



Ventilator Withdrawal (Palliative Care)

Withdrawal of mechanical ventilation

IMPORTANCE OF FOCUS

Patients who have been supported with prolonged mechanical ventilation may consider the option to withdraw ventilatory life support when all attempts at weaning have failed and it is deemed futile to continue the therapy, when quality of life is unacceptable, or when it is perceived that the patient is experiencing suffering.

Withdrawal of mechanical ventilation is a complex process that requires clearly defined and meticulous planning and management. Conversations with the patient and his/her family are critical to ensuring everyone is provided an opportunity to gather information and understand the process, and while providing emotional and spiritual support. Clear communication with patients and their families can ensure that the process goes smoothly.

GOALS

Subscribing to an organized approach to withdrawal of mechanical ventilation can ensure that patients experience a peaceful death and staff experience closure regarding the event.

KEY RECOMMENDATIONS

The process of withdrawal of ventilator support will be divided in 3 phases:

- (1) Preparation
 - Family meeting
 - Clinical team meeting may include physicians, nurses, social workers, chaplains, and respiratory therapists
- (2) Withdrawal procedure
 - Create peaceful surroundings
 - Gather family
 - Pre-medicate, if needed
 - During withdrawal process, use suction, monitor patient for comfort, and titrate medications as needed for any s/s of distress
- (3) Post-withdrawal care
 - Maintain sedation level as agreed in family meeting
 - Manage breathlessness, pain, and anxiety
 - Reassure family that abnormal movement is involuntary and does not reflect conscious suffering
 - Encourage family involvement
 - Consider transition or transfer of care for family comfort



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CARE PATHWAY COMPONENTS

Phase 1. Preparation:

1. **Family meeting.** Review the decision to withdraw life-sustaining treatments, and discuss the preferred process:
 - a. If the patient is conscious, what are his or her desires about conducting the procedure?
 - b. Does the family want to be present in the patient's room or in the waiting room, or how should they be notified about the completion of the procedure or death? Do they want to see the patient after the death? Consider special readings, rituals, prayers, or music before, during, and after withdrawal of the ventilator. Advise the family on the possibility, if any, of prolonged survival after withdrawal of ventilatory support.
 - c. Discuss how younger children would be involved and what resources are available to help them: social worker, nursing, Pediatric child-life team, or community hospice programs, etc.
 - d. Consider discussing in advance decisions that will be faced after death, such as tissue, organ, or body donation, autopsy, and funeral arrangements. (Life-point 803.794.1831.)
 - e. Establish a time for withdrawal when the family and selected staff can be present. Does the family want others present (e.g., a family pastor or priest)?
 - f. Decide on a plan, and then document the meeting and plan in the chart.
 - g. Consider Hospice team involvement if appropriate.
2. **Clinical team meeting.** may include physicians, nurses, social service, social workers, chaplains, and respiratory therapists:
 - a. Review which Life-Sustaining Treatments are being provided now and which should be withdrawn. Review all orders (life-sustaining and routine treatments) and discontinue whatever is causing the patient discomfort, including routine treatments (e.g., turning), while adding measures to palliate current or anticipated distress.
 - b. What order of Life-Sustaining treatment withdrawal makes most sense? Typically, adequate sedation is achieved before any anticipated discomfort arises, but the following order of withdrawal usually makes sense:
 - i. Blood draws, arterial sticks
 - ii. Intermittent therapies (antibiotics, hemodialysis)
 - iii. Fluid and nutrition
 - iv. Continuous therapies that maintain circulation (vasopressors, pacers, CRRT, LVAD,



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Impella)

v. Ventilator

c. Ventilator withdrawal

- i. Assure discontinuation of neuromuscular blockade (which would mask distress).
- ii. Is pre-sedation necessary? Target SAS ≤ 2 (deep sedation). *see attached scale: pg 7.
- iii. Different methods of discontinuation may be discussed, and may be chosen on the basis of the patient's clinical condition and the family's preferences:

- Rapid Reduction (dialing down the ventilator settings stepwise for FiO₂, PEEP, respiratory rate, and volume or pressure every few minutes, watching for distress) vs. Immediate Cessation of ventilatory support (immediate discontinuation of mechanical ventilation).

- Leave in Endotracheal Tube until the patient dies vs. Immediate or Eventual Extubation. Removal of the endotracheal tube can be associated with severe coughing and messy secretions, but the tube may be a source of distress in conscious patients and prevent talking, while the ventilator may hinder the family from gathering around the bed and touching the patient. Maintaining the airway protects against stridor and difficulty with copious secretions, especially when the patient lacks adequate gag or cough reflex.

d. Who will be present during and after the withdrawal procedure in order to assure that plenty of hands are available, but also to address the family's needs (e.g., nurse, social worker, or chaplain)? Consider involving Palliative Care. Who will watch the children?

e. Write orders for management of distressing symptoms and signs, such as agitation, air hunger, and noisy secretions. (Narcotic plus benzodiazepine, and consider anticholinergic agents)

Phase 2. Withdrawal Procedure:

1. Create Peaceful Surroundings
 - a. Remove unnecessary equipment, creating bedside space for the family.
 - b. Provide tissues and comfortable chairs.
 - c. Remove soft restrains, mitts and poseys, lower bedrails, and set bed height to facilitate family-patient touching or handholding.
 - d. Discontinue monitors and alarms in the room, including but not limited to: oximeters, vital sign monitor, ECG recording, unneeded pumps, and respirator alarms.
 - e. Discontinue inappropriate television or radio distractions. May use Care TV Channel.
2. Gather Family.



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- a. Invite family to be with the patient, but tell them that you will ask them to step out of the room (or behind the curtain) for a moment once we are ready to remove the tube to allow the respiratory therapist and nurse to suction and clean the patient. If they insist that they want to stay in the room, review the process of what they might see.
 - b. Allow time for any rituals and for saying a final goodbye.
 - c. Address particular needs of young children.
 - d. Social worker, nurse, or chaplain may stay with the family by the bedside or in the waiting room.
 - e. Check family perception of the level of patient comfort, and address appropriately to incorporate their wishes about sedation and analgesia.
3. Determine if premedication is necessary: if the patient is capable of experiencing distress or if distress is likely during the withdrawal procedure, continue current analgesia and sedation regimen, and premedicate with opioids and benzodiazepines via bolus or infusion (see below). Even if the patient appears comfortable when undisturbed, anticipatory dosing is appropriate if he or she has shown signs of distress during nursing or respiratory care interventions. For example, a comfortable appearing patient may have experienced grimacing or distress with prior suctioning, repositioning, or reduction in ventilatory support, and would be expected to experience distress with withdrawal of ventilatory support.
 4. During the withdrawal process, use suctioning as needed, monitor the patient's comfort frequently, and titrate medications for any signs of distress, such as tachypnea, labored breathing, accessory muscle use, nasal flaring, tachycardia, hypertension, diaphoresis, grimacing, restlessness, and excess or noisy secretions. The combination of an opioid plus benzodiazepine is indicated because narcotics provide relief of dyspnea and pain, while suppressing cough, whereas benzodiazepines provide sedation, and anxiolysis. Benzodiazepines also offer anticonvulsant effects that may protect from hypoxemia-related seizures. In the ICUs, fentanyl is often the preferred narcotic because of staff familiarity with this agent, while morphine is more likely to lead to toxicity (typically myoclonus) at high doses, especially in the setting of renal failure. However, morphine, not fentanyl, may be continued out of the intensive care unit.

Phase 3. Post Withdrawal care:

1. **Sedation:** When talking to the patient or the family you predetermined in advance a reasonable level of sedation desired (conscious but calm, light sleep, heavily sedated). Make sure you have written appropriate orders to maintain that level of sedation.
2. **Breathlessness, pain and anxiety:** Breathing changes will likely occur, but the feeling of "air hunger" can be alleviated. If the patient is capable of feeling discomfort, medications will be given to avoid the sensations of breathlessness, pain, or anxiety. Anticipate family members noting episodes of abnormal breathing: i.e. "He'll have many breaths that may look like his last breath but, he may continue to breath some sporadically." Make sure you have written appropriate orders to maintain good symptom control.
3. **Abnormal movement:** If a well-sedated or comatose patient shows gasping, twitching or other involuntary movements, reassure the family that such actions do not reflect conscious suffering.
4. **Family involvement:** Encourage the family to engage in cultural or spiritual practices befitting of the patient's life and traditions.



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5. **Potential transition or transfer** (for patient's in high acuity settings): Caution the family that, while death is expected, the timing of it is uncertain: i.e. "We will watch and wait as we continue to focus on comfort while letting nature take its course." If a patient is deemed to be stable for transfer, he or she may be transferred to a medical private room to allow the family to spend time with the patient without the strict limits that are usually present in intensive care areas.

REGIMENS FOR SEDATION/ANALGESIA/ANXIOLYSIS:

1. **Narcotic:** increase current regimen or start Fentanyl or Morphine.
 - a. **Fentanyl** infusion
 - i. At current rate (assuming patient is comfortable) then bolus with $\frac{1}{4}$ - $\frac{1}{2}$ the hourly dosage and increase infusion rate by 25%.
 - ii. OR begin with a bolus of 50-100 mcg and start the infusion at 25-100 mcg/hr. For signs of discomfort, give a bolus equal to 50% of the hourly infusion dose and increase the infusion rate by 25-50%. Repeat upward titration every 10 minutes, as needed.

*Note: Fentanyl infusions are not allowed on routine wards. The approximate equianalgesic conversion between intravenous fentanyl and intravenous morphine is 25 mg/hr morphine = 100 mcg/hr fentanyl.
 - b. **Morphine** continuous infusion
 - i. At current rate (assuming patient is comfortable), then bolus with current hourly infusion dose and increase rate by 25%.
 - ii. OR begin with a 5-10 mg IV bolus and begin infusion at 2-5mg/hr. For signs of discomfort, give a bolus equal to 50% of the hourly infusion dose and increase the infusion rate by 25-50%. Repeat upward titration every 10 minutes, as needed.

*Note: Remember that just increasing the infusion rate for morphine (and hydromorphone [Dilaudid] or methadone) will not lead to a new steady state for a number of hours, so you need to both bolus the patient and increase the infusion rate in order to achieve a new level of analgesia quickly.
2. **Sedative:** continue current regimen or start a benzodiazepine
 - a. **Lorazepam** continuous infusion
 - i. At current rate (assuming patient is comfortable), then bolus equal to hourly dose and increase rate by 25-50% as needed.
 - ii. OR begin with a bolus of lorazepam 1-2 (range 1-10) mg IV and repeat boluses every 15 minutes as need or begin a continuous infusion at 1-2 mg/hr.
 - iii. If an infusion is chosen, titrate upward as often as every 15 minutes for signs of discomfort:



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give an additional lorazepam bolus equal to the current hourly infusion rate and increase the infusion rate by 25-50%.

b. Midazolam infusion

- i. At current rate (assuming patient comfortable at that dose), then bolus over 2 minutes with $\frac{1}{2}$ the hourly rate and increase the infusion rate by 1-2 mg/hr or 25%
- ii. OR begin with a bolus of 1-2 mg IV over 2 minutes and start an infusion at 1-2 mg/hr. For signs of discomfort, give an additional midazolam bolus equal to $\frac{1}{2}$ – 1x the current hourly infusion rate up to q15 minutes and increase infusion rate by 1-2 mg/hr or 25%.

Note: midazolam infusions are not allowed on routine wards. (Alternately, titrate equivalent dosages for diazepam or a barbiturate.)

3. Secretion control: You may consider the addition of a medication for secretion management.

a. Glycopyrrolate bolus

- i. Provide Glycopyrrolate IV 0.2mg once, as a stat dose before extubation to reduce oral secretions.
- ii. May continue with 0.2mg IV every 4 hours PRN for secretions. (Patients who remain as a “full code” should only be given a maximum of 0.8mg/24hr. Comfort care patients may receive 0.2mg every 4 hours PRN.)

***Remember: Glycopyrrolate** is a quaternary amine which does not cross the blood-brain barrier and does not provide much of a sedative effect to patients who are still able to communicate and interacts with their family. **Scopolamine** and **atropine** are tertiary amines and can cross blood brain barrier, and can cause more sedation.

Ventilator Withdrawal

1. If the patient experiences discomfort during any of the following reductions in ventilation, resume higher settings and adjust the medication for comfort prior to further ventilator changes.
2. Reduce alarm settings (apnea, heat, etc.) to minimal settings or, if possible, turn them off.
3. Over 0-5 minutes, reduce FiO₂ to 30% and PEEP to zero.
4. You may want to wait a while at this point, expecting the patient to expire, or you can proceed over 0-15 minutes to reduce the respiratory rate and tidal volume or target pressure on the ventilator to 0.
5. Concerning the airway:
 - a. Extubate patient to room nasal cannula oxygen, wrapping the ET tube (which may be messy) in a towel, or



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- b. Remove connection to the ventilator, keeping the ETT or tracheostomy in place.
- 6. If tracheal secretions are bothersome, an in-line suction catheter can be attached to the ETT without supplemental O2 or humidity.
- 7. Note time of death, if it occurs.

Riker Sedation-Agitation Scale (SAS)

Score	Term	Descriptor
7	Dangerous Agitation	Pulling at ET tube, trying to remove catheters, climbing over bedrail, striking at staff, thrashing side-to-side
6	Very Agitated	Requiring restraint and frequent verbal reminding of limits, biting ETT
5	Agitated	Anxious or physically agitated, calms to verbal instructions
4	Calm and Cooperative	Calm, easily arousable, follows commands
3	Sedated	Difficult to arouse but awakens to verbal stimuli or gentle shaking, follows simple commands but drifts off again
2	Very Sedated	Arouses to physical stimuli but does not communicate or follow commands, may move spontaneously
1	Unarousable	Minimal or no response to noxious stimuli, does not communicate or follow commands

Guidelines for SAS Assessment

1. Agitated patients are scored by their most severe degree of agitation as described
2. If patient is awake or awakens easily to voice ("awaken" means responds with voice or head shaking to a question or follows commands), that's a SAS 4 (same as calm and appropriate – might even be napping).
3. If more stimuli such as shaking is required but patient eventually does awaken, that's SAS 3.
4. If patient arouses to stronger physical stimuli (may be noxious) but never awakens to the point of responding yes/no or following commands, that's a SAS 2.
5. Little or no response to noxious physical stimuli represents a SAS 1.

This helps separate sedated patients into those you can eventually wake up (SAS 3), those you can't awaken but can arouse (SAS 2), and those you can't arouse (SAS 1).



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MEDICAL PROVIDER'S ORDER SET WITHDRAWAL OF LIFE-SUSTAINING TREATMENTS

Orders preceded by a will be initiated only if \checkmark 'ed. All others will be initiated unless deleted by a single line.

Allergies: _____

1. Medical Provider Preparations - Provider is to assure that:

- Patient does not meet brain death criteria.
- DNR/DNI order is written and present in the EMR.
- Note has been written in chart that documents rationale for withdrawal of life-sustaining treatments, the perspective of attending physician and agreement from healthcare POA or surrogate(s). If patient has capacity, then their bedside consent is solely required.
- Deactivate implantable cardioverter-defibrillator (ICD) if present. Verbal consent is required.
- Verify that Life point (803.794.1831) has evaluated patient for Donation after Cardiac Death (DCD). *If appropriate.*
- From discussions with patient or healthcare POA/surrogate(s), establish time for discontinuation of vasopressors, inotropes and antiarrhythmics and removal of ventilator, so that all who wish to be present have an opportunity.
- Liberalize visitation.
- Review this order form with patient's bedside RN and with respiratory therapist (RT).

2. Nursing Preparations:

- Discontinue all previous orders, including routine vital signs, blood glucose, lab orders, x-rays, medications, enteral feedings, IV fluids, and infusions of Propofol and paralytic agents. (If patient has been on paralytic agent, return of motor function must be demonstrated). *See below for orders on vasopressors, inotropes and antiarrhythmics.*
- Discontinue monitors in patient's room and remove nasogastric tubes, blood pressure and leg compression cuffs. *See below for orders on endotracheal tube and ventilator.*
- Notify on-call team of impending withdrawal.

3. Nursing Care:

- Allow family and others involved to be present for withdrawal, if they wish.
- Maintain Head of bed (HOB) at 30 to 45 degrees.
- If upper airway obstruction occurs upon extubation, reposition head and neck. If no benefit, then nasal trumpet per RT.
- Consult Hospice for possible care and bereavement support for family.
- If patient is stable 1 hour after withdrawal, transfer to private room to be managed by primary care team and hospice team.

4. Ventilator (check one):

- Extubate to nasal cannula 2 L/minute. May administer below PRN morphine, fentanyl and/or lorazepam 10 minutes prior to extubation.
- Terminal wean
 - Change ventilator mode to SIMV with rate 12 per minute and pressure support (PS) 5 cm, FiO2 0.5 and PEEP 5 cm.
 - Reduce FiO2 to 0.30 and PEEP to zero over less than 5 minutes and titrate comfort medications.
 - When patient is comfortable, wean rate to 4/min and again titrate comfort medications.
 - When comfort achieved, either (check one):
 - extubate to nasal cannula 2L/min. or _____.
 - place on T piece with FiO2 0.3.

5. Medications:

- To treat discomfort related to **pain and/or dyspnea** (check one):
 - Morphine 5 mg IV every 10 minutes PRN discomfort. **Or** Morphine _____ (range 1-10) mg IV every 10 minutes PRN discomfort
 - Fentanyl 50 micrograms IV every 10 minutes PRN discomfort. **Or** Fentanyl _____ (range 25-100) micrograms IV every 10 minutes PRN discomfort
 - Morphine drip at current rate or at _____ mg/hr. May give additional IV morphine bolus up to 50% the current hourly rate every 10 minutes. May increase infusion rate by 25% every 10 minutes for signs of discomfort not relieved by bolus.
 - Fentanyl drip at current rate or at _____ mcg/hr. May give additional IV fentanyl bolus up to 50% the current hourly rate every 10 minutes. May increase infusion rate by 25% every 10 minutes for signs of discomfort not relieved by bolus.



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- Other opiate: _____
 - None, Notify physician if patient shows signs of discomfort
 - To treat discomfort related to **agitation or anxiety** (check one):
 - Lorazepam 1-2 mg IV every 10 minutes PRN discomfort
 - Lorazepam drip at current rate or at _____ (range 1-10) mg/hr. May give additional IV lorazepam bolus up to 50% the current hourly rate every 10 minutes. May increase infusion rate by 25% every 15 minutes for signs of discomfort not relieved by bolus.
 - Midazolam 1-2 mg IV every 10 minutes PRN discomfort
 - Midazolam drip at current rate or at _____ (range 1-10) mg/hr. May give additional IV Midazolam bolus up to 50% the current hourly rate every 10 minutes. May increase infusion rate by 25% every 15 minutes for signs of discomfort not relieved by bolus.
 - Other benzodiazepine: _____
 - None; notify physician if patient shows signs of discomfort.
 - To prevent **high oral secretion**. A.k.a. "dead rattle". (check below)
 - Glycopyrrolate 0.2 mg IV at least 30 minutes prior to extubation.
 - Follow by Glycopyrrolate 0.2mg IV every _____ hours as needed (range 4-8hr) for high oral secretion.
 - For significant thin oral secretions, give hyoscyamine 0.125 mg sublingual every 8 hours PRN.
 - Other medication for secretions: _____
 - For temp greater than 100°, give acetaminophen 650 mg per rectum every 4 hours PRN.
- 6. Discontinue vasopressors, inotropes and antiarrhythmics simultaneous with either extubation or placement on T piece**
- 7. Inform attending team of patient's death to pronounce whenever that occurs.**

Adaptation NS-1787. 0064

RESOURCES

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8. Massachusetts General Hospital, Medical ICU Project (2006, July): Ventilator Withdrawal Guidelines. <http://www.aacn.org/WD/Palliative/Docs/mgh8.pdf>

For Additional Information

Contact Dr. Andres Leone or Lauren King (Lauren.King@palmettohealth.org) for more information.

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This Care Map presents a model of best care based on the best evidence available at the time of publication. It is not a prescription for every patient, and it is not meant to replace clinical judgment. Although physicians are encouraged to follow the Care Map to help focus on and measure quality, variation from the pathway may occur as clinical freedom is exercised to meet the needs of the individual patient. Send feedback to Elizabeth Sheridan, Manager of Clinical Integration for the Palmetto Health Quality Collaborative (PHQC) at Elizabeth.sheridan@palmettohealth.org or 803 434-6906