

Two Cases of Asthma in Handicapped Elderly Persons in Which Assisted Inhalation Therapy Was Effective

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ABSTRACT

Background: Chronic airway inflammation is a basic pathology of bronchial asthma and it is important to control the inflammation by anti-inflammatory therapy mainly with steroids. However, in asthma in the elderly, there are cases where physicians hesitate to introduce the inhaled corticosteroid (ICS) therapy based on the diagnosis that the use of inhalants is difficult due to the existence of a functional lesion accompanying asthma.

Methods & Results: In cases where self-administrated inhalation therapy is difficult to execute due to the accompaniment of a functional lesion and in cases where sufficient curative effects of steroids are not produced in self-inhalation, administration of assisted inhalation resulted in improvement of clinical symptoms and pulmonary function and was proven effective.

Conclusions: Assisted inhalation therapy is expected to be useful in general and also in terms of expanding the application of ICS in the asthma in the elderly.

KEY WORDS

assistance, bronchial asthma, elderly persons, handicapped persons, inhaled corticosteroid

INTRODUCTION

A basic pathology in bronchial asthma is chronic airway inflammation, in which various cells such as eosinophils, lymphocytes, mast cells, and airway epithelial cells and various cytokines, chemokines, and inflammatory mediators produced from them are involved.¹ In addition, chronic airway inflammation is also involved in the enhancement of airway hyperresponsiveness, which is another pathology of bronchial asthma.^{2,3} Therefore the basics of the therapy against bronchial asthma is to control inflammation caused by these wide range of cells and the drug of first alternative at this point is inhaled corticosteroids (ICS). ICS improves enhancement of airway hyperresponsiveness as well as controls airway inflammation by their powerful anti-inflammation action.³ ICS are positioned as the drug of first choice for asthma controllers in the 2002 GINA Guidelines as well.⁴

Devices for inhalants are developed assuming that the circumstances where patients use inhalants by themselves. In actual clinical conditions, however, there are cases where physicians hesitate to introduce ICS therapy because of the diagnosis that the use of inhalants is difficult due to the accompaniment of a functional lesion, and asthma cases where sufficient curative effects of steroids are not produced in self-inhalation mostly among the elderly. Even in such cases, however, we experience cases where asthma control is improved with execution of accurately manipulated ICS therapy assisted by a caregiver for a part of the inhalation procedure (Fig. 1). Such being the case, this paper presents handicapped elderly asthma cases where clinical symptoms and pulmonary functions were improved by providing assistance for inhalation to discuss problems in inhalation therapy against asthma in the elderly. Written informed consent was obtained from

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Fig. 1 Actual Assisted Inhalation Therapy. An asthma case where self-inhalation is impossible due to finger deformation associated with rheumatoid arthritis. A caregiver will spray the inhalant in a timely manner for the patient's inspiration and make sure of the inhalation condition.

both patients.

CLINICAL SUMMARY

CASE 1

Case: 81-year-old, woman

Chief complaints: Wheezing, coughing, sputum

Past history: She suffered from infantile asthma until nine years of age and has been suffering from rheumatoid arthritis since the age of 50.

Personal history: She has no smoking history, and occasionally drinks alcohol.

History of the present illness: The patient has been aware of coughing, sputum, and wheezing developing mostly during the night and continuing to the early morning for approximately four years and was treated with cough suppressants after being diagnosed as suffering from chronic bronchitis. After being admitted to our hospital for work-up of low back pain and rehabilitation, the patient was referred to our department for work-up of coughing.

Laboratory findings: FVC (forced vital capacity) 1.49 (L), FEV_{1.0} (forced expiratory volume in one second) 1.05 (L), FEV_{1.0}% 70.5 (%), %FEV_{1.0} 62.5 (%), %PEF (Peak expiratory flow) 50.2 (%)

Clinical course: With bronchial asthma suspected from the clinical history, administration of inhalational β_2 stimulants and monitoring of PEF under assistance started. We used the predicted PEF values in the Japanese report by Tsukioka *et al.*⁵ After admini-

stration of inhalational β_2 stimulants, %PEF value reversed by approximately 20% and symptoms improved with no other cardiopulmonary diseases accompanied, the patient was diagnosed as suffering from bronchial asthma. Thus, self-administrated ICS therapy with 400 μg / day of hydrofluoroalkane-beclometasone (HFA-BDP) was started. With no improvement recognized both in the subjective symptoms and in the %PEF, which remained on the order of 59.1%, after eight weeks passed since the introduction of the ICS therapy, inhalation guidance was provided again, where it was found that inhalation was conducted with an inaccurate technique. Because it was considered difficult for the patient to manipulate inhaled steroids on her own due to a swan-neck deformity resulting from rheumatoid arthritis recognized in the inter-phalangeal joints, we introduced administration of assistance for inhalation with the cooperation of the patient's family. After administration of assistance for eight weeks, the clinical symptoms disappeared almost completely and the %PEF relative to the predictive values improved from approximately 59% to 90% (Fig. 2).

PATHOLOGICAL FINDINGS

CASE 2

Case: 82-year-old, woman

Chief complaints: Wheezing, dyspnea, insomnia

Past history: She suffered from asthma since the age of 70 and has been suffering from vascular dementia since the age of 76.

Personal history: She has no smoking history, and occasionally drinks alcohol.

History of the present illness: The patient became aware of paroxysmal dyspnea since the 70 years of age. Diagnosed as suffering from asthma by a general physician, the patient was receiving treatment with a theophylline drug. From approximately six months prior to admission, the frequency of wheezing and paroxysmal dyspnea increased and the patient became aware of insomnia due to nighttime asthma symptoms on several occasions a week. The patient was additionally administered with a patch-type β_2 stimulant but no sufficient improvement was noted in the asthma symptoms. The patient was referred to our hospital for the purpose of controlling the asthma.

Laboratory findings: FVC 1.48 (L), FEV_{1.0} 1.12 (L), FEV_{1.0}% 75.7 (%), %FEV_{1.0} 59.1 (%), %PEF 40.2 (%)

Clinical course: After administration of inhalational β_2 stimulants, FEV_{1.0} improved by approximately 280 ml with no simultaneous onset of other cardiopulmonary diseases recognized in blood tests, thoracic radiographs, and electrocardiography. From the above findings, the asthma was diagnosed as being under control. With no problem in the patient's short term memory notwithstanding the accompaniment of vascular dementia, self-administrated ICS therapy

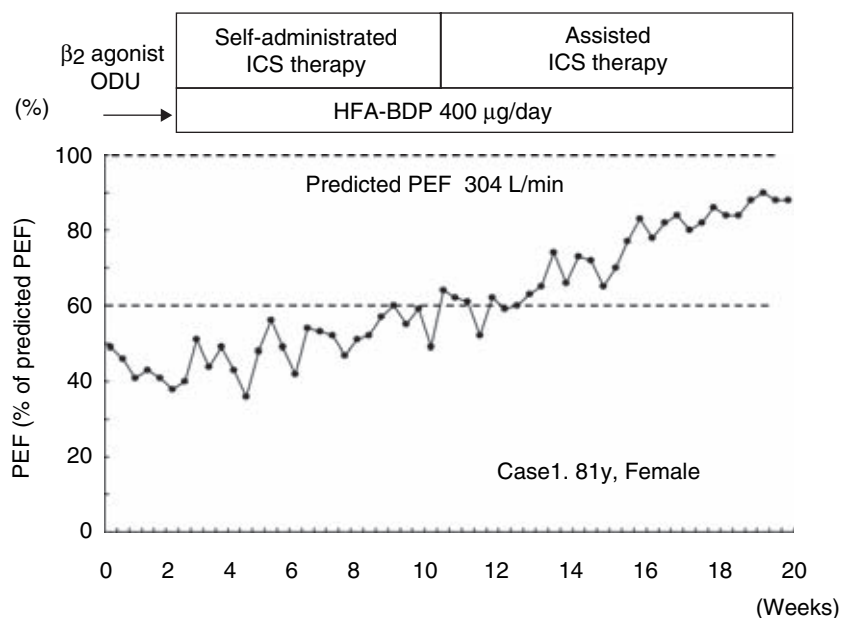


Fig. 2 Clinical Course of Case 1. PEF: peak expiratory flow; ODU: on demand use; ICS: inhaled corticosteroid; HFA-BDP: hydrofluoroalkane-beclometasone

was diagnosed as possible in inhalation guidance by a physician and ICS therapy with 400 $\mu\text{g}/\text{day}$ of fluticasone propionate (FP) was introduced. In order to monitor the pulmonary function, the PEF values were measured by the physician three times from 9:00 to 11:00 in the morning and the highest value indicated in the measurement was regarded as the PEF value at that point. No improvements were recognized both in the subjective symptoms and in the %PEF, which remained on the order of 39.1%, after eight weeks passed since the introduction of the self-administrated ICS therapy. Inhalation guidance was provided again, where it was found that inhalation was conducted not only with an inaccurate technique but also in poor compliance with the prescription. To cope with the situation, assisted ICS therapy with a FP introduced under the cooperation of her family was administered with the objective of continuing inhalation with an accurate technique. After eight weeks of assisted administration of FP, insomnia associated with the asthma symptoms developing during the night time as well as the wheezing and dyspnea disappeared. The %PEF relative to the predictive value also improved from approximately 42% to 76% (Fig. 3).

DISCUSSION

In a case where self inhalation therapy is difficult to perform due to motor dysfunction associated with rheumatoid arthritis, and in a case where a problem was recognized in the inhalation technique and in the compliance to the prescription due to intellectual dis-

ability associated with vascular dementia, execution of assisted ICS therapy resulted in improvement in the clinical symptoms and the pulmonary function parameters.

It has been proven in many clinical studies that periodical use of ICS for persistent asthma results in improvement in pulmonary function, improvement in airway hyperresponsiveness, improvement in asthma symptoms, improvement in frequency and severity of attacks, and improvement in QOL.⁶⁻⁹ In order to produce sufficient curative effects of ICS therapy, inhalation by an accurate technique is imperative.⁴ It is often experienced, however, that complications accompanying asthma inhibit the inhalation technique in cases of asthma mostly in the elderly. While intellectual disability is a complication causing lack of understanding about the inhalation technique, motor dysfunction is a complication resulting in impairment of the inhalation technique. An inaccurate inhalation technique will not bring about improvement in asthma control because it will not produce sufficient curative effects of inhaled steroids, which may also result in lowering of compliance to an inhalation prescription. Assisted inhalation therapy is "an inhalation therapy performed with the assistance of caregivers for patients with diseases for which the therapy is indicated, in cases that the patients have difficulty in inhalation by themselves due to some functional disorders". Introduction of assisted ICS therapy is expected to be useful for improvement of asthma control in handicapped persons, in cases where self inhalation therapy is difficult to execute due to accompani-

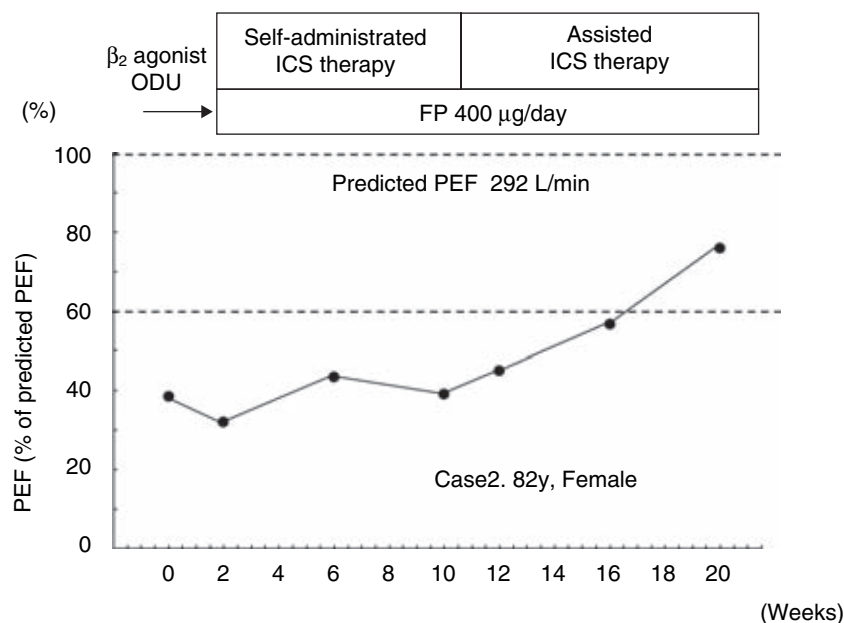


Fig. 3 Clinical Course of Case 2. PEF: peak expiratory flow; ODU: on demand use; ICS: inhaled corticosteroid; FP: fluticasone propionate

ment of a functional lesion or in cases where sufficient curative effects of steroids are not produced in self-inhalation, as presented this time. In the future, more handicapped asthma cases, for which the assisted ICS therapy is applicable, need to be accumulated to prove the clinical utility of assistance for inhalation.

The asthma mortality in the Japanese population, which continued to be on the order of approximately 6,000 people per annum in the early 1990s, has improved to less than 4,000 people per annum in the recent years.¹⁰ The prevalence of anti-inflammatory therapy mostly with ICS is considered to have made a substantial contribution to the decrease in the asthma mortality.¹¹ On the contrary, according to a study on the change of asthma mortalities by generation over the years, however, the asthma mortality in the elderly aged 80 or higher has been increasing.¹² Chronic airway inflammation is a basic pathology of asthma in the elderly too and therefore it is important to control the inflammation by a therapy centering on ICS. However, it has been pointed out that the usage of ICS is extremely low in asthma in the elderly.^{13,14} Assisted inhalation therapy is expected to be useful also in terms of expanding the application of ICS in the asthma in the elderly.

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