Criteria

1. Pregnancy with active labor
2. Dental pain
3. Patients with care-plans that prohibit use of parenteral analgesics by EMS
4. Patients with chronic pain who aren't part of a hospice and/or palliative care plan

Patient Management

Assessment, Treatment, and Interventions

1. Determine patient's pain score assessment using standard pain scale.
 - a. Less than 4 yo: observational scale (e.g. Faces, Legs, Arms, Cry, Consolability [FLACC] or Children's Hospital of Eastern Ontario Pain Scale (CHEOPS))
 - b. 4–12 yo: self-report scale (e.g. Wong Baker Faces, Faces Pain Scale [FPS], Faces Pain Scale Revised [FPS-R])
 - c. Greater than 12 yo: self-report scale (numeric rating scale [NRS])
2. Place patient on ECG cardiac monitor per patient assessment.
3. Assess patient for existing medication delivery device such as patches or implanted pumps
4. Consider use of non-pharmaceutical pain management techniques, if available.
 - a. Placement of the patient in a position of comfort.
 - b. Application of ice packs and/or splints for pain secondary to trauma.
 - c. Use of verbal reassurance to control anxiety.
5. If not improved and patient is experiencing mild to moderate discomfort consider use of analgesics:
 - a. **Acetaminophen [EMT-O, AEMT-R]**
 - **Adult: 325-1000mg PO**
 - **Pediatric: 15mg/kg PO**
 - b. **Ibuprofen [EMT-O]**
 - **Adult 200-600mg PO**
 - **Pediatric: 10mg/kg PO**
 - c. **Ketorolac (one-time dose only) [AEMT-O]:**
 - **Adult: 15mg IV/IO, 30mg IM**
 - **Pediatric 0.5mg/kg IV/IO (Max 15mg), 1mg/kg IM (Max 30mg)**
6. Establish IV/IO of normal saline [AEMT].
7. If the patient is experiencing moderate to severe pain, administer analgesics.

- a. **Fentanyl [PARA] Preferred initial medication**
 - **Adult: 25-100mcg IV/IO/IM/IN (Max initial dose 100mcg)**
 - Typical dose: 50mcg
 - Patients greater than 65 years old, less than 50kg (110lbs), frail or elevated concern for respiratory depression: Typical dose: 25mcg
 - Doses of 75mcg or 100mcg should only be used in cases of severe pain or known opioid tolerance
 - **Pediatric:**
 - **0.5-2mcg/kg IV/IO/IN (Max dose dose 100mcg)**
 - **3mcg/kg IM (Max Dose 100mcg)**
- b. **Hydromorphone: [PARA]**
 - **Adult: 0.5-1mg IV/IO/IM**
 - Typical Dose: 0.5mg
 - Patients greater than 65 years old, less than 50kg (110lbs), frail or elevated concern for respiratory depression: Typical dose: 0.25mg
 - Dose of 1mg should only be used in cases of severe pain or known opioid tolerance
 - **Pediatric 0.01-0.02mg/kg (Max 0.5mg) IV/IO/IM**
- c. **Ketamine: [PARA]**
 - **Adult: 0.1-0.3mg/kg IV/IO ideally over 20 minutes but can be administered as a slow push**
 - May be repeated every 20-30 minutes (after completion of IV push or infusion)
 - Ketamine should not be a first-line analgesic unless there are mitigating factors to avoid parenteral opioids such as true allergy, active buprenorphine or methadone treatment, or history of opioid addiction now in remission.

8. SEDATION

- a. Analgesia Adjunct: patient with moderate to severe pain AND suspected to have muscle spasm or anxiety response associated with pain: Benzodiazepine-**Midazolam [PARA]**
 - **Adult: 2.5-5mg IV/IO/IM/IN**
 - **Pediatric: 0.1mg/kg (Max 2.5mg)**
- b. Procedural Sedation
 - Preferred (Short Acting) Benzodiazepine-**Midazolam [PARA]**
 - **Adult: 5-10mg IV/IO/IM/IN**
 - **Pediatric: 0.1mg/kg IV/IO/IN or 0.25mg/kg IM**
 - Alternative (Long acting) **Ketamine [PARA] Medical Control Consultation Required**
 - **Adult/Pediatrics: 1-2mg/kg IV/IO, 3-5mg/kg IM**

9. Mechanically Ventilated Patient

- a. Initial dose of post-intubation sedation and analgesia should be prepared prior to intubation attempt
- b. Initial dose of post-intubation sedation (IVP or bolus with infusion initiation) and analgesia will be administered upon endotracheal tube or supraglottic airways confirmation and securement and no later than 10 minutes of after intubation
 - Pre-intubation analgesia and sedation/induction agents typically wear off prior to paralytics
- c. Reassess the level of sedation and pain management every 15 minutes, document assessments
- d. Administer additional sedation and pain management as clinically indicated
 - When increasing sedative infusion rates, consider if an IVP/bolus is needed to obtain appropriate sedation until the infusion dose increase takes effect
- e. Potential Sedation Medications. Refer to [Medication Dosing Protocol](#)
 - **Benzodiazepine-IV Push [PARA]**
 - **Ketamine-IV Push [PARA]**
 - **Benzodiazepine-Infusion [PARA/Primarily Inter-Facility]**
 - **Ketamine Infusion [PARA//Primarily Inter-Facility]**

- **Propofol Infusion [PARA/Inter-Facility Only]**
 - **Dexmedetomidine [PARA/Inter-Facility Only]**
- f. Potential Analgesics
- **Fentanyl or Hydromorphone IVP** is most common
 - Infusion may be considered but likely will need to be obtained from the sending facility
 - **Ketamine** may be used for sedation but should be paired with an analgesic, given the differences in mechanisms of action
10. Consider administration of oral, sublingual, or IV antiemetics to prevent nausea in high-risk patients [see Nausea/Vomiting guideline].
 11. Repeat vital signs 10 minutes after medication dose.
 12. **If indicated based on pain assessment and vital signs allow, consider repeating parenteral pain medication administration after 10 minutes of the previous dose (excluding ketorolac, ketamine, see parameters above).**
 - a. Do NOT repeat both parenteral opioid pain medications and benzodiazepines in non-mechanically ventilated patients
 - b. The time interval between parenteral opioids, benzodiazepines and ketamine doses is **10 minutes** in non-mechanically ventilated patients to allow for appropriate onset of medication effects and detection of adverse effects before next medication that can result in additive adverse effects
 - c. For Mechanically Ventilated Patients: no set time interval between medications between different classes, but monitor closely for hypotension
 13. Transport in position of comfort and reassess as indicated.

Adult nonverbal pain scale University of Rochester Medical Center			
Categories	0	1	2
Face	No particular expression or smile.	Occasional grimace, tearing, frowning, wrinkled forehead.	Frequent grimace, tearing, frowning, wrinkled forehead.
Activity (movement)	Lying quietly, normal position.	Seeking attention through movement or slow, cautious movement.	Restless, excessive activity and/or withdrawal reflexes.
Guarding	Lying quietly, no positioning of hands over areas of body.	Splinting areas of the body, tense.	Rigid, stiff.
Physiology (vital signs)	Stable vital signs	Change in any of the following: * SBP > 20 mm Hg. * HR > 20/minute.	Change in any of the following: * SBP > 30 mm Hg. * HR > 25/minute.
Respiratory	Baseline RR/SpO ₂ Compliant with ventilator	RR > 10 above baseline, or 5% ↓SpO ₂ mild asynchrony with ventilator	RR > 20 above baseline, or 10% ↓SpO ₂ severe asynchrony with ventilator

Abbreviations: HR, heart rate; RR, respiratory rate; SBP, systolic blood pressure; SpO₂, pulse oximetry.
 Instructions: Each of the 5 categories is scored from 0-2, which results in a total score between 0 and 10. Document total score by adding numbers from each of the 5 categories. Scores of 0-2 indicate no pain, 3-6 moderate pain, and 7-10 severe pain. Document assessment every 4 hours on nursing flow-sheet and complete assessment before and after intervention to maximize patient comfort. Sepsis, hypovolemia, hypoxia need to be excluded before interventions.

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scale (NVPS) for assessment of pain in sedated critically ill patients. Available at: <http://www.aacn.org/AACN/NTIPoster.nsf/vwdoc/2004NTI Posters>. Accessed July 18, 2017.

Pediatric-Appropriate Pain Assessment Tools

Faces, Legs, Activity, Cry, Consolability (FLACC) Behavioral Scale

Appropriate age for use (per guideline): less than 4 years

Scoring

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

Each of the five categories (F) Face; (L) Legs; (A) Activity; (C) Cry; (C) Consolability is scored from 0-2, which results in a total score between zero and ten.

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Instructions:

- **Patients who are awake:** Observe for at least 1–2 minutes. Observe legs and body uncovered. Reposition patient or observe activity, assess body for tenseness and tone. Initiate consoling interventions if needed.
- **Patients who are asleep:** Observe for at least 2 minutes or longer. Observe body and legs uncovered. If possible reposition the patient. Touch the body and assess for tenseness and tone.

Face

- Score 0 point if patient has a relaxed face, eye contact and interest in surroundings.
- Score 1 point if patient has a worried look to face, with eyebrows lowered, eyes partially closed, cheeks raised, mouth pursed.
- Score 2 points if patient has deep furrows in the forehead, with closed eyes, open mouth and deep lines around nose and/or lips.

Legs

- Score 0 points if patient has usual tone and motion to limbs (legs and arms).
- Score 1 point if patient has increased tone, rigidity, tense, intermittent flexion or extension of limbs.
- Score 2 points if patient has hyper tonicity, legs pulled tight, exaggerated flexion or extension of limbs, tremors.

Activity

- Score 0 points if patient moves easily and freely, normal activity or restrictions.
- Score 1 point if patient shifts positions, hesitant to move, guarding, tense torso, pressure on body part.
- Score 2 points if patient is in fixed position, rocking, side-to-side head movement, rubbing body part.

Cry

- Score 0 points if patient has no cry or moan awake or asleep.
- Score 1 point if patient has occasional moans, cries, whimpers, sighs.
- Score 2 points if patient has frequent/continuous moans, cries, grunts.

Consolability

- Score 0 points if patient is calm and does not require consoling.
- Score 1 point if patient responds to comfort by touch or talk in ½–1 minute.
- Score 2 points if patient requires constant consoling or is unconsolated after an extended time.

Whenever feasible, behavioral measurement of pain should be used in conjunction with self-report. When self-report is not possible, interpretation of pain behaviors and decision-making regarding treatment of pain requires careful consideration of the context in which the pain behaviors were observed. Each category is scored on a 0–2 scale, which results in a total score of 0–10.

Assessment of Behavioral Score:

- 0 = Relaxed and comfortable
- 1–3 = Mild discomfort
- 4–6 = Moderate pain
- 7–10 = Severe discomfort/pain

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Source: *The FLACC: A behavioral scale for scoring postoperative pain in young children*, by S Merkel and others, 1997, *Pediatr Nurse* 23(3), p. 293–297.

Faces Pain Scale – Revised (FPS-R)



In the following instructions, say "hurt" or "pain," whichever seems right for a particular child. "These faces show how much something can hurt. This face [point to face on far left] shows no pain. The faces show more and more pain [point to each from left to right] up to this one [point to face on far right]—it shows very much pain. Point to the face that shows how much you hurt [right now]."

Score the chosen face 0, 2, 4, 6, 8, or 10, counting left to right, so "0" = "no pain" and "10" = "very much pain." Do not use words like "happy" or "sad." This scale is intended to measure how children feel inside, not how their face looks.

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educational and research use. For reproduction of the FPS-R in a journal, book or web page, or for any commercial use of the scale, request permission from IASP online at www.iasp-pain.org/FPS-R.

Patient Safety Considerations

All patients should have drug allergies identified prior to administration.

- Administer opioids with caution to patients with GCS less than 15, hypotension, identified medication allergy, hypoxia (oxygen saturation less than 90%) after maximal supplemental oxygen therapy, or signs of hypoventilation.
- Opioids are contraindicated for patients who have taken monoamine oxidase inhibitors (MAOIs – e.g. Nardil®, Parnate®, Azilect®, Marplan®, Eldepryl®) during the previous 14 days.
- Avoid non-steroidal anti-inflammatory medications such as ketorolac in patients with NSAID allergy, aspirin-sensitive asthma, renal insufficiency, pregnancy, or known peptic ulcer disease.
- Ketorolac should not be used in patients with hypotension (due to renal toxicity).
- Use of splinting techniques and application of ice should be done to reduce the total amount of medication used to keep the patient comfortable.

Notes and Educational Pearls Key Considerations

- Record pain severity (0–10) before and after analgesic medication administration and upon arrival at destination.
- Provide analgesic interventions for patients with acute abdominal pain. Use of analgesics for acute abdominal pain does not mask clinical findings or delay diagnosis.
- Recognize that opiates may cause a rise in intracranial pressure.

Pertinent Assessment Findings

- Mental status (GCS and pain level)
- Respiratory system (tidal volume, chest rigidity)
- Gastrointestinal (assess for tenderness, rebound, guarding, and nausea)

Quality Improvement

Associated NEMESIS Protocol(s) (eProtocol.01) 9914071—General-Pain Control

Key Documentation Elements

- Documentation of patient vital signs with pulse oximetry [*EMR-O; EMT-R*]
- Acquisition of patient's allergies prior to administration of medication
- Documentation of initial patient pain scale assessment
- Documentation of medication administration with correct dose
- Documentation of patient reassessment with repeat vital signs and patient pain scale assessment

Performance Measures

- The clinical efficacy of prehospital analgesia in terms of adequacy of dosing parameters
- **EMS Compass® Measures** (for additional information, see www.emscompass.org)
 - *PEDS-03: Documentation of estimated weight in kilograms.* Frequency that weight or length-based estimate are documented in kilograms
 - *Trauma-01: Pain assessment of injured patients.* Recognizing that pain is undertreated in injured patients, it is important to assess whether a patient is experiencing pain
 - *Trauma-02: Pain re-assessment of injured patients.* Recognizing that pain is undertreated in injured patients, it is important to assess whether a patient is experiencing pain

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