INTERDISCIPLINARY CLINICAL GUIDELINES

TITLE:	PRONE POSITIONING / PRONING. Clinical Guidelines for Critical Care amendment to policy	NUMBER:	CC 45-075
Date:	March 24, 2020	Page:	13
Applies To:	NSHA, Department of Critical Care, Provincial Level Two Critical Care Units		

Guiding Principles:

1. Physician orders are required for the initiation and discontinuation of prone position therapy.
2. Rotational therapy cannot be used for prone position patients.
3. Air beds (i.e. KCL) cannot be used for prone position patients.
4. The Proning Checklist (CD0598MR) must be completed Q1H to document care.
5. CPR & ACLS resuscitation can be conducted in the prone position.
6. VV-ECMO patients may be placed in the prone position
7. Use the supine-to-prone checklist when turning a patient prone.
8. Use the prone-to-supine checklist when turning a patient supine.
9. Prone patients may be transferred between hospitals by Life Flight Nova Scotia.
10. For all COVID positive/suspected patients the ETT to be clamped before moving.
11. Prone patients for a maximum of sixteen hours as per physician order.

Rationale:

1. Prone Positioning is indicated in Acute Respiratory Distress Syndrome with a PaO2/FiO2 ratio < 150 mmHg and FiO2 greater or equal to 60. Prone positioning can be considered with a PaO2/FiO2 ratio < 200 mmHg.
2. Early prone position for ARDS patients with poor PaO2/FiO2 ratios (Ideally less than 48 hours from admission).
3. Benefits from prone positioning are multifactorial:
    a. Improved lung compliance secondary to displacement of the heart and diaphragm.
    b. Improved pulmonary perfusion (V: Q matching).
    c. Drainage of secretions.
    d. Reduction in pleural pressures and increase in the transpulmonary pressure

Expected Outcomes:

1. Improved oxygenation (↑PaO2) (↑SpO2).
2. Improved ventilation (↓PaCo2).
3. Improved lung compliance

Absolute Contraindications:

1. Unstable cervical fractures
2. Pelvic fractures

Relative Contraindications:

1. Elevated ICP
2. Pregnancy
3. Recent Abdominal Surgery

Introduction:

Prone positioning is indicated early (< 48 hours for severe ARDS patients (PaO2-FiO2 ratio<150 & FIO2>60 %). Prone positioning can be considered with a PaO2/FiO2 ratio < 200 mmHg. Oxygenation can be consistently improved in patients with ARDS when ventilated in the prone position. Approximately 55-75 % of patients will experience improved oxygenation (responders). Failure to respond (improved oxygenation and ventilation) is not an indication to discontinue prone positioning. Non responders may still benefit from reduced ventilator lung injury (Johnston, Luks & Glenny, 2017).

When turning a patient supine to prone or prone to supine the appropriate checklist should be used to minimize adverse events such as: pressure injuries, facial periorbital edema, ETT tube and I.V line displacement, cardiovascular instability, staff injury, brachial plexus injury and CRRT line problems, pre and post checklists should be used for all critical care units attempting to place patients in the prone position (Smith & Bamford, 2017).

Supine to Prone Step by Step Procedural Checklist

- ❑ 1. Designate team roles. Everyone to introduce themselves and their roles. Respiratory therapist at head of bed. Team leader at end of bed to direct team. Physician skilled in airway management in unit. Respiratory therapist, nurses and staff enough to turn patient. Minimum of five staff including respiratory therapist. At least two staff per side of patient
- ❑ 2. ECMO proning must have perfusionist present
- ❑ 3. Patient has adequate sedation and analgesia. Rass score of -4/-5. Consider bolus dosing of paralytic if necessary, as per physician direction
- ❑ 4. ETT tube is in satisfactory position and secured with a tube holder. X-ray confirmed position of ETT and documented in respiratory and nursing notes pre proning
- ❑ 5. Airway management equipment is available Advanced airway cart outside the room
- ❑ 6. Minimize all non-essential infusions such as medication lines and insulin infusions
- ❑ 7. Place lines running midline to the head or to the foot of the bed
- ❑ 8. Cap off arterial line or extended tubing on the line
- ❑ 9. Stop feeds ideally one hour before if not place NG on wall suction empty stomach and clamp NG**. NG length should be documented pre proning**
- ❑ 10. Any participant can call a "**STOP**" during the procedure if concerned
- ❑ 11. Disconnect EKG, remove anterior electrodes and NIBP cuff. Remove patient gown. O2 sat probe is the last to be removed
- ❑ 13. Eye patches and lubricant applied to patient eyes
- ❑ 14. Minimum of 5 staff to safely turn patient
- ❑ 15. RT at head of bed controlling the stability of the ETT
- ❑ 16. Two nurses on each side of the bed. (Depending on size of patient more staff may be needed)
- ❑ 17. Turn patient's head away from the ventilator
- ❑ 18. Position the ETT tube to the side of the mouth furthest from the ventilator
- ❑ 19. ETT tube is clamped proximal to connection between ETT and ventilator tubing
- ❑ 20. Put ventilator in standby
- ❑ 21. Position supine patient near the edge of the hospital bed away from the ventilator. This is the horizontal move
- ❑ 22. Ensure patient's arm closest to the ventilator is tucked under their buttock
- ❑ 23. Position the head, chest and pelvic pillows prior to prone position. The pillows can be placed under the chest, iliac crests and knees. They should be placed to reduce pressure placed on the abdomen

- ❑ 24. The person managing the airway must say **ALL READY** when initiating moving the patient. Final safety check
- ❑ 25. Lateral the patient is 90 degrees on their side
- ❑ 26. Once patient is over on their side **Pause** to ensure no tension is on the airway or lines. Person controlling airway asks this question. Team lead at the foot of the bed monitors the situation
- ❑ 27. Slowly roll patient to prone on head, chest, and pelvis pillows
- ❑ 28. Carefully support the head and neck as the patient is turned lateral to prone
- ❑ 29. Pillow under shins to avoid hyper-extension of at ankle and minimising pressure exerted on patient knees
- ❑ 30. Reassess patient
- ❑ 31. Check ETT tube is not kinked. Check position and length.
- ❑ 32. Check O2 sat reconnect monitor and check blood pressure. Ensure all monitoring pre proning is reconnected. Arterial lines, BIS, TOF
- ❑ 33. Post reconnection access for increased inotrope requirements post proning
- ❑ 34. Reconnect disconnected infusions such as medication line and insulin
- ❑ 35. Reconnect feeds
- ❑ 36. Check patient position. Carefully place arms of the patient in the swimmer's position. This means raising one arm on the opposite side to which the head is turned while placing the other arm by the patient's side
- ❑ 37. Pressure injury check. Lines/tubing not pressed against the skin, ears not bent over, N.G bent into the lips, ETT not pressed into lip, penis and breasts not compressed. Place hands under abdomen to check if any caps or stray loose pieces of equipment. Proning checklist **CD0598MR to** be started and filled out every hour. (Critical care nursing proning checklist)
- ❑ 38. Head to be turned with nursing and respiratory therapy every two hours and arms repositioned during turn. Three people usually two nurses to lift and respiratory therapist to reposition ETT tube
- ❑ 39. Eye patches on and lubricant to eyes every two hours
- ❑ 40. Bed in Reverse Trendelenburg position

Prone-to-Supine Step by Step Procedural Checklist

- ❑ 1. Designate team roles. Introduce each other and your roles prior to moving. Ensure physician skilled in airway management present in unit.
- ❑ 2. Patient has adequate sedation/analgesia Rass of -4/-5. Consider bolus dose of paralytic upon physician direction

- ❑ 3. ETT tube is in satisfactory position and secured with a tube holder. Length marked and documented in respiratory and nursing notes pre turning.
- ❑ 4. N.G feeds are stopped and aspirated if possible. N.G is marked and documented position
- ❑ 5. Remove patient gown, EKG leads, blood pressure cuff. Cap off arterial line if possible. Any other patient monitoring disconnected such as BIS, TOF. O2 Sat probe is the last to be removed.
- ❑ 6. Airway management equipment is available. Advanced airway cart is outside the room
- ❑ 7. Minimize all non-essential infusions such as insulin and med line
- ❑ 8. Place lines running midline to the head or the foot of the bed. May cap arterial line for turn
- ❑ 9. Any participant can call a "**STOP**" during the procedure if concerned
- ❑ 10. Check that all patient equipment is off. Disconnect EKG, remove posterior electrodes and NIBP cuff
- ❑ 11. Minimum of 5 staff to safely turn patient
- ❑ 12. RT at head of bed controlling stability of the ETT
- ❑ 13. Two nurses on each side of the bed
- ❑ 14. Position the ET tube to the side of the mouth closest to the ventilator
- ❑ 15. The person managing the airway must say ALL READY when initiating moving the patient
- ❑ 16. Slide the patient over to the edge of the bed closest to the ventilator
- ❑ 17. Slowly tilt patient onto their side away from the ventilator
- ❑ 18. Pause to ensure no tension is on the airway or lines
- ❑ 19. Remove pillows and slowly turn the patient supine
- ❑ 20. Unclamp ETT and turn ventilator back on
- ❑ 21. Reassess patient. Access RASS, CCPOT, analgesia/sedation
- ❑ 22. Reconnect monitor. All other monitoring such as BIS, TOF.
- ❑ 23. Reconnect infusions. Access post inotrope/vasopressor support
- ❑ 24. Assess for any pressure injuries
- ❑ 25. Be prepared to resume prone therapy if needed, can be turned back quickly upon physician direction/team leader
- ❑ 26. ABG thirty minutes post proning
- ❑ 27. Resume feeds that were stopped only for supine turning
- ❑ 28. Team Debriefing

Special Circumstances:

1. Proning on ECMO

Introduction and Background:

Significant number of patients referred for VV ECMO will have already undergone prone positioning during escalation of local management due to clinical deterioration or advice from the level one center in Halifax. Once established on VV ECMO it is unusual for patients to be prone positioned. This is due to the fact ECMO allows lung rest with minimal minute ventilation.

Indications for Prone Positioning on ECMO:

There are three main situations when prone positioning may be considered during VV ECMO:

1. Refractory hypoxia on ECMO
2. Facilitate pulmonary toilet and drainage
3. Failure to wean VV ECMO

These are extraordinary circumstances and are at the discretion of the attending physician staff in conjunction with another attending staff physician on team.

Risks of Proning on ECMO:

A. Possibility of dislodging the ECMO cannula
B. ‘Increased risk of air entrainment into the ECMO circuit
C. Reduction of blood flow through the ECMO cannula and circuit tubing or through abdominal pressure changes
D. Bleeding through cannula sites that are no longer accessible
E. Difficulty monitoring an oxygenator thrombosis that requires immediate circuit changes

2. Cardiac Arrest in the Prone Position

Turning a patient during a cardiac arrest while prone is associated with significant risk. There is risk of displacement of the ETT, dislocation of lines and injury to patient and staff. The time delay also impacts effective chest compressions and defibrillation. **The American Heart Association Guidelines for CPR recommend that when the patient cannot be placed in the supine position it may be reasonable to provide CPR and**

defibrillation in the prone position. Recommendations are based on limited evidence and suggest two handed techniques over the mid thoracic spine located between the two scapulae.
Defibrillation can be attempted placing pads one in the left mid axillary line and the other over the mid scapula

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PRE-PRINTED ORDER

Critical Care

Acute Respiratory Distress Syndrome (ARDS) for Low Tidal Volume Mechanical Ventilation

Patient: _____ Allergies: _____

Items preceded by a **bullet** (•) are active orders. Items preceded by a **checkbox** (☐) are only to be carried out if checked.

THE FOLLOWING ORDERS:

- May only be used on Medical Surgical and Neurosurgical Intensive Care Units and will be carried out ONLY ON THE AUTHORITY OF AN AUTHORIZED PRESCRIBER

1. **Supportive Therapy**
   - All patients on ARDS Protocol must use inline suction
   - Ensure head of bed elevated greater than 30° for prevention of ventilator associated pneumonia
2. **Ventilator Settings** – based on Ideal Body Weight (IBW*)
   - Initiate pressure control ventilation.
   - Reduce by 1 mL/kg IBW q2h until tidal volume 4-6 mL/kg
   - Target plateau pressure less than 30 cm H_2O
   - Use pressure limit or pressure controlled mode (PCV) if pressure targets cannot be achieved
   - Adjust respiratory rate (not greater than 35/min) to maintain minute ventilation, allow for permissive hypercapnia (pH greater than 7.2)
   - ABG 20 minutes post-initiation of protocol, repeat q1h until the above parameters are met and unchanged for 2 consecutive hours
   - Adjust Inspiratory:Expiratory ratio to be maintained at 1:1. Extension of the expiration phase is mandated in case of incomplete exhalation (air trapping) and generation of intrinsic PEEP
   - Set FiO_2 and PEEP to achieve SpO_2 88–95%
   - Use the following incremental FiO_2/PEEP combinations to maintain arterial oxygenation within target range:

     Standard PEEP setting:

FiO_2	0.3	0.4	0.4	0.5	0.5	0.6	0.7	0.7	0.7	0.8	0.9	0.9	0.9	1
PEEP	5	5	8	8	10	10	10	12	14	14	14	16	18	20–24

***To Calculate Ideal Body Weight (IBW)**

For Males IBW (kg) = 50 + 0.91 (height {cm} – 152.4)

For Females IBW (kg) = 45.5 + 0.91 (height {cm} – 152.4)

3. **Adjunctive Therapy**
   - For moderate to severe impairment of oxygenation (PaO_2/FiO_2 less than 150) consider prone position 16-20 h/day (within first 48 h) and / or neuromuscular blockade (NMB).
   - Once sedation is reduced, start weaning protocol if PEEP is less than 12 cm H_2O
   - When instituting prone position and / or NMB or if extracorporeal membrane oxygenation (ECMO) is a consideration, early consultation to QEII ICU for potential transfer is recommended.

Prescriber's Signature _____ Date _____ Time _____

Prescriber's Name _____ Reg. No. _____

Print

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Critical Care Proning Checklist

Please place check mark in column when observed.
Arm position should be changed every two hours.
It is expected that the observations should be every hour.

Time	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	Time	2000	2100	2200	2300	2400	0100	0200	0300	0400	0500	0600	0700
Neck													Neck												
Eyes													Eyes												
Ears													Ears												
Nose													Nose												
ETT													ETT												
Arms													Arms												
Lines													Lines												
Foreign Bodies													Foreign Bodies												
Legs													Legs												
Feet													Feet												
Initials													Initials												

EXPLANATIONS FOR CHECK ITEMS L = left R = right

Neck: Ensure a neutral position — change the direction the head faces every two hours and document right or left. The special air bed head pillows are deflated and if available a "round circular sponge pillow" is used for support.

Eyes: Insert lubricant every two hours. Eyes should be taped shut, and then padded (use eye pads or gauze) to avoid drying and corneal abrasions.

Ears: Ensure ears are not folded.

Nose: No excessive strain on NG/OG. Use Vaseline or zinc oxide on facial skin (after E-TAD is applied) to prevent breakdown or rash.

ETT: Check tube is secure, and has not migrated from previously documented mark. E-TAD is to be applied prior to Proning. Use Vaseline or zinc oxide to help prevent rash or skin breakdown.

Arms: Hands in neutral position, check radial/ulnar pulses. Arms in 'swimmers' position (arm up and other arm down) and alternate positioning every two hours.
Chart R↑ or L↑ and alternate limb↓.

Lines: All lines secure and connected, not under the patient.
NO caps or "dead enders" in bed.

Foreign Bodies: Do a sweep around patient looking for caps, syringes, pens, which may cause pressure points. Check for wrinkles in sheets or incontinent pads.
These all CAUSE PRESSURE POINTS.

Legs: Lower legs should be elevated just enough to keep toes off bed. No pressure points on knees or pelvis, TED stockings should be used with extreme caution as there is great potential for shear injury.

Feet: Toes should be elevated, not touching the bed. ANKLES IN NEUTRAL POSITION

Signature and Initials: TD _____ _____

TN _____ _____

Proning for COVID-19

BEFORE THE PROCEDURE

PREPARATION

- Have all members of the team introduced themselves and their roles?
- Physician skilled in intubation present in the unit?
- Any contra-indications?
- Re-intubation advanced airway cart outside door?
- RASS -4 to -5; titrate medications for affect
- Bolus of paralytic as needed
- Eye pads on? Eyes lubricated
- Stop NG feeds & aspirate NGT. Length documented
- ETT tube position confirmed by x ray and documented
- Non-essential infusions disconnected
- Adequate length on remaining lines going either up or down bed
- EKG lead/ patient gown removed.
- NIBP cuff, BIS, TOF and temperature cables disconnected
- Arterial line disconnected and capped.
- 2 pillows for chest, pelvis and lower legs ready.

PLAN

- Allocate team leader/airway control
- Positon remainder of team 2 people each side (depending of Pt size)
- Decide and communicate direction of turn
- Clamp ET tube before movement of patient
- Planned number of movements
- All team members are donning full PPE equipment (N 95 mask, gloves, gown and face shield)

EQUIPMENT

- Staff x 5
- 6 pillows
- Eye pads
- Advanced airway cart
- Turning System or 2 soaker pads
- Proning pillow
- EKG leads

TIME OUT

Verbal confirmation between team members prior to commencing proning

- Role allocation clear
- Airway expert staff present
- Plan in case of accidental extubation
- Final head to toe check of lines etc.
- No concerns from team
- Perform prone as per ICU clinical guidelines

SIGN OUT

POSITIONING

General:

- Ensure ET tube is unclamped
- Check ET tube position
- Patient central on pillows
- Sufficient space between chest and pelvic pillows for abdominal expansion
- Check shin pillows
- Reverse Trendelenburg position

Head:

- Face positioned on proning pillow
- Eye pads on
- No pressure applied to eyes
- Nose not squashed
- NG tube not bent, kinked or migrated
- NG tube at nares at _____ cm

Arms:

- Swimmers position
- Head away from raised arm
- Raised arm at a relaxed positon and not over-extended at shoulder

Lines:

- EKG lines placed on back and connected
- Arterial line & infusions reconnected
- NIBP, BIS, temperature and TOF

POST-PRONE

- Achieving adequate ventilation & bilateral air entry
- Head to toe check of pressure areas and lines
- Repeat ABG 30 min post prone
- Follow CC Proning Checklist
- Planned duration of proning _____hrs