

Fenoterol Inhalation Powder and Aerosol in the Treatment of Asthma

K. KIVIRANTA

Department of Allergic Diseases, Helsinki University Central Hospital, Helsinki, Finland

Twenty patients with asthma were studied. They were given either fenoterol powder or fenoterol MDI for 2-week periods using a double-blind cross-over design. Identical doses of fenoterol (0.2-0.4 mg 2-4 times daily) were given to an individual patient throughout the 4-week study period. Both forms of treatment produced an almost identical bronchodilation, and there were no statistically significant differences in symptoms or side effects. It is concluded that fenoterol powder and fenoterol aerosol are equally effective.

Key words: asthma; fenoterol; powder.

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Bronchodilator drugs are most often administered as freon-propelled aerosols using a metered-dose inhaler (MDI) device. Usually this method works well, but some problems do occur.

A poor MDI technique can inhibit the desired drug effect (5). A considerable portion of patients use the spray incorrectly (2, 3). Moreover, the propellant freons may have undesirable effects. Methods of administering the bronchodilator as a fine powder carried by inhaled air have therefore been developed. This necessitates a comparison of the methods and dosages.

Fenoterol (Boehringer Ingelheim) is an effective bronchodilator with a long duration of effect (4). It is available in the regular MDI form, but a dry powder inhaling device has also been produced. The aim of this study was to compare the effects of these two forms of medication in a group of patients with asthma.

PATIENTS AND METHODS

Twenty patients with asthma (9 men and 11 women) were studied. They all gave an informed consent to participate in the study. Their

mean age was 35 years (range 18-57). The mean duration of asthma was 11 years (range 1-43). The disease was mild in nine patients, moderate in 10 and severe in one. However, all patients needed daily medication. They had diurnal variation of the peak expiratory flow (PEF) and bronchodilation followed medication. They had been taught to use the MDI correctly. The mean PEF was 430 l/min (SD = ± 109) and the increase after bronchodilators was at least 15%.

Besides inhaled bronchodilators most of the patients used peroral long-acting theophylline and some of them had also either inhaled beclomethasone or peroral cortisone regularly.

The study period consisted of three phases:

- 1) A "run-in" week, when the patients used their ongoing medication, but recorded PEF twice daily before and half an hour after inhaled bronchodilators. They also kept a diary of symptoms. Thus the compliance could be ascertained.
- 2) A 2-week period when the inhaled bronchodilator was, according to randomization, either fenoterol MDI + placebo powder or fenoterol powder + placebo MDI. The dose

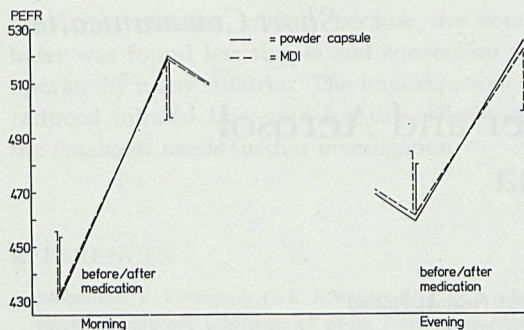


Fig. 1. The mean $\pm$ SEM peak expiratory flow (PEF) values before and after fenoterol treatment in the morning and evening during 14 days (MDI = metered-dose inhaler).

Table 1

The effect of fenoterol treatment on peak expiratory flow (PEF) values during 14 days

Treatment	PEF value $\pm$ SD			
	Morning		Evening	
	Basal values	After fenoterol	Basal values	After fenoterol
Powder capsule	432 $\pm$ 105	520 $\pm$ 104	457 $\pm$ 94	525 $\pm$ 105
MDI ^x	433 $\pm$ 109	518 $\pm$ 98	462 $\pm$ 105	524 $\pm$ 102

^x MDI = metered-dose inhaler

Table 2
Symptom recordings

	0	1	2	3
Powder capsule period	Number of patients			
Wheezing under physical strain	7	5	6	2
Wheezing at rest	11	7	2	0
Cough	7	12	1	0
MDI period	Number of patients			
Wheezing under physical strain	8	4	6	2
Wheezing at rest	9	8	3	0
Cough	11	9	0	0

Scale 0–3 as follows: 0 = no, 1 = moderate, 3 = severe.

Table 3
Side-effects

	0	1	2	3
Powder capsule period	Number of patients			
Tremor	13	1	6	0
Heart palpitation	15	4	1	0
MDI period	Number of patients			
Tremor	11	5	4	0
Heart palpitation	15	4	1	0

Scale 0–3 as follows: 0 = no, 1 = moderate, 3 = severe.

was 0.2–0.4 mg 2–4 times daily, depending on the patients earlier need of bronchodilators (13 patients used 0.2 mg twice daily, six patients 0.2 mg four times daily, and one patient 0.4 mg three times daily). The dose was kept constant throughout both periods.

- 3) A 2-week period with the opposite form of active treatment to phase 2.

Thus a double-blind cross-over design was completed.

The patients kept a diary of symptoms and recorded the best of three consecutive expirations using the peak flow meter at each point of measurement.

RESULTS

The mean PEF values (basal values and values after beta-agonist) during the 2-week periods are shown in Fig. 1 and Table 1, which give the expected variation within time. The curves are practically identical. The mean increases of PEF after the fenoterol MDI and powder were 85 and 88 l/min, respectively, in the morning, and 61 and 67 in the evening.

The symptoms of asthma are summed up in Table 2. Some of the patients had occasional wheezing, but there were no differences between the treatments.

The possible side effects are shown in Table 3. "Heart symptoms" consisted of mild feeling of palpitation.

Eleven of the patients preferred the MDI, five preferred the powder, and four claimed no difference. Two patients had throat and one

had nose irritation during the powder treatment. One of the patients complained of pharyngeal irritation during the MDI-treatment.

DISCUSSION

Identical doses of fenoterol given as powder or MDI produced a similar bronchodilation. This is in concordance with other investigations (1, 6).

Salbutamol is also marketed as inhaled powder (Ventolin Rotahaler, Glaxo) but the recommended dose is twice as high as for the MDI. It is possible that particle size or the construction of the inhaler device lead to the diminished bronchodilator effect. It appears that fenoterol as a powder can be used in the same dosage as with the MDI. A majority of patients may prefer the MDI, but the powder inhalation is a useful alternative for patients who find the MDI difficult, especially children and some older patients.

REFERENCES

1. Anderson, G., Wilkins, E. & Jariwalla, A. G.: Fenoterol in asthma. *Br. J. Dis. Chest.* 73, 81, 1979.
2. Dahl, R.: Dosis-aerosolbehandling. *Inhalationstekniske vanskeligheder for spraybehandlede.* *Ugesk. Laeg.* 139, 1856, 1977.
3. Kornstad, S. & Boye, N. P.: Patient errors and preference with regard to the use of a bronchodilating spray and fenoterol (Berotec) powder. *Eur. J. Respir. Dis* 64 (Suppl. 130) 12-16, 1983.
4. Nuchel Petersen, N. & Nuchel Petersen, B.: Fenoterol inhalation powder and aerosol. *Eur. J. Respir. Dis.* 64 (Suppl. 130) 1-5, 1983.
5. Orehek, J., Gayard, P., Grimaud, C. & Charpin, J.: Patient error in use of bronchodilator metered aerosols. *Br. Med. J.* 1, 76, 1976.
6. Salorinne, Y. & Siren, R.: Ventilation effect of fenoterol powder and freon-propelled aerosol in patients with asthma. *Eur. J. Respir. Dis.* 64 (Suppl. 130) 6-8, 1983.

Address:

K. Kiviranta

Department of Allergic Diseases

Helsinki University Central Hospital

Helsinki, Finland

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