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Neuroendocrine Tumour of the Lung- A Case Report

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Abstract

Carcinoid tumours are a rare group of neuroendocrine tumours which can present in a wide variety of ways. In the lungs they present as central tumours with or without obstructive features. The evolving modalities in imaging, interventional pulmonology and clinical pathology have helped to improve the accuracy in diagnosis and early intervention.

Keywords: Neuroendocrine tumour, Carcinoid tumour, Kulchitsky cells, Atypical carcinoid

Introduction

Lung neuroendocrine tumours (NETs) popularly known by the name bronchial carcinoids are rare, low-grade, malignant tumours that arise from tracheobronchial Kulchitsky cells. Lung neuroendocrine tumours account for about 1 to 2 % of all lung malignancies in adults and nearly 20 to 30 % of all NETs. Lung NETs are the most common primary lung neoplasm in children, and late adolescence. Bronchial carcinoids are of two types. Typical Carcinoids, are low-grade tumours with a low mitotic rate, are more common and atypical carcinoids are intermediate-grade tumours with a higher mitotic rate and/or necrosis [1-4]. Worldwide, incidence rates range from 0.2 to 2 per 100,000 populations per year, with almost equal male to female preponderance. Here we present the case of an elderly gentleman presenting with bronchial carcinoid occluding the right lower lobe bronchus leading to post obstructive bronchiectasis.

Case report

An elderly gentleman presented with history of cough with scanty expectoration for 2 months and right sided chest pain for 2 weeks. Cough was productive with scanty whitish sputum, no h/o diurnal or postural variation, not associated with cough syncope. He also had right sided chest pain, dull aching type of pain in right lateral chest, not increased on deep breathing or coughing. No h/o hemoptysis, wheezing, dyspnoea or fever. No h/o weight loss or loss of appetite. No h/o similar complaints in the past. He was a Type 2 diabetic on oral hypoglycaemic agents. He had no other comorbidities. He was a non-smoker, non-alcoholic, with normal bowel and bladder habits. There

was no relevant family history.

On examination he was moderately built and nourished with no pallor, icterus, cyanosis, clubbing, lymphadenopathy or oedema. His vitals were stable. Upper respiratory system examination was unremarkable. Respiratory system examination showed coarse inspiratory crepitations over right mammary, infraxillary and infrascapular areas. His routine blood investigations were within normal limits. Chest X-ray showed increased markings in right lower zone. CECT thorax was taken which showed a well-defined intraluminal soft tissue density lesion in right lower lobe bronchus causing near total occlusion with associated cylindrical bronchiectasis in right lower lobe and fibro-bronchiectasis in the right upper lobe (**Figures 1, 2**). He was subjected to fibre-optic bronchoscopy, which showed a reddish, fleshy pedunculated mass almost completely occluding the right lower lobe bronchus except the superior segment of lower lobe (**Figure 3**). Cryobiopsy samples were taken from the lesion which was sent for histo-pathological examination. HPE was suggestive of a typical carcinoid, which was confirmed using immunohistochemistry (IHC) staining (**Figures 4, 5**). Immunohistochemistry staining with Ki-67 had an index of <2%, Chromogranin A staining was focal positive and Synaptophysin staining was diffusely positive. A final diagnosis of typical carcinoid tumour of the lung with associated post obstructive bronchiectasis was made.

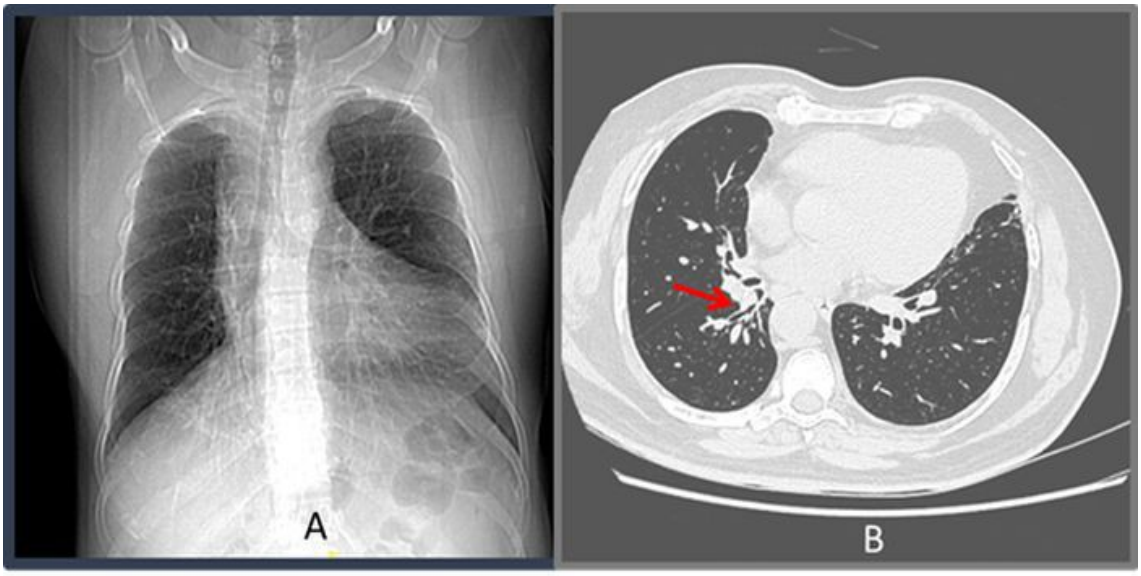

Figure (1A): Scanogram of the patient showing increased marking in right lower zone, and **Figure (1B)**: CT thorax Lung window axial section showing an intraluminal lesion in the right lower lobe bronchus (Red arrow).

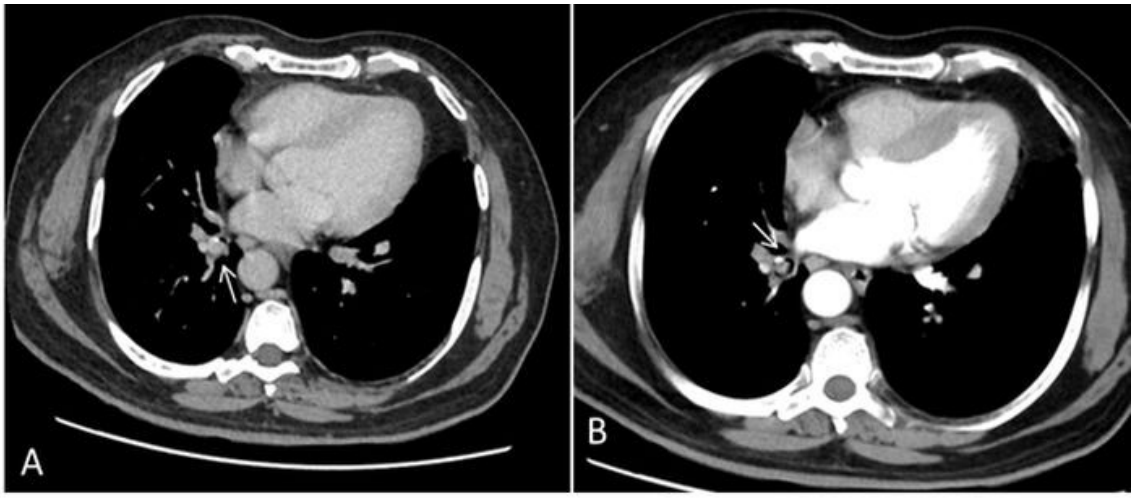

Figure 2: C T Thorax mediastinal window, axial section of non-contrast (**A**) and contrast (**B**) demonstrating the intraluminal mass with high contrast enhancement (White arrows).

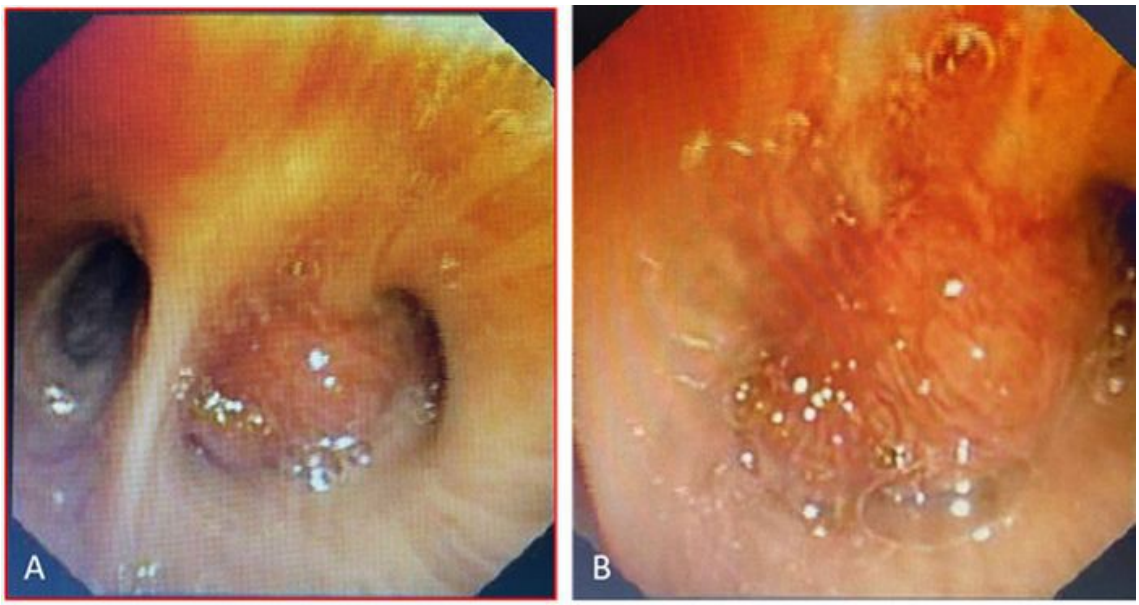

Figure 3: Bronchoscopic images (**A** & **B**) showing a fleshy, reddish, pedunculated mass lesion in the right lower lobe bronchus almost completely obliterating the right lower lobe bronchus except the superior segment of right lower lobe

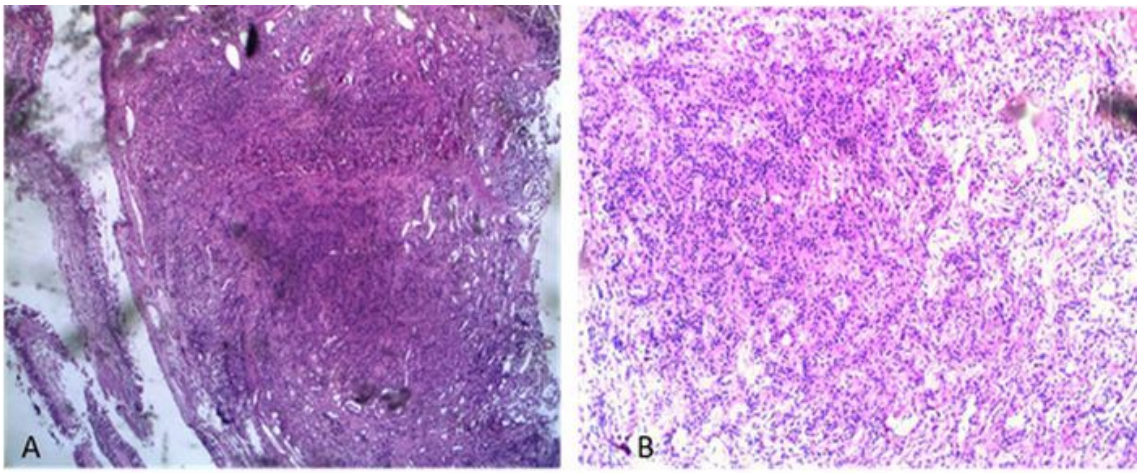

Figure 4: Histopathology slides showing bits of tissue lined by respiratory epithelium and sub mucosa showing neoplasm composed of monotonous population of cells arranged in rosettes, trabecular and insular pattern (**A** & **B**).

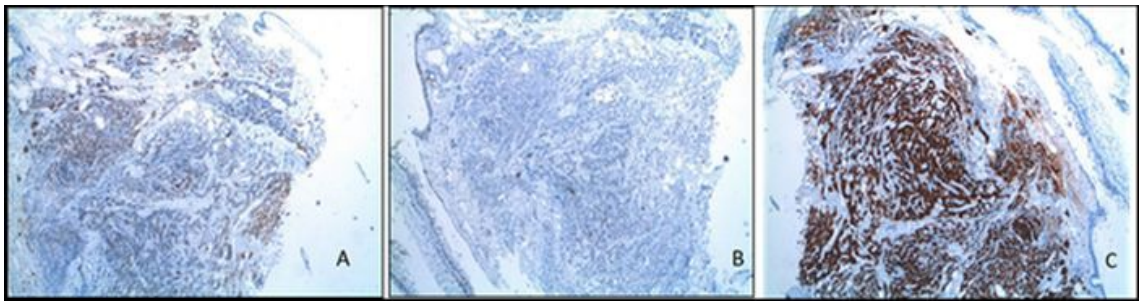

Figure 5: Immunohistochemistry staining with Chromogranin (**A**) which is focal positive, Ki-67 (**B**) having an index below 2%, and Synaptophysin (**C**) which is diffusely positive.

Discussion

Bronchial carcinoids are lung neuroendocrine tumors which accounts for about 1-2 % of all lung malignancies in adults and nearly 20 to 30 % of all NETs. According to the latest 2021 WHO classification of thoracic tumours [5] the lung neuroendocrine neoplasms are divided into:

1. ***Precursor lesion*** Diffuse idiopathic neuroendocrine cell hyperplasia

2. ***Neuroendocrine tumours***

Carcinoid tumour, NOS/neuroendocrine tumour, NOS

a) Typical carcinoid/neuroendocrine tumour, grade 1

b) Atypical carcinoid/neuroendocrine tumour, grade 2

3. ***Neuroendocrine carcinomas***

a) Small cell carcinoma

b) Combined small cell carcinoma

c) Large cell neuroendocrine carcinoma

d) Combined large cell neuroendocrine carcinoma

Patients usually present with cough, hemoptysis or post obstructive pneumonia. There can be rare presentation in the form of paraneoplastic syndrome, such as Cushing's syndrome due to ectopic production of ACTH. This is more common in typical carcinoid compared to atypical type. Carcinoid syndrome which is another paraneoplastic syndrome described, is rare in bronchial carcinoid tumors, but it has been reported in patient with atypical carcinoid and liver metastasis. Most carcinoids occur as a central hilar or peri-hilar nodule or mass with 85% in the main stem bronchus, lobar, or segmental bronchi. Carcinoid tumor can be totally endobronchial, but often manifest as an "ice berg" growth pattern, with the bulk of tumor outside of the airway and a smaller endobronchial component within, forming the "tip of the iceberg". Up to 20% of carcinoids may occur as peripheral, solitary pulmonary nodules.

Macroscopically it appears as a smooth red polypoid endobronchial nodule or mass. Microscopically they are characterized by uniform cells separated by a fibrovascular stroma.

Lung carcinoids typically demonstrate intense enhancement on contrast-enhanced studies due to high vascularity. They may exhibit calcification, but it is uncommon. Secondary atelectasis and/or post obstructive pneumonitis may be seen.

Biopsy sample is subjected to histo-pathological examination and immunohistochemistry. Lung carcinoids are positive for pan-cytokeratins and neuroendocrine markers of first- generation (CD56, chromogranin A, and synaptophysin) and second-generation lineages (INSM1). Histopathology and immunohistochemistry including Ki-67 index helps us to make a confident diagnosis of carcinoid tumour. The proliferation marker Ki67 is generally low in typical carcinoids but may be higher in atypical tumours [6]. Thyroid transcription factor-1 (TTF-1) stain is positive in 28-69% of lung carcinoids [7,8] and may help in the differential diagnosis between a primary lung carcinoid and metastasis from a neuroendocrine tumour located elsewhere. The marker is considered highly specific (but not sensitive) for pulmonary neuroendocrine neoplasms [8]. Patients should also undergo 68Ga- DOTATATE PET CT scan to look for metastatic lesion elsewhere in the body.

Patients with either a low- or intermediate-grade resectable lung NET whose medical condition and pulmonary reserve is adequate, surgical resection is preferred including mediastinal lymph node sampling or dissection. Complete surgical resection is the most effective treatment in case of typical carcinoid. Recurrence-free survival is common in patients with typical carcinoid. Five-year survival rates following complete resection of typical carcinoid and atypical carcinoid are 87% to 100% and 44% to 77%, respectively. Bronchoscopic laser therapy was reported to be safe and effective for approximately 54-64% of individuals with typical intra bronchial carcinoids [9, 10]. If possible, a sleeve resection may be done to avoid a lobectomy and repeated surgery [11]. Patients with distant metastases may be treated with somatostatin analogues [12], chemotherapy with temozolomide-based, mTOR inhibitors, or peptide receptor radionuclide therapy (PRRT) with 177Lu-DOTATATE [13]. Most patients have an excellent prognosis. Poor prognostic factors include atypical histology and lymph node metastases at diagnosis. Long-term follow-up is mandatory as metastases may occur late.

Conclusion

Carcinoid tumours are a rare group of lung neuroendocrine tumours which can present in a wide variety of ways. The evolving modalities in imaging, interventional pulmonology and clinical pathology have helped to improve the accuracy in diagnosing such a rare condition.

Declaration

1) Necessary patient consent was obtained for publication of this case

2) Authors have no conflict of interest

3) There was no external funding for this study

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