






A case of recurrent pneumothorax and skin lesions diagnosed with Birt–Hogg–Dubé

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Abstract

Birt–Hogg–Dubé (BHD) syndrome is an autosomal dominant disease that is manifested as benign cutaneous tumors, multiple lung parenchymal cysts and an increased risk of renal cancer. Its symptoms usually do not appear until adulthood. We report a patient who was admitted with recurrent pneumothorax. Discovering typical cutaneous lesions accompanied with a history of the same condition in his son, BHD syndrome was diagnosed.

INTRODUCTION

Birt–Hogg–Dubé (BHD) syndrome is an autosomal dominant disease that is manifested by benign cutaneous tumors (fibrofolliculoma and trichodiscoma), recurrent pneumothorax, multiple lung cysts and renal cancer. This syndrome, which was first described in 1977, is caused by a mutation in the folliculin gene (FLCN) located on chromosome 17 (p11.2), which encodes the tumor suppressor protein folliculin. Dysfunction of the folliculin protein leads to the abnormalities seen in BHD syndrome [1, 2].

CASE PRESENTATION

The patient was a nonsmoker 70-year-old man who presented with pain in the right side of his chest, shortness of breath and tachypnea that started suddenly after he lifted a heavy object. The patient also reported an occasional dry cough. He mentioned the history of similar symptoms and associated pneumothorax twice, once in the same year and once 6 years before. Both of the episodes also occurred in the right lung, causing him to be hospitalized with a chest tube. Vital signs on arrival were oxygen saturation of 90%, blood pressure of 130/80, respiratory rate of 23 per minute and pulse rate of 98 beats per min. Several 1–2 mm soft and whitish lesions were found at the site of hair growth in the form of dome-shaped papules, the same color as the skin. Furthermore, small lesions and peduncles were observed on the right shoulder, neck and upper chest (Fig. 1).

Chest wall examination showed hyper-resonance and reduced breath sound in the right lung, and asymmetric



Figure 1. Patient's skin lesions. (A) fibrofolliculoma and trichodiscom (yellow arrow) (B) Acrochordon (red arrows).

chest expansion. A family history of multiple pneumothorax incidents were reported in his 30-year-old son. Computed tomography (CT) scan showed extensive pneumothorax in the right side of the chest and multiple parenchymal cysts. Moreover, sub-pleural fibrotic bands were detected at the lower lobes of both lungs (Fig. 2).

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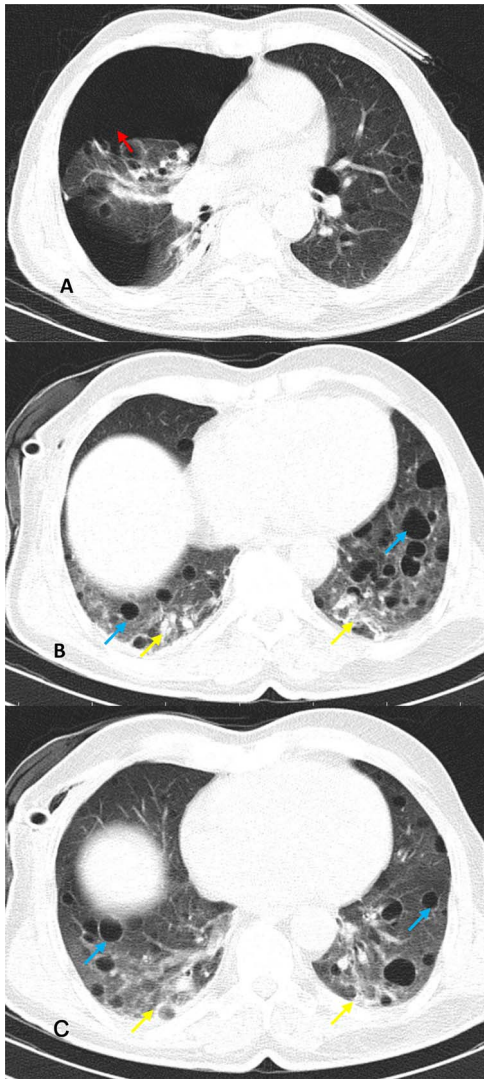


Figure 2. Patients chest CT scan: (A) right side pneumothorax. (B, C) multiple parenchymal cysts (blue arrow) and, sub-pleural fibrosis at the inferior lobes of both lungs (yellow arrow).

There were no abnormal findings in the renal, liver and hematology laboratory tests. A chest tube was placed in the right side of pleural space, and the patient's symptoms improved afterward. Renal ultrasonography was performed, and the result was unremarkable. His chest tube was removed after 3 days, and he was discharged with a good general condition.

DISCUSSION

Spontaneous pneumothorax may be primary or secondary. Primary spontaneous pneumothorax occurs without an external predisposing factor and/or pulmonary disease. However, secondary spontaneous pneumothorax happens due to serious underlying conditions such as chronic obstructive pulmonary disease (COPD), cystic diseases of the lung such as BHD syndromes and Lymphangiomyomatosis (LAM) and other diseases such as thoracic endometriosis. BHD is caused by a mutation in the FCLN gene, which encodes the tumor suppressor

protein folliculin. Abnormal folliculin protein accounts for the manifestations of BHD. The incidence of BHD syndrome is unknown worldwide [3]. The main and most common cutaneous lesion of BHD syndrome is a benign hair follicle hamartoma called fibrofolliculoma. These lesions usually occur as numerous small whitish lesions on the face and neck of patients. Another cutaneous lesion is called trichodiscoma, which is similar in appearance. Another cutaneous lesion is Acrochordon—a small and pedunculated lesion with a dermal and epidermal origin. Acrochordon usually appears on the eyelid, neck, upper chest and armpits [4]. In addition to cutaneous lesions, patients with BHD syndrome have bilateral, multiple, small and irregular-shaped cysts in the peripheral lung parenchyma. Unlike bullae in emphysema, which are usually found in the apices of the lungs, BHD cysts are more common in the bases. These cysts' walls are covered with a layer of the alveolar epithelium, which is unique and puts patients at increased risk for recurrent pneumothorax [5].

These cysts grow gradually and are hamartomatous, and in all cases, the cyst wall staining is positive for FLCN. The most worrying feature of BHD syndrome is its association with renal lesions, especially renal cancers. The prevalence of renal tumors in people with this syndrome is seven times higher. The most common renal cancer histopathologies are chromophobe and chromophobe-oncocytic, but papillary and clear cell types are also observed [3]. LAM is most often seen in young women with small thin-walled cysts that spread throughout the parenchyma of both lungs [6].

Pulmonary langerhans cell histiocytosis is a rare nodular and cystic disease of the lung interstitium that primarily affects young adult smokers. It is caused by aggregations of abnormal dendritic cells. Chest CT scan shows thickening of the interstitial tissue, as well as multiple cysts and nodules, usually in the upper lobes, sometimes leading to pneumothorax [7].

Another disease with similar lung involvement to BHD is pneumocystis jiroveci pneumonia, a life-threatening disease, which is observed in individuals with immunodeficiency. These patients are often referred to the hospital due to pulmonary insufficiency, fever and dry cough. Chest radiography of these patients shows diffuse, bilateral infiltrations, single or multiple nodules and sometimes pneumatocele and pneumothorax [8]. Spontaneous pneumothorax also occurs in patients with COPD. Bullae formation is associated with non-fibrotic degradation of the airways, and usually affects the upper lobes more than the lower lobes. These patients often have a history of smoking and coughing [9].

Our case was a 70-year-old man who was referred to the hospital with recurrent pneumothorax. Male sex, absence of immunodeficiency and smoking history, his imaging and cutaneous findings, as well as a family history of pneumothorax in his son are all highly suggestive of BHD disease. Considering the rarity, diagnosis of the disease and its complications is often delayed.

Therefore, after diagnosis, annual medical follow-up with laboratory tests and imaging is recommended. For those patients with recurrent pneumothorax wedge resection or pleurodesis are beneficial. Moreover, the genetic evaluation of other family members is necessary for early diagnosis [10].

In this case, BHD diagnosis was made due to recurrent pneumothorax, cutaneous lesions and imaging findings. Early diagnosis of these patients is valuable to alert providers to the need for annual renal cancer screening and to suggest possible treatment options. Determination of pneumothorax etiology is important in order to treat the patients appropriately.

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Not applicable.

CONFLICT OF INTEREST

No conflict of interest.

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ETHICAL APPROVAL

This report was approved by the Ethical Committee of Ardabil University of Medical Science.

CONSENT

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

GUARANTOR

Dr. Mohammad Negaresh.

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