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# A Rare Case of Birt–Hogg–Dubé Syndrome

## Birt–Hogg–Dubé Sendromlu Nadir Bir Olgu

Selime Kahraman, Nur Simge Kökleş, Tamer Okay


### Abstract

Birt-Hogg-Dubé syndrome (BHDS) is a systemic disease characterized by bilateral pulmonary bullae, hair follicle hamartomas and renal tumors. We present here the case of a 41-year-old male who presented with spontaneous pneumothorax with a history of surgery due to a renal tumor. The patient was referred for genetic testing based on clinical suspicion and a family history of pneumothorax, and was subsequently diagnosed with BHDS.


**Keywords:** *Hemophilia, Birt–Hogg–Dubé Syndrome, Bullous Lung, Rare Lung Diseases.*


### Öz

Birt-Hogg-Dube' sendromu (BHDS), akciğerde bilateral büller, saç folikülü hamartomları, renal tümörler karakterize sistemik bir hastalıktır. Spontan pnömotoraks ile başvuran 41 yaşında erkek hastamızda renal tümör nedeniyle operasyon öyküsü mevcuttu. Ailesinde pnömotoraks öyküsü olduğu öğrenilmesi üzerine klinik şüphe ile hasta genetik incelemeye yönlendirildi ve sonuçta hastamıza BHDS tanısı konuldu.


**Anahtar Kelimeler:** *Birt–Hogg–Dubé Sendromu, Büllöz Akciğer, Nadir Akciğer Hastalıkları.*

Department of Chest Surgery, Dr. Siyami Ersek Chest Cardiovascular Surgery Training and Research Hospital, İstanbul, Türkiye

Dr. Siyami Ersek Göğüs Kalp ve Damar Cerrahisi Eğitim ve Araştırma Hastanesi, Göğüs Cerrahisi Bölümü, İstanbul

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**Correspondence (İletişim):** Selime Kahraman, Department of Chest Surgery, Dr. Siyami Ersek Chest Cardiovascular Surgery Training and Research Hospital, İstanbul, Türkiye

**e-mail:** selimekahraman91@hotmail.com

Birt-Hogg-Dubé syndrome (BHDS), first described by Birt et al. (1) in 1977, is an autosomal dominant disorder caused by mutations in the FLCN gene on chromosome 17p11.2. The disease is characterized by multiple pulmonary cysts, recurrent spontaneous pneumothoraxes, cutaneous fibrofolliculomas and kidney tumors of various histological types. It typically manifests in the third or fourth decade of life and does not show a gender predilection (2,3).

## CASE

A 41-year-old male patient presented to the emergency department with complaints of chest pain and was admitted to the hospital after a minimal pneumothorax was observed on chest radiography. His medical history revealed no history of smoking, a diagnosis of leiomyosarcoma from a soft tissue biopsy of the right forearm two years earlier and a partial nephrectomy for renal cell carcinoma in the same year. The patient's medical history revealed pneumothoraxes in the patient's father, sister and brother. High-resolution computed tomography (HRCT) of the thorax revealed multiple bullae in the bilateral lung parenchyma (Figure 1) that were indicative of Birt-Hogg-Dubé syndrome, and so the patient was referred for genetic testing. The genetic analysis confirmed a mutation in the FLCN gene. The patient was subsequently monitored with 2 L/min of oxygen via nasal cannula for 3 days and was discharged following the resolution of the pneumothorax on chest radiography, but was warned of the risk of recurrence.

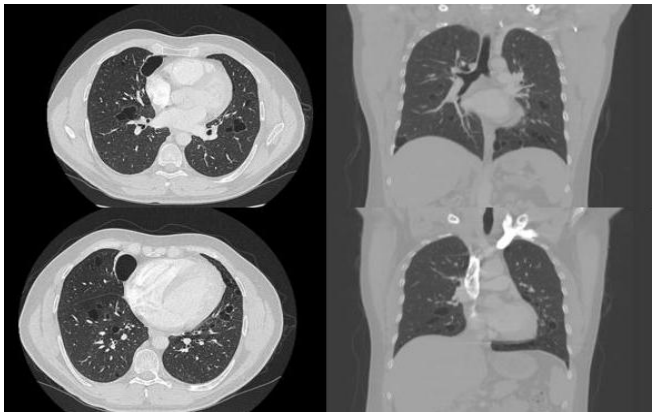

*Figure 1: Transverse and sagittal sections from the thorax computed tomography, with widespread bullae seen in the lung parenchyma*

## DISCUSSION

Birt-Hogg-Dubé syndrome is diagnosed based on major and minor criteria (4), with one major criterion or two minor criteria considered sufficient for diagnosis. The major criteria include mutations in the FLCN gene and the presence of at least five histologically confirmed fibrofolliculomas or trichodiscomas of adult onset, while the minor criteria include bilateral basal lung cysts (with or without spontaneous pneumothorax), early onset (age <50), multifocal or bilateral renal cancer, or a first-degree relative with BHDS. Our patient had an FLCN gene mutation, renal cell cancer and bullae in bilateral basal lung fields, supporting the Birt-Hogg-Dubé syndrome diagnosis. The patient gave consent for the presentation of his case. Other lung diseases included in the differential diagnosis of BHDS are lymphangioleiomyomatosis, pulmonary Langerhans cell histiocytosis, lymphocytic interstitial pneumonia, cystic lung metastases, amyloidosis, and fungal and parasitic infections such as Pneumocystis jirovecii pneumonia, coccidioidomycosis, paragonimiasis and echinococcosis (5). The air cysts in the lungs in BHDS can range in size from a few millimeters to 2 cm and are most commonly found on computed tomography. Unlike other cystic lung diseases, the size and number of pulmonary cysts in BHD syndrome do not progress over time (6). A study of 96 patients revealed normal FEV1, FVC and FEV1/FVC ratios. In the same study, patients' residual volumes increased by 116%, while DLCO values decreased by 85%. BHDS rarely leads to respiratory failure, unlike other cystic lung diseases (7). Most cases of BHDS reported in the literature were diagnosed based on dermatological lesions and a history of pneumothorax (8–11), while the presented case was diagnosed based on the presence of renal cell carcinoma, in addition to pneumothorax and a family history of pneumothorax. The diagnostic methods applied in various earlier case reports are summarized in Table 1.

*Table 1: Case reports reported in the literature and data from our study*

| Case Report | Date/Number of cases | Age / Gender | Presence of pneumothorax / Family history | Diagnosis |
|---|---|---|---|---|
| Akay BN (8) | 2013/1 | 59/M | -/- | Fibrofolliculoma |
| Uçar HA (9) | 2025/1 | 53/M | +/ Not included in the article | Trichodiscoma |
| Cimsit C (10) | 2016/2 | Not included in the article | +/+ | Fibrofolliculoma |
| Aksoy S (11) | 2021/1 | 58/M | +/+ | Fibrofolliculoma |
| Our Case Report | 2025/1 | 41/M | +/+ | Renal Cell Carcinoma |

The initial treatment of primary spontaneous pneumothorax includes observation, aspiration and tube thoracostomy. In cases with prolonged air leakage or disease recurrence, excision of the bullae via video-assisted thoracoscopic surgery (VATS) or pleurodesis may be required (12). In the presented case, lung re-expansion was achieved with nasal oxygen therapy, and there was no recurrence within a 1-year follow-up. Smoking, age and sex are not considered risk factors for recurrence in BHDS (13).

## CONCLUSION

Birt-Hogg-Dubé syndrome is a rare condition characterized by bilateral pulmonary cysts associated with spontaneous and recurrent pneumothoraces. Unlike other cystic lung diseases, it is non-progressive and does not impair pulmonary function, and its recurrent pneumothoraces are unrelated to smoking. The disease is definitively diagnosed through the identification of FLCN gene mutations and is often associated with a family history of pneumothorax. Our case emphasizes the importance of recognizing this rare syndrome.

## CONFLICTS OF INTEREST

None declared.

## AUTHOR CONTRIBUTIONS

Concept - S.K., N.S.K., T.O.; Planning and Design - S.K., N.S.K., T.O.; Supervision - S.K., N.S.K., T.O.; Funding - S.K., N.S.K.; Materials - N.S.K., T.O.; Data Collection and/or Processing - S.K., T.O.; Analysis and/or Interpretation - S.K., T.O.; Literature Review - S.K., N.S.K.; Writing - S.K., N.S.K.; Critical Review - S.K., T.O.

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