Infant Bubble Nasal CPAP System

Purpose

To standardize the bedside procedure for the application of the Bubble Infant Nasal CPAP system in the Infant Special Care Unit.

Audience

Licensed Respiratory Care Practitioners with the understanding of age specific requirements of this patient population.

Scope

Outlines the accepted clinical techniques for the use of nasal CPAP in the neonatal population in the treatment of infants with respiratory distress by increasing the functional residual capacity (FRC), increasing pulmonary compliance, decreasing total airway resistance and decreasing respiratory rate.

Indications

- Respiratory Distress Syndrome (RDS)
- Apnea of Prematurity (AOP)
- Hypoxemia
- CO_2 retention
- Airway Collapse
- Increased work of breathing
- Weaning from mechanical ventilation

Contra-indications

Contraindications to the use of infant nasal CPAP are: upper airway abnormalities, untreated air leaks, cardiovascular instabilities, and untreated diaphragmatic hernias.

Physician's Order

- Order for Nasal CPAP
- CPAP level
- FiO_2

Equipment

- Oxygen/ Air Blender
- Appropriate size nasal prong interface (Binasalpharyngeal Airway or Fisher & Paykel)
- Fisher and Paykel infant single limb heated wire circuit
- Oxygen tubing
- Infant oxygen mask
- Aerosol Tee adapter, 22mm adapter
- Fischer Paykel heater
- Humidifier chamber with water feed set
- Oxygen Analyzer
- 1000 ml bottle of 0.25% acetic acid
- Tape measure

Continued next page

Procedure

Equipment Assembly:

Step	Action
1	Connect blender air and oxygen lines to 50 psi wall source.
2	Place humidifier chamber with water feed set in the Fischer Paykel heater.
3	Connect 22mm adapter to inspiratory side of humidifier chamber. Place green aerosol tee adapter on top of the 22mm adapter. Remove the 15mm x 4.5mm adapter from the infant oxygen mask and insert into the aerosol tee adapter. Attach the oxygen tubing to the 15mm x 4.5mm adapter and connect to the Oxygen/ Air blender. Run flow from the blender at 6-8 lpm. Insert Oxygen analyzer into the side port of the aerosol tee adapter.
4	Attach the inspiratory limb of the Fisher and Paykel infant single limb heated circuit to the humidifier chamber. Insert temperature probe into the appropriate places in the circuit.
5	Pour 400ml out of the 1000ml bottle of 0.25% acetic acid.
6	Cut the tape measure at 8cm and affix with clear tape to the outside of the water bottle with the leading edge (0) at the top of the water line.
7	Insert the expiratory tubing into the water with the depth of insertion of the tubing corresponding to the level of CPAP desired (i.e. for 5cmH2O insert the tubing to the 5cm mark).
8	Remove the plunger from a 10cc syringe and insert the syringe next to the expiratory tubing to serve as a pressure pop-off.
9	Check for bubbling in the water bottle. If no bubbles are present, check for leaks in the system.
10	Using a pressure manometer, check the CPAP pressure by attaching an ETT adapter with Oxygen tubing to the patient wye.

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Procedure

Patient Set-up Procedure:

Step	Action
1	Verify physician order, patient identification and check chart for contraindications.
2	Explain set-up to family members present. Stress the importance of patient compliance for successful treatment and the reasons for utilizing this modality.
3	Observe and record the following parameters prior to placing nasal mask or prongs on patient: Heart rate, Respiratory rate, Breath sounds, Oximeter saturations, and breathing pattern.
4	If using the Fisher & Paykel interface, place the appropriate sized hat on patient's head with tie straps located in the center of the forehead. Position the hat so that it is placed below the ears and at the level of the patient's eyebrows. Ensure that the patient's ears are not folded over.
5	Attach the nasal tubing to the breathing circuit and affix the appropriate nasal prongs.
6	Insert the nasal prongs into the infant's nares and secure to the bonnet.
7	If using the binasalpharyngeal airway, prep the infant's cheek with mastisol and place Velcro patches to the site. Using an infant posey, insert the binasalpharyngeal airway with the Velcro side down and affix with tape. Attach the nasal prongs to the breathing circuit.
8	Using normal saline to lubricate the prongs, gently insert the prongs into each nare, placing the posey across the Velcro patches.
9	After placing CPAP interface, observe water bottle for bubbling. If no bubbling seen, check for leaks in the system.
10	Monitor heart rate, respiratory rate, breathing pattern, ABGs, pulse oximetry, saturations, level of consciousness and patient compliance.

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Procedure Continued

Patient Set-up Procedure:

11	Document clinical affects and record final settings in the patient record, per RCS Policies # 7.1.1 and # 7.1.2.

Adverse Reactions

If any of the following conditions are observed reevaluation of the treatment modality must be performed.

- Increase in heart rate >20 breaths per minute above baseline
- Increase in respiratory rate >20 breaths per minute above baseline
- Marked increase in agitation of patient
- Marked decrease in level of consciousness
- Increase in $PaCO_2$ >15mmHg above baseline

Infection Control

Follow procedures as outlined Healthcare Epidemiology Policies and Procedures: #2.24 Respiratory Care Services.
http://www.utmb.edu/policy/hcepidem/search/02-24.pdf

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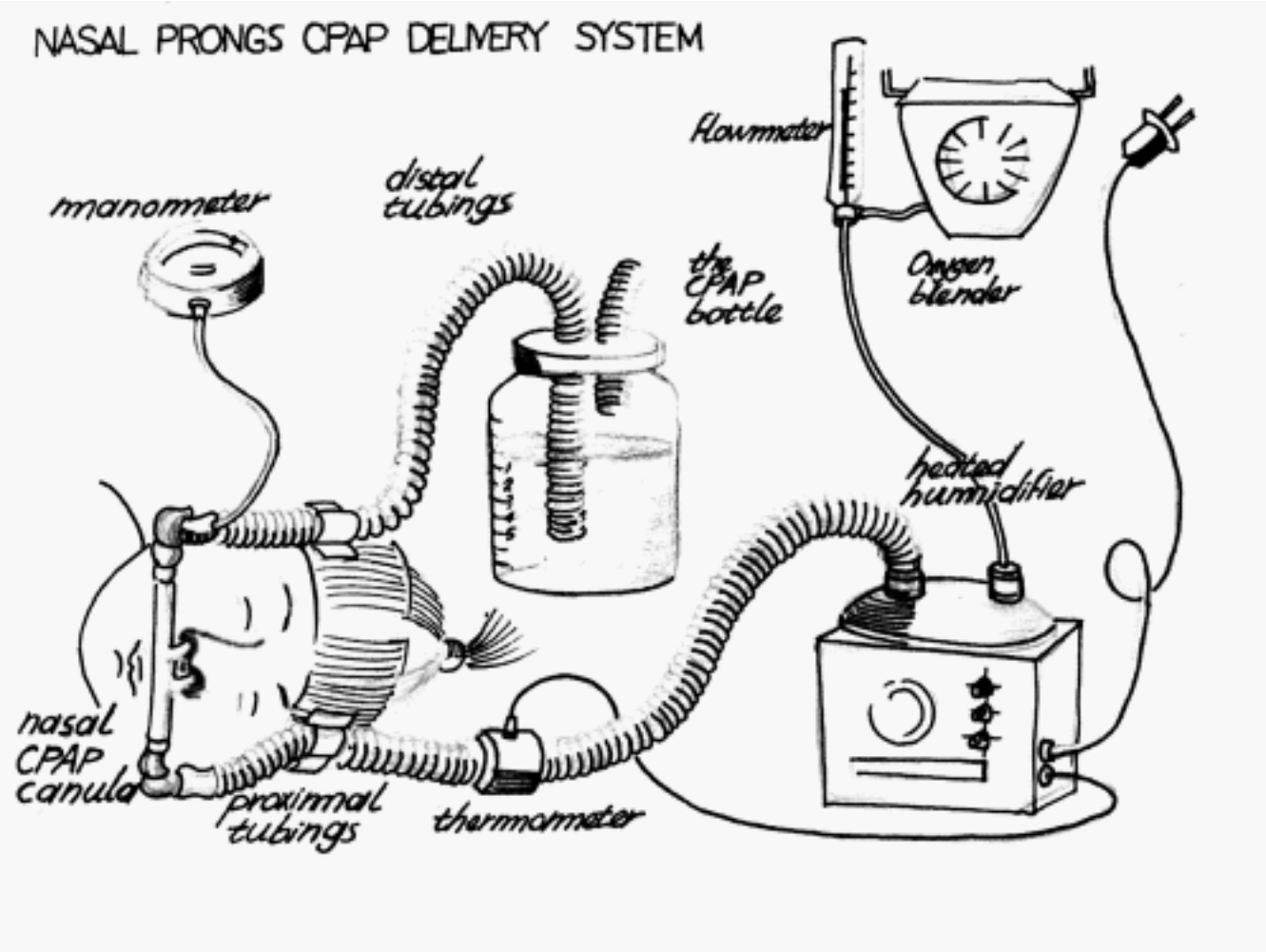
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manometer
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