

[Case Report]

Primary Adenoid Cystic Carcinoma of the Peripheral Lungs

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Abstract : We herein report a very rare case of adenoid cystic carcinoma of the peripheral lungs. A 77-year-old female visited a family physician for aortitis syndrome, diabetes mellitus and hyperlipidemia. A follow-up chest computed tomography scan for aortitis syndrome revealed a nodule in the middle lobe of the right lung. Although a transbronchial lung biopsy was attempted, a definitive diagnosis could not be made. Because the possibility of lung malignancy could not be ruled out, thoracoscopic wedge resection of the middle lobe was performed. The intraoperative pathological diagnosis revealed carcinoma of the lungs and we performed middle lobectomy under complete video-assisted thoracoscopic surgery. A histopathological examination demonstrated an adenoid cystic carcinoma with a characteristic cribriform structure.

Keywords : adenoid cystic carcinoma, peripheral lung, primary lung cancer, video-assisted thoracoscopic surgery.

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Introduction

Adenoid cystic carcinoma (ACC) is a distinctive type of malignant epithelial neoplasm that commonly arises in the salivary glands [1]. ACC of the lungs is a relatively rare lung cancer that originates in the bronchial glands, accounting for approximately 0.04-0.2% of all lung cancers [2, 3]. Primary ACC arises in the central airways, such as the trachea and main bronchus. Meanwhile, peripheral lung ACC is very rare, representing approximately 10% of cases of primary lung ACC [4]. We herein report a case of primary ACC of the peripheral lungs treated with video-assisted thoracoscopic surgery (VATS).

Case

A 77-year-old female visited a family physician with aortitis syndrome, diabetes mellitus and hyperlipidemia. A follow-up chest computed tomography (CT) scan for aortitis syndrome revealed a nodule in the middle lung, and she was referred to our hospital. Chest radiography showed a well-circumscribed, rounded tumor nodule in the right upper lung field. A chest CT scan demonstrated a lung nodule measuring 14 × 11 mm with spiculation in the right S4 segment (Fig. 1); there was no swelling in the hilar or mediastinal lymph nodes. Although a transbronchial lung biopsy was attempted, a definitive diagnosis could not be obtained. Fluorodeoxyglucose-positron emission tomography (FDG-PET) showed a focal abnormality in the lung nodule, with a maximum standardized uptake

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value (SUVmax) of 1.67 (Fig. 2). There was no abnormal uptake in any other organs, including the head and neck region. The levels of tumor markers were as follows: carcinoembryonic antigen = 2.7 ng/ml, squamous cell carcinoma antigen = 0.5 ng/ml, Cyfra21-1/cytokeratin 19 fragment = 3.1 ng/ml, and neuron-specific enolase = 13.1 ng/ml. All the tumor markers were in the normal range. A diagnosis of malignancy could not be excluded based on these findings, and the surgical procedure was performed. At first, thoracoscopic wedge resection of the middle lobe was performed, and the intraoperative pathological diagnosis of the lung nodule was carcinoma. Therefore we performed

middle lobectomy under complete video-assisted thoracoscopic surgery (VATS). The macroscopic specimen exhibited a 20-mm (maximum diameter) mass. A histopathological examination with hematoxylin and eosin staining showed ACC with a cribriform structure and mucinous component (Fig. 3) and invasion into the pleura. In an immunohistochemical analysis, the tumor cells were positive for thyroid transcription factor 1 (TTF-1) (Fig. 4). The tumor was diagnosed as a primary ACC of the lungs, pathological T2aN0M0 (stage 1B). The patient's postoperative course was uneventful, and she has remained in good health for two years without any evidence of recurrence.

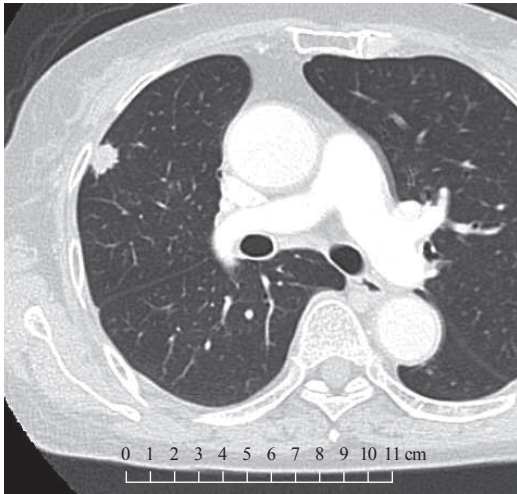


Fig. 1. Computed tomography shows a nodule with spiculation in segment 4 of the right lung.

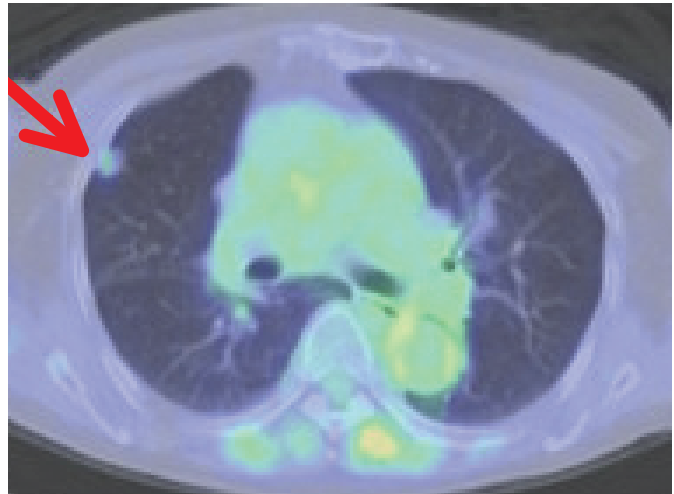


Fig. 2. Positron-emission tomography shows increased uptake in the S4 nodule (arrow), with a standardized uptake value of 1.67.

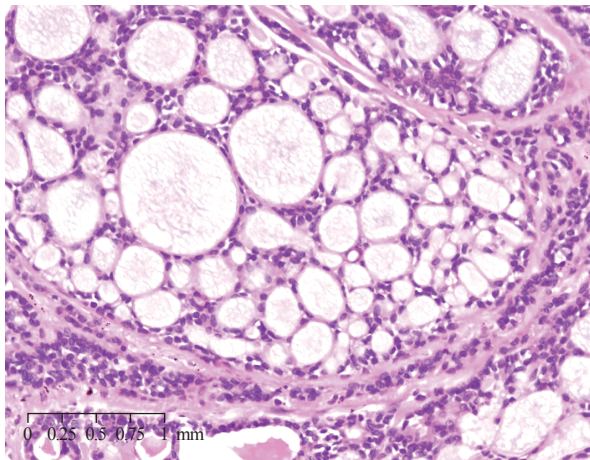


Fig. 3. The histological findings showing atypical bronchial epithelia cells that form a cribriform pattern and include a mucinous component.

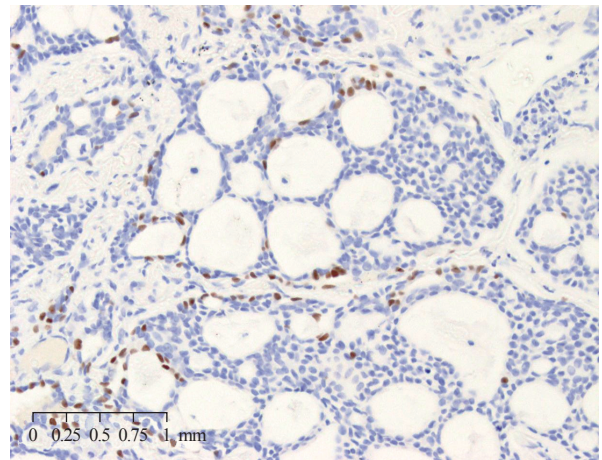


Fig. 4. An immunohistochemical examination revealed that the tumor cells were positive for thyroid transcription factor 1.

Discussion

The most common site for ACC is the salivary glands; however, the disease can also occur in the breast, skin, uterine cervix, upper digestive tract and lungs [5]. Most cases of ACC arise from central tracheobronchial regions, rather than the peripheral bronchi [3]. ACC originates in the bronchial glands and exists in a more closely distributed pattern in the central bronchi than in the segmental bronchi. Peripheral lesions in the bronchial glands are sparsely distributed; thus, the occurrence of ACC in the peripheral lungs is very rare. In our case, the ACC lesion in the peripheral lungs was a primary lung cancer, as there were no primary tumors in other regions, including the salivary glands, on PET. Furthermore, immunohistochemical staining revealed positivity for TTF-1. TTF-1 is highly sensitive and specific for the diagnosis of primary lung cancer. TTF-1 is a transcription factor that is specifically expressed in the thyroid and lungs, present in 60-70% of pulmonary adenocarcinomas; therefore, this marker is useful for distinguishing between primary and metastatic lesions [6, 7].

ACC developing in the salivary glands is reported to exhibit a better prognosis than other pathological types of carcinoma occurring in the salivary glands, due to its slow growth and absence of metastasis until the late stages of tumor development [8]. Shin *et al.* [9] reported that breast ACCs follow a favorable clinical course, with a better prognosis than that of salivary disease, while Cerar *et al.* reported that esophageal ACCs have a worse prognosis due to their vital location and the development of synchronous tumors of the esophagus [10]. ACC has a distinctive microscopic appearance, and its histological features are useful not only in diagnosing the tumor but also help to determine the prognosis. It consists of 3 histological subtypes: cribriform, tubular and solid. The typical ACC has a cribriform pattern, as in our case. Some have a predominantly tubular pattern, and a few others have a solid pattern. Among the subtypes, the tubular subtype has the best prognosis, and the worst prognosis has been found with the solid type [11]. In the present case, the SUV of the lung tumor on a PET scan was 1.67, which is relatively lower than that of lung cancer. The SUV, which measures the uptake

and trapping of radiolabeled glucose by tissues, and the maximal SUV of the primary tumor may therefore reflect the biological malignant potential of non-small cell lung carcinoma (NSCLC) [12]. Okereke *et al.* reported that the SUV exhibits a strong correlation with survival and that a higher SUVmax predicts a poor survival outcome in patients with NSCLC [13]. El-nayal *et al.* showed that FDG uptake was much higher in ACC (SUVmax : median, 8.6; range, 3.7 – 17.6) than in other salivary gland-type tumors of the lung, although increased FDG uptake didn't translate into worse overall survival or progression-free survival time [14]. However, the SUVmax of the ACC in their report was much higher than in our case. They showed that five of nine patients who had PET/CT studies had nodal metastatic disease with a median SUVmax of 10 (range, 4 – 17.6). Since that result may have been affected by lymph node metastasis, and the number of patients with PET/CT studies was small, further investigations are necessary to clarify the relationship between the pulmonary ACC and FDG uptake.

The clinical behavior of pulmonary ACC has not yet been fully defined, and most reported cases of ACC of the peripheral lungs have been diagnosed and treated surgically [15, 16]. The first-line treatment for ACC is surgical resection. Molina *et al.* suggested that surgical resection is a determinant prognostic factor [17]. However, Grillo *et al.* suggested that performing extensive resection in risky patients is not recommended because pulmonary ACC is regarded as a low-grade malignancy with a prolonged survival rate, even after incomplete surgery [18]. In our case, we performed a partial resection of the lung nodule in order to make a diagnosis via VATS and carried out middle lobectomy following the diagnosis of ACC.

Yokouchi *et al.* reviewed the English literature and found 10 cases of ACC. They reported that males were more frequently affected than females, although ACC was more frequent among women in a larger study in which the average patient age was 58 years and two of 10 patients developed recurrence (one case of lung metastasis and one case of lymph node metastasis) after surgery [19]. Although no recurrence was observed for two postoperative years in the present case, recurrence was detected after nine years; therefore, providing careful follow-up observation is mandatory [20].

Conflicts of Interest

None of the authors have a conflict of interest in relation to this work.

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末梢肺に発生した原発性肺腺様嚢胞癌の1例

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要 旨：末梢に発生する肺腺様嚢胞癌は極めて稀であるため報告する。症例は77歳女性。大動脈炎症候群, 糖尿病, 高脂血症の診断で近医外来受診していた。肺結節の経過観察のためにCTを撮影したところ, 右肺中葉末梢に結節影を指摘された。気管支鏡下肺生検を行ったが肺結節の確定診断には至らなかった。悪性の可能性が否定できず, 胸腔鏡下右中葉の部分切除を施行した。肺結節の術中迅速病理診断は, 悪性腫瘍の診断であり, 中葉切除の追加を行った。病理検査の結果, 篩状構造を有する腺様嚢胞癌の診断であった。

キーワード：腺様嚢胞癌, 末梢肺, 原発性肺癌, 胸腔鏡手術。

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