Primary adenoid cystic carcinoma in the lung: reporting a recurrent case at an advanced stage and mini-literature review.

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Case Report

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Abstract

Introduction: Primary adenoid cystic carcinoma (ACC) of the lung only account for less than 0.2% of all primary lung tumors**.** ACC in lung usually arises from the peribronchial glands and they are usually proximally located which makes it often challenging for surgical resection

Case presentation: A 65-year-old woman who was diagnosed with adenoid cystic carcinoma in 2017 at another institution and treated with lobectomy. In 2021, she presented at our hospital with frequent cough and dyspnea at rest and on exertion. Chest radiography showed bronchial obstruction and lung atelectasis, for stent placement for symptomatic relief. Repeated chest CT in 2022 showed progression of the tumor involving beyond the lung parenchyma into pleura and diaphragm Finally, the patient had left posterolateral thoracotomy, extra pleural pneumonectomy, En bloc pericardiectomy and En bloc resection of left diaphragm. Now she is on lung cancer surveillance with chest CT every 6 months. Last chest CT did not show any residual tumor or recurrence.

Conclusion: Despite its rarity, primary ACC of the lung should be well recognized by the pathologist and clinicians to make accurate diagnosis. . Although ACC of the lung usually has an indolent clinical course and behavior, recurrences are relatively frequent. The prognosis depends on the most dominant histological pattern, tumor staging and surgical margin status.

Introduction

Adenoid cystic carcinoma (ACC) is a rare malignant tumor accounting for less than 1% of malignancies in the head and neck region. ACC can be found in both major and minor salivary glands and more rarely in other locations including lung (1), skin (2), and breast (3). ACC in lung usually arises from the peribronchial glands and they are usually proximally located which makes it often challenging for surgical resection. Unlike other bronchopulmonary malignancies, ACC is not associated with smoking or many other common risk factors, and it is considered as a low-grade malignancy. Primary ACC of the lung only account for less than 0.2% of all primary lung tumors. Therefore, its biology, pathophysiology and clinical management remain largely unclear.

Case Presentation

Here we present a case of a 65-year-old woman who was diagnosed with adenoid cystic carcinoma in 2017 at another institution and treated with lobectomy at the time. In 2021, she presented at our hospital with frequent cough and dyspnea at rest and on exertion. Chest radiography showed bronchial obstruction and lung atelectasis, for which she underwent multiple bronchoscopies and stent placement for symptomatic relief. The patient was treated with Lenvatinib for 5 months before the oncologist stopped the treatment due to multiple side effects and limited effect on tumor. Repeated chest CT in 2022 showed progression of the tumor involving beyond the lung parenchyma into pleura and diaphragm. PET scan showed mild increase in FDG activity within the tumor with no evidence of distant metastasis.

Ventilation/perfusion revealed that the involved lung accounts for approximately 4% of the total lung function on semi-quantitative analysis.

Finally, the patient had left posterolateral thoracotomy, extra pleural pneumonectomy, En bloc pericardiectomy and En bloc resection of left diaphragm due to wide spread of the tumor in early 2022. Grossly, lung parenchyma, pleura and diaphragm showed multiple tan-white, well-circumscribed and soft nodules, ranging from 4–12 mm, the nearest one was 2.7 cm from bronchial margin and 1.6 cm from vascular margin. Microscopically, the carcinoma exhibits the classic adenoid cystic carcinoma trabecular and cribriform architecture (Fig. 2-A). The tumor extensively involves lung parenchyma, pleura (Fig. 2-B), diaphragm, and hilar lymph nodes., without solid or high-grade transformation. Vascular and perineural invasion were present (Fig. 2-C). Bronchial margin was positive for carcinoma (Fig. 2-D). However, vascular and the final diaphragmatic resection margins were negative for carcinoma

After the surgery, the patient was improving and has been stable without neoadjuvant chemotherapy. Now she is on lung cancer surveillance with chest CT every 6 months. Last chest CT did not show any residual tumor or recurrence.

Discussion

Salivary gland tumor in the lung is very rare. The most frequent types are mucoepidermoid carcinoma and adenoid cystic carcinoma. Unlike ACC in salivary gland, ACC in lung tends to occur more frequent in female. In contrast to other lung carcinomas, smoking is not considered to be a risk factor for the development of primary ACC. Clinically, Symptoms are not specific and may be misleading, which could be the reason for the late diagnosis in many cases.

The correlation between the histological patterns and clinical behavior of ACC of the lung has been suggested. Indeed, this tumor exhibits three predominant histological growth patterns. The most frequent and predominant pattern is the cribriform followed by the tubular pattern and then, the least frequent and the most aggressive, the solid pattern. In contrast to the cribriform type, which shows a more benign behavior, solid ACC has been associated with a more destructive clinical course and early distant metastases. Perineural invasion has been reported frequently However, vascular emboli and lymph node metastases are not commonly reported. In our case, there were extensive perineural invasion with both vascular and lymph nodes invasion.

MYB-NFIB fusion is the most frequently identified genetic alteration in ACC regardless of the sites. In the original study by Persson et al., all ACCs analyzed harbored the *MYB* fusion, irrespective of whether they arose in the salivary glands, lacrimal glands, ceruminous glands of the ear, or breast. In another study, Roden et al. analyzed the cytogenic features of lung ACC where they identified *MYB* rearrangement in 41% of the cases (5). This shared genetic alteration could explain the similar indolent behavior of ACC across various sites.

The prognosis of ACC in the lung relies mainly on histological subtype, tumor staging as well as surgical margin status. Even though this type of tumor usually has a slow and indolent growth pattern, ACC of the lung may be more aggressive in some cases.

The fact that lung ACC often arises from the complex and arborising tracheal and bronchial tree precludes wide and clear resection margin, making residual tumor at the resection margin very common as described in our case. Moreover, as perineural invasion is considered one of the most common characteristics of ACC, and ACC commonly originates in the central lung and close to the main pulmonary nerve plexus, we claim that this could contribute to local recurrence of the tumor because it is not possible for surgeons to dissect all the way through main nerve trunk in order to create truly tumor-free margins.

Despite the possibility of local recurrence, in the recent study Han et al. has found that majority of the patients with primary pulmonary adenoid cystic carcinoma are diagnosed at an early clinical stage with a favorable prognosis. The size of the tumor and the age of the patients are independent prognostic indicators. (6)

Per literature, two cases of primary lung ACC had distant metastasis. The first case reported by N.N. Junejo et al. (7) was a rare case of histologically confirmed renal metastasis from ACC of the right lung three years after primary presentation. The second case was reported by G. Montecamozzo et al. (8), which was a rare case of histologically confirmed thyroid metastasis from a pulmonary ACC treated 6 months prior.

Currently surgical resection of the tumor is considered the main stay of curative treatment with tumor free margins. However, this could not be achieved in all cases. Hence, the management of residual disease, additional radiotherapy and/or chemotherapy might be indicated for unresectable tumors or incomplete resection. According to the study by Muhammad Shahid Iqbal et al. (9), the role of radiotherapy remains unclear and further studies are needed to establish the indication for radiotherapy in both aggressive and palliative settings. Chemotherapy has not shown any benefit in most patients, which is consistent with our case where Lenvatinib had very limited effect on the tumor.

Conclusion

Despite its rarity, primary ACC of the lung should be well recognized by the pathologist and clinicians to make accurate diagnosis. The histologic features can mislead to a false diagnosis. Therefore, the immunohistochemistry study plays an imperative role to ensure the correct diagnosis and management. Although ACC of the lung usually has an indolent clinical course and behavior, recurrences are relatively frequent. The prognosis depends on the most dominant histological pattern, tumor staging and surgical margin status.

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Figures

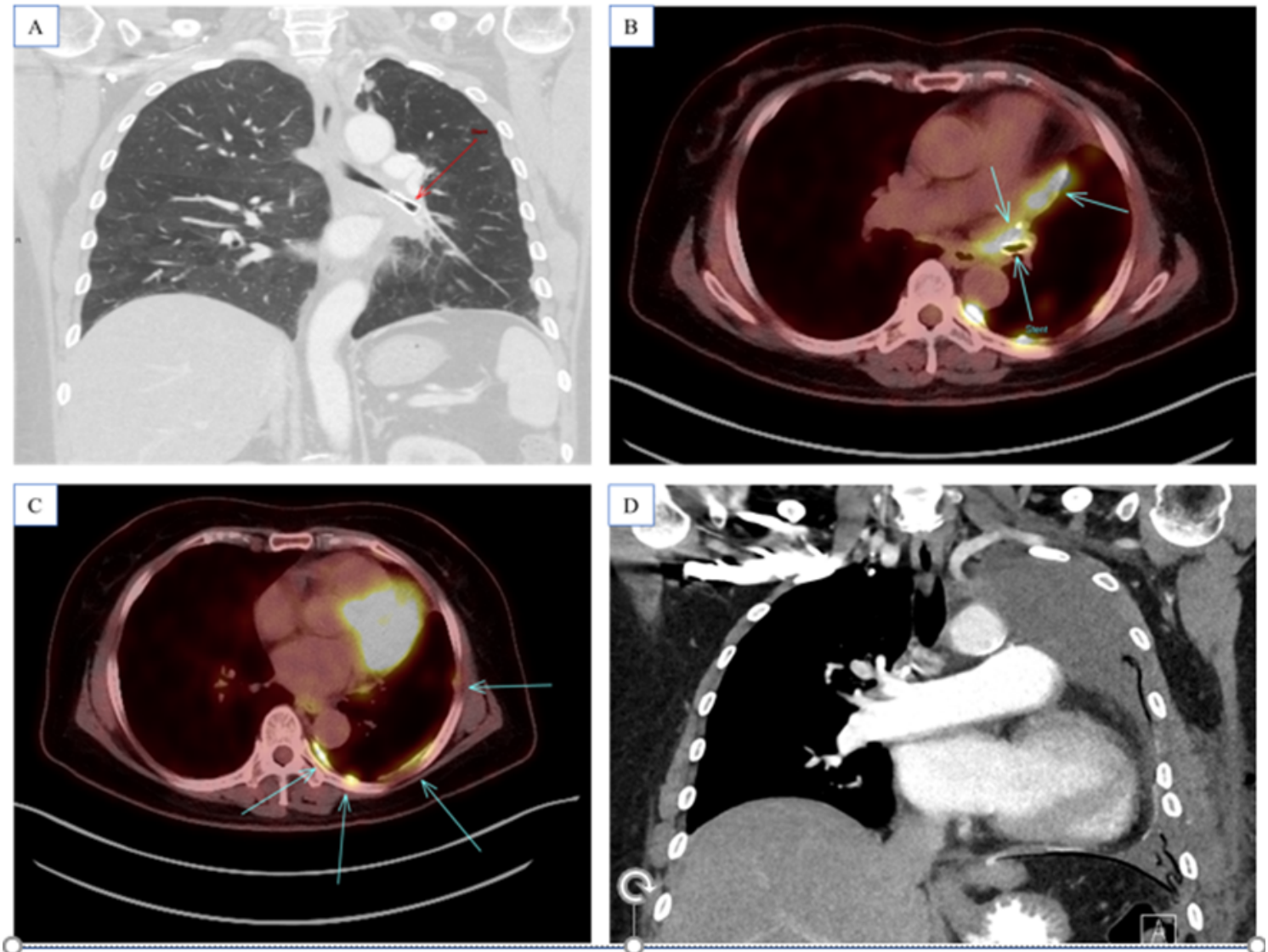

Figure1: (A) Chest CT (status post left upper lobectomy) shows left lower lobe main bronchus obstruction with stent placement. (B) PET scan shows stent within left main bronchus with pleural and lymph node involvement by the tumor. (C) PET scan shows progressive involvement of left lower lobe and pleura by the tumor. (D) Chest CT status post completion extra pleural pneumonectomy.

Figure 1

See above image for figure legend.

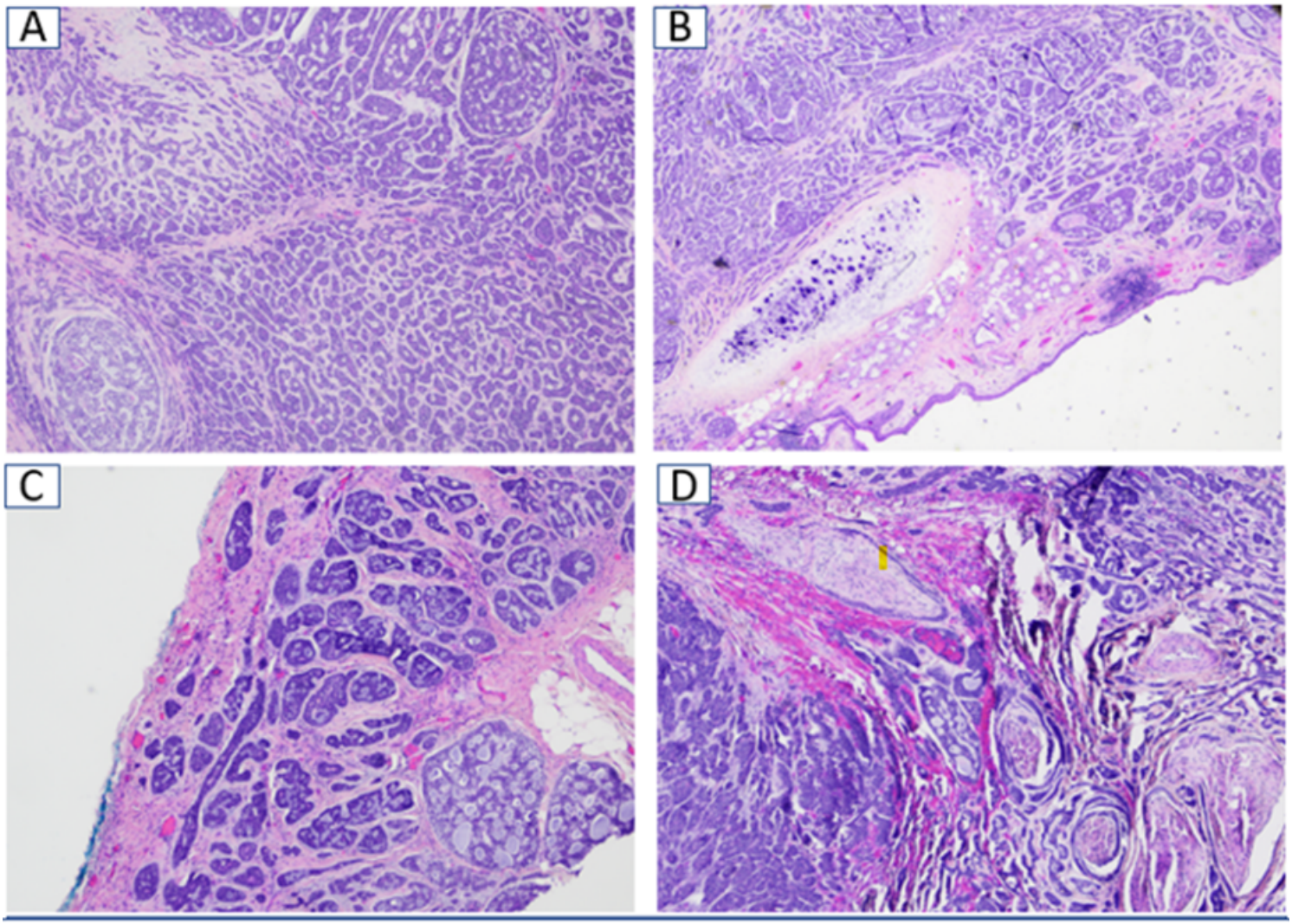

Figure2: (A) Classic adenoid cystic carcinoma trabecular and cribriform architecture. (B) Bronchial margin positive for carcinoma. (C) Pleura stuffed with carcinoma. (D) Extensive perineural invasion.

Figure 2

See above image for figure legend.