Acta Otolaryngol (Stockh) 1996; 116: 490–492

SHORT COMMUNICATION

Reduced Nocturnal Asthma by Improved Nasal Breathing

BJÖRN PETRUSON and KAJ THEMAN

From the Department of ENT and Asthma & Allergy Research Centre, Sahlgrenska University Hospital, S-413 45 Göteborg, Sweden

Petruson B., Theman K. *Reduced nocturnal asthma by improved nasal breathing* Acta Otolaryngol (Stockh) 1996; 116: 490–492.

The nose and not the mouth should be used for breathing as the nose has better air conditioning capacity. When air is inhaled through the mouth it may dry and cool the respiratory mucosa, which can lead to bronchoconstriction in sensitive patients with asthma. By dilating the nostrils you can increase nasal breathing in most subjects. The aim of this study was to investigate whether sleeping with dilated nostrils reduces nocturnal asthma. At the Asthma and Allergy Research Centre, Gothenburg, 15 out-patients with nocturnal asthma were selected. Every other night for 10 nights the test subjects slept with the nasal dilator Nozovent® which has been shown to increase the nasal air-flow and decrease the need for mouthbreathing. Every morning the patients self-reported on a form whether they had woken with asthma during the night or if they had had to take asthma medication. When sleeping with the nasal dilator the patients woke up with asthma on 17 of 75 nights as compared with 32 of 75 when sleeping without the device ($p < 0.01$). Reduced nocturnal asthma was observed by 12 patients and less need for asthma medication at night by 7. None of the patients noted any side-effects due to the device. In conclusion, the easy-to-use and cheap medical device, Nozovent®, which mechanically dilates the nostrils and improves nasal breathing, can reduce nocturnal asthma. *Key words: secondary asthma prevention, respiration, nasal breathing, mouth dryness.*

INTRODUCTION

It has been known for many years that some patients with asthma have greater difficulty than normal people breathing during the night (1). In two recently published editorials (2, 3), different factors triggering bronchoconstriction at night have been analysed. In none of them the importance of nasal breathing was mentioned.

Air at room temperature with a relative humidity of 30%, inhaled through the nose, has a relative humidity of 98% when it reaches the pharynx compared with 90% when inhaled through the mouth (4). The relative humidity, however, appears to vary with the extent to which the mouth is opened, being lower when the mouth is wide open (4). Mouth breathing lowers the inspiratory air temperature in the pharynx and trachea (5).

In asthmatic subjects, forced expiratory volume decreased to a significantly greater degree with oral breathing compared with nasal breathing, and the fall in retrotracheal temperature was significantly more pronounced (6). A linear relationship between the degree of airway cooling and the severity of bronchoconstriction was also shown.

Increased breathing capacity through the nose was observed in all 72 tested subjects when the nostrils were dilated (7). When the dilator was used during the night, dryness of the mouth was reduced significantly (8).

The aim of this study was to evaluate whether sleeping with dilated nostrils reduces nocturnal asthma.

MATERIAL AND METHODS

Test subjects

At the Asthma and Allergy Research Centre, Sahlgrenska University Hospital, Gothenburg, 15 out-patients suffering from nocturnal asthma were selected and instructed on how to use the nasal dilator correctly (Figs. 1 and 2). The study group consisted of 7 women and 8 men between 36 and 67

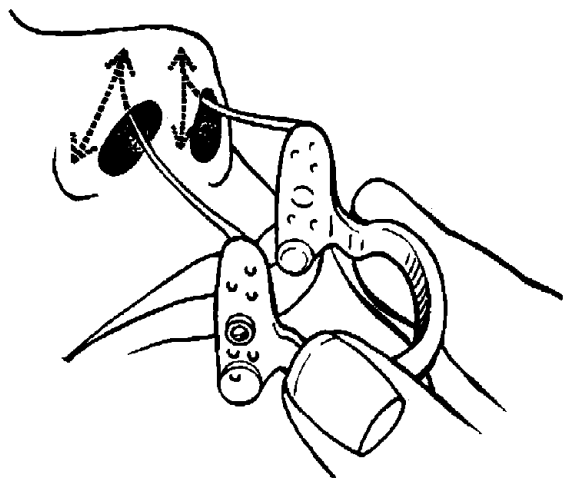

Fig. 1. The introduction of the nasal dilator.

© 1996 Scandinavian University Press. ISSN 0001-6489

easier to breathe through the nose on the nights when the device was used and 10 said they had slept better.

Improvement of the inhaled air through the nose was described by 7 patients. Reduced nocturnal asthma was observed by 12 patients, 7 noted less need for asthma medication on the nights when the dilator was used, and 5 patients said they needed less asthma medication during the daytime after a night spent with the device. None of the patients noted any side-effects due to the device.

REFERENCES

1. Editorial. Asthma at night. Lancet 1983; *i*: 220–2.
2. MacDonald JB. Nocturnal asthma (editorial). BMJ 1992; 304: 998–9.
3. Douglas NJ. Nocturnal asthma (editorial). Thorax 1993; 48: 100–2.
4. Ingelstedt S. Studies on the conditioning of air in the respiratory tract. Acta Otolaryngol (Stockh) 1956; Suppl 131.
5. Cole P. Modification of inspired air. In Proctor DF, Andersen I. The nose. Upper airway physiology and the atmospherie environment. Amsterdam: Elsevier Biomedical Press, 1982: 351–75.
6. Griffin MP, McFadden ER, Ingram RH. Airway cool-

Table I. *Fifteen patients with nocturnal asthma were tested for 150 nights, half of the nights with the Nozovent® nasal dilator (Noz) and half without (no Noz)*

			The number of nights that the patients:			Summary of the test nights, answer yes = +, answer no = −			
Pat no	Age	Sex	Woke up due to asthma Noz/no Noz	Used asthma drugs Noz/no Noz	Had dryness of the mouth Noz/no Noz	Less asthma with Noz	Fewer asthma drugs at night	Fewer asthma drugs following day	Better sleep
1	40	F	1/0	5/5	2/2	−	−	−	−
2	45	M	0/0	1/0	5/5	+	−	−	−
3	40	F	0/3	1/3	3/5	+	+	+	+
4	49	F	0/5	0/3	1/5	+	+	−	−
5	45	F	0/0	0/0	5/5	−	−	−	+
6	36	F	1/2	1/2	0/0	+	+	+	+
7	52	M	4/5	0/0	4/5	+	−	−	−
8	54	M	0/0	0/0	0/5	+	−	−	+
9	67	M	0/3	0/3	1/4	+	+	+	+
10	44	F	2/2	0/0	3/2	+	−	−	+
11	58	F	0/0	0/0	0/0	−	−	+	−
12	57	M	0/0	0/0	5/5	+	−	−	+
13	49	M	2/5	1/4	5/5	+	+	+	+
14	57	M	5/5	4/5	2/5	+	+	−	+
15	55	F	2/2	2/0	2/4	+	+	−	+
Total			17/32	15/25	38/57	12	7	5	10
p-value			<0.01	<0.05	<0.01				

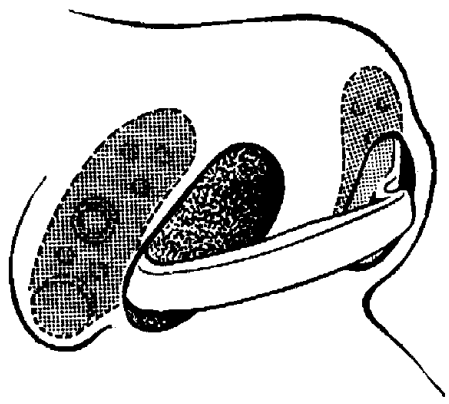

Fig. 2. The nasal dilator in position.

years of age (mean 50 years) who had had moderate/severe chronic bronchial asthma for several years; 6 of them were smokers. Their answers to relevant questions in a questionnaire gave the following information: Breathing through the mouth in supine position was noted by 9 patients. Dryness of the mouth during the night or in the morning was noted occasionally in 3, several times in 3 and continuously in 8 patients. Discomfort from getting cold air into the bronchi was observed by 9 patients. When cold air entered the bronchi, bronchospasm had been experienced by 11 patients.

Methods

During the test period of 5 + 5 nights, each patient was asked to sleep with the Nozovent® nasal dilator every other night, as reported in a previous publication (8). Every morning during the test period, the past night was rated by the patient him/herself. After the 10 nights, the patients had to answer a questionnaire about their experience with the device with questions like: Were you less disturbed by nocturnal asthma when you slept with dilated nostrils? no/yes. Did you have less need for asthma drugs during the nights when you slept with dilated nostrils? no/yes. The subjects gave their informed consent and the study was approved by the Ethics Committee of Sahlgrenska Hospital. The significance of differences was analysed using Fisher's exact test.

RESULTS

During the 75 nights the patients slept with dilated nostrils, they woke up with asthma on 17 nights as compared with 32 when sleeping without the device ($p < 0.01$, Table I). There was a need for asthma medication on 15 of the nights when the device was used compared with 25 nights spent sleeping without the nasal dilator ($p < 0.05$). Dryness of the mouth was noted on 38 of the nights with the dilator and 57 without ($p < 0.01$). All but one patient found it