

## September 2018 Pulmonary Case of the Month: Lung Cysts

**Lewis J. Wesselius, MD**

Department of Pulmonary Medicine  
Mayo Clinic Arizona  
Scottsdale, AZ USA

### **History of Present Illness**

A 67-year-old woman was referred for mild shortness of breath for several years, but worse since January 2018. She has dyspnea on exertion after 1 block. An outside chest x-ray, electrocardiogram and echocardiogram are reported as normal. She was begun on prednisone at 40 mg/day and her symptoms improved. However, her symptoms worsened when the dose tapered to 5 mg/day. She gained 35 pounds while on the prednisone and tried a steroid inhaler therapy without benefit. She is still dyspneic after 1 block of exertion.

### **Past Medical History, Social History, Family History**

- Her past medical history was only positive for gastroesophageal reflux for which she takes ranitidine and hypertension for which she takes lisinopril.
- She was a life-long nonsmoker.
- There was no occupational history, hot tub or bird exposures.
- Family history is noncontributory.

### **Physical Examination**

- Her SpO<sub>2</sub> was 94% on room air.
- Chest: few crackles noted at right base.
- Cardiovascular: regular rate and rhythm without a murmur.
- Extremities: no edema or clubbing.

Which of the following should be **done at this time?**

1. Measure her SpO<sub>2</sub> after exercise
2. Reassure the patient the patient that she has hysterical dyspnea
3. Pulmonary function testing
4. 1 and 3
5. All of the above

**Correct!**  
**4. 1 and 3**

Dyspnea is an extremely common cause of referral to a pulmonary office. The causes are extensive but often fall in the categories of deconditioning, cardiac disease and/or lung disease. An assessment of oxygen saturation after 6-8 minutes of exercise, a chest x-ray and pulmonary function tests are a good starting point (1). Dyspnea due to anxiety is mostly a diagnosis of exclusion although circumoral or extremity paresthesias can suggest the diagnosis.

Our patient's SpO<sub>2</sub> decreased from 94% to 87% with exercise. Her pulmonary function testing (PFTs) is shown in Figure 1.

	PREDICTED		CONTROL	
	Pred	LLN	Actual	%Pred
-- LUNG VOLUMES --				
TLC (Pleth) (L)	5.32	4.26	*4.07	*76
SVC (L)	3.29	2.75	*2.13	*64
RV (Pleth) (L)	2.18	1.74	1.95	89
RV/TLC (Pleth) (%)	42	34	48	113
-- SPIROMETRY --				
FVC (L)	3.29	2.75	*2.16	*65
FEV1 (L)	2.51	2.10	*1.76	*70
FEV1/FVC (%)	77	64	82	105
FEF 25-75% (L/sec)	2.13	1.17	1.92	89
FEF Max (L/sec)	6.10	4.58	6.22	101
MVV (L/min)	93	78	*57	*61
-- DIFFUSION --				
DLCOUNC (ml/min/mmHg)	21.49	17.19	*11.96	*55
DLCOCOR (ml/min/mmHg)	21.49	17.19	*13.32	*61
VA (L)	5.32	4.44	*3.38	*63

Figure 1. Patient's pulmonary function testing.

Which of the following are **true** regarding the pulmonary function testing?

1. PFTs are consistent with asthma
2. PFTs are consistent with mixed obstructive and restrictive disease
3. PFTs are consistent with restrictive disease
4. 1 and 3
5. Any of the above are possible

**Correct!**

**3. PFTs are consistent with restrictive disease**

The PFTs show a small forced vital capacity (FVC) and forced expiratory volume in one second (FEV1) with a normal FEV1/FVC ratio, reduced lung volumes and a reduced diffusing capacity. These are consistent with restrictive disease (2).

Which of the following **should be done next?**

1. Thoracic CT scan
2. Bronchoscopy with transbronchial biopsy
3. Video-assisted thorascopic (VATS) biopsy
4. 1 and 2
5. 1 and 3

**Correct!**  
**1. Thoracic CT scan**

Bronchoscopy with transbronchial biopsy is reasonable, but like VATS, is probably too invasive at this juncture. A thoracic CT scan was performed (Figure 2).

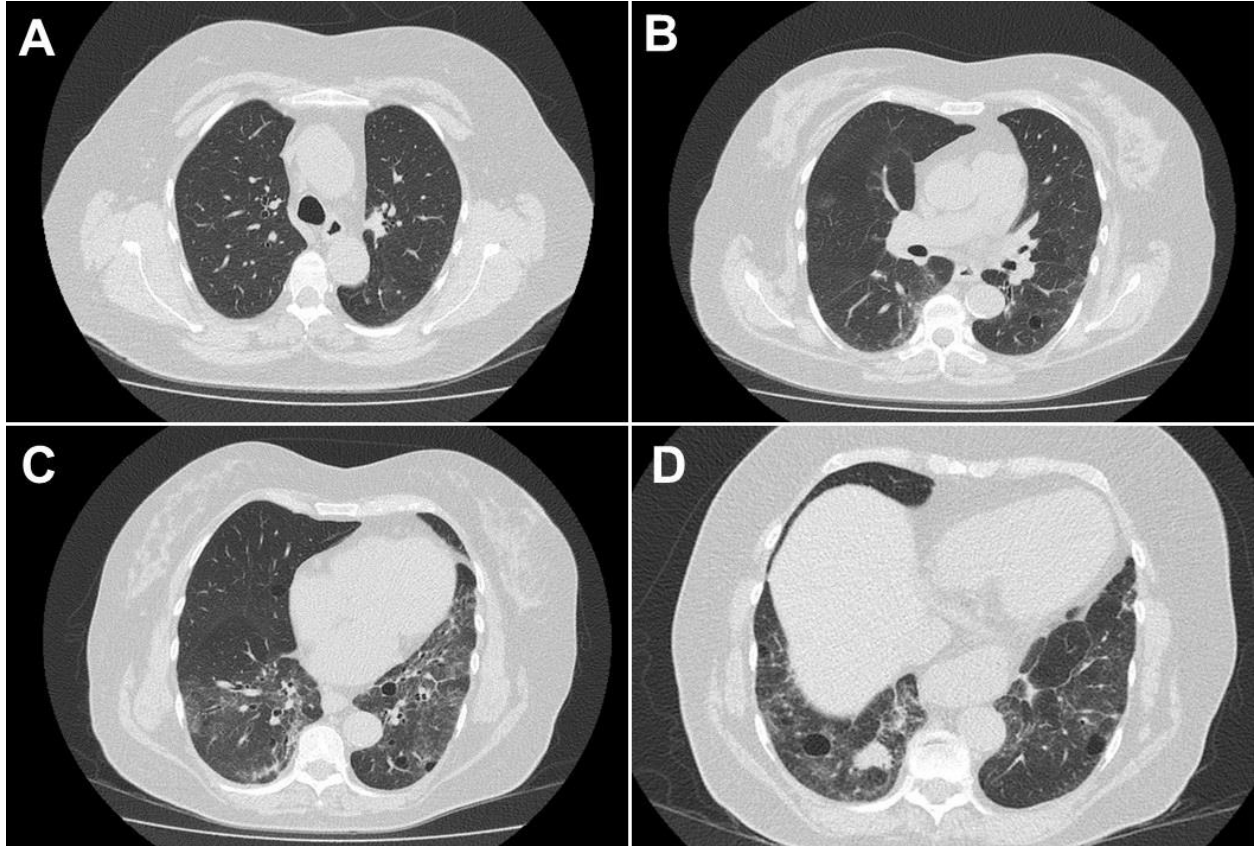


Figure 2. Representative axial images from the thoracic CT scan in lung windows.

Which of the following is the **best** interpretation of the thoracic CT scan?

1. Basilar fibrotic changes with honeycombing
2. Basilar ground-glass opacities and fibrosis with multiple cysts
3. Multiple basilar lung cavities with ground-glass with ground-glass opacities
4. 1 and 3
5. All of the above

**Correct!**

## **2. Basilar ground-glass densities and fibrosis with multiple cysts**

The CT scan shows multiple cysts in the basilar areas of the lung (Figure 3).

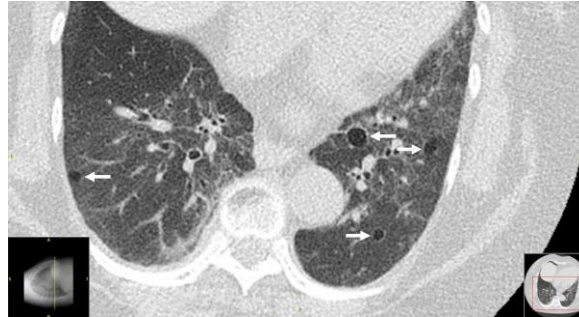


Figure 3. Close up of thoracic CT scan in lung windows showing multiple cysts (arrows).

A number of lesions can be confused with lung cysts (Table 1).

Table 1. Lung lesions that can be confused with lung cysts.

- Emphysema – Areas of emphysema appear as polygonal or rounded low-attenuation areas that lack walls. A bleb is a type of subpleural bulla; the term bleb is now discouraged.
- Honeycombing – Honeycombing appears as clustered hypolucent areas ranging in diameter from 0.3 to 1.0 cm (but occasionally as large as 2.5 cm), with well-defined, often thick walls
- Bronchiectasis – Bronchiectatic cysts (also known as "cystic bronchiectasis") can be differentiated from cystic lung disease based on their continuity with an airway, tendency to form clusters, and associated findings of tram lines and signet or Cabocho ring sign.
- Cavitary lung disease – Pulmonary cavities are typically thick-walled (>4 mm) gas-filled spaces often within an area of consolidation, mass, or nodule and may be filled with other contents in addition to air.
- Pneumatoceles – Pneumatoceles are a type of thin-walled parenchymal cyst that are typically asymptomatic and often disappear following resolution of the inciting event.

Which of the following are **true** regarding cystic lung disease?

1. Birt-Hogg-Dubé syndrome is associated with skin fibrofolliculomas in most cases
2. Lymphangiomyomatosis (LAM) is a disorder that almost exclusively affects women
3. Pulmonary Langerhans cell histiocytosis (PLCH) is associated with current or former cigarette smoking
4. 1 and 3
5. All of the above

**Correct!**  
**5. All of the above**

In addition to those characteristics mentioned in the question, a number of cystic lung diseases have certain characteristics (3). Parenchymal cysts associated with LAM are typically profuse, evenly distributed throughout both lungs, thin-walled and round, display limited variability in size and shape, and lack internal structures such as vessels or septae (Figure 4).

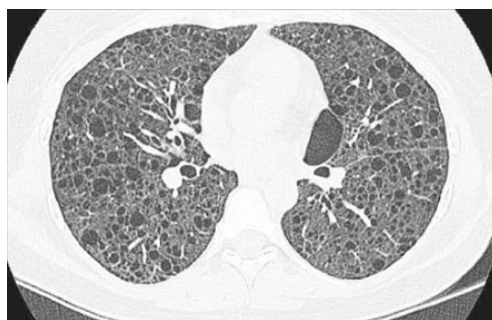


Figure 4. Typical thoracic high-resolution CT findings in LAM.

The cysts associated with Birt-Hogg-Dubé syndrome are thin-walled, often lentiform in shape (lens-shaped), basilar predominant, and distributed in subpleural regions and abutting the mediastinum (Figure 5) (3).



Figure 5. Typical high-resolution findings in Birt-Hogg-Dubé syndrome.

Our patient's findings are most consistent with lymphoid interstitial pneumonia (LIP). LIP often has thin-walled cysts that are typically few in number and most often seen in areas of ground glass.

Which of the following disease(s) are **associated with LIP?**

1. HIV infection
2. Sjögren's syndrome
3. Systemic lupus erythematosus
4. 1 and 3
5. All of the above

**Correct!**  
**5. All of the above**

LIP is often seen in conjunction with a variety systemic disease, most notably HIV infection (or AIDS) and Sjögren's syndrome although some cases remain idiopathic. Our patient's human immunodeficiency virus serology was negative. The patient was questioned about rheumatologic symptoms and she denied joint pains and skin rashes, although she had mild mouth and eye dryness for many years. A rheumatology consult was obtained and a panel of serologic studies were obtained (Table 2).

Table 2. Serologic studies.

- ANA 8.8 (H)
- ENA 158 (H)
- Anti-SSA > 8.0 (H)
- Anti-SSB 2.4 (H)
- RF 41 (H)
- CCP, anti-RNP, anti-SM, SCL-70, Jo-1 were all normal.

The rheumatology consultant was confident that the above serologic pattern was diagnostic of Sjögren's syndrome. An open lung biopsy was discussed with the patient. Diagnosis of some interstitial lung diseases such as idiopathic pulmonary fibrosis no longer requires an open lung biopsy. It was felt that in this case the classic serologic pattern and clinical findings were sufficient to make a presumptive diagnosis of Sjögren's syndrome (5).

Treatment was discussed with the patient. She refused another course of prednisone because of the weight gain.

What **alternative therapies** to prednisone have established efficacy in lung disease secondary to Sjogren's syndrome?

1. Azathioprine
2. Cyclosporine
3. Infliximab
4. 1 and 3
5. All of the above

**Correct!**  
**1,2,3,4 or 5.**

This was to some extent a trick question. Histological analyses frequently reveal a pattern of NSIP overlapping with organizing pneumonia in Sjögren's syndrome. Corticosteroids are the reference therapy for organizing pneumonitis. In refractory organizing pneumonia, immunosuppressive agents such as azathioprine, cyclosporine, infliximab and rituximab have been used but none are established therapy in Sjögren's syndrome (5). Our patient opted for mycophenolate therapy with close observation since the tempo of her disease appeared to be relatively slow.

### **References**

1. Martin LJ. Tests to diagnose shortness of breath. WebMD. August 14, 2016. Available at: <https://www.webmd.com/lung/breathing-problems-diagnosis#2> (accessed 8/13/18).
2. Pellegrino R, Viegi G, Brusasco V, *et al*. Interpretative strategies for lung function tests. *Eur Respir J*. 2005 Nov;26(5):948-68. [\[CrossRef\]](#) [\[PubMed\]](#)
3. Kumar A, Kotloff RM. Diagnostic approach to the adult with cystic lung disease. UpToDate. June 23, 2017. Available at: <https://www.uptodate.com/contents/diagnostic-approach-to-the-adult-with-cystic-lung-disease> (accessed 8/13/18).
4. Larsen BT, Colby TV. Update for pathologists on idiopathic interstitial pneumonias. *Arch Pathol Lab Med*. 2012 Oct;136(10):1234-41. [\[CrossRef\]](#) [\[PubMed\]](#)
5. Flament T, Bigot A, Chaigne B, Henique H, Diot E, Marchand-Adam S. Pulmonary manifestations of Sjögren's syndrome. *Eur Respir Rev*. 2016 Jun;25(140):110-23. [\[CrossRef\]](#) [\[PubMed\]](#)