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Carcinoid Tumor with Localized Bronchiectasis

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Bronchial carcinoid tumor comprises 1 to 3% of lung neoplasms. The common age of onset is mainly post-puberty although atypical carcinoid tumors occur at ages 44 to 55. Carcinoid tumors cause two groups of symptoms in patients: symptoms due to obstruction and symptoms due to the production and release of active neuropeptides. Histologically, carcinoid tumors are categorized into two groups of typical and atypical while in terms of location of lesion, they are grouped into central and peripheral types. Differentiation between malignant and benign carcinoid tumors is based on presence or absence of metastasis.

Bronchoscopy and endobronchial biopsy are the best diagnostic measures in these patients. Serologic evaluation and assessment of active metabolites in case of liver metastasis also help the diagnosis. Surgical resection is the treatment of choice for this condition.

This report discusses a patient with carcinoid tumor who was receiving bronchodilator treatment for a couple of months because of chronic cough with possible diagnosis of asthma and had received several courses of antibiotic therapy with possible diagnosis of lung infection until he eventually developed bronchiectasis in the right lower lobe.

In patients with chronic pulmonary symptoms especially with localized bronchiectasis, diagnostic bronchoscopy must be included in the diagnostic work-up to rule out intrabronchial lesions.

Key words: Carcinoid tumor, Pulmonary neoplasm, Bronchiectasis, Recurrent pneumonia

INTRODUCTION

Carcinoid lung tumor is a rare pulmonary tumor with neuroendocrine cell (Kulchitsky cell) origin. These tumors are considered malignant due to their metastatic potential and have a wide spectrum of manifestations from a typical carcinoid to atypical neuroendocrine tumors and small cell lung cancer. Bronchial carcinoid tumor comprises 1 to 2% of all pulmonary tumors and approximately 20% of carcinoid tumors occur in the lungs (1, 2).

Based on the type of cell, these tumors are microscopically divided into two types of typical and atypical types. In terms of location, these lesions are categorized into two groups of peripheral and central types. The typical type is more prevalent, has a slower growth and less tendency to involve other organs. This type is approximately 4 times more common than the atypical type. However, the atypical type has a faster growth and higher tendency to involve other organs. About 75% of carcinoid tumors are of central type and usually involve the airway walls.

Differentiation of the malignant and benign carcinoid tumors is based on presence or absence of metastasis rather than pathological findings because even in malignant carcinoids hyperchromatic pleomorphism or increased mitotic activity may be minimal or absent. Metastatic

potential in carcinoid tumors is more associated with the size of lesion and primary site of the tumor.

Carcinoid tumor is the most common primary tumor of the lung in childhood. Pulmonary carcinoid tumors mainly have a post-pubertal onset and are usually seen at 45 years of age. However, patients with atypical carcinoid tumors are usually 10 years older than this age (3). A specific risk factor is usually not present and smoking is not among its risk factors. In the majority of studies, one-third to two-third of patients are smokers. Atypical carcinoid patients have high cigarette consumption (4).

Signs and symptoms:

Proximal airway is usually the most commonly involved site by this tumor. Patients often experience obstructive symptoms and hemoptysis due to tumor hypervascularity. Patient complaints vary from cough, wheezing, hemoptysis and chest pain to recurrent segmental or lobar antibiotic-resistant pneumonia (5). About 25% of patients have peripheral involvement; which is mainly asymptomatic and is an incidental finding in radiological studies.

Less than 5% of these tumors manifest symptoms due to the release of hormones by the tumor such as the carcinoid syndrome and metastasis which is indicative of low prevalence of liver metastasis in bronchial carcinoid tumor (6).

Diagnostic workup:

This tumor has the ability to produce and store active neuroamines and neuropeptides. Serum level of chromogranin A (CGA) increases in patients with bronchial carcinoid tumor; but, patients with non-malignant conditions such as chronic renal failure, under treatment with proton pump inhibitors and those with chronic atrophic gastritis can also have high serum levels of CGA. Its measurement is non-specific for carcinoid tumor but is helpful for the follow up of the advanced disease and metastasis. Pulmonary carcinoids secrete less neuropeptides in comparison to intestinal carcinoids (7).

Approximately 75% of bronchial carcinoids have abnormal chest X ray. The majority of these tumors manifest as 2-5 cm circular or round opacities or in the form of hilar masses. In case of bronchial obstruction, they manifest as atelectasis. Diagnosis is usually delayed and patients have often received several courses of antibiotic therapy due to pneumonia before reaching a definite diagnosis (8).

Chest CT scan is obtained to better indicate the tumor and its location as well as the involvement of mediastinal lymph nodes. It also reveals the morphological characteristics of peripheral and central masses. CT scan sensitivity is very high for mediastinal and hilar nodes but its specificity is less than 45% (9).

About 80% of carcinoid tumors have somatostatin receptors and are detected with radionuclide imaging using the somatostatin analog (octreotide) (somatostatin receptor scintigraphy). However, use of this imaging technique has been limited considering its false positive results in other conditions such as tumors, granulomas and autoimmune diseases. When liver metastasis is suspected, use of abdominal CT scan or somatostatin scan provide favorable sensitivity and specificity and are optimal for detection of carcinoid metastasis (10).

About 75% of bronchial carcinoids are of central type and bronchoscopically accessible for biopsy. For definite diagnosis, endobronchial biopsy needs to be carried out.

Prognosis

Typical carcinoid tumors have a good prognosis and their 5-year survival rate is 87-100%. Atypical carcinoid tumors have higher tendency for metastasis and their 5-year survival rate varies from 30-90%. Chemotherapy and radiotherapy are effective for atypical stage-2 and 3 surgically resected tumors but do not have the required efficacy for typical types (11).

Treatment

Bronchoscopic resection can be done for intrabronchial polypoid tumors. Surgical resection is the treatment of

choice for all patients given that their physiological condition allows it. The goal of treatment is complete resection of tumor along with the preservation of optimal functional lung capacity. Type of surgical procedure and extent of resection depend on tumor location (12, 13).

Role of post-surgical adjuvant chemotherapy has not been very well documented and the majority of authors do not agree on post-surgical chemotherapy for typical carcinoid tumors. However, chemotherapy and radiotherapy are performed post-operatively in patients with stage II and III atypical carcinoid tumor.

CASE SUMMARIES

Our patient was a 20 year-old male with a history of asthma since three years earlier receiving several treatments during this time period. The patient developed severe productive coughs 4 days before hospitalization. He also complained of chest pain and wheezing. He mentioned no history of night sweat and had 2 hospitalizations in the past 6 months due to low-grade fever and productive cough. The patient mentioned weight loss of about 4 kg during the past 6 months. He had no history of smoking with frequent hospitalizations following dyspnea attacks and exacerbation of coughs. He also had hospital stay due to lung infection. No history of diarrhea was recalled.

The patient also mentioned the use of Seretide, cromolyn sodium, theophylline and Montelukast inhalers. Family history was negative for allergic and pulmonary diseases. His blood pressure was 110/70 mmHg, heart rate 80/min, body temperature 38.9˚C, respiratory rate 22/min and arterial oxygen saturation rate was 92%.

On physical examination, the patient had normal head and neck, normal cardiac examination and thoracic shape and symmetric movements along with reduced resonance in the lower half of the right lung. Mild and disseminated wheezing along with reduced pulmonary sounds were evident over the right lung. Examination of other organs revealed no specific findings. Clubbing was not present. The patient was hospitalized with a suspected diagnosis of pneumonia, bronchiectasis and asthma.

During hospitalization, supportive therapy and bronchodilator treatment were administered for the patient based on his complaints. On chest X ray, air space lesions were observed in the inferior zone of the right lung and CT scan was requested for the patient.

At 3 days post-hospitalization, the patient developed hemoptysis which was continued during the 4th and 5th days. Lung CT scan was indicative of bronchiectasis in the inferior zone of the right lung (Figure 1).

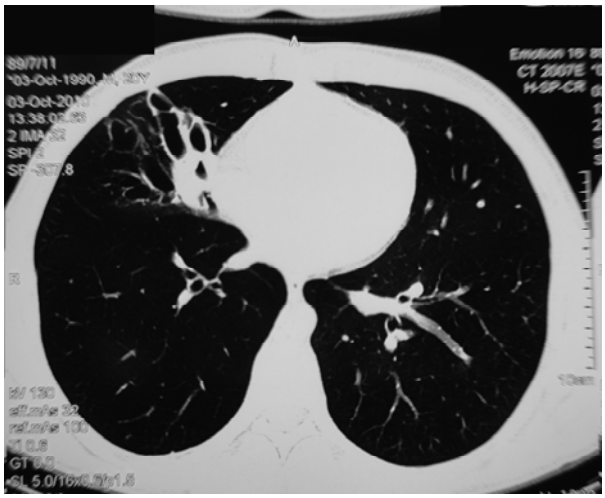

Figure 1. Lung CT-scan of patient.

Considering the prolongation of hemoptysis and localized bronchiectasis in the inferior half of the right lung, the patient became a candidate for bronchoscopy. During bronchoscopy, a hypervascular pink mass was observed in the right main bronchus. A biopsy was obtained from this mass and sent to the pathology laboratory. The bronchial biopsy result revealed central typical bronchial carcinoid tumor. Patient's bronchoalveolar lavage was reported negative for acid-fast bacilli. A consultation with a thoracic surgeon was requested and at day 14 post-hospitalization, the patient underwent inferior and middle lobectomy along with dissection of regional lymph nodes. No sign of mediastinal lymph node involvement was reported in patient's

pathology report. One week after surgery the patient was discharged from the hospital in good general condition without respiratory problem. At 6 months follow up, the patient had no pulmonary symptoms and was in good general condition. No sign of tumor recurrence was noted.

DISCUSSION

Asthma is a pulmonary disease with an increasing prevalence during the past few decades. It is characterized by symptoms of dyspnea, cough and heaviness in the chest. However, none of the mentioned symptoms are specific for asthma and their presence alone is not indicative of this condition. On physical examination of asthmatic patients expiratory wheezing is present. However, this physical finding is not specific for asthma either and there are some differential diagnoses that need to be evaluated. Asthmatic patients experience airway remodeling which may be seen in other pulmonary diseases as well. Spirometry for detection of airway obstruction is necessary in asthmatic patients for diagnosis of this condition and determining its severity. This technique is not asthma-specific either and other differential diagnoses have to be considered as well.

In patients with asthma attacks, chest X ray is normal although hyperinflation is seen in some cases. In all patients presenting for the first time with coughs and dyspnea, chest X ray is indicated due to the presence of thoracic symptoms. In our patient, considering the non-specificity of pulmonary symptoms and history of several hospitalizations due to the exacerbation of symptoms and recurrence of disease, there was no sufficient data for definite diagnosis of asthma and complementary evaluations had to be performed. On the other hand, considering the abnormal radiography, and presence of air-space lesions at the lung bases, these findings did not correspond with asthma and other differential diagnoses had to be suggested and evaluated. However, our patient was symptomatic for a couple of years but no complementary evaluation was performed for him.

Our patient had several hospitalizations with history of antibiotic therapy which reveals that the diagnosis of recurrent pneumonia had been probably suggested for him. In this situation, differential diagnoses of pneumonia should have been suggested and systematic assessment should have been done for the patient. Various conditions are included in differential diagnoses of patients who receive a complete course of antibiotic therapy but do not respond to it. A complete evaluation including physical examination, paraclinical assessments, and pulmonary imaging studies need to be performed for the patient. Two series of etiologic factors (infectious causes and non-infectious causes) have to be considered in these patients.

Of the non-infectious causes, neoplastic diseases are among the main differential diagnoses and have to be thoroughly investigated. In our case, no such evaluation was carried out during the several years that the patient was symptomatic.

Considering the mentioned findings, presence of recurrent symptoms, history of several courses of antibiotic therapy and no recovery, presence of lesions on chest X ray and hemoptysis, our patient underwent further assessment. Bronchoscopy is the principal diagnostic measure in these patients considering local bronchiectasis. In our patient, bronchoscopy confirmed the presence of an obstructive mass. The intratracheal lesion was biopsied and the diagnosis of carcinoid tumor was histopathologically confirmed.

The most common sign and symptom of carcinoid tumor are chronic cough and hemoptysis (18-35%), respectively and both were present in our patient. The most frequent finding in these symptomatic patients is a chronic obstructive mass which was observed in our patient. However, many of these patients are asymptomatic and the tumor is an incidental finding on chest x ray or CT-scan requested for another reason (5).

CONCLUSION

As there are no specific signs, symptoms or findings for asthma, a chest x ray is recommended for all patients

suspected of asthma and in case of presence of abnormal clinical findings, other differential diagnoses have to be considered. A systematic evaluation needs to be carried out as well. Also, in patients with recurrent pneumonia that have received several courses of antibiotic therapy with no recovery, obstructive lesions should be considered and diagnostic bronchoscopy has to be performed. In patients with localized bronchiectasis, intrabronchial local lesions should also be considered and thus, bronchoscopy must be necessarily performed for them.

Carcinoid tumors are among the less prevalent pulmonary tumors but attention should be paid to less common pulmonary conditions in patients with pulmonary symptoms in order to achieve an in-time diagnosis and prevent further debilitation in these patients.

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