A Young Woman with Cough and abnormal Chest Radiograph

J. Abubaker, I. A. Khan, S. Siddiqi
Department of Internal Medicine, Ziauddin Medical University Hospital, Karachi.

A 24-year-old medical student presented with the complaints of dry cough for 2 days, fever and shortness of breath for 5 days. At the time of presentation, she was afebrile and physical examination was normal. She was given symptomatic treatment, but she continued to have cough and low grade fever (99-100^{o}F) with worsening dyspnoea; she denied any weight loss or anorexia. Her physical exam including a detailed ENT and respiratory exam was unremarkable.

Based on the history and examination what should be the course of action?

1) Continue symptomatic treatment
2) Antibiotics
3) Investigate with Chest Radiograph (CXR) and complete blood count (CBC)
4) Sputum for acid fast bacilli (AFB)
5) Mantoux test (MT)

At this point in her illness, no definitive diagnosis is possible; one way of management would be to treat her for her symptoms (anti-tussive for cough and antipyretics for fever), but with normal physical findings her dyspnoea cannot be explained and warrants further investigation.

The clinical history and physical examination almost always direct the investigations. In the present case the symptoms are suggestive of respiratory origin. Although physical exam is normal, CXR is valuable because if it is normal we may have to look for causes other than pulmonary in origin. If there is an abnormality, then the causes have to be investigated. Since her symptoms have been present for more than a few days and are progressive, CBC will be helpful; presence or absence of leucocytosis and or leucopenia and differential count can help in narrowing the differential diagnosis.

The absence of high grade fever and productive cough makes acute bacterial infection less likely, therefore treating her empirically as a case of typical or atypical pneumonia may not be justifiable; waiting for the results of her limited investigation is probably more appropriate.

Even though we are living in an endemic area for tuberculosis, collecting sputum which is not there may lead to confusion as negative sputum for AFB means either true negative or that there was no real sputum and the test was done on oral secretions. Also because of the short duration and absence of sputum production at this point in her illness, sputum for AFB is probably not the first investigation we would ask for Mantoux test has no value in the diagnosis of acute or active TB.

Following is the patient's CXR:

Patient's CBC was reported as: Hb 11gm/dl, MCV 75.2Fl, MCHC 33%, TLC 23000, Neutrophils 15.8% (3634), Lymphocytes15.3% (3519), Eosinophils 66.8% (15364), Monocytes 1.9% (437), Basophils 0.2% (46).

Based on the history, CXR and CBC, what do you think the patient has?

1) Pulmonary Tuberculosis
2) Pneumonia
3) Upper respiratory tract infection
4) Interstitial lung disease with eosinophilia

Pulmonary TB could be a possibility considering the patient's occupational exposure, the persistent symptomatology and abnormal findings on the CXR. However, the sudden onset of symptoms, short history, non-productive cough, absence of malaise and loss of appetite, dyspnoea out of proportion to CXR finding and marked peripheral eosinophilia, essentially rules out the diagnosis of pulmonary TB.

Pneumonia in a young patient would usually present with productive cough, swinging fever and typical signs on chest examination. Our patient has none of these. Atypical Pneumonias could be a possibility with mild symptoms and diffuse bilateral infiltrates on CXR, however peripheral eosinophilia to that degree will be less likely in any atypical pneumonia.

Upper Respiratory Tract Infection

With increasing shortness of breath and positive findings on CXR, even if the disease started as URTI, it is now not limited to the upper air ways.

Interstitial Lung Disease

Although there is no history of exposure to pets, inorganic dusts and drugs, and there are no extrapulmonary manifestations, the increasing shortness of breath and reticular shadowing on the CXR make the possibility of early interstitial lung disease a consideration.

What is your diagnosis?

The combination of symptoms and CXR abnormality and the patient's CBC showing marked eosinophilia (count upto 15364), the most probable diagnosis would be a condition known as Pulmonary Infiltrates with eosinophilia.

Course

She was asked to make weekly visits to the Pulmonologist. In a week's time the fever subsided but the cough and shortness of breath persisted. Serial CXR showed migratory pattern of lung infiltrates. 3 weeks later a repeat CBC reported a TLC of 8,900 with Eosinophilia of 3150.6 (35.4%).

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In a few days the patient's symptoms improved considerably. Finally after 6 weeks the CXR and CBC completely normalized. The patient recovered with no residual symptomatology (Figure 2).

Discussion

Numerous classifications have been proposed for pulmonary eosinophilia. Pulmonary infiltrates with eosinophilia (P.I.E. syndrome) was first suggested by Reeder and Goodrich and was the basis for initial classification by Crofton and colleagues[1] who divided eosinophilic lung diseases into 5 groups. There is no optimal way to classify these disorders. Allen and Davis[1] reviewed the subject and were able to give a detailed discussion of this difficult to classify entity; they reviewed 10 entities (Table). Since our patient had a presentation suggestive of Simple Pulmonary Eosinophilia, we will limit our discussion to this.

Simple Pulmonary Eosinophilia

In 1932, Loffler first described simple pulmonary eosinophilia (Loffler's syndrome), which is characterized by migratory pulmonary infiltrates accompanied by increased peripheral blood eosinophilia and minimal or no pulmonary symptoms. Normal blood generally contains between 50 and 250 eosinophils/ul. In this regard the absolute blood eosinophil count is preferred to the blood eosinophil percentage.

The CXR usually demonstrates unilateral or bilateral, transient, migratory, non-segmental densities of various sizes that are often peripheral and may appear pleural based.[2] Patients who develop Simple Pulmonary Eosinophilia should be evaluated carefully for a parasitic infection or drug reaction, although in about one-third of these patients no cause can be identified. Patients with Simple Pulmonary Eosinophilia have an excellent prognosis and rarely require corticosteroids because the infiltrates and blood eosinophilia resolve spontaneously generally within one month.

Pearls

All patients with cough and CXR abnormality do not have TB.

CBC is helpful in-patients with abnormal CXR.

Peripheral Eosinophilia with lung infiltrates has a broad differential.

Not all patients with simple pulmonary eosinophilia require steroids.

References

1. Allen JN, Davis WB. Eosinophilic lung diseases. Am J Respir Crit Care Med 1994;150:1423-38.

2. Bain GA, Flower CD. Pulmonary eosinophilia. Eur J Radiol 1996;23:3.