

Comfort Management in the Adult with Congenital Heart Disease

What the ICU Bedside Nurse Needs to Know

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Introduction

ACHD patients in any ICU typically receive comfort medications to promote their safety, decrease anxiety, alleviate pain, enhance sleep, and facilitate treatments. Institute for Healthcare Improvement (IHI) has recommended "...the use of dosing protocols, automatic dose reductions for benzodiazepines and other sedatives and hypnotics in target populations." In 2013 Society of Critical Care Medicine (SCCM) revised their 2002 guidelines for the management of pain, sedation, sleep and delirium, please refer to these guidelines for specific algorithm and dosing. Updated recommendations for the assessment and management of delirium are included in these guidelines. Accurate assessment, goal-directed therapy, titration of dosing to a defined assessment end-point, daily interruption, and retitration to minimize prolonged effects are important aspects of care. Additionally, special vulnerable populations will require very specific care. For example, cognitively impaired ACHD patients can be particularly vulnerable to delirium (hypoactive delirium) and will need an initial assessment within 24 hours of admission, scheduled on-going assessment, preventive measures, lower dosing (with smaller titrations), and use of medications with a short half-life in order to minimize the risk of developing delirium.

Psychological Aspects

The psychological aspects of comfort management in ACHD patients are an important consideration for the bedside nurse. Perception of unrelieved pain (especially from previous hospitalization for their chronic illness) can have a significant impact on hospitalization. ACHD patients with inadequate analgesia during childhood procedures may have centrally mediated pain sensitizations therefore may be more sensitive to pain and have greater fear of painful procedures. Additionally, the inability to communicate, continuous noise, continuous ambient lighting, excessive stimulation, and sleep deprivation can make the ACHD patient fearful, anxious, or delirious. The critical care environment can also trigger post-traumatic stress disorder (PTSD).

Pain:

- **Analgesia** – is the absence or blunting of the sensation of pain or noxious stimuli
 - Unrelieved pain can contribute to inadequate sleep and cause exhaustion and disorientation; provoke stress responses (e.g., tachycardia, increase oxygen consumption, hypercoagulable states, immunosuppression, and persistent catabolism); pulmonary dysfunction (from splinting or not mobilizing)

- Optimal pain management should be tailored to the individual and should involve goal-directed therapy
 - Short-term goals: comfortable patient (e.g., important to advise that the patient will not be pain-free)
 - Long-term goals: prevention of VAP, reduction in ICU LOS, minimizing the psychological implications of critical illness
- **Goal directed therapy**
 - Setting end-points and using prescribed pain assessment scales
 - Lowest effective dose
 - Dosage adjusted defined at the start of therapy and adjusted based on pain scale prescription
 - Goals should be re-evaluated frequently
- **Assessment**
 - Self-report is the most accurate means of assessment
 - Numeric-rating scale (NRS), verbal rating scale (VRS) or visual analogue scale (VAS)
 - Whereas, non-communicative patients can be more challenging. These patients may require subjective criteria such as movement, facial expression, physiologic parameters (e.g., blood pressure, heart rate, respiratory rate, lacrimation, sweating) or family report
- **Treatment**
 - Preventing pain is more effective than treating established pain especially in patients whom have had previous interventions and ICU stays
 - Use of protocols, guidelines, and algorithm are supported by the SCCM guidelines. For an example, please refer to the 2002 SCCM guidelines for specific algorithm and dosing (PMID: 11902253)
 - Titration orders to balance the potential impact of adverse effects of under- and over-medicating are encouraged
 - Customized pain therapy should be instituted by establishing a pain management plan and set therapeutic goals on a daily basis and re-evaluate frequently based on the patient's condition
 - Daily wake-up testing is recommended for most patients on continuous infusions
 - Ensure pain is adequately controlled if your patient is agitated prior to treating with sedatives
- **Nonpharmacologic Interventions**
 - Elimination of irritating physical stimuli (e.g., ensuring no traction of ETT)
 - Use of warmth and cool (use with caution on poorly perfused areas)
 - Distraction (e.g., music, television)
 - Complementary therapies (e.g., massage and aromatherapy)
 - Frequent repositioning (and maintaining proper alignment)
- **Pharmacologic interventions**
 - Analgesia tailored to their individual requirements (preferably with patient-controlled (PCA) administration)
 - Continuous infusion

- PCA
 - Intermittent doses
 - Nurse controlled analgesia
 - Opioids
 - Morphine, Fentanyl, Dilaudid
 - Dosage recommendations in SCCM guidelines
- Non-opioid analgesic for multi-modal therapy (e.g., Acetaminophen, non-steroidal anti-inflammatory agents)
 - May reduce total opioid use
 - NSAIDs can have significant adverse effects
 - Bleeding from platelet inhibition (ACHD patients can have difficulties with postoperative hemostasis)
 - Renal insufficiency (ACHD patients may have baseline renal dysfunction)
 - Reduced dosing in elderly
 - Acetaminophen is an analgesic for mild to moderate pain
 - In combination with opioid can produce a greater analgesic effect than opioid alone
 - Care to avoid hepatotoxicity
 - For example, Fontan circulation may have hepatic dysfunction
 - Reduced dosage for those in poor nutritional state or history significant for alcohol intake
- Regional analgesia
- Disease states such as chronic renal or hepatic insufficiency may alter metabolism of medications
- Elderly may also have reduced opioid requirements
- **Monitoring effects**
 - Monitor frequently and re-titrate to lowest effective dose
- **Weaning**
 - Neuroadaptation or physical dependence can occur after a week
 - Consider opioid withdrawal after use of high doses for more than 5-7 days of continuous therapy and taper doses
 - Weaning protocols are associated with improved survival

Anxiety & Agitation:

- Sedation – adjunct therapy for treatment of anxiety and agitation
- Agitation
 - Differential: extreme anxiety, delirium, adverse drug effects, pain, fear, drug or alcohol abuse
 - Deleterious effects – increased oxygen consumption, inadvertent device removal, stress response, ventilator dyschrony
 - Treat the underlying physiologic or environmental disturbance first
- Optimal sedation is dependent on diagnosis and severity of CHD, co-morbidities, and goals and should involve goal-directed therapy

- Short-term goals: synchronization with ventilator
- Long-term goals: prevention of VAP, reduction in ICU LOS, minimizing the psychological implications of critical illness
- Goal directed therapy
 - Setting end-points and using sedation assessment scales
 - Lowest dose to avoid over sedation
 - Dosage adjusted defined at the start of therapy and adjusted based on sedation scale prescription
 - Goals should be re-evaluated frequently
- **Assessment**
 - Sedation levels can be subjectively measured by nurses and physicians by utilizing a sedation scale such as the Richmond Agitation Sedation Scale (RASS), Motor Activity Assessment Scale (MAAS) or Riker Sedation-Agitation Scale (SAS) in order to titrate medications effectively
 - Sedation can be objectively measured by EEG and perhaps Bispectral (BIS) monitoring although BIS has not been proven useful as yet
- **Treatment**
- Algorithms, guidelines, and protocols are supported by the SCCM guidelines – (For a reference, please refer to these guidelines for SCCM protocol)
 - Nonpharmacologic interventions should be considered first in an effort to use the lowest effective medication dose
 - Explain what is happening and reorient frequently
 - Establish a method of nonverbal communication
 - Calm voice and gentle touch to convey reassurance
 - Frequent repositioning
 - Distraction (e.g., music, television)
 - Environmental control (e.g., limiting noise)
 - Complementary therapies (e.g., massage and aromatherapy)
 - Ear plugs
 - Pharmacologic management
 - Sedation tailored to their individual requirements
 - Continuous vs. intermittent modes
 - Benzodiazepines
 - Diazepam, midazolam, 4orazepam
 - Precedex
 - Propofol
 - Ketamine
 - Etomidate- inductive hypnotic for intubation in severe cardiovascular failure
 - Dosage recommendations in SCCM guidelines
 - Sedation Holidays” or holding sedation: 2 RCT and I observation study showed decreased duration of ventilation (Jackson et al., 2010)
 - Post-traumatic stress disorder (PTSD) may be minimized by daily awakenings
 - Contraindicated in patient receiving paralytics

- Need to be closely monitored during wake-up test
- **Monitoring effects**
 - Monitor frequently and re-titrate to lowest effective dose
 - Patient factors such as age, prior alcohol abuse, co-morbidities, and concurrent medications affect the intensity and duration of benzodiazepines
 - Increased monitoring in elderly - slower clearance, larger volume distribution lead to marked prolongation of elimination
 - Hepatic and renal insufficiency may slow clearance
 - Hemodynamic unstable patients may experience hypotension with the initiation of sedation
 - Flumazenil is the benzodiazepine antagonist
- **Weaning**
 - Neuro-adaption or physical dependence can occur after a week
 - Consider withdrawal after use of high doses or more than 5-7 days of continuous therapy and taper doses
 - Weaning protocols are associated with improved survival

Sleep:

- Around the clock nursing care, noise, lighting, medication administration can cause nocturnal interruptions – one study estimated total sleep time was 57% during the day and 43% at night (Freedman et al., 2001)
- Fear of underlying disease and loss of personal self-control may exacerbate insomnia
- Sleep in the ICU can include few complete sleep cycles, numerous awakenings, and infrequent rapid-eye-movement (REM) sleep
- Critically ill patients receiving sedatives demonstrate atypical sleeping patterns
- Sleep deprivation and sleep fragmentation disturb circadian rhythms, influence vasomotor tone, ventilation control, upper airway collapsibility, immunologic processes, cognitive, muscular functions and provoke unit syndrome
 - Primary stimulus for circadian rhythm is light/dark cycle
- Insomnia and fragmented sleep significantly affect the healing process
- **Assessment**
 - Self report is best measure of sleep adequacy
- **Treatment**
 - Nonpharmacologic
 - Focus needs to be placed on how the interdisciplinary team can limit nighttime light exposure and interruptions of rest and sleep
 - Simple behavioral rules on interruptions, light and noise for ICU staff during night shift
 - Reduced lighting (based on patient acuity) to simulate day/night and opening blinds/shades for natural light
 - Noise reduction
 - Noise detectors that flash lights to warn staff of noise

- Night-time restrictions (e.g., designated quiet time between 10pm – 6am)
- Medication schedules that give patients more time for sleep
- Consider when you are giving diuretics when there is not a Foley catheter)
- Changing patient care activity times to promote day-night cycle
- Blood administration, lab draws, weights/bath
 - Complementary therapies (e.g., massage therapy, relaxation therapy)
 - Music therapy or alternatively ear plugs or white noise machine
- Pharmacologic
 - Adequate pain control
 - Oral hypnotics (benzodiazepines, zolpidem)
 - Dosage recommendations in SCCM guidelines
- **Monitoring effects**
 - Monitor frequently and re-titrate to lowest effective dose

Delirium:

- Acutely changing or fluctuating mental status, inattention, disorganized thinking, or altered mental status = brain dysfunction
 - Hypoactive, hyperactive, mixed
 - Sleep/wake cycle disruption or day/night reversal
 - Hypoactive associated with worst prognosis
- Significant consequences
 - Increased risk of dementia and/or death
 - Increased length of hospital stay
 - Increased risk of new admission to long-term care facility
- Patient populations at increased risk (Barr, 2013)
 - Over 65 years of age
 - Cognitive impairment (History or developmental delay)
 - Preexisting dementia
 - History of hypertension and/or alcoholism
 - Severity of illness/intensive care
 - Benzodiazepine use in adult ICU patients
- Assessment
 - Within 24 hours of admission, then daily
 - Regular targeted screening for symptoms of delirium with a valid and reliable tool such as the confusion Assessment Method for the ICU (CAM-ICU) or the Intensive Care Delirium Screening Checklist (ICOSC)
 - Reported behavior changes by patient, family, care givers

- Cognitive factors – decreased concentration, slow responses, confusion
 - Physical factors – reduced mobility, reduced movement, restlessness, agitation, changes in appetite, sleep disturbances
 - Social behavior – lack of cooperation, alterations in communication, withdrawal, changes in mood/attitude
 - Risk factors: anticholinergic medication, , co-morbidities, surgery, pain, severity of illness, sedatives, intubation and mechanical ventilation, psychological and social factors, environmental and iatrogenic factors
- Treatment
 - Symptom-oriented treatment of delirium should be started promptly
 - Always consider the possibility of withdrawal syndrome causing delirium
- Nonpharmacologic
 - Avoid withdrawal symptomology
 - High priority should be given to tapering medications
 - Maintain day-night rhythm
 - Re-orientation
 - Cognitive stimulation
 - Early mobilization
- Pharmacologic treatment
 - Antipsychotic may be used to reduce anxiety and agitation in hyperactive delirium
 - Haloperidol (monitor for prolonged QT syndrome), risperidone
 - Atypical medications that may be helpful olanzapine, quetiapine, ziprasidone
 - Careful use with the elderly
 - Dosage recommendations in SCCM guidelines
- **Monitoring effects**
 - Monitor frequently and re-titrate to lowest effective dose

Alcohol Withdrawal Syndrome (AWS):

- It is estimated that up to 1 in 4 patients admitted to general hospitals meet diagnostic criteria for alcohol dependence
- Symptoms: altered concentration, tremulousness, autonomic hyperarousal, psychosis, seizures, and delirium tremens or “DT’s”
- DT’s most serious and is characterized by hallucinations, disorientation, tachycardia, hypertension, low-grade fever, agitation, and diaphoresis
- Alcohol can change the immune system, dysfunction of the protective barriers of the respiratory tract
- DT’s begin between 2-4 days after the last drink and last < week
- AWS Treatment
 - Assessment for signs and symptoms
 - Benzodiazepines are the drug of choice for serious symptoms
 - Ameliorate symptoms and prevent seizures/DT’s

- Long acting agents can pose a risk for the elderly, frail, or those with liver disease but overall provide a smoother course with less breakthroughs or rebound symptomology
- Most commonly used diazepam, chlorthalidone, and lorazepam
- Symptom based treatment has been found to be more beneficial than scheduled dosing
- Ensure reversal agent is present
- Physical restraints may be needed to keep patient from pulling tubes, removing essential equipment, or climbing out of bed
- Falls precautions

Bowel Regimens:

- Gastric retention and ileus are common in critically ill patients
- Gastric hypomotility is further enhanced by opioids
- Routine use of stool softeners and laxatives may minimize opioid associated constipation

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