◎原 著

Intranasal glucocorticoid therapy in asthmatic patients with mucosal abnormalities of sinonasal cavity

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Abstract : Bronchial asthma is often accompanied with allergic rhinitis or chronic sinusitis. Mucosal abnormalities of sinonasal cavity may influence lower respiratory responses in patients with asthma. We experienced a case of 72-year-old woman with asthma, who had dyspnea on exertion and a large volume of expectoration of more than 100mℓ a day. Furthermore she had nasal symptoms (nasal obstruction and rhinorrea) with prominent post-nasal discharge. Computed tomography (CT) scans of sinonasal cavity revealed marked thickness of nasal mucosa. Although her asthma symptoms such as wheezing and dyspnea improved by administration of bronchodialators, antiallergic agent, and beclomethason diisocyanate (BDI) accompanied with spa therapy after admission, the volume of expectoration revealed no decrease and her peak expiratory flow (PEF) didn't increase. The volume of expectoration and the PEF showed marked improvement after starting of intranasal glucocorticoid therapy. It is suggested from her clinical course that treatment with intranasal glucocorticoids is very important in asthmatic patients with mucosal abnormalities of sinonasal cavity.

Key word : bronchial asthma, rhinitis, intranasal steroid therapy, expectoration, peak expiratory flow

Introduction

Bronchial asthma is classified into three fundamental types ; I a. simple bronchoconstriction type, I b. bronchoconstriction+hypersecretion type, and II. Bronchoconstriction type, according to clinical symptoms and findings[1-3]. Among these clinical

asthma types, I b. (hypersecretion) asthma is closely related to eosinophilia in the airways[4], and it is difficult to control hepersecretion without systemic glucocorticoid therapy.

Bronchial asthma is often accompanied with allergic rhinitis or chronic sinusitis. However, the influences of mucosal abnormalities of sinonasal cavity in these disease on the pathogenesis of asthma are poorly understood. Sinusitis is more commonly observed in allergic individuals than in normal subjects[5,6]. It has been reported that intranasal glucocorticoids during pollen seasons reduce asthma symptoms[7,8], and decrease bronchial reactivity in pollen-allergic asthmatics[9]. These findings suggests that allergic rhinitis or chronic sinusitis influences the pathophysiological changes in the airways of bronchial asthma. In this article, we reported a case with type I b asthma whose hypersecretion improved by the use of intranasal corticosteroids.

Case Report

A 72-year-old woman with asthma was admitted to Misasa Medical Branch because of severe continuous attacks accompanied with hypersecretion. She had no dyspnea until the age of 52. When she was 52 years old, she had slight dyspnea and wheeze after she suffering from common cold. She subsequently consulted a doctor, and was diagnosed as bronchial asthma. Since then, she had asthma attacks several times a year, however, she had no therapy for bronchial asthma. In 1989, She had undergone left mammectomy because of mastocarcinoma. After the operation, she often had suffered from asthma attacks. Recently she had dyspnea on exertion and a large volume of expectoration.

On admission at our hospital, the physical examination revealed prominent post-nasal discharge and marked decrease of breath sound at the both lower lung fields. The findings of blood chemistry and urinalysis were normal. The serum IgE level was 150.8 IU/mℓ and no specific antibody for inhaled allergen were detected by multiple antigen simultaneous test (MAST). Results of respiratory function tests were as follows ; %VC 85.2%, FEV1.0% 57.2%, $\%\dot{V}75$ 25.7%, $\%\dot{V}50$ 20.2% and $\%\dot{V}25$ 19.9%.

A chest X-ray showed neither sign of diffuse panbronchiolitis nor pulmonary emphysema (Fig. 1). A computed tomography (CT) scan revealed marked mucosal thickening in bilateral nasal cavity (Fig. 2).

Her clinical course is shown in Fig. 3 . After admission, she was underwent complex spa therapy (swimming training in a hot spring pool+inhalation of iodine salt solution+fango therapy) with inhaled glucocorticoid (BDI 200mg/day), anti-allergic agent and bronchodialators. No apparent improvement in dose of expectoration (more than 100mℓ/day) was found despite gradual improvement of dyspnea. The peak expiratory

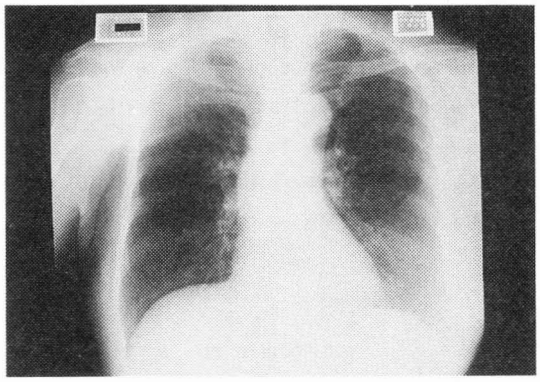

Figure 1 Chest radiograph on admission showing normal findings

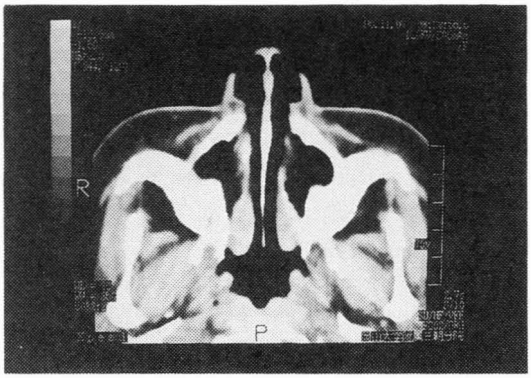

Figure 2 CT scans of the sinus level. Marked thickenings of nasal mucosa were observed.

flow (PEF) (80－130 ℓ／min) in the early morning did not improved. To improve post-nasal discharge, intranasal steroid (fulticasone) was started to be administered on the 37th hospital day. As shown in figure 3, the volume of expectoration gradually decreased, accompanied with improvement of PEF.

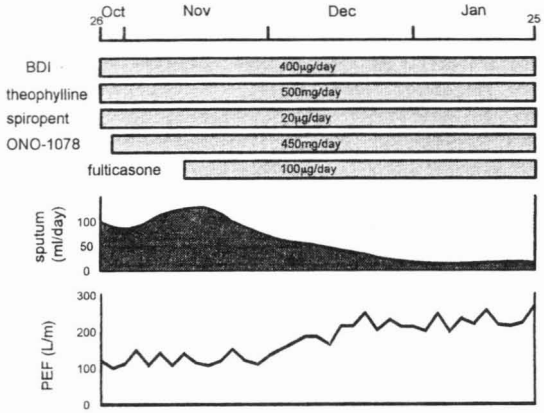

Figure 3 Clinical course of patient during admission at our hospital

Discussion

Our previous studies have shown that bronchial asthma is classified into three types according to the clinical symptoms caused by the pathophysiological changes in the airways [1-3]. In patients with hypersecretion type, mucosal abnormalities of sinonasal cavity is often observed, suggesting that pathophysiological changes in sinonasal mucosa may influence airway responses in patients.

In this article, we presented a case with hypersecretion type asthma and a low value of PEF, which were improved by intranasal steroid therapy. The volume of post-nasal discharge and expectoration in this patient clearly decreased after the intranasal steroid therapy. This most likely indicates that post-nasal discharge from mucosal disorders of sinonasal cavity influences the pathophisiology of airways, leading to hypersecretion.

Regarding airway responses, intranasal steroid therapy improved morning PEF;the value PEF increased from 120 ± 20 L／m to 210 ±20 L／m after intranasal steroid therapy. The improvement of PEF may be associated with the decrease in nasal discharge. It has been reported that nasal inflammation may lead to exacerbation of asthma symptoms by inducing increased bronchial reactivity [10]. The treatment with intranasal glucocorticoids during pollen season reduces asthma symptoms [7, 8] and suppresses upper and lower airway responses to cat exposure [11]. These observations indicate that nasal inflammation changes bronchial reactivity and exacerbate asthma symptoms. In many of patients with chronic sinusitis, eosinophil infiltration in sinus mucosa has been observed, and extracellular deposition of major basic protein (MBP) has also been shown to correlate with mucosal damage [6]. This may suggest the possibility that eosinophils in

Table 1. Laboratory Findings on Admission

Hematological findings		Sodium	146.8 mmol/L
White blood cell		Potassium	3.98 mmol/L
5,000/mm^3		Chloride	105.7 mmol/L
lymph.	31.5%	Blood urea nitrogen	13.7 mg/dL
mono.	7.5%	Creatinine	0.9 mg/dL
neutro.	59.5%	Uric Acid	6.5 mg/dL
eosino.	1.5%		
Red blood cell	416x10^4/μL	Immunological findings	
Hemoglobin	15.1 g/dL	IgE(RIST)	150.80 IU/mL
Hematocrit	43.7%	IgE(RAST)	
Platelet	14.1x10^4/μL	D. pteronyssinus	score 0
ESR	6 mm/h	D. farinae	score 0
		HD1	score 0
Blood chemistry		HD2	score 0
Total protein	7.4 g/dL	Cockroach	score 0
Albumin	5.1 g/dL	Candida albicans	score 0
A/G	2.23	IgE(MAST)	
γ-grobulin	14.2 %	Inhalation allergens	all negative
GOT	26 IU/L		
GPT	6 IU/L	Respiratory function test	
ALP	94 IU/L	FVC	1.80 L
LDH	207 IU/L	%FVC	86.2%
γ-GTP	18 IU/L	FEV1.0	1.03 L
Total cholesterol	175 mg/dL	FEV1.0%	57.2%
Triglyceride	56 mg/dL		

nasal discharge aspirated into airways make damages to bronchial mucosa.

CT scans brings a lot of imagings of nasal cavity and paranasal sinuses [12]. Studies on CT scans of patients with chronic sinusitis have shown that many of subjects with extensive mucosal thickening and ostiomeatal complex change are associated with asthma [13]. The pathophysiology of asthma may change related to nasal inflammation, and nasal disorder can lead to impairment of bronchial mucosa in asthma.

In fact, from the course of this case, intranasal glucocorticoid therapy would be expected to improve asthma symptoms in patients with chronic sinusitis or allergic rhinitis.

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気管支喘息症例に対する鼻腔内ステロイド療法

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気管支喘息症例には，アレルギー性鼻炎や慢性副鼻腔炎の合併が認められる。鼻腔内への吸入ステロイド投与が喘息症状を改善したという報告も存在し，鼻腔病変が下気道の反応に何らかの影響を及ぼしている可能性が考えられる。今回，気管支喘息にて入院した72才の女性の症例を呈示する。労作性呼吸困難と多量の喀痰排出が認められ，入院後の投薬や温泉療法にて呼吸困難は改善したが，喀痰排出は減少せず，ピークフロー値も上昇が認められなかった。明らかな後鼻漏が認められ，CTにて両側鼻腔粘膜の著明な肥厚の所見が見られたため，鼻腔内吸入ステロイド投与を開始した。開始後，喀痰排出量，ピークフロー値は著明な改善を示した。この症例のように，鼻腔あるいは副鼻腔に対する治療が喘息症状を改善する症例が存在する可能性が考えられた。

索引用語：気管支喘息，鼻炎，鼻腔内吸入ステロイド療法，喀痰排出，ピークフロー