

PROTOCOL FOR: CPAP: Nasal and Infant Flow-SiPAP

DESIRED PATIENT

- OUTCOMES:**
1. Positive airway pressure will be maintained at a level to provide alveolar stability and adequate oxygenation without promoting excessive carbon dioxide retention.
 2. Complications associated with the use of nasal CPAP/SiPAP will be minimized or readily identified.
 3. CPAP/SiPAP will be delivered in a manner that minimizes discomfort or distress for the duration of the CPAP/SiPAP therapy.
 4. Integrity of skin and mucous membranes will be maintained.

**CLINICAL
ASSESSMENT AND**

- CARE:**
1. Cardiorespiratory monitor at all times.
 2. Vital signs every hour with blood pressure every 4 hours unless otherwise indicated by clinical condition.
 3. Auscultate breath sounds at least every 4 hours to determine that CPAP/SiPAP is being delivered and for equality and nature of breath sounds.
 - a. *Report inequality of or significant change in breath sounds.*
 - b. *Report limited air entry/inability to hear CPAP/SiPAP.*
 4. Assess color and respiratory effort at least every 4 hours to include retractions, chest wall movement, frequency and nature of apnea.
 - a. *Report signs of increased work of breathing, respiratory deterioration and/or pneumothorax.*
 - b. *Report signs of respiratory improvement.*
 5. Ongoing assessment of nature and amount of secretions, need for suctioning, tolerance and effectiveness of suctioning.
 - a. Clean or replace CPAP/SiPAP device as needed when obstructed by secretions.
 - 1) *Report change in nature or amount of secretions.*
 - 2) *Report repetitive occlusion of CPAP device by secretions.*
 6. Assess need for pulmonary toilet to include supports needed, tolerance and effectiveness.
 - a. Reposition every 2 to 4 hours to promote mobilization of secretions.
 - b. Suction nares and oropharynx only as needed.
 - 1) *Report adverse responses to procedures.*

PROTOCOL FOR: CPAP: Nasal and Infant Flow-SiPAP

7. Assess response to aerosol treatments.
 - a. *Report side effects, response or lack of response.*
8. Assess integrity of skin and mucous membranes at least every 4 hours.
 - a. Examine the external area of the nose for redness or excoriation.
 - 1) *Report redness or other significant findings of the nasal area to House Staff.*
 - 2) Presence of redness may be an indication that the hat is too small. Double-check the hat size.
 - 3) The 24 hour internal exam can be performed with the Cannulaide® in place. In the event that an area cannot be visualized, the Cannulaide® must be removed.
 - 4) Presence of erosion, tissue loss, or bleeding requires documentation.
 - b. Examine the outer ears to ensure that they are not folded over.
 - c. Mouth care every 4 hours with water-soaked gauze.
9. Assess that CPAP/SiPAP bonnet and prongs are correct and properly positioned at least every hour.
10. Assess internal nares, using a laryngoscope or pen light, at least every 24 hours.
 - a. Examination of internal nares needs to be performed with the Respiratory Therapist and Medical Staff.
11. Assess trends in oximetry every hour. Observe events associated with increased or decreased O₂ sats.
 - a. Attempt to minimize oxygen consumption by:
 - 1) Providing an NTE.
 - 2) Preventing agitation and providing developmental and environmental supports, such as containment, quiet environment, swaddling, pacifier, interaction as tolerated.
 - b. *Report the following:*
 - 1) *Increased oxygen requirements of 15 to 20% to maintain SaO₂ in desired range with system patency and stability assured, and comparable oxygen delivery to incubator.*
 - 2) *Decreased oxygen requirements of 15 to 20%. Additional changes in support may be required.*

PROTOCOL FOR: CPAP: Nasal and Infant Flow-SiPAP

12. Assess the frequency and severity of apnea and determine associated events.
 - a. *Report increased frequency or severity of apnea, apnea requiring vigorous stimulation, apnea with slow recovery, or apnea which requires bagging.*
13. Assess abdominal girth at least every 8 hours - more frequently if distended.
 - a. Place 6.5 or 8.0 Fr Og tube (use largest size possible) for gastric decompression:
 - 1) In all infants with birth weights < 1200 grams during the first 2 weeks.
 - 2) Whenever abdominal distention occurs.
 - b. Elevate tube to prevent loss of secretions or feedings.
 - c. Use Og tube because NG tube will increase airway resistance.
 - d. Assess functioning of orogastric tube and the nature and amount of secretions.
 - 1) *Report abdominal distention with visible bowel loops which is unrelieved by gastric decompression.*

DELIVERY

SYSTEMS:

1. The ventilator is a device that provides Nasal CPAP delivered through a continuous gas flow using the Inca Prongs®.
2. Infant Flow® is a device that provides Nasal CPAP delivered through a variable gas flow using a mask or prongs.
3. Infant Flow® SiPAP is a device that provides two continuous positive airway pressure levels (high and low CPAP) through a variable gas flow using a mask or prongs.

SYSTEM

ASSESSMENT:

1. Assess placement of CPAP/SiPAP device at least every hour and the alarms.
2. Assess and record settings hourly (PEEP, FiO₂, mean airway pressure, humidity). Maintain settings as ordered, checking level of CPAP after suctioning or manipulating of the prongs.
 - a. For SiPAP, add PIP, rate Ins. Time (Ti) to above settings.
3. Secure CPAP/SiPAP device so that desired level of CPAP is maintained. The largest prong that will sit inside the nares snugly without causing blanching of the skin should be used.
4. Use Cannulaide® as the protective layer between skin and prongs for infants ≤ 1 kilogram and are on CPAP for at least 23 hours per day.

PROTOCOL FOR: CPAP: Nasal and Infant Flow-SiPAP

- a. Use the T-shaped Duoderm as a protective layer between skin and prongs for infants > 1 kilogram.
 - 1) Once redness develops and infant is on CPAP for at least 23 hours, change T-Duoderm to Cannulaide®.
 - 2) Once redness develops and infant is alternating between CPAP and Nasal cannula, apply Bacitracin and maintain Duoderm on upper lip area only.
4. Maintain bonnet in proper position.
 - a. Bonnets should never cover the nape of the neck and be at eyebrow level.
5. CPAP tubing should have slack at all times.
6. Maintain FiO₂ in incubator comparable to that which is delivered with CPAP.
 - a. Analyze a minimum of every hour.
7. Position the infant using developmental support.
 - a. Maintain neck in a neutral position.
8. Maintain bed in a flat position.

**INTERVENTIONS
FOR VENTILATOR**

NASAL CPAP:

1. Select the correct size prong based on the infant's weight. If no weight is available there is a ring that contains sample prongs which can be used to estimate proper size.
2. Select the appropriate sized bonnet. The bonnet should fit snugly on the infant's head.
 - a. If the bonnet that is supplied with the prongs is too large or too small for the infant's head the proper bonnet must be obtained.
 - b. Bonnet size will need to be reassessed with head growth or with changes after birth as edema and molding subside.
3. Secure the Stay-Flex tubing to the bonnet with the Velcro tab.
4. Assess the following to ascertain correct placement of the prongs.
 - a. Eyes clearly visible.
 - b. Nose in "normal position" and not pushed upward.
 - c. Stay-Flex tubing is positioned just above the ears and away from the eyes.
 - d. Prongs are set inside the nares and there is some space between

PROTOCOL FOR: CPAP: Nasal and Infant Flow-SiPAP

the prong set and the infant's nose.

- 1) Properly placed prongs should only have 1/3 to 1/2 of the prongs in the nares.
- 2) Prongs fit snugly in the nares.

**INTERVENTIONS
FOR INFANT FLOW**

- CPAP:**
1. Select the correct size prong (small, medium or large) by measuring the prong diameter against the infant's nares. Use the largest prong size that will fit the infant's nares. The prong sizes may need to be increased as the infant grows.
 - a. If the prongs are too small, you will have a poor seal and loss of CPAP/SiPAP.
 - b. Prongs that are too large will distort the nose.
 2. Attach the prongs to the generator; ensure that the prongs are correctly situated.
 3. Select the appropriate sized bonnet according to the manufacturers' guidelines.
 - a. Bonnet size will need to be reassessed with head growth or with changes after birth as edema and molding subside.
 - b. If the bonnet is too large, it can slip over the eyes and cause the prongs to be released from the nose.
 - c. If the bonnet is too small, it will ride up on the head, put excess tension on the prongs and distort the nose.
 4. Attach the generator:
 - a. Place the bonnet well down over the infant's head ensuring that the ears are well covered and flat against the head. (Refer to photo attached to infant Flow CPAP system).
 - 1) The string ties should be in the midline facing to the front.
 - 2) The front edge of the bonnet should be at the eyebrow line.
 - 3) The back of the bonnet should cover the entire skull.
 - b. Secure the fixation straps by placing them in between the Velcro Tabs located on the sides of the cap.
 - c. Tie the inspiratory and pressure lines to the bonnet with the string ties.
 - 1) DO NOT tie the ribbed exhalation line down. This may decrease the generator's ability to divert the gas flow when the infant exhales.

PROTOCOL FOR: CPAP: Nasal and Infant Flow-SiPAP

- d. Use the point of entry that will best reduce the tension of the tubing.
5. Assess the following to ascertain correct placement of the prongs.
 - a. Eyes clearly visible.
 - b. Nose in "normal position" and not pushed upward.
 - c. Fixation tapes extend horizontally from the generator.
 - d. Prongs are set inside the nares and there is some space between the prong set and the infant's nose.
 - 1) Properly placed prongs should be inserted inside the nares so the seal is snug without causing blanching of the skin.
6. Avoid tightening or pulling upon the fixation straps to secure the prongs. This may contribute to pressure injury to the nasal septum.
7. Avoid use of indwelling nasal tubes which contribute to increased resistance. Oral tubes are preferred.
8. Troubleshooting:
 - a. To keep prongs securely in the nose.
 - 1) Verify that prongs are correctly placed on the generator.
 - 2) Check the size and position of the bonnet and fixation straps and that the exhalation line is free.
 - 3) Try the next larger sized prongs.
 - b. If unable to maintain the desired level of CPAP/SiPAP:
 - 1) Check if the mouth is open and creating a pop-off.
 - 2) The prongs may be too small; try the next larger size.
 - 3) Check if there is an NG tube in place which may distort the prongs.

SAFETY: 1. Bedside equipment needed:

- a. Appropriate size ET tube, cut to specified length with stylet in place.
- b. Resuscitation bag with mask and manometer.
- c. Oxygen flow meter and tubing.
- d. Pneumo aspiration set-up.
- e. Laryngoscope.

PROTOCOL FOR: CPAP: Nasal and Infant Flow-SiPAP

f. CO₂ detector.

- DOCUMENTATION:**
1. Document on the Nasal CPAP Flow Sheet and the Neonatal Intensive Care Respiratory Flowsheet.
 - a. The Nasal CPAP Flow sheet is utilized by both Respiratory Therapists and nurses.
 1. Respiratory Therapists document the CPAP settings and alarms at least every 4 hours.
 2. Nurses or Respiratory Therapists document the infant's position, CPAP tubing & bonnet assessment and external nares exam findings at least every 8 hours.
 3. Nurses or Respiratory Therapists document findings of internal nares exam at least every 24 hours.

APPROVAL: Nursing Standards Committee

EFFECTIVE DATE: 2/89

REVISION DATES: 5/90, 4/91, 8/92, 8/93, 12/94, 3/97, 6/97, 1/99, 7/99, 11/00, 11/02, 10/03, 3/06, 10/06, 11/08

REVIEWED DATE: 11/07