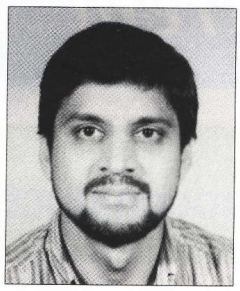
Home Nebulisers and Spacers

Dr Ahmed Manjra
MB ChB (Natal), FCP(SA)Paeds



Curriculum Vitae

Dr Ahmed Manjra qualified at Natal University where he received a MBChB in 1983, and a FCP(SA) Paed in 1988. He gained some experience in the Allergy Clinic at Red Cross Children's Hospital as senior Registrar and is currently an executive member of the Allergy Society of South Africa.

P O Box 4223
Durban
4000

Summary

Nebulised bronchodilators are useful, especially for asthmatic children, but there is a growing concern about poorly informed parents who over-rely on home nebulisers, with rising mortality as a result. The use of home nebulisers is evaluated, the dangers explained and practical advice given to doctors based on sound research findings.

S Afr Fam Pract
1994;15:565-8.

KEYWORDS:
Asthma; Child;
Physicians, Family;
Nebulisers and
Vaporisers;
Bronchodilator Agents.

Introduction

It is of concern that home nebulisers are freely prescribed by doctors for asthmatic children. It is common for patients in recent years to request a prescription for a nebuliser for their asthmatic child and it takes a firm doctor to refuse to comply with this request. Whilst there is no doubt that nebulised bronchodilators are useful for acute, severe and brittle asthma in a hospital environment, the concern is mainly about the increasing use of nebulisers for regular domiciliary therapy.[1] In this context, particularly, concern should be about regular nebulised bronchodilators rather than prophylactic drugs.

Why Nebulisers?

Nebulisers have two distinct advantages when compared with delivery systems such as Metered Dose Inhalers (MDI) or Powdered Inhaler Devices (PID).

1. **Dose:**
   Nebulisers can be used to deliver high doses of prophylactic bronchodilator drugs to the

airways of asthmatic children. This can be achieved with devices such as the MDI or PID but multiple actuations are **necessary.**

2. **Ease of Administration:** Nebulisers are a convenient method of delivering drugs to the airway since co-ordination and respiratory gymnastics are not necessary as with the MDI and PID. The disadvantage of nebulisers however is that they are cumbersome, awkward to set up and depend on a power source.

Efficiency of Nebulisers

Studies have demonstrated that 10% of drugs used in a nebuliser chamber reach the lungs and this is similar to deposition achieved with usage of MDI and spacers as well as with PID. However, to achieve a similar concentration of drug reaching the lung, would require about 50 puffs from a MDI. Therefore nebulisers have a useful role to perform in acute attacks of asthma of mild to moderate severity as well as in the delivery of prophylactic drugs such as *sodium cromoglycate and beclomethasone dipropionate* in young children unable to use MDI or PID.

Asthma Deaths and Nebulisers

Many reports have suggested that over-reliance on nebulisers and consequent delay in obtaining medical help have contributed to rising asthma mortality.[2,3,4] A parallel increase in the sales of home nebulisers and the asthma mortality rate in New Zealand was noted in the late seventies and early eighties.[5] Subsequently more reports were published on the subject and concluded that whilst there was evidence of direct toxicity of nebulised drugs, many of the deaths could have been prevented by timeous consultation with medical practitioners.[6] These reports also highlighted the alarming widespread use of unsupervised nebulisers. Many of these patients did not use peak flow meters and were not on adequate asthma prophylaxis. Oxygen, which is life saving in severe acute attacks, was not provided for patients with previous near fatal asthmatic attacks.

An increasing use of nebulisers at home

Paediatric Home Nebuliser Survey

Many home nebuliser surveys conducted in the United Kingdom have been published recently.[6] They have demonstrated and highlighted once again the inadequate instructions given to patients with regard to their nebuliser usage. They highlighted the following points:

- Poor patient instruction on when and how to use a home nebuliser.
- Patients used widely varying doses of bronchodilator drugs.
- Patients were not given proper written instructions.
- No crisis management plan discussed.
- Inadequate peak flow meter usage.
- Children (more than 50%) experienced side effects from bronchodilators, ie hyperactivity, tremor, vomiting and drowsiness.

Over-reliance on nebulisers contributed to rising asthma mortality

Nebulisers and Other Delivery Systems

Many researchers have compared the B2 agonist drugs from domiciliary nebulisers and MDIs and PIDs and found no difference between them.[8,9,10] Similar results were demonstrated for *ipratropium bromide* delivered via a nebuliser and a MDI, Spacer and Mask.[11] Therefore there is an increasing body of evidence which suggests that the dose of broncho-

Home Nebulisers and Spacers

dilator medication is more important than the delivery system. High doses can be delivered via large volume spacer devices to increase MDI efficiency.

Indications

With the availability of spacer devices commercially as well as powdered inhaler devices the indication for home nebulisers has diminished over the years. There are however, some clear indications for home nebuliser usage.

1. Children under four years of age who require prophylactic drugs such as *sodium cromoglycate* or inhaled steroids. Some children in this age category will also benefit from nebulised bronchodilators for acute mild and moderately severe attacks. However, consider use of a MDI with a spacer. If this has been found to be ineffective and large doses of drugs are needed, consider a home nebuliser.
2. Children who have brittle asthma will benefit from regular high dose nebulised bronchodilators in addition to their regular prophylactic drugs. In this context, the child must be on maximum prophylactic drugs and only if this is inadequate, should nebulised B2 agonist be considered.
3. Children with previous severe life threatening asthmatic attacks, where parents can be relied on to follow a crisis management plan if the nebuliser in unhelpful. Oxygen must be provided as well.

Guidelines for Nebuliser Usage

Before considering a home nebuliser:

1. Explore other methods of drug administration especially spacers with the MDI.
2. Ensure patient is complying with prophylactic drugs.
3. Conduct a two week domiciliary nebuliser trial to clearly demonstrate benefit and clinical efficacy.
4. Give verbal and written instructions on:
   - method and frequency of use
   - nebuliser cleanliness
   - crisis management plan
   - regular follow up.
5. All children able to use a peak flow meter must be issued with one.
6. All nebulisers should carry a warning with regard to over-reliance and delay in seeking medical help.

Alarming widespread use of unsupervised nebulisers – no peak flow meters or adequate asthma prophylaxis.

Finally, use of a nebuliser by non-compliant parent or parents with a poor understanding of their child's asthma is positively dangerous.

Inadequate instructions given to patients

Spacer Devices

Several spacer devices are available for use by children. They confer the advantage of better drug deposition into the peripheral airways. They do this by allowing the particles of drugs to be held in suspension for 3-5 seconds during which time the child can inhale the drug. They reduce deposition of drug in the mouth and orpharynx and therefore may prevent candidiasis sometimes seen with inhaled steroid use.

Large and small volume spacer devices are available for use. In general larger volume spacer devices are useful in smaller children (less than 4 years of age) whereas small volume spacers are suitable in children over 4 years of age. Spacers with a mask are much more efficient and convenient. A simple device used by many of us is the plastic disposable coffee cup method. However, larger doses need to be used and its value

More than 50% of the children experienced side effects from bronchodilators

has only been confirmed for bronchodilators but not yet for Lomudal or inhaled steroids.

In most children MDI should be used with spacers because of the difficult technique involved with the MDI.

References

1. The Nebuliser Epidemic. The Lancet 1984; II: 789-790.
2. Laroche CM, Harries AVK, Newton K, Britton MC. Domiciliary nebulisers in Asthma: a distinct survey. Br Med J 1985; 290:1611-13.
3. Murphy D, Holgate STS. The use and misuse of domiciliary nebuliser therapy on the Isle of Wight. Respir Med 1989;83:349-52.
4. British Thoracic Association. Death from asthma in two regions of England. Br Med J 1982;285:1251-5.
5. Grant IWB. Asthma in New Zealand Br Med J 1983;286; 374-7.
6. Sears MR, Rea HH, Tenwick J et al. Br Med J 1987;294:477-81.
7. Bendefy IM. Home nebuliser in childhood asthma: Survey of hospital supervised use Br Med J 1991;302:1180-1.
8. Jenkins SC, Heaton RW, Fulton TJ, Moxham J. Comparison of Domiciliary nebulised salbutamol and salbutamol from a metered-dose inhaler in stable chronic airflow limitation. Chest 1987;91:804-7.
9. Gunawardena KA, Smith AP, Shankleman. A comparison of metered dose inhalers with nebulisers for the delivery of Ipratropium bromide in domiciliary practice. Br J Dis Chest 1986;80:170-8.
10. Fuglsang, Pedersen S. Comparison of nebuliser and nebuliser treatment of acute severe asthma in children. Eur J Respir Dir 1986;69:109-13.
11. Wesley AG, Paruk F, Broughton MH, Gouws E. Ipratropium bromide delivered by metered-dose aerosol to infant wheezers. S Afr Med J 1991;79:536-7.

Are you a member of the Academy? Please contact your local Academy branch for further details

UNIVERSITY OF CAPE TOWN/
CAPE PROVINCIAL ADMINISTRATION

Chair of Primary Health Care

Applicants should be senior health care professionals in the area of Primary Health Care. The successful applicant should have proven research, teaching, clinical and managerial ability in this field. She/he will need to take a leadership role in the current process of adoption of the Primary Health Care approach by the Faculty of Medicine in all its activities and departments. This will include developing the present Unit of Family Medicine/Primary Health Care into a fully-fledged Department of Primary Health Care with a teaching, research and clinical profile, appropriate to the training of health professionals for the health needs of the people of South Africa.

The post is full-time and under the terms of the joint agreement between the University of Cape Town and the Cape Provincial Administration.

A negotiable remuneration package includes attractive staff benefits such as medical aid, an excellent car scheme, a housing subsidy in certain circumstances and a pension scheme. Further details are available on request.

Please send your curriculum vitae together with the names, addresses, telephone and fax numbers of three contactable referees not later than 15 November 1994 to the Appointments Officer, Personnel Department, University of Cape Town, Rondebosch 7700. Telephone (021) 650-2192/2196; fax (021) 650-2138; email: perappt@bremner.uct.ac.za for further information.

The University of Cape Town is committed to policies of equal opportunity and affirmative action which are essential to its mission of promoting critical inquiry and scholarship.

C77385/2210R