T-Piece CPAP

Purpose: To describe the procedure for providing constant positive airway pressure (CPAP) to the lung with endotracheal intubation or tracheostomy tube.

Description: CPAP is applied to the patient with a breathing circuit sealed to the ET-tube or trach tube. The patient breathes from the pressurized circuit with a gas flow high enough to maintain the desired positive airway pressure. A CPAP valve attached to the end of the circuit produces the constant positive pressure. Oxygen concentration is maintained by a source that is not affected by backpressure from the CPAP valve.

Indications:
1. To prevent or reverse atelectasis, thus improving oxygenation.
2. To reduce the work of breathing in asthma and COPD by reducing the inspiratory threshold of auto PEEP created by air trapping.

Contraindications/Hazards/Complications:

Relative Contraindications
1. Increased intracranial pressure.
2. Hemodynamic instability.
3. Active hemoptysis.
4. Untreated pneumothorax.

Hazards and Complications
1. Increased work of breathing.
2. Increased intracranial pressure.
3. Cardiovascular compromise.
4. Drying of secretions and mucociliary tree if adequate humidity not maintained.
5. Obstruction of CPAP valve by expectorated secretions. (Thus, this setup should only be used in ICU or ER where the patient is closely monitored.)

Equipment:
1. Down’s high flow generator adjustable FiO2, capable of meeting patients inspiratory flow demands and maintaining airway pressure. (If Down’s high flow generator is unavailable a high flow flowmeter, capable of 40 Lpm, attached to an oxygen blender may be used.)
2. Corrugated tubing.
3. T-piece adaptor.
4. CPAP valve.
5. Heated humidity system.
6. Airway pressure manometer.
7. FiO2 analyzer.

Personnel:
Respiratory Care Practitioners; Respiratory Therapy Technicians I and II, Respiratory Therapists I and II.
Procedure:

**Down’s high flow generator** (figure 1)

1. Verify order to include CPAP level and FiO2.
2. Identify patient by comparing hospital and billing numbers on the armband to those on the physicians’ orders for therapy.
3. Explain the procedure to the patient.
4. Connect Down’s flowmeter to oxygen source. Place filter on air entrainment port.
5. Attach one end of corrugated tubing to output of Down’s flowmeter and other end to heated humidifier.
6. Attach 6 foot corrugated tubing from heated humidifier to T-piece adapter.
7. Attach prescribed CPAP valve to T-piece with 12 to 18 inches of corrugated tubing.
8. Rotate “On/Off” knob on top of Down’s flowmeter clockwise to turn on flow. (Adjust to meet patient’s demands and to keep CPAP level constant throughout respiratory cycle.)
9. With an oxygen analyzer in line, rotate the FiO2 knob on front of the Down’s flowmeter to deliver the prescribed FiO2. Depending on flow conditions, delivered FiO2 of 30% to 100% may be delivered. (The flow may need to be readjusted after making FiO2 changes). (If Down’s flowmeter is attached to an oxygen blender, utilize blender to titrate oxygen concentration.
10. Attach the T-piece to the ET-tube or trach tube of the patient.
11. Attach an airway pressure monitor line near the T-piece adaptor with a pressure line adaptor. Assure prescribed pressure level is being maintained and set low and high pressure alarms at + or – 5 cmH2O.
12. Assess the patient for comfort and toleration of the CPAP device. Follow up assessment by the RCP shall be done at least Q4 hours and with any change in prescribed CPAP level. Assess CPAP valve for patency and replace as necessary.

Infection Control:

1. Standard universal precautions shall be observed at all times.
2. Single patient use circuits shall be disposed of after use.
3. Monitors and Down’s high flow generator shall be aseptically cleaned between patient use.

References:

1. AARC Clinical Practice Guidelines
2. Vital Signs, manufacturing guidelines

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Turning “1” and “2” will affect total flow. Turning “2” and “3” will affect FiO2.