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Atypical carcinoid with multiple central airway metastases: A case report

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ABSTRACT

A 51-year-old man was found to have multiple polypoid tracheal and bilateral main bronchial tumors during postoperative follow-up of atypical carcinoid. He underwent transtracheal biopsy, and was diagnosed as having central airway metastases of the atypical carcinoid. He underwent chemotherapy, but the effects were unfavorable. Owing to the risk of airway obstruction, he was referred to our hospital for interventional bronchoscopy. Carcinoid tumors usually present as peripheral lung lesions or solitary endobronchial abnormalities, but rarely appear as multiple central airway lesions. We present a very rare case of multiple central airway metastases of atypical carcinoid, controlled by bronchoscopic treatment.

1. Introduction

Pulmonary carcinoid tumors are a family of neuroendocrine tumors that comprise about 2% of all pulmonary cancers [1]. By morphological analysis, carcinoid tumors can be classified as typical carcinoid (TC) and atypical carcinoid (AC), depending on their mitotic cell count (TC: 0–2 mitoses per 2 mm^2, and AC: 2–10 mitoses per 2 mm^2) and on the presence of necrosis (AC) [2]. ACs have a higher rate of recurrence and tendency to metastasize compared with TC [1]. Although surgery is still the standard treatment for endobronchial lesions, bronchoscopic treatment (BT) modalities, such as argon plasma coagulation (APC), microwave coagulation (MC), laser treatment, cryotherapy, etc., are becoming more common. Favorable treatment results have been reported after BT in some patients with TC and AC [3,4].

We here present a case of a patient with atypical carcinoid with multiple endobronchial metastases, which was efficiently controlled by BT.

1.1. Case presentation

A 51-year-old man, who was a light smoker (1 pack-year), underwent right lower lobectomy for pulmonary atypical carcinoid 8 years previously. During postoperative follow-up 3 years previously, computed tomography (CT) revealed multiple tumors in the central airway. Bronchoscopy revealed multiple polypoid lesions from the upper portion of the trachea to the bilateral orifice of the main bronchi. Bronchoscopic biopsy was performed, and recurrence of the carcinoid tumor was diagnosed. He received chemotherapy (cisplatin plus etoposide [EP regimen]) 3 years previously. The lesions shrank after chemotherapy, and the effect was a partial response; therefore, he received periodic follow-up examinations. As the lesions were subsequently found to be growing gradually, and right hilar lymph node (#11s) and liver metastases also appeared, he received chemotherapy (EP regimen rechallenge) again a year ago. However, the patient complained of dyspnea because no reduction of the bronchial lesions was achieved by the chemotherapy (Fig. 1), and therefore, he was referred to our hospital for bronchoscopic intervention.

Bronchoscopy revealed multiple polypoid tumors scattered from the upper trachea to the bilateral main bronchus. The largest tumor was 1.5 cm. The tumors had almost completely occluded the right main bronchus (Fig. 2). For dilatation of the central airway, a rigid bronchoscope was inserted under total intravenous anesthesia, and tumor resection was performed by snaring, APC and MC using a flexible bronchoscope. The resected tumor was diagnosed as atypical carcinoid based on histological findings (Fig. 3). After opening the central airway by the resection of the metastatic tumors, his general condition improved. Thereafter, he underwent surgical resection for his liver metastasis.

During the 2 years after the first bronchial treatment, we performed

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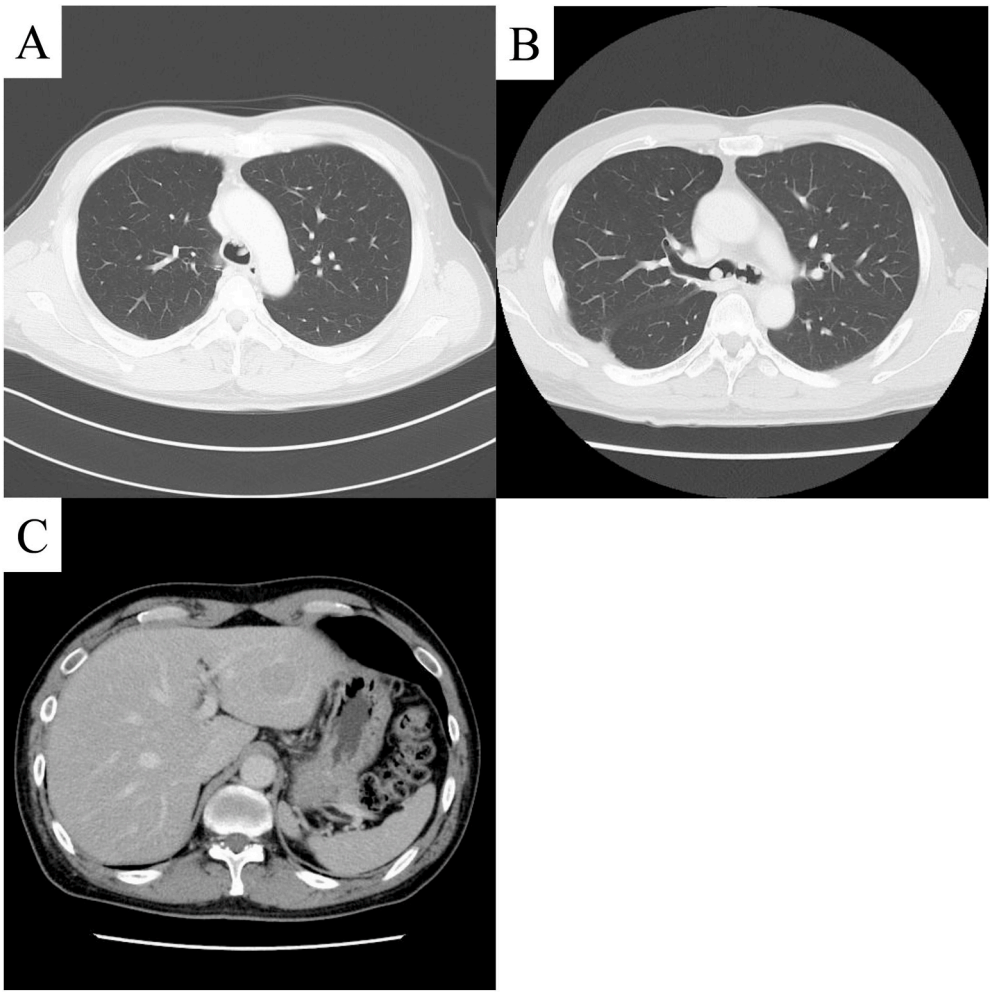


Fig. 1. Computed tomography images of taken before the first endobronchial treatment.
(A) Middle trachea, (B) tracheal bifurcation, and (C) liver (liver metastasis).

bronchial tumor ablation using APC once a year for some tumor regrowth around the tracheal bifurcation, and the lesions have remained under control (Table 1).

2. Discussion

Several types of primary malignant tumors, most commonly those of the breast, kidney, and colon, as well as melanoma, tend to metastasize to the bronchi [5]. Schoenbaum S. et al. proposed the following 4 pathways for endobronchial metastasis: (1) pulmonary arterial metastasis caused by embolization of a tumor in the peripheral pulmonary artery, and its subsequent movement into the lymphatic vessels around the trachea, (2) lymphatic metastasis occurring retrogradely in the lymphatic vessels around the bronchi from the metastasized hilar lymph node, (3) bronchial arterial metastasis onto the bronchial wall via the artery, and (4) transtracheal/bronchial metastasis [6]. In our present patient, as right hilar lymph node metastasis and liver metastasis were observed, we speculated that the metastasis in the central airway was a result of lymphatic metastasis or bronchial arterial metastasis. However, it is difficult to clarify the actual metastatic pathway from only the bronchoscopic findings.

Rosado de Christenson et al. demonstrated that the rate of metastasis of bronchial carcinoid tumors is 15%, and the metastatic sites are typically the liver, bone, adrenal gland, and brain [7]. To date, only 1 similar case to our present case, namely, a patient with numerous polypoid endobronchial metastases of atypical carcinoid, has been reported by Surani et al.; however, they did not perform bronchoschopic treatment for the lesions [8]. Therefore, we believe that our patient with multiple central airway metastases of polypoid atypical carcinoid, who underwent bronchoscopic treatment is an extremely rare case.

Regarding the treatment of carcinoid tumors, lobectomy and pulmonary resection are generally performed for atypical carcinoids [9]. Chemotherapy for unresectable carcinoids is often performed in the same manner as for small cell lung cancer, with a response rate of 20%–56% for EP regimens, and no difference in response rate has been observed between patients with typical carcinoid and those with atypical carcinoid [10]. In addition, the efficacy of radiation therapy remains unclear.

Endobronchial treatment using bronchoscopy is generally considered unsuitable for carcinoid tumor with distant metastases [4]. However, in the present patient, chemotherapy was ineffective and there was no other effective treatment option. In addition, as the patient was at serious and immediate risk of airway obstruction, we performed bronchoscopic intervention and continued periodic follow-up by bronchoscopy. It has been reported that even incomplete intrabronchial resection of a carcinoid tumor may achieve favorable results, because carcinoid tumors show characteristics of low-grade malignancy and slower tumor growth than non-small cell lung cancer [3]. Although this patient did not achieve complete remission of the multiple metastases in the central airway from the pulmonary atypical carcinoid tumor, bronchoscopic intervention may be a useful treatment option for the purpose of disease control.

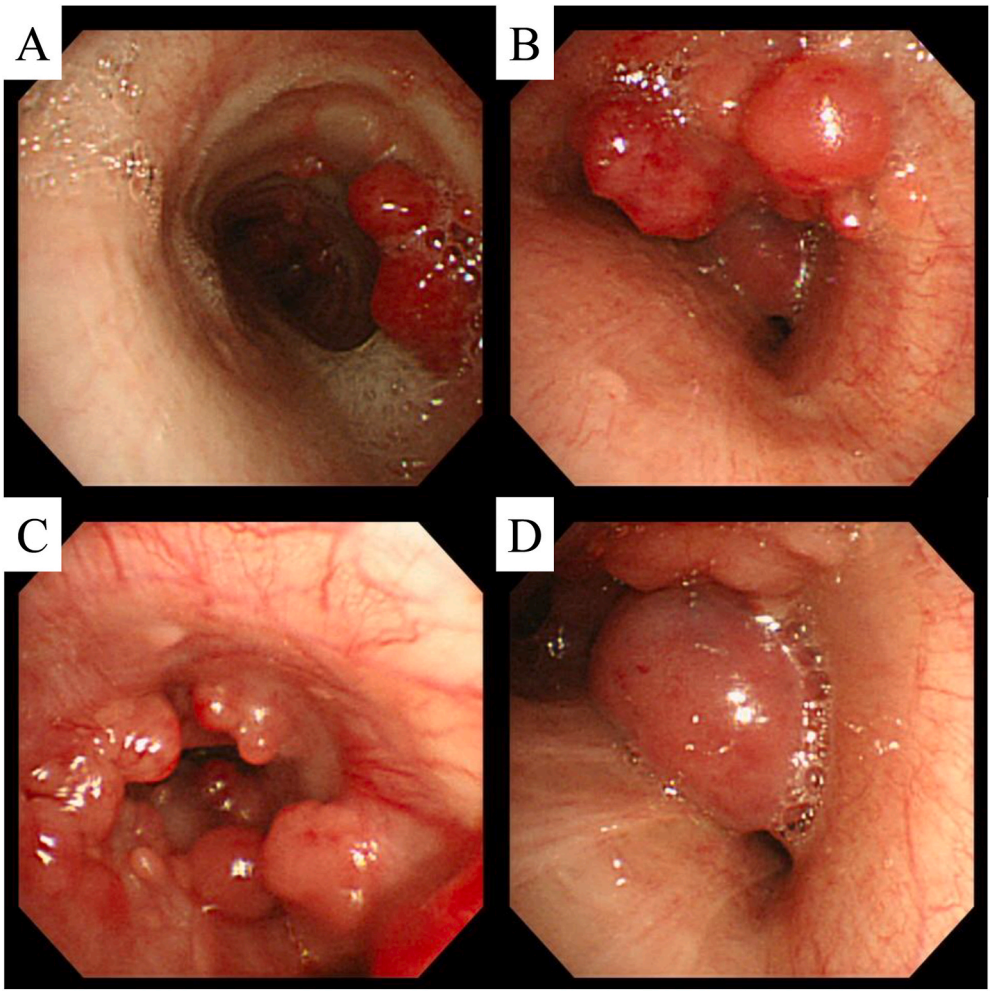


Fig. 2. Bronchoscopic images taken before the first endobronchial treatment.
(A) Upper trachea, (B) middle trachea, (C) right main bronchus, and (D) left main bronchus.

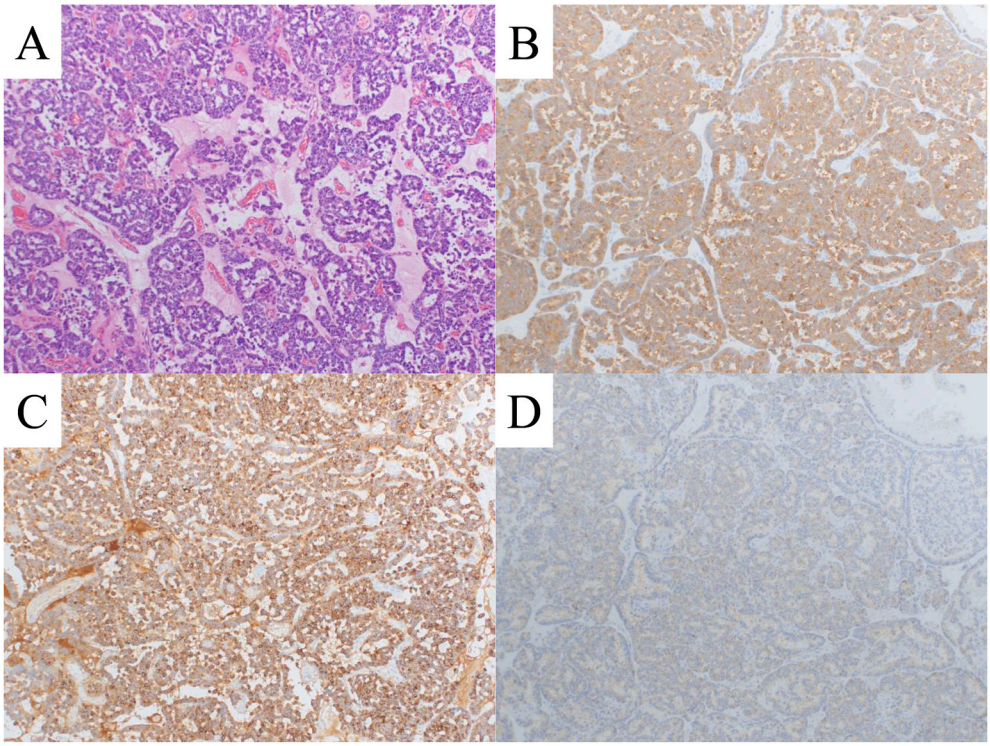
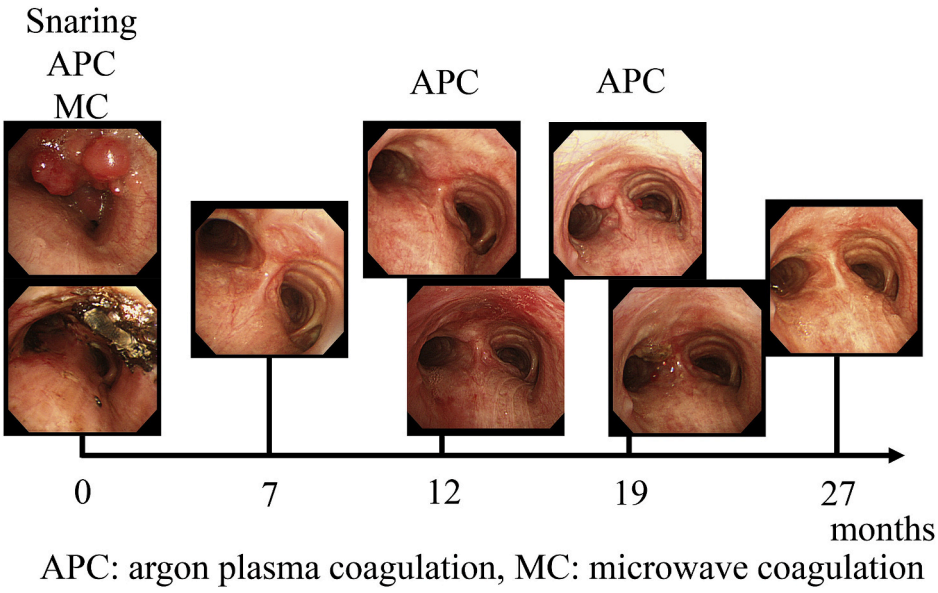


Fig. 3. Histological findings of the tumor. Tumor cells were growing in a trabecular and cribriform pattern, and there was some mucus retention. (A) Tumor cells had a polygonal, moderately eosinophilic cytoplasm, and a nucleus with mild atypia. The tumor showed 5 to 10 mitoses per 2 mm^2. Immunostaining was positive for chromogranin A and synaptophysin staining, and slightly positive for CD56. (B, C and D) (A) Hematoxylin and eosin staining (magnification: × 100), (B) synaptophysin staining (magnification: × 100), (C) chromogranin staining (magnification: × 100), and (D) CD56 staining (magnification: × 100).

Table 1
Bronchoscopic findings of the tracheal bifurcation and timekeeping changes.



3. Ethics in publishing

Prior to writing this case report, we obtained comprehensive informed consent from the patient.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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References

[1] W.D. Travis, Pathology and diagnosis of neuroendocrine tumors: lung neuroendocrine, Thorac. Surg. Clin. 24 (2014) 257–266.

[2] P.L. Filosso, O. Rena, F. Guerrera, et al., Clinical management of neuroendocrine tumors of the lung, Eur. J. Cardio. Thorac. Surg. 48 (2015) 55–64.

[3] H.A. Brokx, M.A. Paul, P.E. Postmus, et al., Long-term follow-up after first-line bronchoscopic therapy in patients with bronchial carcinoids, Thorax 70 (2015) 468–472.

[4] E.M.B.P. Reuling, C. Dickhoff, P.W. Plaisier, et al., Endobronchial treatment for bronchial carcinoid: patient selection and predictors of outcome, Respiration 95 (2018) 220–227.

[5] S.S. Braman, M.E. Whitcomb, Endobronchial metastasis, Arch. Intern. Med. 135 (1975) 543–547.

[6] S. Schoenbaum, M. Viamonte, Subepithelial endobronchial metastases, Radiology 101 (1971) 63–69.

[7] M.L. Rosado de Christenson, G.F. Abbott, W.M. Kirejczyk, et al., Thoracic carcinoids: radiologic-pathologic correlation, Radiographics 19 (1999) 707–736.

[8] S. Surani, J. Tan, A. Ahumada, et al., Delayed recurrence of atypical pulmonary carcinoid cluster: a rare occurrence, Case Rep Pulmonol 620814 (2014) 4.

[9] T.N. Machuca, P.F.G. Cardoso, S.M. Camargo, et al., Surgical treatment of bronchial carcinoid tumors: a singlecenter experience, Lung Cancer 70 (2010) 158–162.

[10] F.C. Detterbeck, Management of carcinoid tumors, Ann. Thorac. Surg. 89 (2010) 998–1005.