

## HOME NEBULIZER THERAPY IN CHILDREN

*P. Vassallo Agius, H.M. Lenicker*

### ABSTRACT

**Drug administration in children is never easy especially in those under five years of age. This is even more so in the case of prophylactic inhalational treatment of asthma in children. The role of home nebulizer therapy is reviewed. Its impact on the need for hospital admission because of acute asthma is discussed.**

*Keywords: Home, Nebuliser, Children, Asthma.*

### INTRODUCTION

The administration of medicines to children can be difficult, especially in the very young and the handicapped. This is even more demanding in the case of chronic or recurrent illnesses which require daily prophylactic treatment measures and strict compliance for optimum effectiveness. The treatment of asthma in young children is fraught with problems of a similar nature.

Nebulized salbutamol administered by means of a Hudson nebulizer and face mask was introduced to the Paediatric Department at St. Luke's Hospital in 1981 for the treatment of acute severe asthma. This mode of treatment quickly made obsolete the use of subcutaneous adrenaline or I.V. selective Beta 2 stimulants. The use of nebulized salbutamol quickly spread to the medical wards.

At about the same time, nebulizer units powered by compressed air became available commercially for home use. Since salbutamol nebulizer solution was not available outside hospital, the increasing demand for domiciliary treatment, meant that at times there was not enough of the solution for emergency use in hospital!

### METHODS

The Hospital Pharmacy Department keeps a register of patients who have been loaned a nebulizer for home use. Instructions about its use were given usually by the nurse on the ward, or by the hospital doctor. The mother was also told how to clean the mask after use. From a total of 104 children aged 0-14 years on the Register, 63

could be traced and form the basis of this study. The histories were reviewed and some were found to be incomplete. The parents were contacted by telephone to answer a structured questionnaire for additional information not obtainable from the notes. All the parents contacted were very co-operative except for one who initially expressed misgivings about being contacted by telephone. The parents were asked who prescribed nebulizer therapy, the type of medicines used both before and after nebulizer therapy, the number of hospital admissions before and after nebulizer therapy, how the nebulizer was cleaned after use and whether any side effects were noticed. The parents were also asked whether they thought the nebulizer had been useful and whether any improvement in the child's condition had been noticed. Finally, they were invited to discuss any problems which they were encountering regarding their child's asthma.

### RESULTS

The 63 children were 36 boys and 27 girls. The age range was: five months to thirteen and a half years, with a mean of 37.9 months. More than half the number of children were under 3 years of age. Only ten children (16%) were over 5 years of age (Fig. I).

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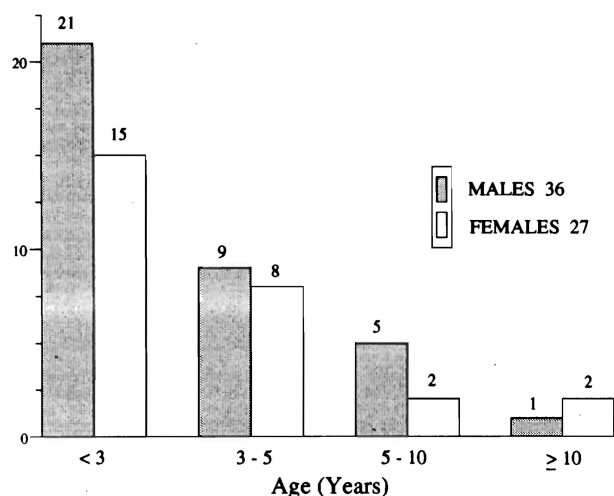


Figure I - Age and Sex : n = 63

The treatment given before nebulizer treatment was started included salbutamol, ketotifen, aminophylline derivatives, steroids and sodium cromoglycate (SCG), in various combinations. These medicines were usually given by mouth, but some were administered by rectal suppository. SCG was given by inhalation either as aerosol or in powder form (Fig. II).

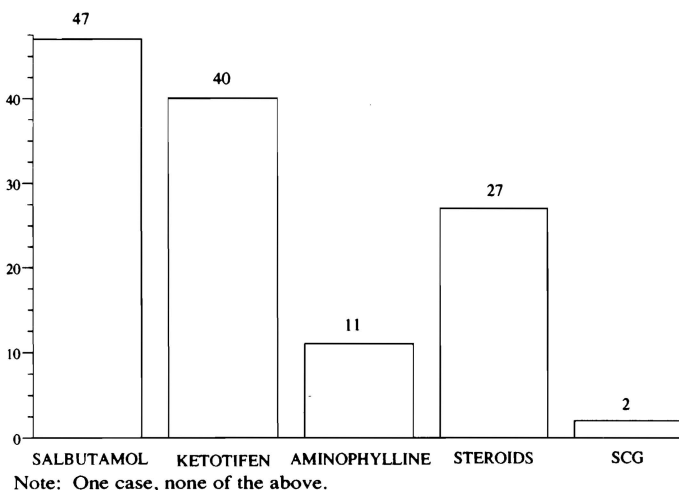


Figure II - Treatment before Nebulizer : n = 63

Home nebulizer therapy was prescribed by the hospital doctor in almost 90% of cases. The rest were started at the suggestion of the general practitioner. The medicines given by nebulizer were steroids, SCG and salbutamol (Fig. III).

All except 11 received prophylactic treatment (either steroids or SCG). It was however evident from the questionnaire that nebulized salbutamol was often used for the treatment of milder attacks at home, almost always with the knowledge and guidance of a hospital doctor or the general

practitioner. There is no doubt that prompt and effective treatment of an asthmatic episode in the early stages can abort the attack.

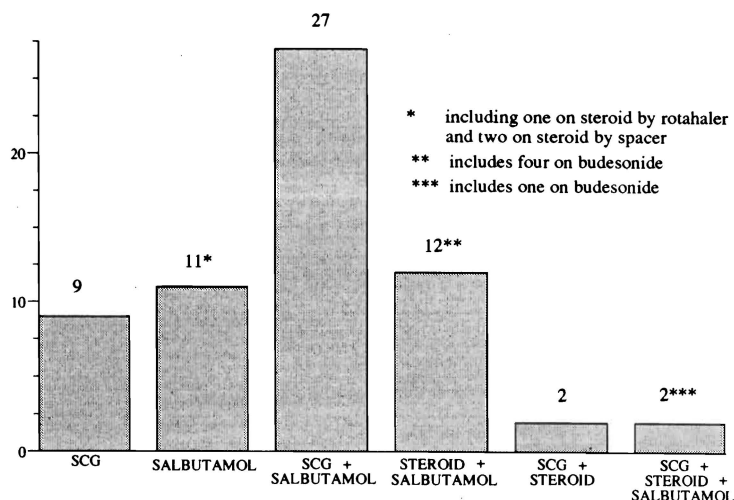


Figure III - Medicines given by Nebulizer : n = 63

The duration of treatment with nebulizer varied from 5 months to over 2 years. Just over one half of the number of cases had treatment of more than 12 months' duration (fig. IV).

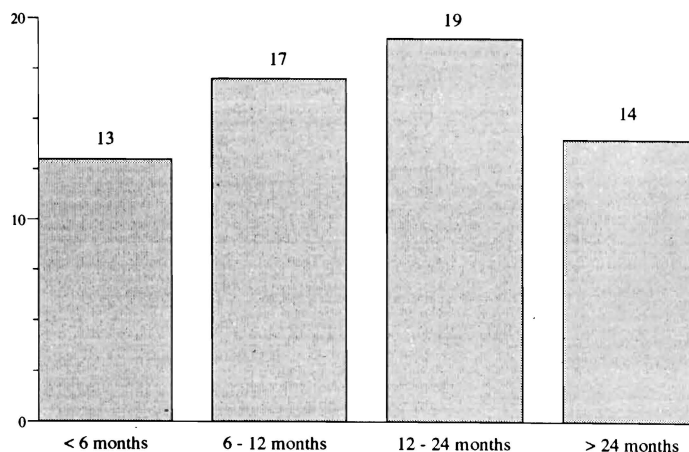


Figure IV -Duration of treatment with Nebulizer : n = 63

The number of admissions after starting the home nebulizer showed a significant reduction when compared to the number of admissions before the nebulizer was introduced (Fig. V).

Before nebulizer therapy, the mean number of admissions was 4.0, while this decreased to 1.3 after the nebulizer therapy was started. P is less than 0.01. Seventeen children who were not admitted before or after nebulizer therapy were excluded from the calculation, for obvious reasons. The nebulizers were cleaned with

running water or with hot water. Only two needed servicing and in two instances the nebulizers had to be changed.

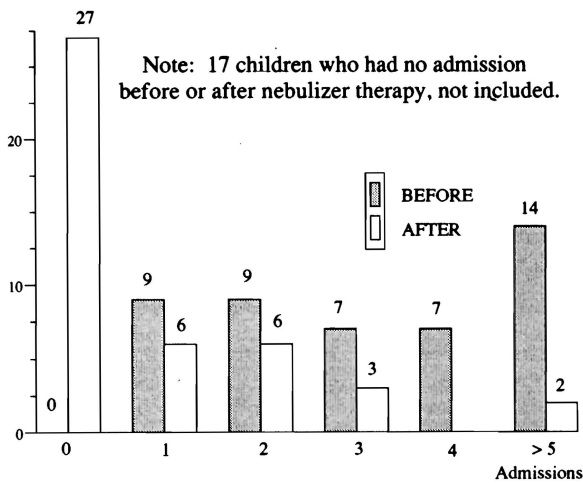


Figure V - Number of Admissions : n = 63

## DISCUSSION

The rising incidence in the number of cases of asthma in children, as well as the increased number of hospital admissions with acute severe asthma have been well documented<sup>1,2</sup>. It is also well known that prophylactic treatment with certain medicines such as sodium cromoglycate and steroids is effective in reducing both the frequency and severity of acute attacks of asthma. We have mentioned previously that administration of medicines can be difficult in children, especially in the very young. Prophylactic therapy of asthma with oral ketotifen has not been very successful<sup>3</sup>. Administration of longterm oral steroids to children is not recommended because of the interference with growth, besides the other well known adverse side effects. Inhalation therapy with sodium cromoglycate and steroids has been associated with a decrease in both the number and severity of attacks of asthma in children. Various ingenious devices such as spacers, nebulizers and so on, have been conceived to enable the administration of these medicines to children, even small children. The use of nebulizers in the treatment of acute severe asthma in hospital has been followed by their use in the home, even for the prophylactic treatment of asthma in children when spacers cannot be used for one reason or other.

Despite the widespread use of home nebulizers, little has been reported about their use in the management of children with asthma. A district hospital survey of asthmatic patients using home

nebulizers in Britain in 1985 included 39 children under 15 years of age out of the 53 patients studied<sup>4</sup>. Only 5 of the children were using the home nebulizer for prophylaxis with SCG alone. Most of the patients apparently were using the nebulizer for administration of bronchodilators only.

Bendefy<sup>5</sup> sent a postal questionnaire to the parents of 93 asthmatic children who were using home nebulizers. They were all using bronchodilators and over two-thirds were also using SCG or beclomethasone. Side effects due to the bronchodilators were reported in 60% of cases. She also reported a decrease in the number of admissions.

Our study shows that home nebulizer therapy for asthma has decreased the number of admissions of children to hospital with acute severe asthma. This is due not only because of more effective prophylactic therapy but also because the milder attacks are being treated efficiently at home by means of nebulized salbutamol, thus preventing the attack from progressing to a severe attack. The indiscriminate use of nebulized salbutamol in the home may be dangerous if not properly supervised. Indeed, some deaths in asthma in a study from New Zealand have been ascribed to this<sup>6</sup>. Lack of improvement may prompt the mother to increase the frequency or even the dose of the nebulized salbutamol, thus precipitating cardiac arrhythmias especially in the presence of hypoxia. The parents should be warned that if treatment does not produce the expected relief, they should seek medical help to avoid deterioration in the child's condition and to determine whether additional treatment with steroids is needed, perhaps in hospital. In our study, no side effects were reported which could be ascribed to the nebulized salbutamol, which is in marked contrast to the experience of Dr. Bendefy.

It must be made clear to the parents that nebulizer prophylactic therapy is only one aspect of, and not an alternative to, the comprehensive treatment of childhood asthma. These children need to be seen at regular intervals not only to check the patient's progress and compliance but also to supervise any other medication which is being given by nebulizer.

## CONCLUSION

With proper supervision, the use of home nebulizers is a useful and effective adjunct in the treatment and prophylaxis of asthma in childhood.

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