

## Evaluation of Bronchoscopic Findings in Patients with Metastatic Pulmonary Tumor

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To clarify the bronchoscopic findings in metastatic spread to the bronchi, we analyzed the records of 65 cases of metastatic pulmonary disease in which fiberoptic bronchoscopy had been done. Forty-five patients (69.2%) had abnormal bronchoscopic findings. These patients could be divided into three groups, according to bronchoscopic findings and route of metastatic spread to the bronchi: endobronchial metastasis (n=15), bronchial involvement (that is, direct extension to the bronchi from adjacent metastatic foci, n=15), and lymphangitis carcinomatosa (n=15). Breast cancer and colon cancer were common in cases of endobronchial metastasis, and the bronchial tumor often presented as a polypoid or nodular lesion covered with necrotic material. Submucosal swelling with an irregular margin and narrowing of the bronchial lumen were seen in cases of bronchial involvement. In conclusion, each type of primary extrapulmonary tumor is associated with characteristic endobronchial findings of pulmonary metastases such as endobronchial metastasis and bronchial involvement, which should be discriminated if possible, because of their different metastatic process.

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**Key words:** fiberoptic bronchoscopy, metastatic pulmonary cancer, endobronchial metastasis, bronchial involvement, lymphangitis carcinomatosa

### Introduction

Because fiberoptic bronchoscopy is frequently used in the diagnosis of lung diseases, metastatic spread of malignant tumors to the central airways, i.e. "endobronchial metastasis" is often seen (1–3). However, reports of the incidence of endobronchial metastases are inconsistent, ranging from 2% to 28% (4–7). This variation in the literature may likely be due to differences in the definition of "endobronchial metastasis". This term has been used ambiguously to refer to metastasis to the bronchial wall from extrapulmonary malignancies (8, 9), to invasion of the bronchial wall from parenchymal or mediastinal tumors (4, 5, 9), and to both (10).

We retrospectively analyzed bronchoscopic findings in 65 cases of metastatic pulmonary disease, to identify bronchoscopic findings characteristic of metastatic spread to the bronchi and to estimate its incidence.

### Patients and Methods

We reviewed the records of 65 patients with cytologically or

histologically confirmed metastatic pulmonary disease who were admitted to Jichi Medical School Hospital. Metastatic pulmonary disease was defined as lymphatic or hematogenous metastasis from an extrapulmonary lesion to the tracheobronchial tree or to the pulmonary parenchyma; cases of direct and continuous invasion from the primary site to the lung were excluded. All patients underwent fiberoptic bronchoscopy. In 45 cases (69%), abnormal bronchoscopic findings were observed and the histological diagnosis could be obtained from transbronchial tumor biopsy. In the remaining 20 cases who had no bronchoscopic findings, 13 cases were histologically confirmed by transbronchial lung biopsy, 4 by autopsy and 3 by transcutaneous ultrasound-guided needle biopsy, respectively. The primary sites of metastatic cancers were breast, stomach, thyroid gland, colon and rectum, and orolaryngopharynx (Table 1).

Data from the 45 patients with bronchoscopically visible abnormalities were analyzed to detect relations between bronchoscopic findings and routes of metastatic spread to the bronchi from extrapulmonary tumors, based upon bronchoscopic, radiological, or pathological findings.

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**Table 1. Primary Sites of Metastasis to the Lung, and Abnormal Bronchoscopic Findings**

Primary site or type	Number of cases	Abnormal findings	
		Number	Percent
Breast	14	11	24.4
Tongue, Larynx, Pharynx	7	7	15.6
Colon, Rectum	8	6	13.3
Stomach	6	4	8.9
Thyroid	5	4	8.9
Sarcoma	4	3	6.7
Others	21	10	22.2
Total	65	45	100.0

**Table 2. Primary Sites Classified by Route of Metastasis to Bronchi**

Endobronchial metastasis

Primary site or type	Number	Percent
Breast, Colon	3 each	20.0 each
Larynx	2	13.1
Kidney, Pharynx, Skin, Tongue Sarcoma, Thyroid, Urethra	1 each	6.7 each
Total	15	100.0

Bronchial involvement

Primary site or type	Number	Percent
Breast, Colon, Rectum, Thymus, Pharynx, Sarcoma	2 each	13.3 each
Larynx, Pancreas, Thyroid, Bone (adenoid cystic carcinoma), Choriocarcinoma	1 each	6.7 each
Total	15	100.0

Lymphangitis carcinomatosa

Primary site or type	Number	Percent
Breast	6	40.0
Stomach	4	26.7
Thyroid	2	13.2
Colon, Melanoma, Paget's disease	1 each	6.7 each
Total	15	100.0

**Results**

Based upon radiological or pathological findings as well as bronchoscopic findings, the patients could possibly be divided into three groups: those with endobronchial metastasis, those with bronchial involvement, and those with lymphangitis carcinomatosa.

Endobronchial metastases could be defined as lesions that fulfilled three criteria: intraluminal proliferation within the visual field in bronchi proximal to the sub-subsegmental level; no invasion of the bronchial wall surrounding the proximal margin of the lesion; and confirmation that the lesions were direct metastases to the bronchial wall, either by radiological or by pathological methods, or by both. Endobronchial metastases could be discriminated from bronchial involvement with direct extension to the bronchial wall, and from extraluminal compression by lymph nodes or by metastatic parenchymal tumors, except in one case.

**Endobronchial metastasis**

Endobronchial metastasis was found in 15 of the 65 patients (23%). Primary tumors included breast cancer in 3, colon cancer in 3, and laryngeal cancer in 2 (Table 2). Among these 15 patients, bronchoscopic examination revealed polypoid lesions in 6, nodular lesions in 7, and superficial irregularity of the bronchial mucosa alone in the remaining 2. Typical bronchoscopic findings were a polypoid or nodular lesion with a sharp margin, proliferating into the bronchial lumen and obstructing the bronchus (Fig. 1).

**Bronchial involvement**

Bronchial involvement was found in 15 of the 65 patients (23%). Primary tumors included breast cancer, colorectal cancer, pharyngeal cancer, soft tissue sarcoma and thymic tumor (thymic cancer and invasive thymoma); each occurred in 2 cases (Table 2). In 14 patients, bronchoscopic examination revealed submucosal swelling and smooth narrowing of the bronchial lumen with or without irregularity of the mucosa, which suggested direct invasion to the bronchial wall and extraluminal compression by lymph nodes or by metastatic parenchymal tumors (Fig. 2). The remaining patient had an invasive thymoma; bronchoscopic examination showed a polypoid tumor, which suggested endobronchial metastasis, but a computed tomography (CT) scan revealed bronchial involvement from the parenchymal metastasis (Fig. 3).

**Lymphangitis carcinomatosa**

Lymphangitis carcinomatosa was found in 15 of the 65 patients (23%). Typical bronchoscopic findings were diffuse edematous change and dilation of bronchial microvasculature, which suggest submucosal lymphatic spread of cancer; the diagnosis of lymphangitis carcinomatosa was confirmed pathologically. Of the 15 patients, primary tumors included breast cancer in 6, gastric cancer in 4, and thyroid cancer in 2 (Table 2).