Lung Cancer Accompanied by Erythema

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Skin manifestations associated with malignant diseases are designated syndrome dermatotumore. A case of lung cancer combined with atypical erythema is reported. A 70-year-old man was admitted to hospital because of a 4-month history of atypical erythema of unknown origin. A nodule in the right lung was revealed on chest roentgenogram which was diagnosed as lung cancer. After right upper lobectomy, the erythema regressed gradually and disappeared completely in 7 days. It is suggested that the erythema was a manifestation associated with the lung cancer.

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Introduction

Skin manifestations associated with visceral diseases are known as dermadrome (1), and dermadrome associated with malignant disease is designated syndrome dermatotumore (2–4). Specific skin manifestations such as skin metastasis from internal malignancy are included in the latter category (5). Skin manifestations of clinical importance are nonspecific lesions such as erythema, dermatomyositis, bullous disease, and erythroderma (6). The present report describes a case of lung cancer accompanied by atypical erythema.

Case Report

A 70-year-old man was admitted to hospital in October 1989 because of itchy skin eruptions over the truncus and extremities. He had been followed regularly for 5 years because of pulmonary cysts. The skin eruption had begun in the femoral region four months before admission, and had then spread gradually over the truncus and extremities. There was no history of cough, sputum, chest pain, dyspnea or body weight loss with the eruption. The patient had a history of right spontaneous pneumothorax, occurring twice in 1988. Family history revealed that his father had had bronchial asthma, and that a brother had died of stomach cancer. He had smoked two packs of cigarettes daily for 40 years but did not consume alcoholic beverages. On physical examination, body temperature was 36.4°C, pulse rate 86/min, respiratory rate 24/min, and blood pressure

100/54 mmHg. There was no cyanosis, anemia or jaundice. Small nodes were palpable bilaterally in the inguinal region. There was erythema over the truncus and extremities. Each area of erythema was 1 to 5 cm in diameter with a clear margin (Fig. 1). Otherwise, physical examination of the chest and abdomen revealed normal findings.

Laboratory data are shown in Table 1. The white blood cell count was normal, with a differential of 19% eosinophils; LDH was 551 IU/ml, and CEA was 7.94 ng/ml. There was no evidence of malignancy in an inguinal lymph node biopsy specimen. Based on its appearance, the erythema was diagnosed as atypical erythema. Since the origin of the erythema was unknown and it showed no response to treatment with steroid and antihistamine, we suspected that the erythema is associated with malignant disease. A chest roentgenogram in December 1988 had revealed a bulla with a thick wall in the right upper lung field and emphysematous changes in both lungs (Fig. 2). A chest roentgenogram on admission revealed a nodule, 2 cm in diameter, attached to the inferior wall of the bulla (Fig. 3). A chest computed tomographic scan revealed that this nodule had an irregular margin without mediastinal lymphadenopathy (Fig. 4). A specimen obtained endoscopically by curettage through right B²_b showed squamous cell carcinoma. Ultrasonography of the abdominal viscera, computed tomography of the brain and a bone scan showed no abnormalities of other organs.

The patient's tumor was evaluated as stage I (T1N0M0). Right upper lobectomy was performed on December 14, 1989. On pathological examination, most of the tumor

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was found to be poorly differentiated adenocarcinoma (Fig. 5A), with squamous cell carcinoma in a part (Fig. 5B). After surgery, the systemic erythema regressed gradually and disappeared completely in 7 days. The patient's itchiness was also resolved simultaneously.

Fig. 1. Photograph of abdominal skin. Erythematous areas (1 to 5 cm in diameter) with a clear margin are evident.

Fig. 2. Chest roentgenogram taken in 1988, demonstrating bilateral emphysematous changes with a bulla in the right upper lung field.

Discussion

Skin manifestations associated with visceral diseases are known as dermadrome, and dermadrome associated with malignant disease is designated syndroma dermatotumorale. Syndroma dermatotumorale is classified

Table 1. Laboratory Data on Admission

Urinalysis		LDH	551 IU/l
Protein	(-)	CPK	51 IU/l
Glucose	(-)	BUN	23 IU/l
Occult blood	(-)	Creatinine	1.0 mg/dl
ESR	40 mm/h	Na	141 mEq/l
CBC		K	4.2 mEq/l
WBC	6,800/mm ³	Cl	110 mEq/l
Neut.	59.2%	CRP	472 µg/dl
Eosino.	19.0%	Tumor markers	
Lymph.	13.3%	CEA	7.94 ng/ml
Mono.	6.8%	SCC	1.6 ng/ml
Baso.	0.7%	NSE	10.5 ng/ml
RBC	4.14 × 10 ⁶ /mm ³	Arterial blood gases (room air)	
Hb	12.5 g/dl	pH	7.415
Ht	37.7%	PaCO ₂	31.9 Torr
Platelet	24.0 × 10 ⁴ /mm ³	PaO ₂	75.2 Torr
Blood chemistry		HCO ₃ ⁻	20.9 mEq/l
T.P.	6.4 g/dl	B.E.	1.8 mEq/l
T.Bil.	0.3 mg/dl	Tuberculin skin test (±)	
GOT	23 IU/l	Pulmonary function test	
GPT	18 IU/l	%VC	68%
ALP	151 IU/l	FEV ₁ %	94%
γ-GPT	14 IU/l		

CEA: carcinoembryonic antigen, SCC: squamous cell carcinoma related antigen, NSE: neuron specific enolase

Fig. 3. Chest roentgenogram on admission, showing a small nodule adjacent to the inferior wall of the bulla in the right upper lung field.

into four categories (7): a) skin metastasis of internal malignancy, b) paraneoplastic dermatoses, c) skin manifestation of systemic carcinogen, d) malignancy-congenital anomaly syndrome (Table 2). Paraneoplastic dermatoses are classified according to the causes, which include hormonal disorders, immunoreaction to malignant cells

Fig. 4. Chest computed tomographic scan, showing irregular margins of the nodule. There is no lymphadenopathy in the mediastinum or hila bilaterally.

(8), and viral infection on impairment of immunity. Paraneoplastic dermatoses caused by immunoreaction to malignant cells include dermatomyositis (9), bullous disease (10, 11), erythroderma and erythema (12, 13).

The erythemas associated with malignant disease

Table 2. Dermadrome of Malignant Disease

1. Skin metastasis of internal malignancy	
2. Paraneoplastic dermatoses	
1) Hormonal disorders	Glucagonoma Carcinoid
2) Immunoreaction	Dermatomyositis Bullous disease Erythroderma Erythema Herpes zoster
3) Viral infection on impairment of immunity	
4) Others	Acanthosis nigricans Leser-Trélat sign
3. Skin manifestation of systemic carcinogen	Bowen's disease
4. Malignancy-congenital anomaly syndrome	Von Recklinghausen's Disease Gardner syndrome

have features such as rapid progression, severe itchiness and lack of response to treatment with steroid or antihistamine (1, 14).

We propose that the erythema in the present case was paraneoplastic dermatosis caused by immunoreaction, since the erythema advanced rapidly with severe itchiness, and showed no response to treatment with steroid and antihistamine. It is unlikely that erythema was due to infectious or allergic disease. In addition, the erythema

Fig. 5. Microscopic section of the tumor, stained with HE. Most of the tumor is poorly differentiated adenocarcinoma (A, $\times 400$), but some portions show features of squamous cell carcinoma (B, $\times 100$).

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Table 3. Cases of Lung Cancer Accompanied by Skin
Manifestation in Japan
(1985–1989)

1. Dermatomyositis	20
Small cell carcinoma	9
Adenocarcinoma	3
Large cell carcinoma	3
Squamous cell carcinoma	2
etc.	2
Unknown	1
2. Skin metastasis of lung carcinoma	16
Adenocarcinoma	6
Small cell carcinoma	4
Squamous cell carcinoma	3
Large cell carcinoma	1
Bronchial gland carcinoma	1
Unknown	1
3. Hyperkeratosis	4
Squamous cell carcinoma	2
Small cell carcinoma	1
Adenocarcinoma	1
4. Bullous disease	3
Squamous cell carcinoma	2
Unknown	1
5. Erythroderma	1
Small cell carcinoma	1
6. Lichen	1
Unknown	1
7. Acanthosis nigricans and Leser-Trélat sign	1
Squamous cell and adenocarcinoma	1
Total	46

disappeared after excision of the lung cancer by right upper lobectomy.

Erythema gyratum repens is known to be an erythema that accompanies cancer (15), and it is reported that 83% of all cases occur with lung cancer (16). Erythema gyratum repens appears as multiple annular erythema, resembling wood grain. However, the erythema in the present patient did not have this appearance, and was classified as atypical erythema.

Table 3 lists 46 cases of lung cancer accompanied by skin manifestations reported in Japan from 1985 to 1989. Dermatomyositis accounted for 20 cases, and skin metastasis from internal malignancy for 16 cases, but no case involving erythema has been reported. Therefore,

erythema appears to be rare among skin manifestations associated with lung cancer.

When erythema of unknown origin showing lack of response to treatment is encountered, malignant disease should be suspected, and systemic examinations including the lungs should be done.

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