

## CONTINUING MEDICAL EDUCATION ΣΥΝΕΧΙΖΟΜΕΝΗ ΙΑΤΡΙΚΗ ΕΚΠΑΙΔΕΥΣΗ

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### Medical Imaging Quiz – Case 15

A 50-year-old woman with history of asthma was admitted to our hospital because of fever (38 °C), cough, breathlessness and sweating at night of 10 days duration. Blood tests showed increased white blood tests with eosinophilia (14%), a high erythrocyte sedimentation rate and increased platelets. The blood cultures were negative and the blood gases were normal. The chest X-ray showed air-space infiltrates in the left upper pulmonary zone with peripheral distribution (fig.1). Chest CT scan showed peripheral air-space consolidation in the upper lobe of the left lung (fig. 2).

Initially, the patient was diagnosed to have bacterial pneumonia and received antibiotics for almost a month which didn't improve her clinical condition. At that time, increased eosinophils (>60%, normally <1%) were found in fluid obtained by a bronchoscopy (bronchoalveolar lavage [BAL] fluid), while a new chest CT scan showed that the peripheral air-space consolidation disappeared and a new one in the right upper lobe appeared (migratory character of the lesion) (fig. 3). Considering all these, a diagnosis was made. The patient was treated with corticosteroids and her clinical condition improved impressively 48 hours after the beginning of the treatment.

#### Comment

*Eosinophilic pneumonia (EP) is a disease in which a certain type of white blood cell called an eosinophil accumulates in the lung. These cells cause disruption of the normal air spaces (alveoli) where oxygen is extracted from the atmosphere.*

*EP is divided into different categories depending upon whether a cause can be determined or not. Known causes include certain medications such as NSAIDs, nitrofurantoin, phenytoin and ampicillin, drugs of abuse such as inhaled heroin and cocaine, environmental triggers such as cigarette smoke, cancer –lung cancer, cervical cancer etc.– and parasites such as the tapeworms *Echinococcus* and *Taenia solium*, the helminths *Ascaris lumbricoides* and *Strongyloides stercoralis*, and the hookworms *Ancylostoma duodenale* and *Necator americanus* (when EP is caused by this last group, it is often called "Löffler's syndrome"). EP can also occur when the immune system attacks the lungs, a disease called Churg-Strauss syndrome. When a cause cannot be found, the EP is labeled "idiopathic". Idiopathic EP can be divided into "acute eosinophilic pneumonia" (AEP) and "chronic eosinophilic pneumonia" (CEP) depending on the symptoms a person is experiencing. AEP was first described in 1989 and*

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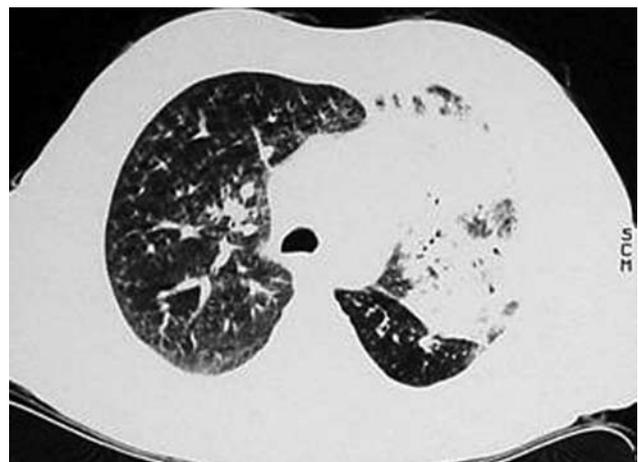
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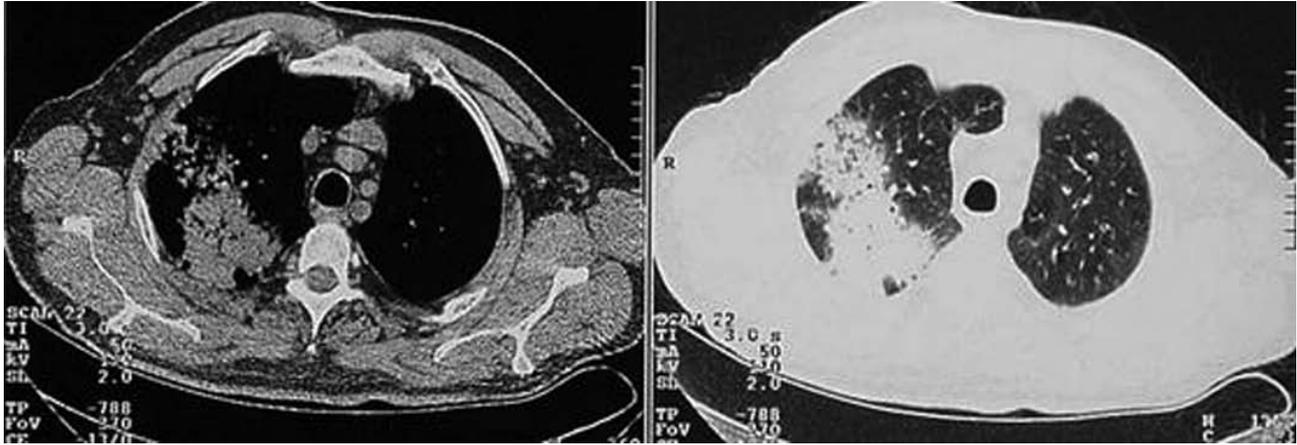
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**Figure 1.** Chest radiograph on admission showed air space infiltrates in the left upper pulmonary zone with peripheral distribution.



**Figure 2.** Chest CT scan on admission showed peripheral consolidation in the upper lobe of the left lung.



**Figure 3.** Chest CT scan almost a month later showed that the peripheral consolidation in the left upper lobe disappeared and a new one in the right upper lobe appeared (migratory character of the lesion).

can occur at any age, even in previously healthy children, though most patients are between 20 and 40 years of age. Men are affected approximately twice as frequently as women. AEP has been associated with smoking. CEP which was first described by Carrington in 1969 and it is known as Carrington syndrome, occurs more frequently in women than men and does not appear to be related to the smoking. An association with radiation for breast cancer has been described.

Most causes of eosinophilic pneumonia have similar symptoms. Cough, fever, increasing breathlessness and night sweats are prominent and almost universal. Acute eosinophilic pneumonia typically follows a rapid course. Fever and cough may develop only one or two weeks before difficulties in breathing progress to the point of respiratory failure requiring mechanical ventilation. Chronic eosinophilic pneumonia usually follows a slower course. Symptoms accumulate over several months and include fever, cough, breathlessness, wheezing, and weight loss. Individuals with CEP are often diagnosed with asthma before CEP is finally recognized. EP due to medications or environmental exposures is similar and occurs after an exposure to a known offending agent. EP due to parasitic infections has a similar prodrome in addition to a host of different symptoms related to the variety of underlying parasites.

Eosinophilic pneumonia is diagnosed in one of three circumstances: When a complete blood count reveals increased eosinophils and a chest X-ray or computed tomography (CT) identifies abnormalities in the lung, when a biopsy identifies increased eosinophils in lung tissue, or when increased eosinophils are found in fluid obtained by a bronchoscopy (bronchoalveolar lavage [BAL] fluid). Association with medication or cancer is usually apparent after review of a person's medical history. Specific parasitic infections are diagnosed after examining a person's exposure to common parasites and performing laboratory tests to look for likely causes. If no underlying cause is found, a diagnosis of AEP or CEP is made based upon the following criteria. AEP is most likely with respiratory failure after an acute febrile illness of usually less than one week, changes in multiple areas and fluid in the area surrounding the lungs on a

chest X-ray, and greater than 25% eosinophils on a BAL. Other typical laboratory abnormalities include an elevated white blood cell count, erythrocyte sedimentation rate, and immunoglobulin E level. Pulmonary function testing usually reveals a restrictive process with reduced diffusion capacity for carbon monoxide. CEP is most likely when the symptoms have been present for more than a month. Laboratory tests typical for CEP include increased blood eosinophils, a high erythrocyte sedimentation rate, iron deficiency anemia, and increased platelets. A chest X-ray can show abnormalities anywhere, but the most specific finding is increased shadow in the periphery of the lung, away from the heart.

When eosinophilic pneumonia is related to an illness such as cancer or parasitic infection, treatment of the underlying cause is effective in resolving the lung disease. When due to AEP or CEP, however, treatment with corticosteroids results in a rapid, dramatic resolution of symptoms over the course of one or two days. Either intravenous methylprednisolone or oral prednisone are most commonly used. In AEP, treatment is usually continued for a month after symptoms disappear and the X-ray returns to normal (usually four weeks total). In CEP, treatment is usually continued for three months after symptoms disappear and the X-ray returns to normal (usually four months total). CEP often relapses when prednisone is discontinued; therefore, some people with CEP require lifelong therapy.

In patients with eosinophilia and CT or radiographs with pulmonary infiltrates or consolidation with peripheral distribution, it should always be kept in mind eosinophilic pneumonia as a possible diagnosis.

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