

2 Year old asthmatics can learn to operate a tube spacer by copying their mothers

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SUMMARY The mothers of 20 asthmatic children aged between 1.9 and 2.9 years were taught to use a tube spacer; 15 (75%) succeeded in teaching their children to operate it. Eight children (40%) inhaled salbutamol correctly. Inability to tolerate salbutamol was as common as failure to use the spacer correctly.

Preschool children with asthma can use tube spacers effectively.^{1 2} Although Warner has stated that most children over the age of 2 can learn to use a tube spacer,³ there have been no reports confirming the correct use of these devices by 2 year old children. I reviewed my experience of teaching mothers to teach their 2 year old asthmatic children to use a tube spacer.

Patients and methods

Over a three month period, 20 consecutive asthmatic children aged between 1.9 and 2.9 years (mean 2.3) attending hospital as outpatients were given a tube spacer (Volumatic). This is a plastic cone, similar in design to the Nebuhaler, with a mouth-piece containing a valve at one end and an aperture at the other through which salbutamol can be sprayed from a metered-dose inhaler. The mother of each child was taught to operate the tube spacer and then asked to teach her child at home. The principle was that children should learn by copying their mothers. No attempt was made by hospital staff to instruct the children directly.

Children were reviewed as outpatients for up to two months. When a child had learned to operate the tube spacer correctly, a salbutamol metered dose inhaler was prescribed. The mother was asked to give salbutamol at home if the child had symptoms of asthma.

The children's ability to operate the tube spacer and to inhale salbutamol was assessed by a paediatrician in the outpatient department. The correct method of operating the tube spacer was defined as the ability to take five consecutive breaths sufficient to open and close the valve.⁴ Correct inhalation of salbutamol was defined as the

ability to perform this manoeuvre after a puff of salbutamol had been sprayed into the spacer.

Results

Fifteen of the 20 children learned to operate the tube spacer correctly. Some of them grimaced, however, when given salbutamol, and would not continue inhaling it after one or two breaths (table). Two of this group also coughed while inhaling salbutamol, and two said that they did not like it. Five other children also coughed while inhaling salbutamol, but were able to finish inhaling it correctly.

Discussion

Most of the mothers were able to teach their 2 year old children to operate the tube spacer correctly in the manner described by Gleeson and Price.⁴ This method of teaching children is simple, effective, and has not previously been emphasised. It only takes a few minutes to teach a mother to use a tube spacer, and there is no need to refer children to a physio-therapist for instruction, as is the practice in many hospitals. Most of the children attempted to take the tube spacer from their mother as soon as they saw her using it. Many children therefore began using the spacer immediately, and subsequently perfected their technique at home.

Unfortunately some of the children who were able to operate the tube spacer correctly found salbuta-

Table Ability of 2 year old asthmatics to tolerate salbutamol inhaled from a tube spacer

	No of children	Mean age (years)
No able to tolerate salbutamol	8	2.3
No unable to tolerate salbutamol	5	2.7
No lost to follow up	2	2.4
Total No able to operate spacer	15	2.3

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mol distasteful and refused to inhale. Failure to tolerate inhaled salbutamol was as common as failure to learn to operate the tube spacer correctly. It is not clear whether salbutamol, or some other component of the aerosol, is specifically unpalatable to children, or whether young children are simply apprehensive at being asked to inhale an unfamiliar substance. This question merits further investigation.

This study does not set out to show that β adrenergic stimulants inhaled in the manner described will produce bronchodilation in 2 year old asthmatics; this has already been shown, albeit in a slightly older group of children (mean age 3.6 years).⁵ The results do suggest, however, that tube spacers can be prescribed for 2 year old asthmatics with a reasonable expectation that they will use them correctly.

References

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Accepted 23 November 1988

Reactive arthritis complicating cryptosporidial infection

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SUMMARY Two cases of reactive arthritis in association with cryptosporidial enteritis in childhood are reported. Oocysts of cryptosporidium should be sought when arthritis complicates diarrhoeal illnesses.

The coccidian parasite cryptosporidium is a common cause of gastrointestinal infection in childhood.¹ In the west of Scotland it is the commonest identified cause of gastroenteritis in children.² In immunocompetent subjects the disease is self limiting and there is no satisfactory treatment. The symptoms comprise diarrhoea without bleeding, abdominal pain, vomiting, and sometimes fever. Various complications have been described including prolonged listlessness, lethargy, loss of appetite, and failure to thrive.² We know of only one previous report of reactive arthritis, which occurred in an adult.³ We report here two cases of reactive arthritis associated with cryptosporidial infection in childhood.

Case reports

CASE 1

A 3½ year old girl whose mother ran a riding school was admitted to hospital with a week's history of

vomiting and diarrhoea. She had become lethargic and had developed swollen, cold, blue, painful feet on the day of admission. On admission she was flushed and feverish and had cold swollen feet. The next day she was not keen to bear weight and had developed swollen, warm, tender ankles with similar changes in the wrists, but to a lesser degree. Her haemoglobin concentration was 151 g/l, white cell count $16 \times 10^9/l$, and erythrocyte sedimentation rate 27 mm in the first hour. Blood cultures, throat swab, and urine culture grew no pathogens. Stool culture and serology for rotavirus, rheumatoid factor, and campylobacter showed no abnormalities. Oocysts of cryptosporidium were seen on microscopy of the stool. She was treated initially with clear fluids orally followed by a return to a normal diet, but loose stools and fever continued for several days. The warm, tender, swollen ankles and wrists persisted for four days after admission and she was reluctant to bear weight for a total of 10 days; thereafter she made a spontaneous recovery and was discharged home.

CASE 2

A 5 year old girl was admitted to hospital with a five day history of severe diarrhoea with mucus but no blood, vomiting, abdominal pain, and fever (maximum temperature 39°C). On the sixth day the index