

COMPARISON OF APPLICATION TECHNIQUE OF METERED-DOSE INHALER AND DISKHALERS TO ASTHMATIC PATIENTS

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There are different applying methods of inhalation therapy to asthmatic patients. Having examined 34 asthmatic patients in two months, we compared their capabilities to use correctly metered-dose inhaler and disc. During the first examination, 66,7% of probationers have made at least one mistake at using the metered-dose inhaler. At the second examination, we noticed that higher percentage of probationers have made fewer mistakes using the disc than metered-dose inhaler ($p < 0,02$). The patients prefer disc to metered-dose inhaler. *Acta Medica Medianae 2007;46(3):35-37.*

Key words: asthma, inhaling devices, metered-dose onhaler, diskhaler

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Introduction

Treatment of patients with asthma is based on inhalation therapy. Inhalation therapy has minimal side-effects. The necessary doses are minimal, and with this treatment, medication has a local effect on the respiratory system. There are different types of inhalers used in inhalation therapy. Metered-dose inhalers (MDI) are most commonly prescribed, while dry powder inhalers - diskhalers are less frequently used (1).

Methods

The two-month study included 56 patients with asthma who did not have any other acute or chronic diseases.

At their first examination, the patients were explained the proper inhalation technique for both inhalers, and then the patients demonstrated their use. Patients took Fluticasone by the MDI, and a combination of Salmeterol - Fluticasone by the diskhaler.

Based on the checking systems (Table 1), analysis of inhalation mistakes was performed (2). Each activity was scored one point.

After two months, the second examination was performed and the inhalation techniques with MDIs and diskhalers were checked again. The difference that appeared in application of these inhaler devices were assessed by Wilcoxon test.

Aims

The aim of this study was to compare mistakes in application of metered-dose inhalers and diskhalers in patients with asthma.

Results

The testing was performed with 54 patients (38 men and 16 women), while two of the patients did not turn up at the follow-up examination after one month. All the patients were over 35, and the average age was 49 ± 7 years. Spirometric examination confirmed moderately persistent asthma, with the average FEV₁ value of 1.671, or $62 \pm 15\%$ of the predicted value.

Characteristics of the patients at the beginning of the testing are given in Table 2.

At their first examination, before they were explained the proper inhalation, 37 (68.5%) patients made at least one mistake while using the metered-dose inhaler, while 34 (62.9%) patients made one or more mistakes while using the diskhaler.

After they had been given the instructions on the proper use of inhalers, 27 patients (50%) used the metered-dose inhaler properly, and 31 (57.4%) used the diskhaler properly.

Two months later, at their second examination, there were significantly more patients that made at least one mistake with the metered-dose inhaler (34 or 62.9%) than with the diskhaler (29 or 53.7%), as seen in Table 3. The patients made fewer inhalation mistakes while using the diskhaler than with the metered-dose inhaler ($p < 0.02$).

The most frequent mistakes (given in Table 1) in inhalation techniques with MDIs and diskhalers were with the elements 3 and 6.

Table 1. Elements for checking the use of MDIs and Diskhalers

	Metered-dose inhaler	Diskhaler
1	Remove the cap from the mouthpiece	Open the mouthpiece
2	Shake the dose inhaler	Pull the handle to the right (until a click heard)
3	Breath out	Breath out
4	Put the mouthpiece between your lips and close lips firmly around it	Bring the diskhaler to the lips and close lips around it
5	Hold the dose inhaler upright	Hold the diskhaler horizontally
6	Press the dose inhaler and inhale at the same time	Breathe in slowly and deeply
7	Hold your breath for 5 seconds	Hold breath for 5 seconds
8	Remove the inhaler and breathe out	Remove the diskhaler from the mouth and breathe out
9	Wait for three to five minutes	Replace the cap on the mouthpiece
10	Shake the dose inhaler again and repeat the procedure 3 to 7 times	
11	Replace the cap	

Table 2. Characteristics of the patients registered at the beginning of the study

	Number of patients (n = 54)
Women (%)	16 (29.6)
Men (%)	38 (70.4)
Age	49 ± 7
Smokers	36 (66.7)
Ex-smokers	16 (29.6)
Duration of asthma (years)	13.1 ± 6.3

Table 3. Number of patients with inhalation mistakes at the second examination

	MDI (total)	Diskhaler (total)
Number of patients (%)	54 (100%)	54 (100%)
Patients with one or more mistakes	34 (62.9%)	29 (53.7%)
Number of mistakes per a patient	0.8 ± 1.2	0.7 ± 0.8

Discussion

When inhalers are improperly applied an inadequate dose of medication gets into the respiratory system (1, 3).

After they had been given the instructions, 57% of the patients made one or more inhalation mistakes while using the meter-dose inhaler, which also reduces the effects of medication (4,5). The goal of this investigation was to compare the ways the two different inhalers (MDI and diskhaler) are used in patients with asthma. Our results show that, after they had been given the instructions, the patients with asthma made fewer mistakes while using the diskhaler than with the metered-dose inhaler.

Pulmologists Eva Ronmark et al. in their perspective study concluded that at their first examination 64% of the patients made at least

one mistake while using the diskhaler, while at their second examination, this number decreased to 43% (7).

Lötwall (10) and Backer et al. (6) obtained similar results.

Dieter et al. (8) point out that mistakes are not related to sex.

After one-month follow up, in 24 patients with asthma, a greater increase in FEV₁ was achieved with the use of the diskhaler than with MDI, in respect to the inhalation technique (Salbutamol was used in both cases) (11).

According to our results, age can be a relevant factor for making errors in the inhalation technique.

It is necessary to conduct further investigations in order to assess to what extent the patients will accept new types of inhalers and how they use them.

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POREĐENJE TEHNIKE PRIMENE MERNO-DOZNOG INHALERA I DISK - HALERA KOD BOLESNIKA SA ASTMOM

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Postoje različita sredstva za primenu inhalacione terapije kod bolesnika sa astmom. Ispitivanjem 34 bolesnika sa astmom u toku dva meseca poredili smo njihove sposobnosti u pravilnom korišćenju merno-doznog inhalera i disk-halera.

Na prvom pregledu je čak 68,5% ispitanika pravilo makar jednu grešku prilikom korišćenja merno-doznog inhalera. Na drugom pregledu zapaža se da veći procenat ispitanika pravi manje greške pri upotrebi disk-halera nego kada su primenjivali merno-dozni inhaler ($p < 0,02$). Bolesnici se radije odlučuju i lakše koriste disk-haler nego merno-dozni inhaler. *Acta Medica Medianae* 2007;46(3):35-37.

Ključne reči: astma, sredstva za inhalacionu terapiju, merno-dozni inhaler, disk-haler