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A Case Report of Familial Spontaneous Pneumothorax

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Abstract

Spontaneous pneumothorax is regarded as a common and benign clinical entity, however, it can be life-threatening if it progress to tension pneumothorax. While tension pneumothorax can develop abruptly, cardiovascular compromise progress more gradually due to the existence of a compensatory mechanism. A 30-year-old Thai male, previously healthy, who presented with left-sided spontaneous pneumothorax. He informed physician that his mother was previously diagnosed as secondary pneumothorax and underwent pleurodesis. He underwent video-assisted thoracoscopic for pleurodesis. Additional investigation showed multiple lung cysts in Computerized Tomography Scan. Birt-Hogg Dube syndrome was confirmed genetically by FLCN gene mutation.

Keywords: Pneumothorax • Birt-Hogg Dube Syndrome

Introduction

Pneumothorax is common and life-threatening clinical condition which may require emergency treatment in Emergency Medicine Departments. The patient's complaint is usually associated with the area covered by pneumothorax and the patient's physiological reserve. Over 10% of patients with primary spontaneous pneumothorax report a positive family history of the disease. While some cases can be attributed to rare inherited connective tissue diseases, several families with familial spontaneous pneumothorax have been described that do not show clinical evidence of these monogenic disorders. Until recently the molecular underpinning of this disease was unknown.

Case Report

A 30-year-old Thai male, who presented with left thoracic pain while he was reading. There was no history of previous trauma, fever, cough or shortness of breath. He had smoking 2-3 rolls of cigarettes per day occasionally. He had history of painless gross hematuria 3 months ago. With his family history we found that his mother and her cousin were diagnosed spontaneous pneumothorax and underwent pleurodesis more than 10 years ago.

On physical examination there were no signs of respiratory distress, but he presented decreased breath sounds on the left hemithorax apex. Pneumothorax of the left side was confirmed by a chest radiograph. Computerized Tomography Scan showed numerous, irregularly shaped, thin-walled pulmonary cysts. The majority of cysts are located in the basilar medial regions of the lungs. A small-loculated pneumothorax was also found at left-side (Figure 1). The pneumothorax was managed with conservative measures (Oxygen facemask with bag and rest) and video-assisted thoracoscopic for pleurodesis was done few weeks later.

Investigations

Computerized Tomography Scan whole abdomen was done without any abnormality. His mother's Computerized Tomography Scan also showed multiple lungs cysts (Figure 2).

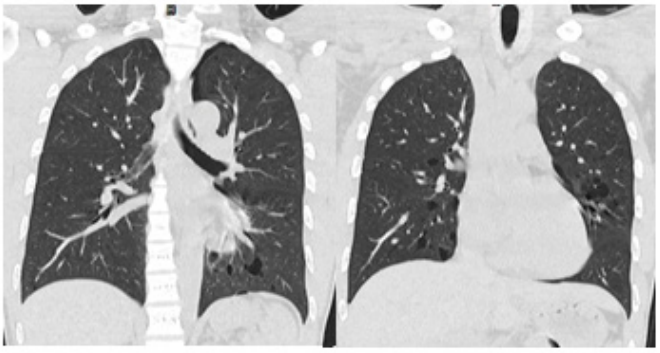

Figure 1. Lung cysts in patient with Birt-Hogg-Dube syndrome.

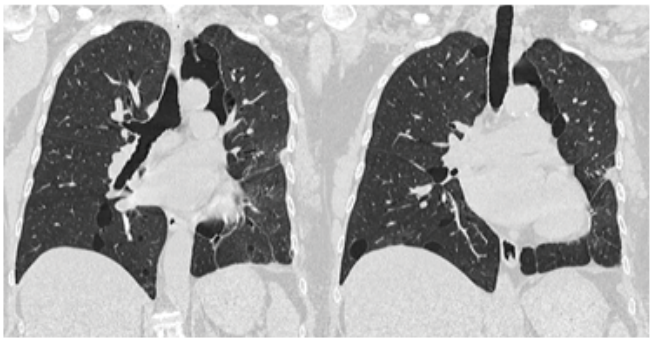

Figure 2. Lung cysts in patient's mother with underwent pleurodesis previously.

Birt-Hogg-Dube syndrome was suspected on the basis of Computerized Tomography Scan findings and family history. The diagnosis was confirmed with mutation analysis of entire coding region for folliculin (FLCN) gene (exons 4-14) by direct DNA sequencing. The results is heterozygous known frameshift mutation c.1285dupC (p.His429ProFs*27) which confirmed the diagnosis of Birt-Hogg-Dube syndrome.

Treatment

At the first episode, pneumothorax was managed conservatively. The treatment of choice was surgical approach with VATS for pleurodesis without perioperative complications.

Outcome and follow up

After treatment of pneumothorax was done, complete renal tumor surveillance with CT whole abdomen and cystoscope and urine cytology were all normal. He maintains follow up with pulmonologist and imaging surveillance

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Table 1. Diagnosis criteria for Birt-Hogg-Dube syndrome [15].

The following diagnostic criteria are suggestive for BHD syndrome	
1.	At least 2 cutaneous papules clinically consistent with fibrofolliculoma/trichodiscoma and at least 1 histologically confirmed fibrofolliculoma
2.	Multiple bilateral pulmonary cysts located mainly in the basilar regions of the lung with or without a history of spontaneous pneumothorax that develops prior to age 40, but especially with a family history of these pulmonary manifestations
3.	Bilateral, multifocal chromophobe renal carcinomas or hybrid oncocytic tumors especially with a family history of renal tumors or early age (<50 years) of onset
4.	A combination of these cutaneous, pulmonary or renal manifestations presenting in a patient or members of his family
Definitive diagnosis of BHD syndrome is confirmed	
1.	Diagnostic genetic test that is positive for a germline *FLCN* mutation

for renal cancer. His first-degree family relatives were offered to genetic testing and imaging surveillance of renal cancer and lung cyst.

Discussion

Birt-Hogg-Dube syndrome (BHDS) is an uncommon disorder that affects skin, lungs and increase risk of developing renal tumors. BHDS was first named after Arthur R. Birt, Georgina R. Hogg and Jame Dube, who described an inherited dermatologic syndrome in the 1970's [1]. In 1999, Toro et al. identified the combination of dermatologic signs with renal tumors and pulmonary manifestation were also key feature of the syndrome [2]. This condition is inherited in an autosomal dominant monogenic pattern [3]. Disease severity can vary significantly even within the same family [1]. Multiple noncancerous skin lesions are seen 84% which particularly on face, neck and upper chest. The lesions typically appear during the third and fourth decades of life. Skin lesions tend to increase in size and number with age [4]. Fibrofolliculomas are the most skin lesion, but also trichodiscomas and acrochordons have been described (skin tag) [5]. Fibrofolliculomas present as pale yellow or white, slightly elevated, dome-shaped and smooth tumors with a diameter of 2-4 mm [6]. Multiple lung cysts are seen 41-90%. The cysts are mostly bilateral and tend to be basal and subpleural. They vary in number and size, and most are nonspherical. Most individuals with BHDS and lung cyst are asymptomatic, but they have a high risk of developing spontaneous pneumothorax. The prevalence of spontaneous pneumothorax in BHDS is 22-41% and they are often recurrent 40-75% [7-12]. Patient with BHDS are at increased risk for developing different types of renal tumors, ranging from benign oncocytomas to malignant renal carcinomas [2,7,13]. Most renal tumors are bilateral, multifocal, slow growing, and usually asymptomatic in the initial stage. Median age of diagnosis is 48 years, with a range from 31-71 years [8]. Other systemic conditions associated with BHDS include colonic polyposis and ophthalmologic disorder, such as progressive flecked chorioretinopathy and chorioretinal scars (Table 1) [14,15].

Conclusion

For diagnosis of BHDS, the patients should undergo examination of the skin for fibrofolliculomas, CT imaging of the thorax for lung cysts, Abdominal CT or MR imaging for renal tumors together with genetic testing screening for pathogenic FLCN gene mutation. Any combination of the cutaneous, pulmonary or renal manifestations in an individual or multiple members of a BHD family can be considered part of the phenotypic spectrum. The following criteria for suggestive and diagnosis BHD syndrome.

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