



HEALTH HOLDING
HAFER ALBATIN HEALTH
CLUSTER
MATERNITY AND
CHILDREN HOSPITAL

Department:	Maternal Intensive Care Unit		
Document:	Multidisciplinary Policy and Procedure		
Title:	Care of Patient on Mechanical Ventilator in Maternal Intensive Care Unit		
Applies To:	All Maternity Intensive Care Unit Staff		
Preparation Date:	January 12, 2025	Index No:	ICU-MPP-010
Approval Date:	January 26, 2025	Version:	2
Effective Date:	February 26, 2025	Replacement No.:	ICU-DPP-010(1)
Review Date:	February 26, 2028	No. of Pages:	4

1. PURPOSE:

- 1.1 To initiation and maintenance of Positive-Pressure Ventilation (PPV).
- 1.2 To improve and maintain oxygenation, ventilation, and provide respiratory muscle rest.
- 1.3 To save patient life and maintain hemodynamic until referral or will organised ICU- in other facility for M.D.P team care
- 1.4 Patient on mechanical ventilation in MICU is temporarily managed (within 48 hours) until referral arrangement
- 1.5 Starting invasive , non-invasive mechanical ventilation is the responsibility of ICU registrar / anaesthesia or / ICU consultant

2. DEFINITIONS:

- 2.1 **Mechanical ventilator** – is a machine that helps a patient breathe (ventilate) when he or she is recovering from surgery or critical illness, or cannot breathe on his or her own for any reason. The patient is connected to the ventilator with a hollow tube and uses it until he or she can breathe on his or her own.

3. POLICY:

- 3.1 Care of ventilated patients shall be provided by a qualified, knowledgeable nurse and RT. Standard precaution to be observed for every procedure.
- 3.2 All personnel in the critical care setting should know how to quickly get assistance and locate and use emergency/ resuscitation equipment.
- 3.3 The MICU nurse collaborates with physician and respiratory therapist for ventilator settings.
- 3.4 The MICU nurse should move tubing circuit from the ventilator carefully, as circuit and systems are closed and the staff nurses should be able to give care without disrupting system integrity or disconnecting components for the convenience of care (e.g. as in changing the patient's gown or position).

4. PROCEDURE:

- 4.1 Preparation:
 - 4.1.1 Double check the ventilator settings against those ordered by the physician.
 - 4.1.2 Plug the Machine in, and turn it ON.
 - 4.1.3 Familiarize yourself with location of alarm systems on the ventilator, and turn in ON.
 - 4.1.4 Validate that tube cuff inflation is appropriate with minimal occlusive volume or minimal leak (squeak heard at end of inspiration) while auscultating over suprasternal notch.
 - 4.1.5 Connect the ventilator tubing to patient's endotracheal tube or tracheostomy tube.
- 4.2 Initiation of Mechanical Ventilation:

- 4.2.1 The orders will be written by the MICU physician/anesthetist, but machine can be set by respiratory therapist or a trained nurse.
- 4.2.2 Choose the ventilator mode with which you are most familiar. The primary goals of ventilator support are adequate oxygenation/ventilation, reduced work of breathing, synchrony between patient and ventilator and avoidance of high end-inspiratory alveolar pressures.
- 4.2.3 Initial FiO₂ should be 100% FiO₂ thereafter can be titrated downward to maintain the oxygenation as measured by the pulse oximetry (SpO₂) at 92% to 94%. In severe acute respiratory distress syndrome SpO₂ ≥88%, may be acceptable to minimize complications of mechanical ventilation.
- 4.2.4 Initial VT = 6 to 8ml/kg in patients with relatively normal lung compliance. In patients with poor lung compliance (e.g. ARDS, a target VT of 6 ml/kg/IBW is recommended to avoid over distension and to maintain an inspiratory plateau pressure ≤ 30cm H₂O.
- 4.2.5 Choose a respiratory rate and minute ventilation appropriate for the particular clinical requirements Target pH, not PaCO₂.
- 4.2.6 Use PEEP in diffuse lung injury to maintain open alveoli end expiration, if volume is held constant. PEEP may increase peak inspiratory plateau pressure, a potentially undesirable effect in ARDS. PEEP levels > 15cm H₂O are rarely necessary.
- 4.2.7 Set the trigger sensitivity to allow minimal patient effort to initiate inspiration. Beware of autocycling if the trigger setting is too sensitive.
- 4.2.8 In patient at risk of obstructive airways disease, avoid choosing ventilator settings that limit expiratory time cause of worsen auto-PEEP.
- 4.2.9 Call the critical care consultant/anesthesia consultant for other appropriate consultant from assistant, if needed.
- 4.2.10 Mechanical Ventilation provides support for the work of breathing and assures alveolar ventilation. This intervention, however requires intubation of the patient, interferes with the normal airway defenses, and increases the risk of pulmonary injury and nosocomial infection. It is desirable to decrease the level of controlled ventilator support as soon as possible to assist the patient to extubation and the return of independent breathing.
- 4.2.11 Monitor patient's heart rate and blood pressure until stable.
- 4.2.12 Obtain arterial blood gases 15 minutes after ventilation is established.
- 4.2.13 Monitor ventilator settings and delivered values: Tidal volume, Inspiratory pressure, Peak pressure, rate, FiO₂, Inspiratory-expiratory (I:E) ratio, Ventilatory modes. The current Ventilators monitor these parameters continuously.
- 4.2.14 Ensure that the ventilator tubing is supported by the ventilator support arm in order to reduce the traction on the endotracheal or tracheotomy tube.
- 4.2.15 Change ventilator tubing if necessary, minimizing frequency of circuit opening and maintenance of a closed ventilator/ patient interface is desirable.
- 4.2.16 Check vital signs every hour and auscultate lungs as Positive Pressure Ventilation may decrease venous return and cardiac output.
- 4.2.17 Observe and listen for possible cuff leaks around tracheostomy or endotracheal tubes.
- 4.2.18 If necessary, discard accumulated water in the ventilator tubing via inline closed circuit drain. Opening circuit exposes patient to environmental pathogens frequency of circuit opening should be minimized.
- 4.2.19 Provide patient with call bell and methods of communication.
- 4.2.20 Test the nasogastric fluid and stool for occult blood if ordered.
- 4.2.21 Assess lung compliance frequently as it falls before changes are evident in blood gas analysis or clinical manifestation. Compliance is determined by VT/PIP-PEEP where VT= Tidal Volume; PIP= Peak Inspiratory Pressure. PEEP= Positive End-Expiratory Pressure.
- 4.2.22 Implement methods for stress reduction such as careful explanation of procedure, pain management, administration of sedatives, or neuromuscular blocking agents, as indicated.
- 4.2.23 Check the ventilator alarm parameters are set.
- 4.2.24 Maintain appropriate "Sigh" delivery as this extra volume breath assists in preventing atelectasis and stimulates surfactant production.

- 4.2.25 Monitor patient frequently to detect changes in status.
- 4.2.26 Eye care
- 4.2.27 Perineal care
- 4.3 Initiation of Non-Invasive Positive Pressure Ventilation (NPPV) Decision of NIPPV is ICU anaesthesia consultant
 - 4.3.1 Do not delay intubation if needed and keep in mind the patient's code status.
 - 4.3.2 Arterial blood gas (ABG) analysis should be considered.
 - 4.3.3 Explain the procedure to the patient.
 - 4.3.4 Keep head of bed $\geq 45^\circ$.
 - 4.3.5 Ensure appropriate mask or helmet size.
 - 4.3.6 Assess patient's tolerance of the mask by applying it by hand before securing the harness.
 - 4.3.7 Use the following initial ventilator settings:
 - 4.3.7.1 Mode: Spontaneous
 - 4.3.7.2 Trigger: Maximum sensitivity
 - 4.3.7.3 FIO₂: 100
 - 4.3.7.4 EPAP(Expiratory Positive Airway Pressure): 4-5cm H₂O (higher levels are poorly tolerated initially)
 - 4.3.7.5 IPAP(Inspiratory Positive Airway Pressure): 10-15 cm H₂O
 - 4.3.7.6 Backup rate: Start at 6/min
 - 4.3.8 Adjust the difference between EPAP and IPAP to achieve an effective tidal volume and CO₂ clearance. Adjust EPAP for alveolar recruitment in increments of 2 cm H₂O/ step to improve oxygenation. Depending on the ventilation, a similar increase in IPAP may be required to maintain the same VT.
 - 4.3.9 Titrate pressures, volume and FiO₂ to achieve appropriate PaO₂ and PaCO₂ levels Ventilator changes can be made every 15 to 30 minutes.
 - 4.3.10 Follow vital signs, pulse oximetry, mental status, clinical appearance and ABG (if indicated).
 - 4.3.11 Goals of NPPV may include a respiratory rate < 30/min, VT > 7ml/kg of predicted body weight, improved gas exchange and patient comfort.

5. MATERIAL AND EQUIPMENT:

- 5.1 Endotracheal tube or Tracheostomy
- 5.2 Pulse Oximetry
- 5.3 Appropriate sized resuscitation facemasks
- 5.4 Mechanical Ventilator
- 5.5 Suction Equipment
- 5.6 End-Tidal Carbon dioxide monitor (if available)
- 5.1 Endotracheal tube or Tracheostomy

6. RESPONSIBILITIES:

- 6.1 Physician
- 6.2 Nurse
- 6.3 Respiratory Therapist









7. APPENDICES:

N/A

8. REFERENCES:

- 8.1 Guidelines for Adult ICU Care/ Ministry of Health, General Directorate of Health Centers- Riyadh, 2013

9. APPROVALS:

	Name	Title	Signature	Date
Prepared by:	Ms. Doha Al Anizi	Maternal Intensive Care Unit Head Nurse		January 12, 2025
Prepared by:	Dr. Mogahid Mahmoud Ali	Maternal Intensive Care Unit Quality Coordinator		January 12, 2025
Reviewed by:	Mr. Sabah Turayhib Al - Harbi	Director of Nursing		January 14, 2025
Reviewed by:	Mr. Hassan Aldahkil	Head of Respiratory Therapy Department		January 14, 2025
Reviewed by:	Dr. Abdelghany Ibrahim	Head of the Department Anesthesia		January 15, 2025
Reviewed by:	Mr. Abdulelah Ayed Al - Mutairi	QM&PS Director		January 16, 2025
Reviewed by:	Dr. Tamer Naguib	Medical Director		January 19, 2025
Approved by:	Mr. Fahad Hezam Al - Shammari	Hospital Director		January 26, 2025