MUSKOKA ALGONQUIN HEALTHCARE

Guidelines for Proning in the Critical Care Unit

2020

Guidance packages provide the nurse with information to enhance knowledge, skill and judgment in caring for patients. The information in this package does not replace Physician Orders, nor can it be considered a Physician Order.

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Introduction

The purpose of this guideline is to provide direction for safe and effective prone positioning for the patient and team involved with the procedure.

Why Prone a Patient

Prone positioning improves oxygenation through a variety of mechanisms, primarily optimization of ventilation and perfusion. It produces changes in the distribution of extravascular lung water as well as secretions and results in a decrease in both alveolar over inflation and alveolar collapse

Ventilation strategies for patients with ARDS maintained in the supine position tend to result in atelectasis in the dependent regions of the lungs and shunting through these areas. With the patient in the prone position, the shift in gravitational forces reduces atelectasis and minimizes compression of lung parenchyma by the heart and mediastinal structures, resulting in improved ventilation-perfusion matching

The Decision to Prone

The decision to proceed with prone positioning is based on weighing clinical benefit versus risk. A physician's order is required and the plan should be discussed by the interprofessional team in advance to ensure a safe environment for proning. The rationale for proning and consent and discussion with the substitute decision maker must be documented in the patient care record.

Duration/ Frequency

Duration and frequency is dependent on the physician's order and is established on a case-by-case basis. Evidence (Guerin, 2013) supports the prone position be maintained for a period of 16 hours, based on patient tolerance with several repeat sessions dependent upon the patient's response.

Inclusion

Inclusion criteria have been based on those used in recent RCTs for patients with ARDS. Patients who meet the following criteria may be considered for prone positioning following the critical care attending physician (or delegate) assessment for any contraindications.

- Endotracheal intubation & mechanical ventilation
- PaO2/FIO2 ratio < 150mmHg with an FIO2 greater than or equal to 0.6, PEEP >5 cm H20 and Vt of 6ml/kg PBW (range 4-8 ml/kg)
- Diffuse bilateral infiltrates as evidenced on a radiological exam

Absolute Contraindications

The following is a list of absolute contraindications as described by Guerin 2013

- Intracranial pressure >30 mmHg or cerebral perfusion pressure <60 mmHg
- Massive hemoptysis requiring an immediate surgical or interventional radiology procedure
- Tracheal surgery or sternotomy in the previous 15 days
- Serious facial trauma or facial surgery in the previous 15 days
- Cardiac pacemaker inserted in the previous 2 days
- Unstable spine, femur, or pelvic fractures
- MAP < 65 mm Hg despite vasopressors
- Pregnant women
- Burns on more than 20% of the body surface area (dependent on location of burns)
- Open abdomen
- Abdominal compartment syndrome

Relative Contraindications

The following list does not exclude a patient from prone positioning but extra caution and consideration must be exercised when proning a patient with any of the following. Discussion with consulting services is recommended to optimize patient safety.

- Dialysis
- Spinal drain
- ICP monitor
- Morbid obesity
- Difficult intubation
- Recent life threatening arrhythmia
- Skeletal traction for extremity fractures
- Single anterior chest tube with air leaks
- Deep venous thrombosis treated for less than 2 days

Complications

The following is a list of common potential complications of proning. Routine care (listed below) with repositioning and ongoing monitoring are geared towards minimizing the risk of complications.

- Corneal abrasions
    - Apply eye lubricant, eye patchs & tape eye lids with paper tape (ensure caution when removing tape)
- Optic nerve ischemia (which can cause blindness)
    - Need to diligently ensure no pressure on eyes
- Skin breakdown/pressure ulcers
    - Place pillows or pressure relieving devices at potential pressure areas (face, knees, chest, hips)
    - Reposition arms & head Q2h
    - Apply barrier cream (include the face due to excessive nasal and oral secretions)
    - Apply protective dressings to bony prominences such as knees/iliac crest (i.e. Mepilex)

    - Do not secure oral gastric tube to the area of the face that rests on the mattress
    - Secure nasogastric tubes with waterproof tape due to excessive nasal secretions
    - If patient is on Progressa bed, consider 10 percent lateral rotation schedule
- Facial edema
    - Use the reverse Trendelenberg position
    - Facial repositioning Q 2h
- Cardiac arrest
    - See ' What to do in Event of Cardiac Arrest' below
- ETT kinking/blockage
    - For Q2h facial reposition RRT & RN should be at the head of bed
    - Use facial gel pads to facilitate a position that avoids kinking/blockages
    - Assess air entry post tuning and facial repositioning
- Line dislodgement
    - Secure lines in a position that will prevent dislodgement
    - Utilize extension tubing as necessary. Position IV pumps opposite site of vent
    - Minimize unnecessary IV tubing
- Gastric intolerance
    - Post pyloric enteral nutrition is preferred
    - May continue enteral nutrition at the discretion of the physician
    - Secure the gastric tube with placement documented in centimeters at the site of insertion (i.e. 65 cm at the right nare)
    - Use reverse Trendelenberg position

When to Discontinue the Prone Position

Discontinuing the prone position is done at the discretion of the critical care attending physician (or delegate); however the following criteria have been utilized in recent trials (Guerin et al., 2013)

- Improvement in oxygenation defined at P/F Ratio >150mmHg with PEEP <10 cm H2O and FIO2<0.6 sustained for 4 hours when supine
- Extubation
- Cardiac arrest
- Right mainstem intubation
- ETT obstruction not immediately relieved with usual procedures (e.g. suctioning)
- Hemoptysis
- SaO2 < 85% or Pa02 < 55 on FI02 1.0 for greater than 5 minutes
- Bradycardia <30 bpm for greater than 1 minute
- SBP <60 mmHg for greater than 5 minutes (despite vasopressors)

Getting Ready for the Procedure:

Patients requiring proning are critically ill and often deeply sedated and paralyzed. As such, it is imperative that the appropriate number of trained staff are at the bedside to prone patients, ensuring no injury to the patient from improper handling, and to diminish the risk of ETT tube disconnect/ loss of airway from the ventilator. ETT disconnect or loss of airway in a patient with severe ARDS is life-threatening. A physician or RRT who is able to reintubate if necessary must be available.

- Personnel (minimum 5 staff required) RRT, Nursing. For the first prone, Critical Care Or Anesthesia to be present. For subsequent turns, a physician capable of intubating must be immediately available. ***Ensure RT scheduled in house 24/7***
- Safety Huddle (led by ICU Attending Physician or Delegate) The purpose of the huddle is to ensure the procedure is done safely and effectively through review of the following:
    - Inclusion criteria & cautions
    - Consider any special circumstances
    - Discuss with any consulting services (ie: surgery, physio) and inform in house emerg physican.
    - Review the procedure. Review roles and responsibilities. Review emergency procedures (i.e. what to do in the event of cardiac arrest,

extubation or prolonged desaturation) and ensure emergency equipment is easily accessible and in good working condition
    - Review the proning checklist
    - Consider watching the video resource (http://www.youtube.com/watch?v=Hd5o4ldp3c0) (On LMS)
    - Consider time of proning
    - Suggest positioning patient prone between 1600-1700 hours and returning to supine between 0800-0900 hours. Based on staff feedback, maximal interprofessional staff is available during these times and the remaining day-time hours allow for assessment, additional testing and family visits.

Equipment

- MAHC Proning checklist (Appendix I)
- Specialty bed (Progressa) if available. Procedure should not be delayed for the purposes of obtaining a specialty bed. The patient may be positioned onto the specialty bed with the next
- Re-position: Pillows (3) or Gel bolsters soakerpads (3) Flat sheet Gel head cushion (stored in OR) Paper tape Eye patch (2) Eye lubrication Electrodes for posterior placement (5) Barrier cream (i.e Proshield)
- Personal protective equipment
- Protective dressings (i.e Mepilex)
- EtCO2 module and equipment
- Medication anticipated to be required i.e. hypotension/pain/agitation

Patient Assessment/Activities Pre-Proning

- Inform the SDM
    - Document discussion with SDM in patient care record
- Reposition ETT and ensure it is secure (non-circumferential tapes)
- Consider insertion of post pyloric feeding tube for enteral nutrition (Post pyloric feeding is preferred due to decrease abdominal distention and risk of aspiration)
- The decision to continue enteral feeds is at the discretion of the physician

- Change any dressings
- Clean face and apply barrier cream (Increased oral/nasal drainage while prone can contribute to skin breakdown)
- Apply eye lubricant and tape eyes shut with eye patch and paper tape (Patients in prone position are at increased risk of corneal abrasion and orbital edema)
- Turn patient and apply ECG electrodes and leads to the back. Remove ECG leads from the anterior of the patient (It may be reasonable to temporarily remove ECG leads for the turn if other hemodynamic monitoring is in place)
- Disconnect any non-essential lines/tubing (i.e.tubing for feeds, maintenance IVs, EtCO2, CVP line) Secure lines and add extension tubing (Reduces the risk of line dislodgment)
- Secure chest tubes and place drainage device at the foot of bed
- Secure foley catheter and place drainage device at the foot of the bed
- Protective dressing applied to bony prominences – iliac crests, knees (Protects pressure points from skin breakdown). Pay attention to any medical devices that may cause pressure (subclavian line)

The Turn to Prone

- Physician or RRT is at the head of bed, nursing minimum 2 staff at each side of the patient
    - A physician capable of re-intubating must be present in the hospital and immediately available during proning/de-proning
    - If the patient is a known difficult airway then anesthesia must be available; if patient was initially easy intubation, may proceed with RRT present and ER MD aware and available prn
    - Physician should be at bedside the first time a patient is being proned
- Tuck arm closest to ventilator under buttock
- Place SpO2 on limb furthest away from the ventilator
    - This will ensure that SpO2 measurement continues through the duration of the turn
- Place soakerpads (2-3) over patient
    - o These will end up under the patient when the turn is complete

- Place 2 pillows or gel bolsters on top of dry flow pads (only required when using standard ICU bed)
    - Chest
    - Iliac crest
- Place flat sheet on top of pillows, fold to as to not cover the face, leave enough sheet to cover mattress when patient prone
    - This sheet will be beneath the patient at the end of the turn Roll top sheet together with bottom sheet (cocoon)
    - The cocoon will ensure that the pillows and lines remain in the correct position and the patient's body is fully supported for the duration of the turn
- Final Steps (Directions refer to the ventilator on the LEFT of patient)

  1. Slide patient away from ventilator (right)
  2. Turn patient to side, facing ventilator (left). Reassess ETT, lines and tubes
  3. Slowly complete proning (as per MD/RRT) taking extra caution with ETT/lines/tubes. MD/RRT to support head & ETT with turn, head to face the ventilator ensuring ETT accessible and not kinked
  4. Assess lines and tubes for dislodgement, or kinking, assess for bilateral air entry
  5. Reattach disconnected lines/cables/tubing
  6. Position arms in modified 'swimmers crawl' Arm up on the side the face is turned Shoulder dropped and elbow below axilla Opposite arm at the side of patient with the palm up
  7. Unfold and pull flat sheet so it's flat under the patient's head
  8. Ensure pillow is under shin; ankles and toes are off the bed (use additional pillows/linen to keep feet at 90 degree angle)
  9. Place the bed in reverse Trendelenburg position
  10. Check ETT cuff pressures (the need to add air to the ETT cuff more than once could indicate that the ETT has migrated into the pharynx or damage to the pilot/cuff. Perform a PA chest xray if any concern to assess placement)
  11. Check tidal volumes and air entry
  12. Check high risk anatomical locations:

  - ensure scrotum and penis are free/not trapped
  - ensure no pressure on or near eyes

- double check arm positioning (as described above)
- ensure feet are not forced into plantarflexion
- ensure neck is neutral; with head adequately supported

Note: The placement of lines and tubes may dictate that the turn happens with the patient turning away from the ventilator. During the "Safety Huddle" the direction of turn should be discussed by the team. Any risk of dislodgement of lines/tubes or any other safety issues are to be resolved prior to the turn.

For patients with limited mobility/short/stiff neck Consult PT and consider alternative arm placement with both arms neutral at sides

Watch the Video on Turning to Prone on LMS or at:

http://www.youtube.com/watch?v=Hd5o4ldp3c0

Monitoring

Proned patients are deeply sedated and often paralyzed during proning. This increases the risk for joint, limb and nerve injury due to altered neuromuscular stability. Special care must be given to maintain proper spine and limb alignment. In addition to the standard ICU care prescribed, patients that are proned should also have the following assessments/procedures done Q2h .

Repositioning

<u>Head and Face:</u>

Ears not kinked
Eyes well lubricated
ETT tapes secure

Pressure points assessed
Nasal/oral/ETT secretions suctioned

The following steps describe 2 methods for facial repositioning:

Method 1 (The Dangle)

This method is preferred when using a standard ICU mattress and/or with patients who have good range of motion in their neck.

1. Ensure the ETT is secure prior to repositioning

2. Gather personnel, 4-5 staff (RRT at HOB)

3. Place both arms at the side of the patient with palms facing up

4. Slide the patient up in the bed so head is fully off the bed and supported by the RRT (an additional staff member may be necessary to assist with ventilator tubing)

5. RRT & RN support the patient's head and reposition the head and tubing to the alternate side

6. Team slides the patient back down the bed so that head is on bed

7. RN and RRT assess the face to ensure ETT is accessible and no pressure on eyes

Method 2 (The Cobra lift)

This method is preferred when using a specialty bed with the 'head deflate' option and/or patients with limited neck mobility

1. Ensure ETT is secure

2. Gather 4-5 personnel

3. Place both arms at the side of the patient with palms facing up

4. One person on each side of the patient raises their chest off the bed (Cobra lift)

5. RRT & RN support the patient's head and reposition the head and tubing to the alternate side

6. RN and RRT to assess the face to ensure ETT is accessible and no pressure on eyes

Arms

Modified swimmers crawl (arm up on the side where face is turned)

Shoulder dropped below chest (Shoulder up or shrugging positions can lead to frozen shoulder/brachial plexus injury)

Elbow below axilla

Arm repositioning will minimize the risk of skin breakdown and nerve injury and can safely be done safely with 2 staff

Legs

Examine knees and toes for skin breakdown

Feet should be maintained in dorsiflexion (ankle at 90 degrees, no downward toe pointing). This can be maintained by placing a gel roll under the lower shin to raise ankles off bed

Genitals

Examine the genitals for position/skin breakdown

Returning Supine

The decision to return the patient supine is based on the ICU attending physician (or delegate) order and patient response. The steps to return to supine are as follows:

- Safety huddle with MD/RRT at HOB, nursing at each side of patient (minimum 2 staff on each side); confirm an MD capable of reintubation is immediately available prn
- Start with head facing the ventilator
- Place SpO2 on limb closest to the ventilator
- Remove posterior ECG leads
- Tuck the arm furthest away from the ventilator under the patient's thigh
- Place 2 soaker pads across patient covering posterior
- Place flat sheet from head to toe, folded as to not cover the head Roll top sheet together with bottom sheet (cocoon)
- ICU attending or designate to review the plan for the turn with the team
- Slide patient toward ventilator
- Check ETT/lines/tubes
- Turn patient to side, facing ventilator, check ETT/lines/tubes
- Slowly complete turn to supine using extra caution with ETT/lines/tubes
- Unfold the flat sheet so it is flat under the patient
- Elevate the HOB to 30 degrees and initiate rotation and advanced therapy with bed if applicable
- Consider a debriefing after the turn for feedback from the team members

Note: The placement of lines and tubes may dictate that the turn happens with the patient turning away from the ventilator. During the "Safety Huddle" the

direction of turn should be discussed by the team. Any risk of dislodgement of lines/tubes or any other safety issues are to be resolved prior to the turn.

Cardiac Arrest

Patients in the prone position are at increased risk of cardiac arrest for a variety of reasons including but not limited to the potential for loss of airway, compromised hemodynamics and severity of illness.

When the patient cannot be placed in the supine position, it may be reasonable for rescuers to provide CPR with the patient in the prone position, particularly in hospitalized patients with an advanced airway in place (Class IIb, LOE C). *AHA Guidelines, 2010*

It is important to be aware that priority should be given to high quality CPR and minimizing time to defibrillation. While it may 'appear' that CPR is less effective when done on the patients back, the decision to return the patient supine should be based on quantitative indicators (EtCO2) and having the resources to safely turn the patient with minimal interruption in CPR (< 10secs)

In the event of cardiac arrest

- Immediately initiate CPR on the patient's back. To landmark:
  - o Place one hand under patient to landmark sternum
  - o Place other hand on the spine and start CPR (hard & fast, 100 compressions/minute)
- Insert hard board under chest or deflate the bed as soon as practical
- RRT to initiate ETCO2 to monitor CPR quality (should be >10mmHg if good quality compressions)
- Return patient supine o If CPR is not effective (as per EtCO2)
  - When the team are prepared to safely reposition

Defibrillation

- Place pads with an anterior and posterior placement
    - This placement requires less time than the typical anterior/lateral placement
    - The anterior pad can be placed when the hard board is placed under the chest

2. Shock as per ACLS guidelines

Check out the video on PRONE CPR on LMS or at:

http://www.youtube.com/watch ?v=AL-ZKsCN_o0

Other Special Considerations

Limited neck mobility

- Consult with physiotherapy regarding head and neck positioning with patients with limited neck mobility
- Use of a specialty bed with the ability to deflate the face and neck area is highly recommended for this patient population (not currently available at MAHC)

Limited arm mobility

- Consult with physiotherapy regarding arm positioning with patients with limited upper extremity movements and/or fractures
- As an alternative, the patient may be positioned with arms at side and palms facing up

Bariatric patient

- Consider using additional bed space with a stretcher to prone a bariatric patient.
- Use the red board and a stretcher parallel to the bed

Gel pads

Gel pads may be used to support the chest, pelvis and face while in the prone position. The pads are stored in the OR and are designed for pressure ulcer prevention. Eyes should be in the opening to prevent ocular pressure and ears should not be folded. The chest pad should be at the chest not the shoulder level to prevent brachial plexus injury.

References

Alberta Health Services Prone Procedure

Eastern Health Prone Positioning Guideline

Procedure for turning a ventilated patient prone in CCTC London Health Sciences Centre
http://www.lhsc.on.ca/Health_Professionals/CCTC/procedures/proning.htm

YouTube resources: http://www.youtube.com/watch?v=Hd5o4ldp3c0
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