Intrabronchial Neurofibromatosis

P Venugopal*, Raseela Karunakaran**, CG Bindu***, Elizabeth****

Abstract

Thoracic manifestations of Neurofibromatosis include intrathoracic posterior mediastinal tumours, meningocoeles, kyphoscoliosis and interstitial fibrosis. Even though mediastinal neurofibromas are common, intrapulmonary neurofibromas are rare. In this paper, we present a case of intrathoracic neurofibroma with intrabronchial extension. Lesions extending into the bronchial lumen making bronchoscopic diagnosis possible, as in this case is extremely rare. The case is presented because of its rarity.

Introduction

Thoracic manifestations of Neurofibromatosis are known and include intrathoracic posterior mediastinal tumours, meningocoeles, kyphoscoliosis, and pulmonary fibrosis. Even though mediastinal neurofibromas are common, intrapulmonary neurofibromas are rare. Nodular shadows in the chest X-rays of neurofibromatosis are often due to the lesions in the chest wall. In this paper, we present a case of intrathoracic neurofibroma with intrabronchial extension. Lesions extending into the bronchial lumen making bronchoscopic diagnosis possible, as in this case is extremely rare.

Case Report

A 24 year old female presented with cough and breathlessness of 1 month duration. She had extensive neurofibromatosis (Figure 1). The chest X-ray shows multiple nodular shadows in the right hemithorax with left pleural effusion (Figure 2). CT thorax confirms that the nodules are intrapulmonary in location (Figure 3).

Fiber optic Bronchoscopy revealed multiple nodular swellings in the both main bronchi partially compressing the lumen (Figure 4). Multiple biopsies were taken from these endobronchial lesions.

Figures 5 and 6 is the histopathology picture of a bronchoscopic biopsy specimen, which shows bundles of elongated spindle shaped cells having wavy nuclei and cellular areas interspersed by loose collagen lined by bronchial epithelium. This is consistent with neurofibroma in the airways.

Pleural aspiration was done and the studies proved that the fluid was transudative, probably as a result of lymphatic obstruction due to the intrapulmonary nodules.

Since the patient couldn’t afford to Laser therapy, she was referred for surgical intervention, but she expired shortly.

Discussion

Neurofibromatosis

Neurofibromas are benign tumours arising from neural crest cells and may arise in any peripheral nerve. The disorder affects all neural crest cells (Schwann cells, melanocytes, endoneurial fibroblasts). They can be solitary or multiple (Neurofibromatosis). Neurofibromatosis (commonly abbreviated NF) is a genetic disorder in which the nerve tissue grows tumours (i.e. neurofibromas) that may be harmless or may cause serious damage by compressing nerves and other tissues. Cellular elements from these cell types proliferate excessively throughout the body forming tumours and the melanocytes function abnormally resulting in disordered skin pigmentation. The tumours may cause subcutaneous nodules, coloured spots, skeletal problems, pressure on spinal nerve roots, and other neurological problems.

Neurofibromatosis type 1 (Von Recklinghausen disease)

Neurofibromatosis type 1 - mutation of neurofibromin chromosome 17q11.2. The diagnosis of NF1 is made if any two of the following seven criteria are met:

- Two or more neurofibromas on the skin or under the skin or one plexiform neurofibroma (a large cluster of tumours involving multiple nerves)
- Freckling of the groin or the axilla (arm pit).
- Café au lait spots (brown pigmented birthmarks).
- Skeletal abnormalities, such as sphenoid dysplasia or thinning of the cortex of the long bones of the body.
- Lisch nodules (hamartomas of iris), freckling in the iris.
- Optic glioma

Neurofibromatosis type 2 - mutation of NF2 (Merlin) in chromosome 22q12

The hallmark of NF 2 is hearing loss due to acoustic neuromas resulting in headache, vertigo, facial paralysis, deafness and tinnitus.

Neurofibromatosis is considered a member of the neurocutaneous syndromes (phakomatoses) and occurs in one of every 2,000 live births. NF-1 and NF-2 may be inherited in an autosomal dominant fashion. However, up to 50% of cases occur sporadically due to spontaneous mutation.

Thoracic manifestations of Neurofibromatosis

Due to the rich distribution of peripheral nerves throughout the thorax, manifestations of NF1 may involve the ribs, chest wall, lungs, and mediastinum. Neurogenic tumours account for about 9% of primary mediastinal masses in adults and 30% of mediastinal tumours in children. Neurofibromas may involve the mediastinum extensively and can become quite large and have pressure effects on thoracic structures like trachea, superior vena cava and oesophagus. They typically appear as well-margined, smooth, round or elliptic masses in the paravertebral regions or along the course of the vagus,
phrenic, recurrent laryngeal or intercostal nerves. In CT, they appear as well-defined subcutaneous neurofibromas, focal thoracic scoliosis, posterior vertebral scalloping, enlarged neural foramina, and characteristic rib abnormalities due to bone dysplasia or erosion from adjacent neurofibromas. They show variable contrast material enhancement and may calcify. They can result in diffuse mediastinal widening and may mimic lymphoma, sarcoid, lymphangiomatosis, and metastatic disease.3

However, neurogenic benign tumours arising from the trachea and bronchus are relatively rare. Hidemi Suzuki et al have reported three cases of neurofibroma of the bronchus which were successfully treated by transbronchial electrical snaring and Nd-YAG laser ablation.

**NF-associated ILD**

Neurofibromatosis with diffuse lung disease is a distinct clinical entity, characterised by upper lobe cystic and bullous disease and basilar fibrosis. Pulmonary function tests show either an obstructive or a restrictive defect, and a decreased DLCO is almost always present. HRCT appearance in NF-DLD commonly report large apical asymmetric thin-walled bullae, cystic changes and emphysema.3 Histopathology is consistent with nonspecific idiopathic pneumonia (NSIP) pattern.

There is biological rationale for a relationship between NF and ILD. Patchefsky et al suggested that the pulmonary parenchymal disease in NF is attributed to a mesenchymal defect, resulting in primary deposition of collagen.6 It is also proposed that there is increased nerve growth factor in the serum of patients with NF and this factor directly activates fibroblasts, stimulating differentiation into more pro-fibrogenic myofibroblasts, a process which may contribute to the pathogenesis of lung fibrosis in
NF. However, it has been suggested that NF may increase the sensitivity of the lungs to cigarette smoke, causing the early development of emphysema-like changes.

Because there is no cure for neurofibromatosis, the only therapy is a programme of treatment by a team of specialists to manage symptoms or complications. Surgery may be needed when the tumours compress organs or other structures. Less than 10% of people with neurofibromatosis develop cancerous growths; in these cases, chemotherapy may be successful. Since mediastinal neurofibromas occurring in patients with diffuse neurofibromatosis are at an increased risk of neoplastic changes, and since tumour resection is incomplete, the mediastinum may be irradiated. Intrabronchial neurofibroma may be treated by transbronchial electrical snaring and Nd-YAG laser abrasion.

Acknowledgements
Dr. Rajeevan K, MD, Professor and Head of the Department of Pathology, Medical College, Alappuzha.

References