



Brent tPCT Policy for the Prescribing and Administration of Drugs for Nebulisation

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1. INTRODUCTION

“The aim of nebuliser treatment is to deliver a therapeutic dose of the drug as an aerosol in the form of respirable particles within a fairly short period of time” (British Thoracic Society 1997 (B T S))

“Nebulisers are useful when large doses of inhaled drugs are needed when patients are too ill or otherwise unable to use handheld inhalers and when drugs are not available in that format for example antibiotics” (B T S July 2007)

The commonest indication for nebulised therapy is the emergency treatment of acute asthma and exacerbations of chronic obstructive pulmonary disease.

2. SCOPE OF POLICY

These guidelines cover all staff working on behalf of Brent Teaching Primary Care Trust who administer nebulised therapy.

The purpose of these guidelines is to:-

- Provide a framework for standardised nebuliser administration.
- Provide healthcare professionals with support, knowledge and evidence of good practice necessary for them to safely administer nebulised therapies.

3. COMPETENCY REQUIRED

These guidelines apply to all healthcare professionals who undertake administration of nebulised therapies.

4. RESPONSIBILITY AND ACCOUNTABILITY

All healthcare professionals who administer nebulised therapies should be aware of the contents of these guidelines. They are reminded that they should at all times adhere to:

- The Nursing and Midwifery Council Code of Professional Conduct (2002)

5. PATIENTS COVERED

These guidelines apply to all adult patients treated as inpatients, outpatients and in their home environments.

6. HAZARDS / COMPLICATIONS

Adverse side effects of nebulisation are usually considered to be drug related. These include:-

- Giddiness
- Tremor
- Nausea
- Palpitations
- Dry mouth
- Wheeziness
- Bronchospasm

- Constipation
- Irritable cough

(British National Formulary 2007 (B N F))

These side effects are usually easily remedied and the patient can be reassured by observing their breathing pattern and consulting the prescribing physician.

Nebulised solutions, which are cold, non-isotonic, acidic or contain certain preservatives, can cause bronchoconstriction. Adverse effects can be monitored by measuring spirometry or peak flow before and after an initial dose of the drug.

Following inhalation via a facemask it is advisable to wash the face to prevent skin irritation. It is also advisable following steroid inhalation to rinse out the mouth to avoid possible oral candidiasis.

7. THE PROCEDURE

- The patient should be sat in a comfortable upright position to enable the nebuliser to function optimally.
- Medications should be given in accordance with the prescription via the nebuliser chamber.
- The appropriate equipment for delivery of the nebuliser should be collected on a clean surface.
- The compressor should be placed on a hard safe surface (not the floor) when in use.
- The driving gas (hospital use) should be set at the appropriate flow rate.
- Patients should be advised to relax and breathe normally
- The treatment is nearly finished when the nebuliser begins to “spit”. At this point the patient or carer should gently tap the side of the nebuliser a few times. The next time the nebuliser begins to “spit” the treatment is complete.
- Once the nebuliser is complete the driving gas or compressor should be switched off.
- The nebuliser should either be disposed of or cleaned in the recommended manner. (see section 15.0)

8. SPECIAL PRECAUTIONS

- Mask or Mouthpiece

Bronchodilator responses are the same whether a mask or mouthpiece is used. The choice should therefore depend upon patient preference and convenience. Facemasks should be tight fitting and patients should be advised to breathe with an open mouth

- Ipratropium Bromide

The health care professional must be aware that there is a potential risk of glaucoma if ipratropium bromide (especially when mixed with salbutamol) comes into contact with the eyes. Wherever possible a mouthpiece should be used in preference to a facemask. Where the patient is too ill to cope with a mouthpiece eye protection e.g. glasses or goggles should be provided. Anticholinergic bronchodilators must also be used with caution in patients with benign prostatic hyperplasia and bladder outflow obstruction (B N F 2007)

- Antibiotics

When nebulising antibiotics the nebuliser set should be fitted with a filter system. Filters should be allowed to dry thoroughly between uses. If nebulising at home, patients may nebulise antibiotics alone in a separate room with an open window and closed door without using a filter system. However the use of a venting system or filter is preferable. A mouthpiece should also be used to prevent topical deposition on the skin.

- Steroids

The special precautions used for nebulised antibiotics also apply to nebulised steroids. One further precaution is the prevention of oral candidiasis. Therefore it is advocated that the patient rinses their mouth out or cleans their teeth following nebulisation.

9. DELIVERY GAS

All prescriptions for nebulised drugs MUST include the choice of driving gas. Prescriptions with the driving gas omitted MUST be clarified with the prescriber before administration. A verbal order from the doctor can be endorsed on the chart, signed and dated by the enquiring nurse.

Nebulisation of drugs against a prescription with this information missing is considered to be a drug administration error.

The protocol for choice of driving gas depends on the clinical condition:-

OXYGEN

- All patients with an acute exacerbation of asthma
- All patients who are hypoxaemic
- All patients who have easy access to piped oxygen

CONTRA-INDICATIONS to oxygen therapy

- It is dangerous to give oxygen to people who retain carbon dioxide
I.e. CO₂ > 6.5 kPa

Oxygen must be used at a rate of 6 – 8 litres per minute unless otherwise stated on the packaging of the nebuliser equipment being used. Community oxygen cylinders are only capable of delivering 4 litres per minute and are therefore inappropriate for driving nebulised medications.

AIR

- All patients who do not fit into the above categories
- All patients who retain carbon dioxide
 - usually chronic bronchitis, emphysema, COPD

A gas flow of 6 – 8 litres per minute is required for jet nebulisers to provide 50% of the particles at a diameter of less than 5 microns. This is the size required for adequate deposition in the distal airways. Compressed air (via piped system in hospital) or compressor (in hospital or community) is the most commonly used driving gas.

Patients who have air driven nebulisers may still be given supplementary oxygen concurrently by nasal cannulae.

10. **RESIDUAL VOLUME**

During nebuliser use, large droplets become trapped within the nebuliser unit to produce a residual volume unavailable for nebulisation, 'dead space'. It is important to know this volume, since the fill volume required for drug delivery can then be determined. Most nebulisers have a residual volume of 0.5 – 2.5 mls. Low residual volumes allow a smaller fill volume.

11. **FILL VOLUME**

In order to maximise the efficiency of the nebuliser, the drug chamber must be filled with a minimum volume of drug to enable a sufficient dose to be given. Most chambers require 2 – 4.5 mls depending on the residual volume. For residual volumes of less than 1 ml, the fill volume need not be more than 2.5 mls. For residual volumes of more than 1 ml, a fill volume of at least 4 mls is required. Volumes above 5ml will increase the time needed to nebulise and this reduces compliance.

12. **NEBULISATION TIME**

For bronchodilators, nebulisation time should be 5 – 10 minutes. Longer nebulisation time will decrease patient adherence to treatment. Other drugs may require a longer time for nebulisation to be completed in order to achieve a higher drug output. Tapping the nebuliser towards the end of the nebulisation time has shown to increase the total volume of drug nebulised.

13. **DILUENT**

To dilute the drug to the correct nebulisable volume, sodium chloride 0.9% should be used (Normasol® sachets).

Water will result in a hypotonic solution, which may cause bronchoconstriction.

Normasol® sachets should be used as a diluent. One sachet may be used for more than one patient during a drug administration round, but must be discarded immediately thereafter.

14. **DRUG MIXTURE**

Combinations of Salbutamol and Ipratropium can be mixed immediately before use and administered as one nebulisation. This combination does not need further dilution.

Do NOT mix other combinations without consulting pharmacy.

15. **INFECTION CONTROL ISSUES**

Bacterial contamination is a frequent finding in compressors and may be the source of pathogens.

All nebuliser administration sets are single patient use only.

Nebuliser masks, mouthpieces and tubing can be re-used for the same patient. All administration equipment except the tubing should be washed after each use with general purpose detergent and warm water. They should then be left to air dry on a

disposable paper towel. The tubing should be attached to the gas delivery device and turned on for a few seconds, which will remove any dampness from inside the tubing. Ensure all the equipment is dry before putting it in a designated container ready for its next use. For hospital patients this container should be clearly labelled with the patient's name.

The compressor when unplugged will need to be wiped over with a damp cloth and general-purpose detergent. This procedure will need to be carried out on a weekly basis.

16. **STORAGE**

When not in use the compressor should be stored clean and dry without the nebuliser equipment attached.

17. **SAFETY**

It is a legal requirement that compressors have an electrical safety check at regular intervals, the frequency of which is determined at local level.

Records of the dates of safety checks of compressors and detachable leads are mandatory (DOH 1991).

REFERENCES AND ACKNOWLEDGEMENTS

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