Case report - Thoracic general

Pulmonary intestinal-type adenocarcinoma

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Abstract

We report a rare case of pulmonary intestinal-type adenocarcinoma in a 69-year-old man. A computed tomographic scan of the chest and positron emission tomography revealed a well-defined nodule measuring 2.5 cm × 2.5 cm in the right lower lobe with high 18F-fluorodeoxyglucose accumulation. Furthermore, sputum cytology tested positive for adenocarcinoma. Right lower lobectomy and systemic lymph node dissection were performed by video-assisted thoracic surgery (VATS). Histopathologically, the tumor was composed mainly of tall columnar cells with similarity to intestinal epithelia and colorectal carcinoma. Immunohistochemical staining was positive for cytokeratin 7 (CK7) and thyroid transcription factor-1 (TTF-1), whereas staining for cytokeratin 20 (CK20) was negative. The final diagnosis was primary pulmonary intestinal-type adenocarcinoma.

Keywords: Lung carcinoma; Intestinal-type adenocarcinoma

1. Introduction

Primary pulmonary adenocarcinomas are typically very heterogeneous, displaying a wide range of histologic features. Pulmonary intestinal-type adenocarcinoma is composed mainly of tall columnar cells with a brush-border and eosinophilic cytoplasm, which is similar to intestinal epithelia and colorectal carcinoma. This is an extremely rare disease, which has not yet been listed in the World Health Organization (WHO) classification of lung tumors.

2. Case report

During a regular checkup, a chest roentgenogram revealed an abnormal shadow in the right lower lung field of an asymptomatic 69-year-old man. A computed tomographic (CT) scan of the chest displayed a well-defined nodule measuring 2.5 cm × 2.5 cm in the right lower lobe. A histological examination including tumor markers such as carcinoembryonic antigen (CEA), cytokeratin fragment (CYFRA) 21, and pro-gastrin-releasing peptide (ProGRP) were within the normal ranges. While transbronchial lung biopsy was unsuccessful, sputum cytology suggested an adenocarcinoma. Positron emission tomography (PET) with 18F-fluorodeoxyglucose (FDG) revealed high FDG accumulation at the lesion. No apparent tumor mass was detected by abdominal CT, brain magnetic resonance imaging (MRI), and FDG-PET CT. With a diagnosis of primary lung cancer, a right lower lobectomy using video-assisted thoracic surgery (VATS) was performed in November, 2006. Interestingly, histological analysis of an intra-operative frozen section of the resected specimen suggested that the tumor was metastatic and derived from colon cancer. However, since preoperative FDG-PET revealed no accumulation in the colon or any other site except for the right lower lobe of the lung, we performed systemic lymph node dissection taking into consideration the possibility of primary pulmonary adenocarcinoma.

The tumor grossly appears as a gray-white cut surface, with significant necrosis. Histopathologically, the tumor consisted predominantly of colorectal carcinoma-like components, composed mainly of tall columnar cells with a brush-border and eosinophilic cytoplasm (Fig. 1). Significant necrosis was present and angiolymphatic invasion was observed. While a resemblance to intestinal adenocarcinoma by light microscopy was noted, immunohistochemical staining for cytokeratin 7 (CK7) and thyroid transcription factor-1 (TTF-1) were positive, whereas cytokeratin 20 (CK20) was negative (Fig. 2). The final diagnosis was primary pulmonary intestinal-type adenocarcinoma. Intrapulmonary or lymph node metastasis was not found and the patient was uneventfully discharged 12 days after surgery.

3. Discussion

It is well known that primary pulmonary adenocarcinomas are typically very heterogeneous, showing a wide variety of histological features including papillary, acinar (tubular), solid, bronchioalveolar, and mucin-producing elements. Additionally, there are some special types of primary adenocarcinomas listed in the WHO classifications as variants, including well-differentiated fetal adenocarcinoma, mucin-
Fig. 1. Hematoxylin and eosin stain shows the tumor composed mainly of tall columnar cells with a brush-border (black arrows) and eosinophilic cytoplasm (white arrow). Significant necrosis is present (arrowheads) \( \times 200 \).

Fig. 2. Immunohistochemical stain shows that the tumor cells are positive for cytokeratin 7 (CK7) \( \times 400 \).

Pulmonary intestinal-type adenocarcinoma is a rare lung neoplasm which is histologically similar to high-grade sinonasal adenocarcinomas and metastatic colorectal carcinoma. It has a gross appearance similar to metastatic colorectal carcinomas, comprising a whitish or gray-white cut surface and necrosis [4, 5]. Histopathologic characteristics of intestinal-type adenocarcinomas are as follows: tumor cells are usually tall-columnar and have eosinophilic cytoplasm, brush borders, and fairly large and usually vesicular nuclei with prominent nucleoli. The polarity of nuclei is largely preserved; therefore, they exhibit nuclear palisading. There may exist an intra-tumoral scar, central or eccentric, with elastic fiber coagulation, particularly in cases with lesser amounts of necrosis [4, 5].

Pulmonary adenocarcinoma often displays cellular heterogeneity, and examples composed of one major component are relatively rare. In such cases, the diagnosis is described as adenocarcinoma, mixed-type with acinar and papillary components. Therefore, pulmonary intestinal-type adenocarcinoma was defined as an adenocarcinoma predominantly (or >50%) composed of cells with a similarity to intestinal epithelium by Inamura et al. [4]. According to Inamura et al., only six intestinal-type adenocarcinomas (1.4%) occurred in 430 patients with primary pulmonary adenocarcinoma.

The distinction of primary pulmonary adenocarcinoma from metastatic colorectal carcinoma is important because the treatment and prognosis greatly differ for patients with these malignancies. The use of immunohistochemical stains, namely a panel with CK7, CK20, TTF-1, and CDX2, may also aid in distinguishing between metastatic colorectal carcinoma and primary lung adenocarcinoma [6–9]. According to Yousem, all six lung intestinal-type adenocarcinomas expressed TTF-1 and CK7, but not CDX-2 and CK20. He concluded that pulmonary intestinal-type adenocarcinoma does not show enteric differentiation by an immunohistochemical study [5].

It is difficult to make an intra-operative diagnosis because of histopathological similarity to intestinal epithelia and colorectal carcinoma. In this case, a preoperative diagnosis becomes very important. The surgical modality for primary lung tumors is often different from that for metastatic tumors of the lung, especially in the case of peripheral tumor of the lung. If pulmonary intestinal-type adenocarcinoma is suspected preoperatively, FDG-PET or fiberoptic colonoscopy should be performed to rule out metastatic adenocarcinomas from colon cancer. Abdel-Nabi et al. reported that FDG-PET exhibits a high sensitivity and specificity for the detection of colorectal carcinomas [10].

In a large series reported by Inamura et al. [4], 2 of 7 patients died of their disease within a period of 6–47 months. However, both tumors were pathologic stage IIIA. Five patients classified as stage I survived within this same period. In the present case, the tumor was restricted to within the right lower lobe, and no metastasis was found in lymph nodes or distant sites, but angiolymphatic invasion was noted. Careful long-term follow-up is required in the present case because we do not know how this rare neoplasm will behave in our patient.

4. Conclusion

Pulmonary intestinal-type adenocarcinoma is a rare lung tumor. The use of immunohistochemical stains is useful to distinguish between metastatic colorectal carcinoma and primary lung intestinal-type adenocarcinoma. There are few reported cases of pulmonary intestinal-type adenocar-
cinoma. More experience of such cases is needed to further understand this rare variant of adenocarcinoma.

References


