**CLINICAL ALGORITHM: END OF LIFE CARE; REMOVAL OF MECHANICAL VENTILATION (RMV)**

**Goal**
The RMV process is an interdisciplinary guideline to provide comfort interventions for the dying critical care patient with compassion and respect when death is the expected outcome from removal of mechanical ventilation.

**POSSIBLE DISEASE PROCESSES:**
- Severe traumatic brain or other devastating traumatic injury's)
- Metastatic cancer or other complex disease processes
- Irreversible sepsis or multisystem organ failure
- Patient/family request for removal of mechanical ventilation

Note: For patients with severe brain injury or progressing to brain death refer to Devastating Brain Injury Pathway and ensure OPO referral has been initiated. Document on Devastating Brain Injury checklist

**Organ Procurement Agency Referral (OPO)**
- RMV patients may have the potential to be an organ donor
- Healthcare providers will not discuss organ donation, but shall Initiate OPO referral
- If pt is a candidate for organ donation or donation after cardiac death the OPO will manage content for the donation conversation

**The Interdisciplinary team (IDT) consists of the treating physician, the critical care nurse, and any other healthcare member who identifies the appropriateness of potential RMV end of life care management in regards to patient’s prognosis and wishes**

The IDT member(s) will communicate and initiate the RMV process if end of life care is the expected goal

**PATIENT RMV STEPS & PROCESS**
- The IDT identifies patient/family’s wishes for possible removal of mechanical ventilation and withdrawal of support
- The IDT coordinates meeting with patient, patient’s family or representative to discuss and confirm the patients wishes
- Facilitate communication, with patient, family, or significant other and ensure all questions are answered.
- Confirm and ensure religious, cultural, spiritual preferences are facilitated. Assess for potential barriers
- Initiate support services and referrals as indicated.
- Provide patient/family with end of life education and support (Bereavement brochure).
- Complete DNR form and initiate RMV orders.
- Update OPO regarding patient’s status
- Documentation to include treating physician discussion/plan, IDT members and family members

**Initiation of RMV Process**
- IDT meets for Huddle
- Assess patient for baseline heart rate, blood pressure, respiratory rate, and/or objective signs of pain/respiratory discomfort
- Discusses comfort medications (morphine and versed are recommended) and weaning method are ordered.
- Determines ventilator wean/removal method - Rate or Pressure weaning

**Processes**
- Proceed to either Rate or Pressure Weaning/Removal of ETT/Ventilation Support
- Order appropriate ventilator setting and comfort medications based on patient’s status and recommends per algorithm

**Principles**
- The RMV algorithm is based upon the 1990 Patient Self Determination Act & National Consensus recommendations.
- Ethical principles and care provided are not intended to hasten death but are to allow the patient a comfortable, peaceful and dignified death.
- Withdrawal of support and withholding support are the same principles
- All resources to validate patient’s wishes (advance directives, legal documents, patient’s family or representative) will be employed
- The RMV process is a guideline and does not replace professional judgment.
- If at any time during the weaning process objective signs/symptoms of pain/respiratory discomfort are indentified, hold weaning and administer pain/sedation medications

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**REFERRALS AS INDICATED**
- Social Service
- Chaplain, Religious, or Spiritual support
- TIPS: Trauma Crisis Intervention
- Palliative Care Team
- Ethics Team
- Child Life

**Lekawa, Williams, & Hoff**

**Interdisciplinary Team Huddle**
- Reviews RMV plan-comfort measures and method of removal of mechanical ventilation
- Addresses any questions or concerns of team
- Confirms understanding and agreement within IDT
- Ensure patient is not receiving PARALYTIC medications
- Ensure non-pharmacological interventions are implemented along with medication administration
**PREPARATION AND REMOVAL OF MECHANICAL VENTILATION USING SIMV RATE WEANING**

- The initial SIMV rate should match the number of supported breaths the patient is receiving
- Set ventilator to SIMV mode and patient’s matched supported breaths
- Set peep to 5 & Pressure Support 10
- Keep FIO2 at current setting

- When SIMV mode is initiated, administer morphine 5mg IVP x 1 and versed 2mg x 1 IVP

- Start morphine drip at 5mg/hr and Versed drip at 2mg/hr

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**Possible signs/ symptoms of pain/ respiratory discomfort:**

- Increased heart rate
- Respirations >24
- Increased systolic blood pressure
- Any physical signs of respiratory distress (i.e. labored breathing, retraction, pallor, diaphoresis, etc.)

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**Extubate**

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**Post Extubation Comfort**

- After extubation, pain and sedation drips may be adjusted as tolerated based on assessment and objective signs/ symptoms pain/respiratory discomfort
- Continue to provide comfort interventions, pain relief, and end of life care
PREPARATION AND REMOVAL OF MECHANICAL VENTILATION USING PRESSURE WEANING

Determine initial pressure mode - either pressure support (PS) or pressure control (PC)
- Change ventilator mode to pressure support spontaneous / CPAP mode by matching pt’s peak pressure of volume control breaths subtracting the set peep
- Peak pressure - peep = PS
- Set FiO2 100%

Pt does not tolerate PS
Pt tolerates PS

When ventilation PS or PC is initiated administer morphine 2mg IVP x 1 and versed 2 mg IVP x1
- Start morphine drip at 2mg/hr and start versed at 2mg/hr

After 2 to 5 minutes of ventilator mode change, evaluate patient for objective signs of pain/ respiratory discomfort

No signs/symptoms of pain/ respiratory discomfort
Yes signs/symptoms of pain/ respiratory discomfort

- Every 2 – 5 minutes reduce PS or PC in decrements of 5
- Assess patient for signs/symptoms of pain/resp discomfort until PS or PC of 0 is reached
- After PS/PC = 0, wean peep to 0

Yes Signs/symptoms of pain/ respiratory discomfort
No signs/symptoms of pain/ respiratory discomfort

Post Extubation Comfort
- After extubation, pain and sedation drips may be adjusted as tolerated based on assessment and objective signs/ symptoms pain/ respiratory discomfort
- Continue to provide comfort interventions, pain relief, and end of life care
- Consider weaning & removing O2 if pt remains comfortable

Extubate

ETT to be removed
Reassess for removal of ETT as appropriate
ETT to remain place

* Patient Comfort Weaning Principles & Parameters
- During ventilator weaning titrate pain/ sedation medication to target respirations 10 to 24 and/or objective signs of pain/ respiratory discomfort
- Assessment of objective signs of pain/ respiratory discomfort is ongoing and with every ventilator change
Possible signs/ symptoms of pain/ respiratory discomfort:
  - Increased heart rate
  - Respiration >24
  - Increased systolic blood pressure
  - Any physical signs of respiratory distress (i.e. labored breathing, retractions, pallor, diaphoresis, etc.)

* For Example: If pt’s peak pressure is 30 & peep is 5, set PS to 25

For Example: Change ventilator mode PC at the same pressure and rate determined during PS trial
Set -time 0.7 – 1.2 seconds to achieve patient resp. comfort

When PS/PC & PEEP are weaned to zero and pain/ sedation control is achieved with no objective signs/ symptoms of pain/respiratory discomfort, determine if endotracheal tube will remain or be removed (based on pt’s ability to handle secretions/ keep airway patent)