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PURPOSE:

To provide guidance on safely placing a patient in prone positioning. The prone position may be used in conjunction with other supportive strategies in an attempt to improve oxygenation in patients with acute lung injury (ALI) or acute respiratory distress syndrome (ARDS).

POLICY STATEMENT:

An order from the Most Responsible Physician (MRP) is required for prone positioning. The order must clearly stipulate duration of prone positioning.

A Critical Care Physician must be present for the initial prone positioning procedure. The Critical Care Physician must always be aware of prone positioning procedure. A Healthcare Professional (HCP) trained in intubation shall be present when placing the patient in the prone position and when returning the patient to the supine position.

Cardiopulmonary Resuscitation (CPR) is to be administered in the supine position. In the event of Code Blue, the patient is to be returned to supine position.

DEFINITION (S):

Prone Position:

Lying face downward. In ARDS, consolidation in lung tissue is patchy and gravity dependent. In the supine position gravity dependent perfusion can match gravity dependent consolidation. Proning increases ventilation to dependent lung zones by matching gravity dependent perfusion to ventilated alveoli, thus decreasing the shunt. Proning may also have a greater negative pleural pressure which may increase pressure to open and maintain airway patency. This results in better ventilation in dependent areas of the lung with better perfusion to match.

PROCEDURE:

1. **Patient Criteria:**
   a) Indications for prone positioning in ventilated patients include:
      - The ratio of arterial oxygen partial pressure (PaO_2) to fractional inspired oxygen (F_iO_2) (PaO2/FiO2 ratio) is less than or equal to 150 mmHg with ventilator settings of:
        - An F_i0_2 greater than or equal to 0.6 (60% oxygen)
        - A positive end-expiratory pressure (PEEP) greater than or equal to 5 cm
        - A tidal volume about 6 mL per kg of predicted body weight
      - Prone positioning is planned for at least 16 consecutive hours per day, if tolerated.

b) The risk-benefit to the patient must be considered by the MRP with consideration of all contraindications, in collaboration with the multi-disciplinary team.

c) Contraindications for prone positioning include, but are not limited to:
- Acute bleeding
- Spinal instability (unstable c-spine)
- Massive hemoptysis (requiring intervention)
- Tracheostomy or tracheal surgery
- Raised intracranial pressure
- Severe facial trauma
- Eye trauma or injury
- Rib fractures
- Pregnancy (later term)
- Anterior chest tube with air leak
- Open abdomen/recent abdominal surgery

d) Clinical criteria for discontinuing prone treatment include:
- Improved oxygenation in supine position at least four hours after the end of the last prone session, defined as a PaO_2/F_i0_2 ratio of greater than or equal to 150 mmHg with ventilator settings of:
  - A PEEP less than or equal to 10 cm;
  - A F_i0_2 less than or equal to 0.6 (60% oxygen).
- Deterioration of patient status related to prone positioning;
- Positioning demonstrates no improvement in patient status;
- Request of MRP.

2. Patient Preparation:

Prior to turning, complete the following care related to:

a) Oral Care:
- Suction mouth and hypopharynx

b) Facial Skin:
- Apply barrier product to prevent breakdown from oral/nasal secretions.

c) Eyes:
- Obtain order for eye lubricant.
- Lubricate eyes and tape shut in a horizontal fashion and pad with eye patches. (To decrease occurrence of corneal abrasions or dehydration).

d) Nasogastric (NG) and/or Orogastric (OG) Tube (Dobhoff)

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- Ensure the face is clean and tube is secure.
- If enteral feeding is contraindicated, the need for Total Parenteral Nutrition (TPN) should be reviewed with Physician and Dietitian.
- Reverse Trendelenburg should be maintained while in the prone position. If reverse Trendelenburg is not possible, ensure a tube with the ability for gastric drainage is in place.

e) Endotracheal Tube (ETT):
- Ensure the face is clean and tube is secure.
- Suction prior to turn.
- Ensure inline suction catheter and all connections are secured.

f) Tracheostomy:
- Ensure tube is well secured, sutured in if possible.
- Avoid circumferential tube securing if possible due to the potential of slippage and impaired venous return.

g) Lines:
- Ensure all peripheral and central lines are secured, not tangled or scheduled to be changed.
- If changing of lines is required, change lines before proning.
- Pad all caps, locks, ports and transducers to ensure skin is well protected. Cap off as many lines as possible for turn.

h) Drains and/or Catheters
- Ensure all drains are secure and the underlying skin is padded.

i) Dressings:
- Change all dressings prior to turn.
- Consider padding on bony prominences as applicable

j) Sedation/Neuromuscular Blockade
- Obtain orders from MRP for analgesia/sedation/neuromuscular blockade

3. Preparation for the Turn

a) Perform hand hygiene and don appropriate personal protective equipment (PPE)

b) A minimum of five (5) Healthcare Professionals (HCPs) are needed:
- Two HCPs are positioned on each side of the bed;
- The RRT is positioned at the head of the bed;
- It is recommended that a sixth HCP stand at the foot of the bed to observe turn, read the proning checklist out loud and monitor patient.

c) The RRT is responsible for:

- Maintaining stability and position of the ETT and ventilator tubing throughout the turn.
- Providing the team with direction regarding the turn (i.e. will lead the count and any position change that is done).
- Evaluating ETT securement and identifying ETT marking at the TEETH prior to turning. The RRT will place the portion of the tubing extending out from the ETT on the side of the patient's face opposite the ventilator and loop remaining ventilator tubing above the patient's head.
- Ensuring correct positioning of all tubes and invasive lines.

d) The team will turn the patient to one side and relocate ECG leads/cables to the patient's back.

e) The team will place pillows in preparation for turn:
- At the torso below the clavicle (just above the level of the axilla)
- At the hips (across the iliac crest – do not place middle roll below the iliac crest as femoral nerve compression can occur)
- Across the thighs

f) The team will position the patient in preparation for turn:
- Turn the patient's head to look in the direction of the ventilator;
- Position patient's arms alongside of the body with fingers pointing towards toes.
- Cross patient's feet at the ankles by placing the foot opposite the ventilator on top.

g) The team will secure the patient for turn:
- Place two lifters over the patient's chest and mid-section.
- Cover the patient with a sheet – from patient head to the foot of the bed. Fold the section of the sheet that is above the shoulder so that the patient's head is not covered.
- Holding both the top and bottom sheets together along the sides of the patient, tightly roll the sheets together like a jelly roll. Roll sheet under on side closest to the ventilator. Roll sheet up on the side farthest from the ventilator.
- Slide the patient to the side of the bed away from the ventilator.

4. Performing the Turn

a) The RRT at the head of the bed is responsible for determining when to turn patient onto their side. Prior to turning, the RRT will review the plan with the team and provide instructions to:
- Log roll using spinal precautions;

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- Hold tightly onto the jelly roll on each side to secure the patient;
- Turn patient onto their side;

b) Following the turn onto side, the RRT will adjust the ETT and tubing to prepare for the final turn.

c) The RRT at the head of the bed is responsible for determining when to turn patient from side to prone. Prior to turning, the RRT will review the expectations for the second turn and provide instructions to:
- Hold tightly onto the jelly roll at each side to secure patient;
- Slowly turn the patient prone;

d) The RRT will provide feedback on speed of turn according to airway needs.

e) The RRT will support the ETT and maintain neck alignment.

f) Following proning, RRT will reassess patient's airway:
- Check for kinks in tubing
- Assess breath sounds, ventilator parameters
- Check that ETT distance has been maintained and re-verify cuff pressure
- Evaluate end tidal CO_2. (A significant change in end tidal CO_2 measurement can also indicate tube migration).

g) The lifting team will assist RRT to establish airway patency. The head and shoulder may need to be lifted and supported in order to allow ventilator tubing to hang freely.
- If the shoulders and chest are not high enough and additional pillows are required, DO NOT allow patient's neck to be extended backward during repositioning or placement of pillows. This can lead to neck injury or loss of airway.

h) The RRT will assess pressure points around ETT and securement device. Adhesive tape securement may need to be considered if Anchorfast is causing pressure.

i) If a cuff leak develops and persists after adding additional air once, the RRT will recheck the tube position at the TEETH and a prone position x-ray will be requested to rule out laryngeal placement.

j) The team will assess all lines and tubes:
- Assess for kinks, disconnection or pressure points.

k) Place bed in reverse Trendelenburg position, at a 10-20 degree angle.

5. Positioning and Care Post-Turn

a) After the patient has been turned, the sheet and lifters that are now on top of patient shall be removed.

b) The patient's head will be repositioned every 2 hours.

- Use an absorbent pad or cloth under the face to contain excess secretions if needed.

c) Assess for and provide pressure relief of vascular devices and tubes on an ongoing basis to ensure patient is not lying on tubing or devices.
- Urinary catheter and fecal management tube shall be placed between patient's legs.

d) Position patient head on "donut" cushion.

e) Ensure eyes are not in contact with the cushion (avoid pressure) and the head is evenly supported with the neck in a neutral position.
- Keep eyes moist and lids closed at all times.

f) Check that ears are not compressed or folded (avoid pressure).

g) Ensure legs and toes are not touching bed by placing a pillow under the shins.

h) Raise the head of the bed so the eyes are slightly above the right atrium to provide for venous drainage.

i) Arms can be left in a side lying position, aligned with the body or one arm up and one arm down, similar to a swimmer's position with the head facing away from the lifted arm to prevent risk of damage to the brachial plexus.
- Alternate arm positions. Dropping the arm below the bed surface (e.g. on padded bedside table) can help relax the shoulder; this can usually be done one arm at a time.
- Ensure the ulnar nerve is protected as it is susceptible to pressure injuries.
- Reposition frequently (every 2 hours minimum with RRT present).

j) Male genitalia should hang freely.
- The pillow at the iliac crest helps to raise pelvis.

6. Duration of the Turn

a) Length of time in prone/supine position shall be determined by the physician. Recommended length of time in prone position is 18 hours maximum per session.

b) Turns should be attempted during day shift if possible (patient remains in prone position overnight and is flipped to supine in the morning).

7. Documentation

a) The RN will document electronically and should include:
- Response to turning;
- Pressure relief strategies;
- Any assessment findings.

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b) The RN will document every 2 hours using the Prone Position Assessment intervention in Meditech.
c) The RRT will document any changes in ventilation.
d) Any change in the patient's condition will be documented.

RELATED PRACTICES AND / OR LEGISLATIONS:
N/A

REFERENCES:

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Niagara Health System (2016). ICU Prone Positioning

APPENDICES:
Appendix A: Proning Preparation Checklist
Appendix B: Patient Preparation (Prior to Prone)
Appendix C: Turning (Prone) Checklist
Appendix D: Proning Maintenance Checklist
Appendix E: Patient Preparation (Prior to Supine) Checklist
Appendix F: Turing (Supine) Checklist

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Appendix A: Proning Preparation Checklist

- ☐ Check physician's order.
- ☐ Ensure patient is on a bed that does not have steering handles or a deep bumper.
- ☐ Insert gastric tube if Reverse Trendelenburg cannot be maintained while in prone.
- ☐ Assemble team and review responsibilities.
- ☐ Obtain difficult airway cart and have equipment ready to use (outside of the room).
- ☐ Examine patient's chest to identify areas vulnerable to pressure. Integrate strategies to alleviate pressure on those pressure points.
- ☐ Obtain extra pillows to aid in positioning.
- ☐ Tighten all ventilator connections and check that cuff is well sealed.
- ☐ Reposition all lines and tubes that are located ABOVE the patient's waist straight up toward the head of the bed.
- ☐ Reposition all lines and tubes (e.g. bladder catheter, fecal drainage system) that are located BELOW the patient' waist straight down toward the foot of the bed.
- ☐ RRT re-evaluate ETT securement device and identify ETT distance marking at the TEETH immediately prior to turning.
- ☐ Ensure no traction on bladder catheter (if applicable, ensure foreskin is in correct positon).
- ☐ Check chest tubes to prevent kinking.

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Appendix B: Patient Preparation (Prior to Prone) Checklist

- ☐ Apply lacrilube and ensure eyes are closed.
- ☐ Maxi-inflate the bed surface
- ☐ Turn patient to one side and apply ECG leads to the patient’s back.
- ☐ Return patient to supine position and remove all chest electrodes.
- ☐ Position pillow across the patient’s upper chest just above the axilla.
- ☐ Position pillow across iliac crest.
- ☐ Position pillow across mid-thigh (avoid pressure in the groin area).
- ☐ Cross the feet at the ankles by placing the foot OPPOSITE to the ventilator on top.
- ☐ Place two lift sheets over the patient’s chest and midsection.
- ☐ Cover the lifters and entire patient with a sheet.
- ☐ Fold the section of the sheet that is above the shoulders so that the patient’s head is not covered up.
- ☐ Grab both the TOP and the BOTTOM sheet together. Along both sides of patient, tightly roll the sheets together like a jelly-roll to sandwich the patient firmly between the sheets.

Appendix C: Turning (Supine to Prone) Checklist

- ☐ Move patient to the side of the bed opposite to the ventilator.
- ☐ Move patient to the top of the bed.
- ☐ Secure the jelly-roll tightly
- ☐ Turn patient to face the ventilator. (Patient should be perpendicular to bed surface).
- ☐ Secure airway and make sure lines/devices are in position prior to completing turn.
- ☐ Complete turn into prone position. Patient's face should be facing towards ventilator.
- ☐ Reassess airway once patient is prone:
    - ☐ Check for any kinks in tubing.
    - ☐ Assess breath sounds, ventilator parameters.
    - ☐ Check that ETT distance has been maintained and re-verify cuff pressure.
    - ☐ Evaluate end tidal CO_2
    - ☐ Lifting team to assist RRT to establish airway patency.
        - ☐ Head and shoulders may need to be lifted and supported to allow ventilator tubing to hang freely.
        - ☐ If additional pillows are required, DO NOT allow patient's neck to be extended backward during repositioning or placement of pillows
        - ☐ Assess pressure points around ETT and securement device.
    - ☐ If a cuff leak develops and persists after adding additional air once, recheck tube position at the TEETH and perform prone position x-ray to rule out laryngeal placement.
- ☐ Assess lines and tubes
- ☐ Review the procedure for ongoing assessment/monitoring/repositioning.
- ☐ Place bed in Reverse Trendelenburg position, at a 10-20 degree angle.

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Appendix D: Proning Maintenance Checklist

- ☐ Reposition arms every two (2) hours
  - ☐ Place arms in adduction position (arms to side, palms up)
  - ☐ Place arms at side of patient's head
  - ☐ Place arms in swimmer's position (one in each position)
- ☐ Reposition head every two (2) hours
  - ☐ Facing towards the ventilator
  - ☐ Facing away from the ventilator
- ☐ Make sure orbits and the eyes are not in contact with the bed mattress.
- ☐ Assess patient's skin for areas of breakdown.
- ☐ Replace or add additional silicone dressings to pressure points.
- ☐ Ensure patient's neck and lower back are not hyperextended.
- ☐ Keep mattress in normal model while patient in prone position.

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Appendix E: Patient Preparation (Prior to Supine) Checklist

- ☐ Assemble team and review responsibilities.
- ☐ Remove pillows and pads from under patient knees and ankles.
- ☐ Turn patient to one side and apply ECG leads to the patient's chest.
- ☐ Remove electrodes from patient's back.
- ☐ Reposition all lines and tubes that are located ABOVE the patient's waist straight up toward head of the bed.
- ☐ Reposition all lines and tubes that are located BELOW the patient's waist straight down toward the end of the bed.
- ☐ RRT re-evaluate ETT securement device and identify ETT distance marking AT THE TEETH prior to turning.
- ☐ Position arms along the side of the body with fingers pointing toward toes. Keep arms as close to the body as possible.
- ☐ Cross the feet at the ankles by placing the foot CLOSEST to the ventilator on top.
- ☐ Place two lift sheets over patient's chest and midsection.
- ☐ Cover the lifters and entire patient with a sheet. This sheet should cover from head to foot of the bed.
- ☐ Fold the section of the sheet that is above the shoulders so that the patient's head is not covered up.
- ☐ Grab both the TOP and the BOTTOM sheet together. Along both sides of the patient, tightly roll the sheets together like a jelly-roll to sandwich the patient firmly between the sheets.

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Appendix F: Turning (Prone to Supine) Checklist

- ☐ Move patient to the side of the bed closest to the ventilator.
- ☐ Move patient to the top of the bed.
- ☐ Secure the jelly-roll tightly.
- ☐ Turn the patient to face the ventilator during the turn.
- ☐ The RRT will count to three.
- ☐ Roll the patient into the supine position AWAY from the ventilator.
- ☐ Reassess airway once patient is supine.
    - ☐ Check for any kinks in tubing
    - ☐ Assess breath sounds, ventilator parameters.
    - ☐ Check that ETT distance has been maintained and re-verify cuff pressure.
    - ☐ Evaluate end tidal CO_2
    - ☐ Lifting team to assist RRT to establish airway patency.
    - ☐ If a cuff leak develops and persists after adding additional air once, recheck tube position at the TEETH and perform prone position x-ray to rule out laryngeal placement.
- ☐ Assess lines and tubes
- ☐ Review the procedure for ongoing assessment/monitoring/repositioning.

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