Related Policies and Procedures:
Mechanical Ventilation
Moderate Sedation or Analgesia Outside the Operating Room
Eye Care in the Intensive Care Unit
Use of Therapeutic surfaces/Bariatric Suites
Adult Enteral Tube Feeding
NMBA
Continuous Lateral Rotation Therapy

Approved by:
Nursing Practice Guidelines Subcommittee
Critical care Quality Improvement

Effective:
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Description: This guideline is for prone positioning of the Acute Respiratory Distress Syndrome (ARDS) patient.

Accountability: A physician’s order is required to prone the ICU patient. Nursing and Respiratory Therapy will coordinate the proning procedure. A physician must be present during the proning procedure.

Definitions:
Adult Respiratory Distress Syndrome (ARDS): PaO2/FiO2 ratio of less than 300, diffuse alveolar infiltrates on CXR or CT scan, with refractory hypoxemia. Onset of symptoms must be acute, as defined as within 7 days of defined event (sepsis, pneumonia, recognition of worsening respiratory symptoms). Patients with high PCWP and/or known CHF with left atrial hypertension can have ARDS.
Mild ARDS (formerly called Acute Lung Injury): PaO2/FiO2 200-300
Moderate ARDS: PaO2/FiO2 100-200
Severe ARDS: PaO2/FiO2 <100

PaO2/FiO2 ratio (P/F ratio): an estimate of the degree of intrapulmonary shunt. The P/F ratio is calculated by PaO2 divided by FiO2, with a normal value of greater than 300, (high altitude corrected value is 250).

Prone positioning: The process of placing a patient on his or her abdomen to recruit collapsed alveoli for improved oxygenation, gas exchange, and reduce ventilator-induced lung injury.

Refractory Hypoxemia: PaO2 less than 60 mmHg on FiO2 more than 50% with the inability to reduce FIO2 despite appropriate PEEP therapy.
Guidelines:

I. Contraindications

A. Absolute Contraindications:
- Unstable spine
- Unstable cardiac rhythm that may require defibrillation and/or cardiac compressions

B. Relative Contraindications
- Increased intracranial pressure
- Hemodynamic instability, defined by a systolic blood pressure of less than 90mmHg regardless of fluid and vasoactive support
- Open chest or abdominal wounds, chest tubes, burns or open wounds on face or ventral body surfaces
- Pelvic fractures
- Abdominal compartment syndrome
- Pregnancy
- Weight greater than 136kg

C. Precautions
- Tracheotomy tubes can cause logistical difficulties with pronation therapy, but techniques can be used to prevent tubes from direct contact with bed or supporting pads.
- Obesity or other problems resulting in increased intra-abdominal pressure may further increase intra-abdominal pressure once patient is in the prone position.
- Dialysis catheters and other central lines must be carefully secured before initiating the turn and monitored during turning process.
- Consider possible effects if chest tube drainage if patient is placed in prone position.

D. Considerations before Proning
- Consider placing patient on CLRT bed as soon as P/F ratio <300 (mild ARDS is suspected). Initiation of consistent lateral rotation to 40 degrees may have therapeutic benefits to prevent need for pronation therapy.

II. Preparations

A. Obtain physician order for prone positioning, including:
1. Length of time for each pronation cycle (recommendation is 6 to 20 hours)
2. Frequency of pronation/supine turning (physician must be present during each pronation/supine turning).
3. Hemodynamic and respiratory criteria for early return to supine position.
4. If using Gel Rolls, obtain order for position of chest and pelvic rolls (OR preference – lengthwise; AACN preference – lateral, see diagram below).
5. Assessment and management of pain and sedation requirements; patient may also need neuromuscular blockade during proning.
(Recommendation is for the patient to be heavily sedated with an ordered Riker scale of 1-2 and chemically paralyzed as status indicates).

**B. Explain the purpose of the proning to the patient and significant others**

**C. Ensure the following preparations have been made and necessary equipment is available:**

1. Must have a secured endotracheal tube to protect the airway.
2. Circulatory access (including central lines and arterial lines).
3. Reposition ECG (lateral placement of arm and leg lead is recommended so as not to cause pressure points when prone).
4. SPO2 monitoring probe is on the patient.
5. Inline suction catheter is in place.
6. Lubricate and protect eyes as per policy.
7. Assess and provide adequate pain management prior to and during procedure.
8. Ensure the tongue is inside the patient’s mouth. Respiratory Therapy will place a bite block if necessary.
9. Capnography (ETCO2) monitoring, if available, during the turning and while in the prone position.
10. Apply moisture barrier to patient’s face.
11. Have patient on a low airloss/pressure relieving mattress, if possible.
12. Remove head board if possible and have bed brake on.
13. RT to perform a complete ventilator check including ET positioning and cuff pressures pre and post turning.
14. Confirm there are enough personal to assist with turn (recommended 4-6 including but not limited to attending physician, RT, and patient’s assigned RN) and discuss the planned turn with assigned roles.
15. Drain all fluid collection bags/chambers on anterior aspect of patient (examples: ostomy bag, JP, etc)

**D. Immediately prior to proning patient perform a physical assessment and document results.**

1. Note condition of patient’s skin, incisions, tubes and catheters.
2. Zero and level and pulmonary and/or arterial catheters to establish baseline hemodynamics
3. Record hemodynamic and respiratory parameters and ventilator settings.
4. Pulse checks of all extremities.
5. Neurological assessment with baseline TOF if using NMBA.

**III. Procedure**

**A. Obtain chest and pelvic gel rolls and Gentle Touch head rest pillow from the OR (or use rolled and taped pillows if OR gel rolls not available).**

**B. Assemble team and delegate responsibilities.**

1. The attending physician is the team leader who directs position changes, protects catheters and tubing, and assists with turn.
2. Have at least 4 staff members (RN and CNA/ACP) assist with positioning and turning.
3. Respiratory therapist ensures airway protection and make ventilator changes if necessary.
4. An MD must be at the bedside during the procedure, to assist with emergencies.

C. Position of the team
   1. 2 RN/CNA/ACPs on each side of the bed.
   2. RT is at the head of the bed.

D. Ensure correct positioning of all tubes and invasive lines to prevent dislodgement.
   1. Catheters and tubing from head to waist are gathered at top of bed, and those below the waist are gathered at the bottom of the bed.
   2. Cover the entire patient with a clean sheet or mattress pad (which will assist with turning and serves as a bottom sheet when the patient is turned).
   3. If patient has an open abdomen, cover with a synthetic material or vacuum dressing prior to positioning and plan to position strategically to allow abdomen to be free of restrictions.

E. (Please see attached diagram for steps in sections E and F)
   1. Turn the patient’s head away from the ventilator, guide the ventilator tubing along face and loop the remaining tubing above the patient’s head.
   2. Slide patient to the side of the bed farthest from the ventilator.
   3. Take the patient’s leg which is closest to the edge of the bed and cross it over the opposite leg at the ankle.
   4. Raise the patient’s arms above the head if shoulder mobility allows, or gently tuck the arms and hands slightly under the patient’s buttocks.
   5. Tilt patient fully toward the ventilator. Be prepared to suction patient during turning as this procedure may mobilize secretions.
   6. While the patient is tilted on his/her side, align gel rolls on the bed in the method below as ordered by physician.

F. For AACN Lateral Chest Roll Method:
   1. For AACN Lateral Chest Roll Method: Using two gel rolls or pillow rolls approximately 5 inches thick, position first chest roll laterally across the patient’s sternal notch below the breasts, and a second roll laterally above the patient’s iliac crests. Place the Gentle Touch head rest pillow where the head and spine will align when proned.
   2. For OR Parallel Chest Roll Method: Using two gel rolls or pillow rolls approximately 5 inches thick, position chest rolls parallel to patient’s body from the acromio-clavicular joints to the supra iliac crests. Place the Gentle Touch head rest pillow where the head and spine will align when proned.
   3. Continue to turn the patient towards the ventilator and place in the prone position on top of rolls and head cushion.
   4. Ensure the abdomen is unrestricted and is not touching the bed surface; pelvic roll should not compress the penis or scrotum and chest roll should not compress the breasts. Judge adequate support by ensuring one hand-width separates the abdomen from the mattress.
5. Place patient in reverse Trendelenberg as tolerated to relieve facial edema and allow for continuation of tube feedings.
6. Ensure patency of all tubes and catheters.
7. RT to perform complete ventilator check including ascultating the chest to check for right mainstem intubation post turn.

IV. Ongoing care of the Proned Patient

A. Turn patient’s head at least every two hours, maintaining ET tube alignment and reposition head (even slightly) hourly. If Gentle Touch head pillow is unavailable from the OR, support the patient’s head by placing folded towels under the chin, cheeks and forehead to avoid pressure on the eyes. Raise the head enough to provide for proper spinal alignment: avoid extension or flexion of the cervical spine. Ensure the head rest placement is such that the eyes have no pressure on the orbits.

B. Gently position the arms in a swimmers pose so that the up arm is in a neutral position above the head and the down arm is parallel to the body in a position of comfort (head should be turned away from the direction of the upper arm to prevent brachial plexus damage). Alternate the arm position every two hours and provide physiotherapy range of motion exercise. When the arm is in the up position, keep the shoulder in a neutral position and the elbow at 90 degrees to prevent hyperextension of the shoulder.

C. The potential for foot drop exists and the legs require support to prevent external rotation or shortening of the Achilles tendons. This can be accomplished
by placement of a pillow under the shins to flex the knees and allow the feet to dangle at a 90 degree angle.

V. Returning to Supine Position

1. RT to perform complete ventilator check including ETT position and cuff pressure.
2. Align the patient with the edge of the mattress closest to the ventilator. (Patient will be turning away from the ventilator, towards the center of the bed)
3. Turn the patient’s head toward the ventilator, guide the ventilator tubing along face and loop the remaining tubing above the patient’s head.
4. Raise the patient’s arms above the head if shoulder mobility allows, or gently tuck the arms and hands slightly under the patient’s buttocks
5. Take the patient’s leg that is closest to the edge of the bed and cross it over the opposite leg at the ankle.
6. Tilt patient to a 45 degree angle, remove pelvic, chest and facial rolls.
7. Turn patient to a supine position.
8. Ensure patency of all tubes and catheters.
9. RT to perform complete ventilator check including ETT position and cuff pressure.

VI. Documentation

A. Patient and family education.
B. Nursing documentation: ongoing assessment of how the patient tolerated the proning turning and proning cycle (respiratory rate and effort, heart rate and blood pressure, SPO2, SVO2 if applicable, ABG prior and 30 minutes after proning, hourly pulse checks), facial and orbital edema
C. Respiratory Therapy document: PF ratio and static compliance pre-proning and while prone as well as documenting ventilator check with ETT positioning and cuff pressures pre and post turning.
D. Length of time in the prone position.
E. Oxygenation response when patient is in prone position and once patient is returned to the supine position.
F. Note any complications or unexpected outcomes during or after the procedure.
G. Nursing Interventions (frequent oral care, suctioning and assessment of skin).

VII. Patient Care Considerations:

A. Provide frequent oral care, suctioning, skin and eye care as needed (refer to therapeutic surface and skin care policies).
B. Maintain tube feeding as tolerated per policy. Consider using prokinetic agents and ensure feeding tube is post-pyloric before patient is turned.
C. Ensure accuracy of hemodynamic monitoring in the supine and prone position is unaffected.
D. Ensure patient comfort and safety. Frequently assess patient for any discomfort or pain.
E. Provide adequate pain relief measures as indicated, and assess response.

References:


Nursing Standard, 24, No 21, 42-45. (LOE 2)


Epic Order Set

Goal length of time for each pronation cycle: 4hrs, 6hrs, 12hrs, 20hrs

Frequency of pronation/supine turning: once, BID

ABG: 30 minutes after each turn (PRN)

Hemodynamic and respiratory criteria for early return to supine position: write in

Gel Roll position: lengthwise (OR preference), Lateral (ICU preference)

Document P/F ratio: with each prone/supine cycle

Hyperlinks to sedation management order set, NMBA order set, Enteral Tubefeeding order set, Mechanical Ventilation order set, Prone Positioning policy, Eye care In the Intensive Care policy,

Check box – Alert Information: *Attending physician must be present at bedside during each patient rotation, Keep Riker 1-2*