Metered Dose Inhaler (MDI) Treatment via Ventilator

Purpose

To standardize delivery of respiratory care medications to patients on mechanical ventilation.

Account-ability

May be administered by a Licensed Respiratory Care Practitioner with understanding of age specific requirements.

Physician's Order

The written physician's order must include:

- Type of solution/medication.
- Amount/dose to be delivered in micrograms or puffs.
- Frequency/duration.
- Mode of administration.

Indications

Demonstrated reversibility of airway obstruction with bronchodilator medications secondary to bronchospasm.

Goals

- Improved drug efficacy.
- Improved dosing accuracy.
- Easier, more rapid administration.
- Improved ventilator safety.
- Reduced nosocomial risk.
- Reduced cost.

Contra-indications

- Documented cardiac sensitivity to Beta agonist bronchodilators.

Equipment

The Metered Dose Inhaler of medication is to be kept in patient's assigned medication drawer and labeled with patient’s information.

Metered dose delivery system to include the following:

- Ventilator - specific MDI spacer, placed in-line with the patient ventilator circuit on the inspiratory side of the patient wye.

Procedure

Step	Action
1	Verify Physicians order: type and dosage (number of puffs) of medication, frequency and any other specifics to the therapy to be performed.

Continued next page

Procedure Continued

Step	Action
2	Review the patient's chart, nursing, and Respiratory Care Services documentation in Epic to obtain pertinent information regarding the patient's disease state, present condition and previous response to bronchodilator.
3	Wash hand thoroughly. • Don gloves and any other protective devices as required by Hospital Epidemiology Department.
4	Check expiration date of medication canister, return to pharmacy and have replaced if expired.
5	Patient Assessment • Heart rate • Respiratory rate • Skin color • Breath sounds • Chest excursion • Mental status • Airway status • Airway resistance
6	Auscultate patient's chest and perform endotracheal suctioning if necessary. Lungs should be as clear as possible prior to treatment to enhance delivery and absorption of medication.
7	Explain procedure to the patient, as appropriate.
8	The patient should be in a Fowler's position or with the head of bed elevated.
9	Shake canister vigorously prior to use.
10	Connect MDI canister to airway adapter and place in ventilator circuit.
11	Deliver a puff of medication from the MDI canister during inspiratory phase of ventilation.
12	Pause for a minimum of 30 seconds to one minute before administering another breath.

Continued next page

Procedure Continued

Step	Action
13	Repeat step 11 and 12 as prescribed by the physician.
14	Remove MDI from spacer adapter and leave spacer inline with circuit.
15	Repeat patient assessment.
16	Patient should not be lavaged and suctioned following treatment unless it is indicted (allowing for absorption of medication).

Undesirable Side Effects

- Tachycardia
- Palpitation
- Headache
- Nausea

Assessment of Outcome

The effectiveness of Metered Dose Inhaler treatment will be judged on how well it accomplishes the stated clinical goals. Observation of the following should be noted on the RCS flowsheet and in the patient progress notes per RCS Policies # 7.1.1 and # 7.1.2.

Includes, but is not limited to:

- Sputum - color, amount, consistency.
- Auscultation - comparison of pre- and post-treatment breath sounds; breath sounds improved.
- Arterial blood gas measurement and/or pulse oximetry.
- Adverse reactions and response to therapy.
- Change in heart rate.
- Pre and post compliance and airway resistance measurements.

Infection Control

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

Continued next page

References

AARC Clinical Practice Guidelines: Assessing Response to Bronchodilator Therapy at Point of Care, Respiratory Care, 1994; 40(12): 1300-1307.

Dhand R, Duarte AG, Jubran A. Dose-Response to Bronchodilator Belivered by Metered-dose Inhaler in Ventilator-supported Patients. American Journal Respiratory Critical Care Medicine. 1996; 154:388-93.

Fink JB, Dhand R, Duarte AG, et al. Aerosol Delivery From a Metered-Dose Inhaler During Mechanical Ventilation. An In Vitro model. American Journal Respiratory Critical Care Medicine 1996; 154:382-7.

Harwood R, Rau JL, Thomas-Goodfellow L. A comparison of three methods of metered dose bronchodilator delivery to a mechanically ventilated adult lung model. Respiratory Care. 1994; 39:886-891.

Diot P, Morra L, Smaldone GC. Albuterol delivery in a model of mechanical ventilation. Comparison of metered-dose inhaler and nebulizer efficiency. American Journal Respiratory Critical Care Medicine 1995; 152:1391-4.

Continued next page