Ventilation Management Protocol CSICU (Respiratory Therapy)

Site Applicability

St. Paul's Hospital

Practice Level

Respiratory Therapist: Entry Level Practice

Need to Know

Physician ventilation orders and ventilatory care management in CSICU are provided under three separate categories:

1. Initial Orders
2. Ventilation and Oxygenation Goals
3. Weaning and Extubation

All patients will be managed as per the CSICU Protocol unless otherwise stipulated by the anesthetist.

Ventilator circuits in CSICU will routinely be set up with a heat-moisture exchanger/filter (HMEF). A heated humidified system should be used for patients in the following situations:

a) Core body temperature less than 34 ºC

b) Inhaled prostacyclin therapy (Flolan)

c) Mechanically ventilated for more than 48 hours

Protocol

1. Initial Orders

When ventilatory support is to be initiated, ventilator parameters should fall within the following ranges unless otherwise ordered by the anesthetist:

- **Tidal Volume:**
  - 6 to 10 mL/kg
- **Respiratory Rate:**
  - Less than 25
- **FiO_2:**
  - To maintain SpO_2 greater than 92%
- **PEEP:**

- 5 to 15 cm H_2O

2. Ventilation and Oxygenation Goals

The maintenance of ventilatory support by the Respiratory Therapist will be guided by the following targets, or as specified by the anesthetist:

- **Oxygenation:**
  - To maintain PaO_2 greater than 60 mmHg
  - To maintain SpO_2 greater than 92%
- **pH Range:**
  - To maintain between 7.25 to 7.48
- **$PaCO_2$:**
  - To maintain less than 55 mmHg

NOTE: When the ABG results are outside of the maintenance range, or when alterations in pH are due to metabolic causes, the anesthetist must be informed.

ABGs may be obtained as per B-00-12-12012, Arterial Blood Gas Clinical Practice Guideline Critical Care.

3. Weaning and Extubation

The mode of choice for weaning will be pressure support ventilation unless ordered otherwise by the anesthetist. The weaning plan will be determined in consultation with the bedside nurse and Respiratory Therapist, utilizing clinical assessment guidelines to determine the patient's readiness to wean.

Patients will be assessed for weaning within the first 4 hours post-operative, and if unsuccessful will be reassessed every hour for readiness to wean and extubate until the morning of post op day 1. If the patient has not been extubated at this point, the extubation plan must be discussed in AM rounds with the bedside nurse and attending physician.

At the end of each day shift that the patient remains intubated; another set of rounds will take place where the overnight plan for ventilator management /extubation will be discussed with the bedside RN, RT, day anesthetist and oncoming night anesthetist.

Weaning Criteria:

a) Normothermic:

- Core body temperature greater than 36 ºC

b) Hemodynamically stable:

- Cardiac index greater than 2.0
- Systolic blood pressure greater than 90
- Stable cardiac rhythm

- Minimal inotropic support

c) Intact airway reflexes:
   - Effective cough

d) Adequate pain control

e) Absence of pulmonary pathology on chest radiograph

f) Oxygenation status:
   - PEEP less than or equal to 8 cmH_2O
   - FiO_2 less than or equal to 0.50
   - SpO_2 greater than 92%

If the above criteria (a – f) has been satisfied, and the patient has an **f/Vt ratio less than 105**, initiate the weaning protocol using CPAP mode with **PS +5 cmH_2O**. Allow a minimum of 15 minutes and then assess for extubation readiness.

Extubation Criteria:

a) Ventilation status:
   - pH 7.25 – 7.48
   - $PaCO_2$ less than 55 mmHg, or; $ETCO_2$ less than 55 mmHg*
   - SpO_2 greater than 92%
   - PaO_2 greater than 60 mmHg

   *For patients that have been weaned from the ventilator and are being assessed for extubation before the morning of post op day 1, it is not necessary to do a pre-extubation ABG provided the $ETCO_2$ is less than 55 mmHg.

b) Respiratory pattern:
   - Stable rhythm
   - No accessory muscle usage or abdominal paradoxus (unless noted prior to surgery)

c) Cough reflex:
   - Strong cough reflex present

d) CNS:
   - RASS +1 or less
   - BPS less than 6

NOTE: If the patient exhibits any signs of respiratory distress, deterioration in ABGs, or hemodynamic changes, the patient will be placed on a higher level of ventilatory support and the anesthetist will be notified.

Extubation:

When the Respiratory Therapist, in consultation with the bedside nurse, determines that the patient is eligible for extubation as indicated by the assessment criteria, the patient will be extubated.

Oxygen therapy delivery for a routine extubation will be via nasal prongs. Consideration for providing high flow oxygen with heated humidity include:

- Patients that have been intubated/ventilated more than 48 hours
- Patients that require an FiO_2 greater than 0.50

Arterial blood gas measurements should be obtained 30 minutes post-extubation to assess the patient's oxygenation and ventilation status.

Documentation

Document the procedure and patient response.

Related Documents

B-00-13-12010, Ventilator Management Protocol for Critical Care (ICU, CIUC, ED)

B-00-12-12012, Arterial Blood Gas Clinical Practice Guideline

References

1. Cove, M., Ying, C., Taculod, J., Oon, S., Oh, P., Kollengode, R., MacLaren, G., and Tan, C. (2016). Multidisciplinary Extubation Protocol in Cardiac Surgical Patients Reduces Ventilation Time and Length of Stay in the Intensive Care Unit. *Ann Thorac Surg* 102: 28-34.

2. Cook, TM., Woodall, N., Harper, J., and Benger, J. (2011). Fourth National Audit Project.. Major complications of airway management in the UK: Results of the Fourth National Audit Project of the Royal College of Anaesthetists and the Difficult Airway Society. Part 2: Intensive care and emergency departments*. Br J Anaesth* 106: 632–42.

Effective Date:	01-Sep-1986
Posted Date:	01-Sep-1986
Last Revised:	23-Jan-2019
Last Reviewed:	01-Nov-2018
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