Case Report

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# First things first: Importance of eosinophil count in diagnosing occult parasites

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**Summary** **Tropical pulmonary eosinophilia (TPE) is a rare allergic manifestation to the filarial nematode. A 38-year old male and a 15-year old female presented with cough and breathlessness. Their complete blood count showed eosinophilia. This finding was overshadowed by the radiological findings suggestive of tuberculosis. The diagnosis of TPE was confirmed by filarial antigen detection test and both the patients were successfully treated with diethylcarbamazine. TPE presents with cough and breathlessness and can be often confused with tuberculosis, especially in endemic settings. An important clue in differentiating the two entities is the presence of eosinophilia in the former.**

***Keywords:*** Tropical pulmonary eosinophilia, filariasis, tuberculosis

## 1. Introduction

Indian subcontinent is endemic for the filarial nematode, Wuchereria bancrofti and Brugia malayi. The adult filarial worm resides in the lymphatics and releases microfilariae into the peripheral circulation. These microfilariae are trapped in lungs. In less than 0.5% of cases, there may be an exaggerated immune response against microfilariae causing eosinophilic inflammation of lower airways (*1*). This syndrome is called as tropical pulmonary eosinophilia (TPE), where patients present with cough, with or without breathlessness and eosinophilia. It is an easily treatable but a commonly missed entity. We present two cases of TPE who were referred to us with a provisional diagnosis of tuberculosis (TB).

## 2. Case Report

### 2.1. *Case 1*

A 38-year-old male patient, resident of Bihar with no prior co-morbidities presented with complaints of cough with expectoration and dyspnea on exertion for one year. He was apparently asymptomatic one year back when he started to have insidious onset cough with mucoid expectoration. This cough would worsen at night and was relieved only temporarily with anti-tussive agents. He also complained of breathlessness on exertion which initially started with strenuous activities like walking up the stairs and gradually progressed in a span of six to seven months, into dyspnea at rest. His brother, who was residing in the same house was diagnosed with pulmonary tuberculosis five years back and was successfully treated with six months of anti-tubercular therapy. There was no associated fever, hemoptysis, chest pain or palpitation. He was not a smoker or an alcoholic. There was no history of tuberculosis. A pulmonary function test was done which revealed severe obstruction with no significant reversibility (FVC-57% of predicted, FEV1-40% of predicted, FEV1/FVC-69% of predicted). He was initially treated with inhalational steroids and inhalational beta-agonists for around four months but there was no response. His serum ACE level was 45 mcg/L (Normal < 40 mcg/L). His Mantoux test was positive with an induration of 25 × 20 mm. Ziehl Neelsen staining and GeneXpert for sputum was negative. A contrast enhanced computed tomography (CECT) scan of chest revealed centrilobular nodules in bilateral lungs with some enlarged subcarinal nodes with foci of calcification

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(Figures 1 and 2). With a suspicion of tuberculosis/ sarcoidosis, he was referred to us to initiate anti-tubercular therapy or steroids or both. On examination, there was diffuse wheezing bilaterally. Rest of the systemic examination was normal. On review of records, it was found that he had a total leucocyte count (TLC) of 12,800/cu.mm with an eosinophil of 9.6% (Absolute Eosinophil count or AEC-1229/cu.mm). A repeat complete blood count (CBC) was ordered which revealed a TLC of 31,300/cu.mm with 75% eosinophils (AEC-23475/cu.mm). IgE levels were found to be > 2,500. IgG immunodiffusion test against *Aspergillus fumigatus* was negative. Microscopic examination of stool for parasite detection was negative (thrice). Peripheral blood smear and quantitative buffy coat for malaria or filariasis was negative. Circulating filarial antigen and filarial IgM antibody was found to be positive. With a provisional diagnosis of tropical pulmonary eosinophilia, he was started on diethylcarbamazine (DEC), 100 mg TDS for 21 days. There was a dramatic response after initiation of therapy. During the follow up, one month after initiation of treatment, the patient was completely asymptomatic. His TLC reduced to 8,800/μL with an eosinophil count of 10.6% (AEC-933). There was some improvement in PFT parameters (FVC-64%, FEV1-61%, FEV1/FVC-99%) also.

2.2. *Case 2*

A 14-year old female from Delhi with no prior comorbidities presented with cough and dyspnea on exertion for one year. She was apparently asymptomatic one year back, when she had cough with whitish expectoration which would increase at night time and decrease only with antitussive agents. The severity of cough was mostly static through-out the year. She also had dyspnea on exertion which initially started with strenuous activities like running on the playground and gradually progressed to dyspnea on walking on plain ground for more than two minutes. There was no history of orthopnoea or paroxysmal nocturnal dyspnoea. She had no associated fever, hemoptysis or chest pain. There was no history of allergy in the family or contact with tuberculosis. She was a non-smoker and non-

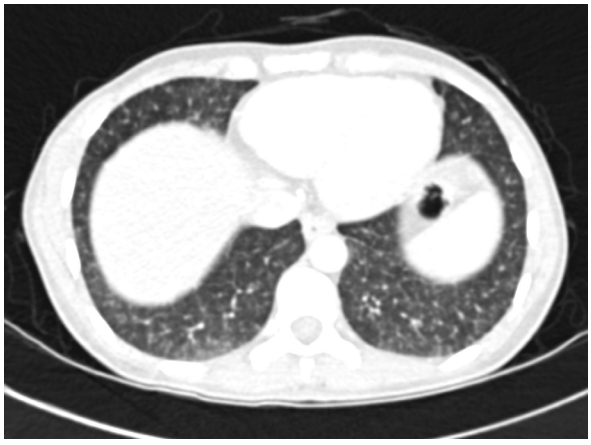

**Figure 1. Contrast enhanced computed tomography (CECT) axial lung window image shows centrilobular and random nodules with areas of ground glass opacity in bilateral lungs predominantly in basal location.**

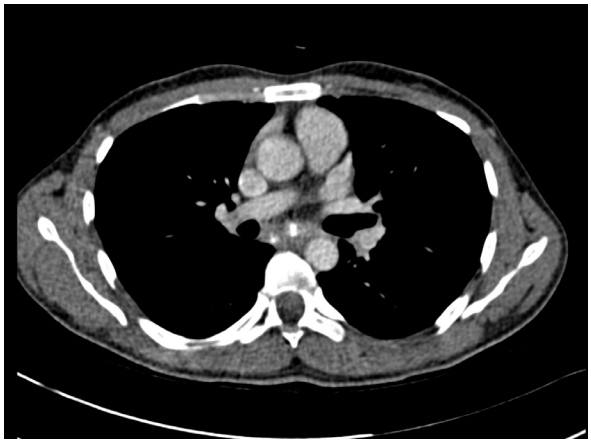

**Figure 2. CECT axial mediastinal window image shows calcified sub-carinal nodes.**

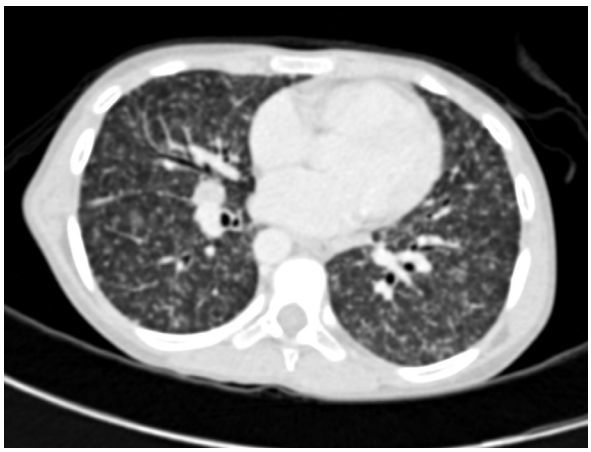

**Figure 3. CECT axial lung window image shows diffuse randomly distributed nodules in bilateral lung fields.**

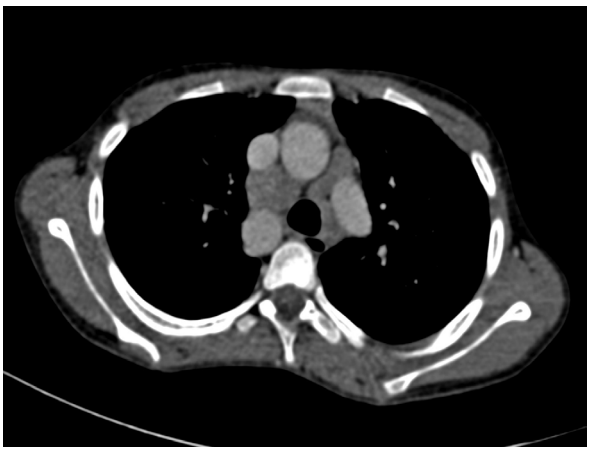

**Figure 4. CECT axial mediastinal window image shows multiple enlarged homogenous nodes in right para-tracheal and aortopulmonary location.**

alcoholic. On examination, she had mild pallor and bilateral sub-centimetric cervical lymph nodes. The chest examination revealed bilateral diffuse rhonchi. Her Chest X-ray showed bilateral infiltrates. PFT showed restrictive pattern (FVC-51%, FEV1-48%, FEV1/FVC-95%). She was started on inhalational steroids and was referred to us with a suspicion of tuberculosis. Her sputum for AFB was negative and mantoux test was negative (0 mm). CECT chest showed multiple bilateral nodules and enlarged mediastinal (aorto-pulmonary and right paratracheal) lymph nodes (Figures 3 and 4). Her complete blood count was traced and was found to have leukocytosis with eosinophilia (TLC-16,500/cu.mm, Eosinophil-53%, AEC- 8745/cu.mm). The repeat total count was 30,300/cu.mm with eosinophil being 71.8% (AEC-21,755/cu.mm). Peripheral blood smear and quantitative buffy coat for filariasis was negative. The circulating filarial antigen came out to be positive. With a diagnosis of TPE, she was started on DEC, 100 mg TDS for 21 days. The patient responded well with complete resolution of symptoms at follow up. Her chest auscultation was clear with normal vesicular sounds. The TLC reduced to 10,000/cu.mm with an eosinophil count of 35% (AEC- 3,500/cu.mm) after 28 days of therapy. There was some improvement in PFT parameters (FVC-79%, FEV1-76%, FEV1/FVC-92%) also.

## 3. Discussion

TPE usually presents as dry nocturnal cough only. Dyspnea on exertion is relatively uncommon. Chest findings are usually absent but wheezing may be occasionally found. Initially the wheezing is due to bronchospasm but later on it is due to alveolitis and involvement of lower airways. PFTs commonly demonstrate restrictive pattern with or without superadded obstruction (*1*). Increased eosinophil count (> 3,000/mcl) and IgE levels (> 1,000 U/mL) due to type 1 hypersensitivity is common (*1*). Radiography of chest sometime shows interstitial shadows, miliary mottling and mediastinal lymphadenopathy (*2*).

The patients were initially managed as a case of airway disease but there was no history of smoking and there was no improvement with inhalational steroids. The history of contact, the positive mantoux test in the first patient and the radiology features in both the patients led to the possible diagnosis of tuberculosis. However, their sputum for ZN staining was negative. A large number of Indian population has latent TB and therefore mere positivity of mantoux test is never taken as indicative of active TB (*3*). There are few reports, where TPE was misdiagnosed as TB (*2*). The non-necrotic hilar lymph nodes and the raised ACE levels raised the suspicion of sarcoidosis in the first patient but ACE levels have been shown to have insufficient specificity for sarcoidosis (*4*).

The diagnosis of TPE was missed initially in both the cases as the CBC which is usually the most basic and often, the most informative investigation, was overlooked. In these cases, the primary care physicians concentrated on initially the PFT report and later on the CECT report. Prompt detection and evaluation of eosinophilia would have alleviated the patient of significant morbidity. Eosinophilia can be seen with other causes such as other helminthic infection or Allergic bronchopulmonary aspergillosis (ABPA) but stool for parasites and immunodiffusion test was negative (*5*).

TPE should be suspected in patients residing in endemic area and presenting with nocturnal cough and breathlessness, infiltrates in Chest X-ray and peripheral eosinophil count of 3,000 cells/µl (*6,7*). The diagnosis can be confirmed by presence of filarial antigen and antibody (*1,7*). Clinical response to DEC also points towards the diagnosis of TPE (*6*). It should be noted that the antigen can be absent in 50% of cases (*8*). DEC is the treatment of choice often requiring supplementation with doxycycline or albendazole (*1*). The response to DEC can often be dramatic but frequent relapses are reported. Therefore, the treatment might need repetition in few cases. There is decrease in eosinophilia with the treatment but the PFT values rarely returns to normal.

We report these cases to highlight the need for performing basic investigations first before moving on to expensive/complicated/invasive tests. The cases although rare, the presentation even rarer, could have been easily diagnosed with a simple blood investigation.

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