NICU: Nasal CPAP (Continuous Positive Airway Pressure)

Site Applicability

SPH NICU

Practice Level

Basic:	Registered Respiratory Therapists (RRT)
Specialized:	NICU Registered Nurse (RN)

Requirements

- CPAP is initiated with the order of a pediatrician.
- When commencing CPAP, a Level 3 Neonatologist will be consulted.
- CPAP beyond 4 hours requires arrangements to be made between SPH and a Level 3 NICU. A plan of care must be created in collaboration between the Pediatrician and Neonatologist.
- The pediatrician must remain in hospital while an infant is receiving CPAP.
- CPAP will be used to stabilize the infant.

Need to Know

The presence of increased work of breathing is indicated by an increase in respiratory rate, the presence of intercostal retractions, and/or grunting or nasal flaring. Abnormal blood gas values may or may not be present.

CPAPA may be initiated for the following reasons:

- The presence of poorly expanded and/or infiltrated lung fields on chest x-ray
- The presence of a condition thought to be responsive to CPAP and associated with one or more of the following clinical presentations:
    1. Respiratory distress syndrome
    2. Pulmonary edema
    3. Atelectasis
    4. Apnea of prematurity
    5. Recent extubation
    6. Tracheal malacia or other similar abnormality of the lower airways

7. Transient tachypnea of the newborn (TTN/wet lung)

Contraindications:

- Any upper airway abnormalities that make CPAP ineffective or potentially dangerous i.e.– cleft lip/palate, choanal atresia, or tracheoesophageal fistula
- Unrepaired diaphragmatic hernia
- Necrotizing enterocolitis

Potential Complications:

- Lung over-distension leading to air leak syndrome
- Nasal excoriation, pressure necrosis and septal distortion

Equipment and Supplies

1. Draeger VN 500 (with humidifier)
2. Neopuff Resuscitator and/or Flow inflating bag and mask (if ventilator not available)
3. Fisher & Paykel FlexiTrunk CPAP Products:
    a. Nasal Tubing 50mm or 70mm
    b. Appropriate size Mask or Prongs
    c. Appropriate size Bonnet
4. Measuring tape in cm (for Bonnet Sizing)
5. Tape
6. Size #5, #6 or #8 OG tube (for decompression)
7. 5ml or 10ml syringe (to aspirate air from stomach)
8. Nasal/Oral Aspirator
9. Chinstrap if necessary

Guideline

Assessment

1. Observe infant's vital signs, oxygenation, abdominal distention and activity.
2. RT will note ventilator settings in CERNER.
3. Nursing will chart PEEP and oxygen setting.
4. Maintain patency of orogastric tube to relieve gastric distention
5. Monitor pressure points on bridge of nose, on upper lip and at base of nose (mask)
6. Monitor nasal septum and upper lip for signs of redness or breakdown (prongs)
7. Gently suction nose, mouth and pharynx every 4 hours/PRN using nasal/oral aspirator as per B-00-07-10026 - NICU Oral/Nasal Suctioning. Clinical signs will determine suction frequency e.g. desaturations, bradycardia, cyanosis, increase in secretions.

8. Ensure nasal interface components are not twisted, no torque or tension on tubing
9. Maintain developmental supportive care for infants on CPAP e.g. use of soother, facilitated tucking

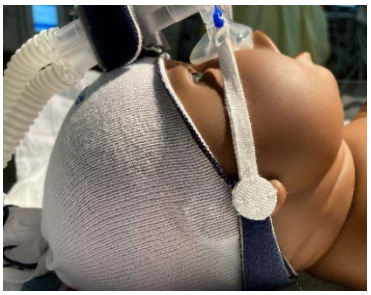
Intervention

Use the Lift/Drop or Pull/Back method to assess skin integrity hourly. If the skin is red; reposition mask/prongs to change the pressure that the equipment may be placing on the skin.

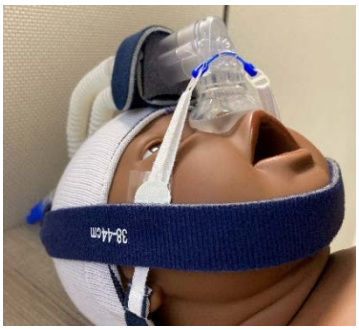
Steps

1. Page RRT to set up ventilator and CPAP circuit.
2. Prepare CPAP equipment. Measure head circumference for bonnet size.
3. Settle infant. Assistance from a second person (RN or RRT) may be needed initially in order to contain the infant in a developmentally supportive manner
4. Position infant supine for initial application. Place a small roll under the infant's shoulders to place head in sniff position.

5. Measure the infant's head circumference in centimeters.
6. Choose the correct sized bonnet. The bonnet should be snug fitting. Stretch the bonnet with your hands initially for ease of placements
7. Slip the bonnet onto the infant's head completely covering the ears with the back edge of the bonnet at the base of the neck. The ears should be flat against the head inside the bonnet. The front edge of the bonnet should be just above or on the eyebrows.
8. Use the sizing guide to choose the appropriately sized prongs or mask. **Prongs** should fill the nares completely without stretching the skin. **Mask** should not touch the edge of the nose, septum or the eyes.



9. **FOR RRT:** Choose the correct length of nasal tubing. Use the shortest length possible. The clear tubing should not extent over the infant's forehead.
10. Connect prongs or mask to nasal tubing ensuring that it is inserted fully. Squeeze sides of prongs to expose groves. Start from one end and insert prong grooves into nasal tubing. Push firmly.



11. **FOR RRT:** Turn on humidifier. Attach the circuit to nasal tubing in EITHER orientation. Set gas flow to prescribed level.
12. **FOR RRT OR RN:** Connect to patient by placing mask around nose. The mask should sit comfortably around the infant's nose. **If using prongs, clear nasal secretions before inserting prongs.** See Oral/Nasal Suctioning Guideline - B- 00-07-10026.

13. Adjust tubing angle to optimize seal. Additional foam inserts may need to be added or removed. Place Velcro strap over the foam block to hold tubing firmly in place.
14. Hook the white clips from the side straps of the bonnet to the blue hooks on the interface. Pull both straps at the same time for central positioning. You may need a second person to assist. Affix the round Velcro tabs to the blue strap of the bonnet. **Use the least tension possible** to maintain CPAP level and stability of interface.
15. Ensure there is **slack** on the tubing to avoid displacement and discomfort.
16. Circuit tubing should be kept below the level of Nasal tubing/ interface to minimize condensation accumulation.

Parent Education

Provide patient and family with information and instruction on the indications and expectations of CPAP using language they can understand. Use interpreter if needed (virtual/ or in person)

Encourage parents to provide developmentally supportive care to their infants (for example facilitated tuck, hand holding, soother, talking).

Documentation

- Document Respiratory Assessment in CERNER → Interactive View → NICU Systems Assessment → RESPIRATORY ASSESSMENT
- Document Supplemental Oxygen, Respiratory Rate and Respiratory Effort in CERNER → Interactive View → NICU Quick View → Newborn Vital Signs & Oxygenation
- Document Respiratory Assessment & Oxygenation, RR & Respiratory Effort Q1H and PRN.
- RRT will document CPAP Management independently in CERNER under Ventilation Assessment

Related Documents

Related Policies

1. B-00-07-10026 - NICU Oral/Nasal Suctioning
2. B-00-12-12099 – Neonatal Nasal CPAP (non-invasive) for Neonates (Respiratory Therapy)

References

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3. Cartwright, D. & Beaumont, T. (2011). Queensland Maternity and Neonatal Clinical Guideline: Management of neonatal respiratory distress incorporating the administration of continuous

positive airway pressure (CPAP). Queensland Maternity and Neonatal Clinical Guidelines Program.
4. Guidelines for Maintaining Non Invasive Respiratory Support (2015) Neonatal Program. BCWH NICU.
5. Fisher & Paykel. (2019). FlexiTrunk Infant Interface Use Instructions.
6. Nyqvist, K.H et al. (2010). State of the art and recommendations. Kangaroo mother care application in a high tech environment. *Acta Paediatrica. 99.* 812-819.
7. Sehgal, A., Nitzan, I., Jayawickreme, N. & Menehame, S. (2020). Impact of skin to skin parent – infant care on preterm circulatory physiology. *The Journal of Pediatrics. 222.* 91- 97.

Appendix A: Oxygenation Goals

Under 36 weeks	SpO_2 = 88 to 92%
Over 36 weeks	SpO_2 = 90 to 94 %

Appendix B: Tips for Maintaining CPAP

Tips for Maintaining CPAP
Correct Mask Size • Mask needs to be snug, not tight • Ensure space between nares and mask base • Monitor for pressure points on bridge of nose, on upper lip and at base of nose • Ensure that mask does not press up against the nares or the infant's eyes Correct Prong Size • Adequate seal & no prong movement • Easily placed in nares & no persistent blanching • Space (1 to 2 mm) between nares and prong base • Monitor nasal septum and upper lip for signs of redness or breakdown • Need for sizing up of the prongs if loose fit or seal not maintained
Correct Hat Fitting • Measure head circumference • Ensure that hat covers the forehead just above eyebrows and back of hat extends to base of neck • Snug fit around the head with no movement • Ears completely covered by hat; ensure ears are flat and not folded over
Lateral Straps • Gentle equal tension to secure prongs • No facial indentations to cheeks • Placement of straps away from eyes • If unable to maintain seal, do not pull straps tight; consider changing or upsizing mask/prongs or changing hats size or using a chin strap
Orogastric Tube • Correct placement- document depth of insertion • Placement not pushing on mucosal membranes or gums • Not recommended to place an 8.0 Fr orogastric tube for infants under 2000 grams
Adequate Seal • Closed mouth and no facial indentations (open mouth can decrease pressure by 1-3cm H2O) • Use of pacifier to assist with seal • Use of chin strap
CPAP Tubing • Correct placement and support of tubing • Nasal interface components are not twisted and no torque or tension on tubing

Respiratory Assessment

- Physical exam (color, work of breathing, respiratory rate, grunting, flaring, retractions, FiO2 requirements, blood gas results, apnea/bradycardia episodes). **This can be done as a hands-off assessment**
- Suction mouth and nares gently using nasal/aspirator no more than 0.5 cm in each naris to prevent trauma, Note color, consistency, quantity of secretions, auscultation of chest briefly, replace CPAP mask/prong.
- Examination of skin done hourly – **Lift/Drop or Pull/Back check**
- **The Lift/Drop** –where mask interface is gently lifted and placed back onto skin-slightly shifting the position of the mask
- **The Pull/Back**- where bar on the prongs interface is gently pulled back from the septum

Developmentally Supportive Care

- Swaddling/mittens if infant pulls at tubing (allow for chest assessment without disturbing infant)
- Pacifier to settle infant as needed.
- Teach parents about their infant on respiratory support. Encourage parent involvement in care (e.g. facilitated tucking, changing the diaper, holding the infants hands)

Prevention & Care if Nasal/ Facial Injury Occurs

- Use the Lift/Drop or Pull/Back method to assess skin integrity hourly. If the skin is red, reposition mask/prongs to change the pressure that the equipment may be placing on the skin. Consult with RRT/CNL. Ensure that components are not touching area that is of concern. RE-CHECK area Q30 min to ensure that the injury has not worsened. Once redness has resolved return to every 1 hour checks.
- **No creams, gels, Vaseline to be used.**

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First Released Date:	01-JUL-2011
Posted Date:	20-JAN-2021
Last Revised:	20-JAN-2021
Last Reviewed:	
Approved By:	PHC
	MSQC Professional Practice Standards Committee
Owners:	PHC
	Maternity Centre; NICU