September 2020 Pulmonary Case of the Month: An Apeeling Example

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History of Present Illness

A 67-year-old woman who developed a chronic nonproductive cough beginning in October 2019. After 4 weeks, she consulted her primary care physician.

PMH, SH, and FH

- She had a history of several prior pneumonias, including respiratory syncytial virus in 2018
- Irritable bowel syndrome
- Hypertension
- Prior smoker: 28 pack years, none since 1999
- FH negative

Physical Examination

Her physical examination is recorded as unremarkable other than decreased nasal flow.

Which of the following **is/are common cause(s)** of a chronic cough?

1. Cough-variant asthma
2. Gastroesophageal reflux disease
3. Upper airway cough syndrome (UACS) secondary to rhinosinus diseases
4. 1 and 3
5. All of the above

Correct!
5. All of the above

Chronic cough is a very common reason for patients to seek consultation from a pulmonary physician. The most common causes are asthma, gastroesophageal reflux disease (GERD), and upper airway cough syndrome (UACS) secondary to rhinosinus diseases (postnasal drip) (1). She had a chest x-ray (Figure 1) which was interpreted as showing no acute disease.

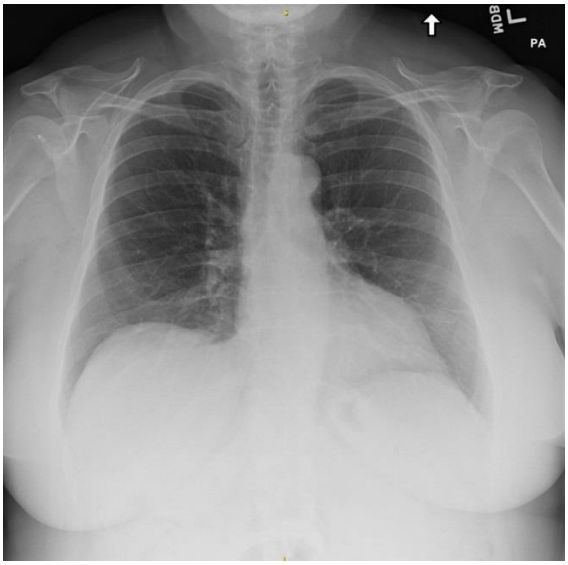

Figure 1. Initial chest radiography.

Spirometry done was interpreted as normal with an FVC of 87% predicted and an FEV1 of 95% predicted. In this patient's case she had nothing to suggest a source of her cough other than the bilateral nasal congestion. She was therefore treated with triamcinolone nasal spray.

Her cough persisted but in the interim she moved from Chicago to the Phoenix area. Starting on May 12, 2020, she developed fever up to 102° F with the cough persisting.

Her physical examination showed only decreased breath sounds at the right base. A review of her medications indicated she was taking lisinopril, amlodipine, albuterol prn, triamcinolone nasal spray and codeine/guaifenesin for cough.

What should be ***done at this time***?

1. Repeat the chest x-ray
2. Sinus imaging
3. Stop her lisinopril
4. COVID-19 testing
5. All of the above

Correct!
5. All of the above

She has not responded to the nasal corticosteroid therapy and according to the CHEST guidelines she has developed a “red flag”, in this case the fever, suggesting that further investigation is warranted. Other “red flags” are listed in Table 1.

Table 1. “Red Flags” in chronic cough evaluation (1).

- Hemoptysis
- Smoker > 45 years of age with a new cough, change
- in cough, or coexisting voice disturbance
- Adults aged 55-80 years who have a 30 pack-year smoking history and currently smoke or who have quit within the past 15 years
- Prominent dyspnea, especially at rest or at night
- Hoarseness
- Systemic symptoms
    - Fever
    - Weight loss
    - Peripheral Edema with weight gain
- Trouble swallowing when eating or drinking
- Vomiting
- Recurrent pneumonia
- Abnormal respiratory exam and/or abnormal chest radiograph coinciding with duration of cough

It should be remembered that up to 15% of patients taking lisinopril can develop a chronic cough (2). However, this would be unlikely to cause fever. Certainly, with the COVID-19 pandemic occurring testing for COVID-19 should be performed because of her fever. It was negative. A repeat chest x-ray and sinus imaging are reasonable looking for a source of the cough and fever. Some might also perform a sputum for eosinophils to evaluate for non-asthmatic eosinophilic bronchitis (NAEB). However, in our experience sputum evaluation of sputum eosinophilia is difficult to perform and requires care in collecting the sputum and experience selecting the portion of the sputum to evaluate.

Sinus imaging was unremarkable.

The repeat chest radiography is shown in Figure 2.

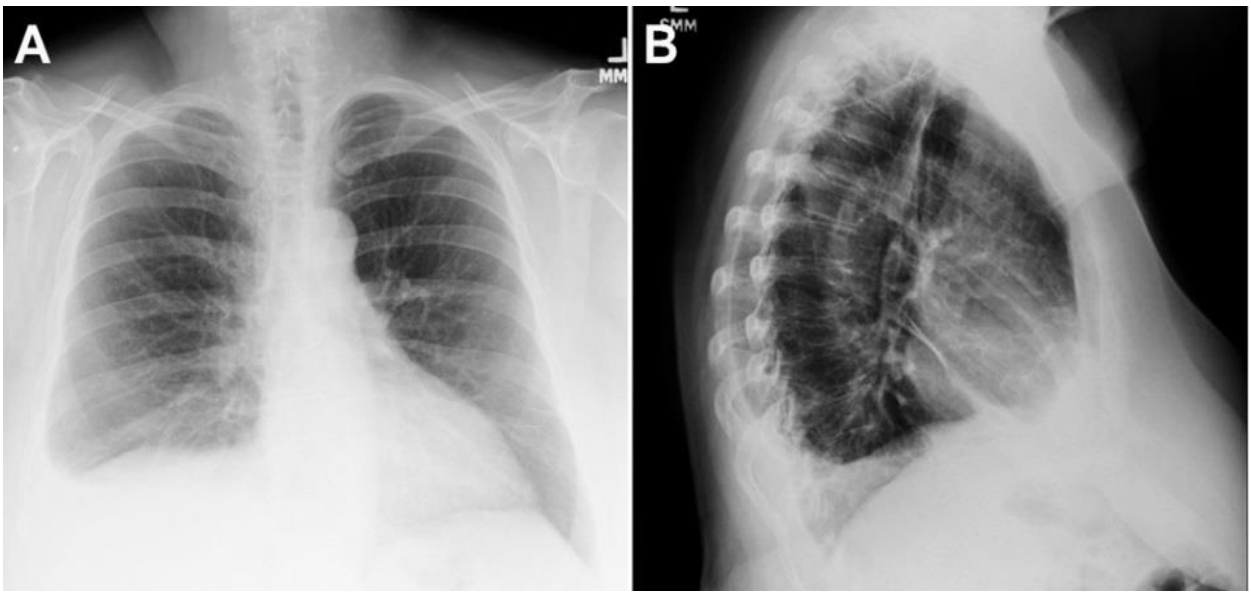

Figure 2. Repeat chest PA (A) and lateral (B) radiography.

Which of the following are ***true*** regarding the repeat chest X-ray?

1. There is a new left lung mass
2. There is a new left pleural effusion
3. There is a new right lung mass
4. There is a new right pleural effusion
5. There is no change

Correct!
4. There is a new right pleural effusion

The repeat chest-ray shows a new right pleural effusion (Figure 3).

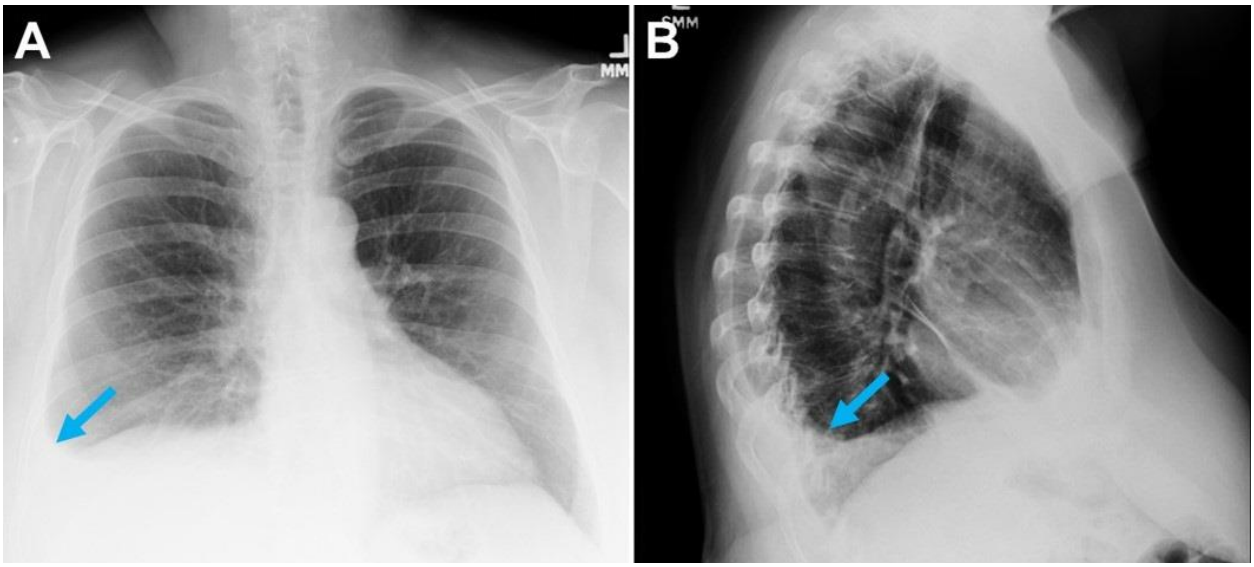

Figure 3. Repeat chest-ray showing a right pleural effusion with a typical meniscus sign (blue arrows) in the right lower chest.

The effusion did not layer on a right lateral decubitus x-ray.

What should be ***done next***?

1. Thoracic CT scan
2. Thoracic ultrasound
3. Video-assisted thoracoscopic surgery (VATS)
4. 1 or 3
5. Any of the above

Correct!
5. Any of the above

Normally one would proceed directly to thoracentesis but the small volume of fluid and the lack of layering suggested it might be complex and difficult. Ultrasound confirmed the complex nature of the fluid and despite several attempts only 1 milliliter of fluid could be obtained. To better define the fluid and exclude other abnormalities, a thoracic CT scan was performed (Figure 4).

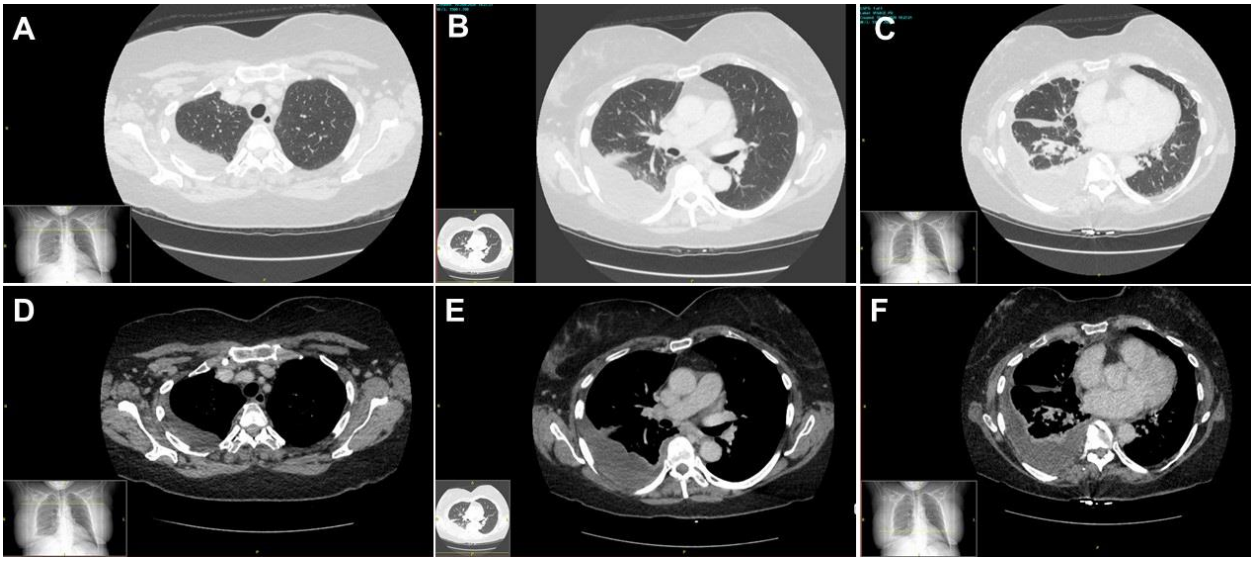

Figure 4. Representative images from the thoracic CT scan in lung windows (A-C) and soft tissue windows (D-F).

What should be ***done next***?

1. Bronchoscopy
2. Repeat thoracentesis
3. VATS with plan for possible thoracotomy
4. 1 or 3
5. Any of the above

Correct!
3. VATS with plan for possible thoracotomy

The CT scan confirms the complex nature of the pleural fluid with what appears to be a rind surrounding the effusion. It is unlikely that a repeat thoracentesis will yield different results than the first attempt. There does not appear to be any bronchial pathology so bronchoscopy is not indicated. Therefore, the best option appears to be VATS with possible conversion to a thoracotomy.

At the time of thoracotomy an extensive pleural peel was noted consistent with empyema (Figure 5). A conversion from VATS to thoracotomy was required to remove the peel.

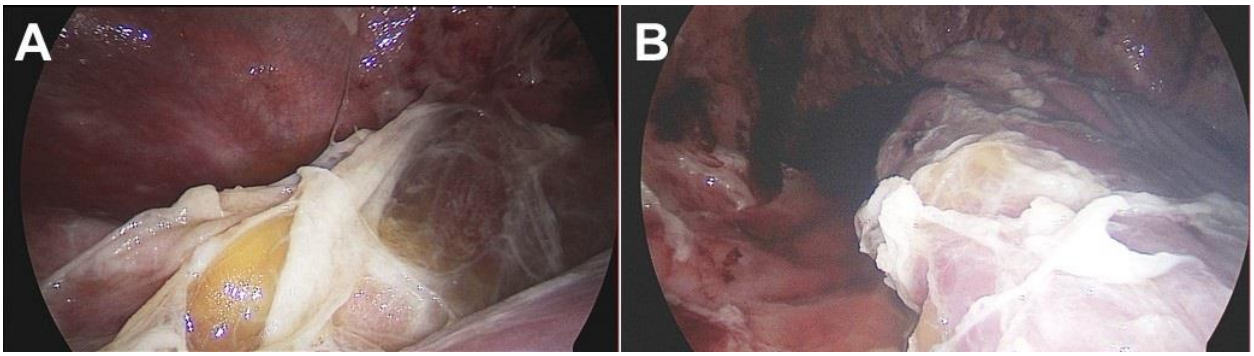

Figure 5. Thorascopic views of right pleural space showing an extensive peel around the right lung.

Histopathology of the pleura showed chronic inflammation but no organisms were identified on pathology or culture.

Empyema or complicated parapneumonic effusions should be managed with which of the following?

1. Chest tube drainage
2. Chest tube drainage + fibrinolytic agents
3. VATS
4. Thoracotomy
5. Any of the above

Correct!
5. Any of the above

The diagnosis of empyema requires demonstration of organisms or pus in the pleural space. A complicated parapneumonic effusion shows a pleural fluid pH < 7.20, but without organisms. Either a parapneumonic effusion or an empyema become can become fibrinous and develop a pleural peel requiring decortication. Management of empyema or parapneumonic depends on the severity and size of the pleural effusion and the local expertise. Both can be managed conservatively with a chest tube and antibiotics; however, higher readmission and reintervention rates were observed in patients managed with chest tubes, suggesting some of these patients may benefit from earlier VATS or thoracotomy (3). The presence of gram-negative organisms or a delayed referral for operative intervention (>2 weeks) both increase the likelihood of having to convert from VATS to thoracotomy in patients undergoing VATS for empyema (4). In this patient, the delay from initial identification of pleural effusion to drainage likely contributed to need for thoracotomy for decortication.

References

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4. Lardinois D, Gock M, Pezzetta E, et al. Delayed referral and gram-negative organisms increase the conversion thoracotomy rate in patients undergoing video-assisted thoracoscopic surgery for empyema. Ann Thorac Surg. 2005;79(6):1851-1856. [CrossRef] [PubMed]