

Synchronous Lung Cancer with Bone Metastasis and Rectal Cancer: A Case Report

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1. Abstract

1.1. Introduction: The incidence of synchronous lung cancer and colorectal cancer is very rare. Therefore, physicians might lead to misdiagnosis as colorectal cancer with lung metastasis when lung lesion is found in a patient with colorectal cancer.

1.2. Case Presentation: A 65-year-old man was detected an abnormal shadow in chest radiography in the medical checkup. Chest Computed Tomography (CT) showed a mass lesion in the upper lobe of the right lung. 18F-fluoro-2-deoxy-glucose (18F-FDG) Positron Emission Tomography (PET) showed uptake of FDG in the lung lesion, rectal, and right sciatica. Colonoscopy showed a polypoid mass in the rectum and a biopsy revealed a moderately differentiated tubule-papillary adenocarcinoma. Because partial resection for the lung lesion of the right upper lobe was performed and a squamous cell carcinoma was revealed in the frozen section, right upper lobectomy and lymph node dissection were performed. CT-guided bone biopsy for the right sciatica was performed and the squamous cell carcinoma was revealed.

1.3. Conclusions: We experienced the case of synchronous primary lung cancer with bone metastasis and rectal cancer. It is important to diagnose which synchronous lung cancer and colorectal cancer or colorectal cancer with pulmonary metastasis for their appropriate therapy.

3. Abbreviations: CT: Computed Tomography; 18F-FDG: 18F-Fluoro-2-Deoxy-Glucose; PET: Positron Emission Tomography; EGFR: Endothelial Growth Factor Receptor; ALK: Anaplastic Lymphoma Kinase; TKI: Tyrosine Kinase Inhibitor; ICI: Immune Checkpoint Inhibitor

4. Background

Although lung cancer and colorectal cancer are the most common causes of cancer-related mortality worldwide [1], the incidence of synchronous lung cancer and colorectal cancer is very rare. The incidence rate of synchronous lung cancer with colorectal cancer was reported to be 0.5-1.5% [2, 3]. A lack of experience in managing patients with synchronous lung cancer and colorectal cancer might lead to its misdiagnosis and delays in treatment. In other words, determining whether a patient has synchronous lung cancer and colorectal cancer or colorectal cancer with lung metastasis is important for ensuring appropriate treatment.

We herein report a case of synchronous primary lung cancer with bone metastasis and rectal cancer and review the relevant literature on lung cancer with colorectal cancer.

5. Case Presentation

The patient was a 65-year-old man who had smoking history (45 pack-year) in whom an abnormal shadow had been detected on chest radiography in a medical checkup. Chest computed tomography (CT) showed a mass lesion in the upper lobe of the right lung (Figure 1A) and peripheral enhancement on enhanced CT (Figure 1B). 18F-fluoro-2-deoxy-glucose (18F-FDG) positron emission tomography (PET) showed the uptake of FDG in the lung lesion (Figure 2A), rectum (2B) and right sciatica (2C). Colonoscopy showed a polypoid mass in the rectum (Figure 3A) and a biopsy revealed a moderately differentiated tubulopapillary adenocarcinoma (Figure 3B). Because it was suspected that the inside of the lung lesion was necrotic, it was considered difficult to diagnose the lung lesion by transbronchial biopsy or CT-guided needle biopsy. Thus, for the diagnosis of the lung lesion, we planned to perform a lung biopsy during surgical resection. Partial resection for the lung lesion of the right upper lobe was performed and squamous cell carcinoma was identified in the frozen section. Because the lung lesion was diagnosed as primary lung cancer, right upper lobectomy and lymph node dissection were performed. A pathological examination con-

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firmly a moderately-differentiated lung squamous cell carcinoma with intrapulmonary metastasis of the right upper lobe (Figure 4A). CT-guided bone biopsy was performed at the right sciatica and the squamous cell carcinoma was identified (Figure 4B). The lung cancer was diagnosed as pathological stage IVa (T3N0M1a) without mutation of endothelial growth factor receptor (EGFR) or rearrangement of anaplastic lymphoma kinase (ALK) or rearrangement of ROS1. The rectal cancer was diagnosed as clinical stage IIIc (T3N1M0). After the operation, the patient received chemotherapy with carboplatin, nanoparticle albumin-bound paclitaxel and pembrolizumab.

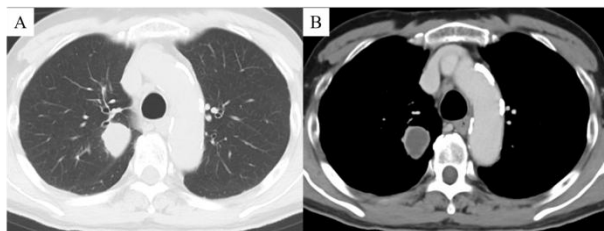


Figure 1: Chest computed tomography (CT) showed a mass lesion in the upper lobe of the right lung (A) and peripheral enhancement in enhanced CT (B).

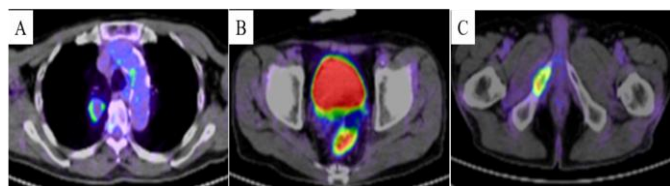


Figure 1: 8F-fluoro-2-deoxy-glucose (18F-FDG) positron emission tomography (PET) showed uptake of FDG in the lung lesion (A), rectal (B), and right sciatica (C).

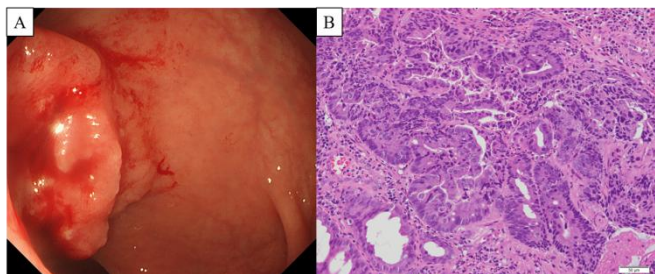


Figure 3: Colonoscopy showed a polypoid mass in the rectum (A) and a biopsy revealed a moderately differentiated tubule-papillary adenocarcinoma (B).

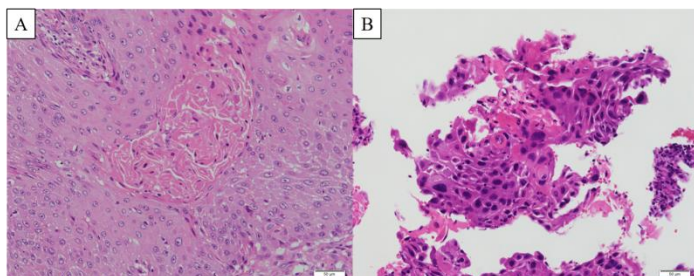


Figure 4: A pathological examination confirmed a moderately-differentiated lung squamous cell carcinoma with intrapulmonary metastasis of the right upper lobe (A). CT-guided bone biopsy for the right sciatica was performed and the squamous cell carcinoma was revealed (B).

6. Discussion and Conclusions

Synchronous lung cancer and colorectal cancer is very rare, with a reported incidence rate of 0.5-1.5% [2, 3]. It was reported that lung metastasis developed in 10-20% of patients with colorectal cancer [4]. Thus, when a lung lesion is found in a patient with colorectal cancer, the patient might be misdiagnosed with colorectal cancer with lung metastasis. Several characteristics of lung cancer and colorectal cancer have been reported. It was reported that smoking was related to the occurrence of synchronous lung cancer and colorectal cancer [3]. Furthermore, a single solitary pulmonary nodule is more likely to be diagnosed as primary lung cancer than metastasis of other cancers in patients with a smoking history [4]. Because the patient in the present case had a >30-pack-year smoking history and a solitary pulmonary lesion, the synchronous occurrence of primary lung cancer synchronously and rectal cancer should have been suspected. On the other hand, it was reported that a mass with a smooth margin can indicate a benign lesion or metastasis [4]. Because the pulmonary lesion in the present case had a smooth margin and peripheral enhancement on enhanced CT, metastasis from rectal cancer was initially suspected.

The incidence rate of bone metastasis from lung cancer was reported to be 30-40% [5, 6]. Furthermore, the reported incidence rates, according to the histological type of lung cancer, were as follows: adenocarcinoma, 57.4%; squamous cell carcinoma, 14.4%; small cell lung carcinoma, 18.7%; and large cell carcinoma and other types of cancer, 9.9% [7]. On the other hand, bone metastasis from colorectal cancer was relatively rare, with a reported incidence rate of 3.3% [8]. In the present case, the pulmonary lesion and bone lesion were synchronously detected, bone metastasis from lung cancer should have been suspected. Because it was initially suspected that the lung lesion was pulmonary metastasis from rectal cancer, it was suspected that the bone lesion was metastasis from rectal cancer and the diagnosis was delayed.

The pathogenesis and biological behavior of synchronous lung cancer and colorectal cancer or colorectal cancer with pulmonary metastasis are quite different. Although lung cancer is the leading cause of cancer-related death worldwide [1], the development of targeted therapies, such as EGFR-Tyrosine Kinase Inhibitor (TKI) and Immune Checkpoint Inhibitor (ICI), has improved the survival time of lung cancer patients [9-17]. Thus, when a single pulmonary lesion is found in patients with colorectal cancer, it is important to determine whether it is synchronous lung cancer and colorectal cancer or colorectal cancer with pulmonary metastasis. Although previous studies showed that the prognosis of patients with synchronous lung cancer and colorectal cancer were poor in spite of the aggressive treatment, recent treatment results might differ due to development of target therapy (Table 1). In the present case, the lung cancer was diagnosed as pathological stage IVa without mutation of EGFR or rearrangement of ALK or ROS1. Thus, the patient

has been treated with chemotherapy consisting of a combination of cytotoxic agents such as carboplatin, nanoparticle albumin-bound paclitaxel and an ICI.

We experienced a case of synchronous primary lung cancer with

bone metastasis and rectal cancer. The determination of whether a patient has synchronous lung cancer and colorectal cancer or colorectal cancer with pulmonary metastasis is important for ensuring that the patient receives appropriate therapy.

Table 1: Synchronous lung cancer and colorectal cancer

	Gender	Age (y.o.)	Lung cancer	Treatment for lung cancer	Colorectal cancer	Treatment for colorectal cancer	Prognosis	Incident rate (%)
			(histology)		(location)			
Nosaka et al.	Male	Unknown	Sq	Lobectomy	Sigmoid	Sigmoidectomy	Unknown	1.5
Peng et al.	Male	60	Ad	Lobectomy	Colon	Colectomy+Chemotherapy	11 mo, alive	Unknown
	Female	63	Ad	Lobectomy	Rectum	Rectal resection	18 mo, dead due to lung cancer	
	Male	81	Sq	No medication	Colon	Colectomy+Chemotherapy	8 mo, alive	
Yamanaka et al.	Female	74	Ad	Lobectomy	Colon	Colectomy	8 mo, died due to cholangiocarcinoma	Unknown
Kurishima et al.	Male 13 / Female 4	60-86	NSCLC 13 / SCLC 4	Surgery ± Chemotherapy	Sigmoid+Rectum 15 / Other 2	Surgery ± Chemotherapy	9 patients died due to lung cancer	
This case	Male	65	Sq	Surgery	Rectum	No medication	3 mo, alive	Unknown

Sq; Squamous Cell Carcinoma, Ad; Adenocarcinoma, NSCLC; Non-Small Cell Lung Cancer, SCLC; Small Cell Lung Cancer, mo; months

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