

HOSPITAL PHYSICIAN®

PULMONARY DISEASE BOARD REVIEW MANUAL

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The *Hospital Physician Pulmonary Disease Board Review Manual* is a peer-reviewed study guide for fellows and practicing physicians preparing for board examinations in pulmonary disease. Each manual reviews a topic essential to current practice in the subspecialty of pulmonary disease.

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Eosinophilic Lung Diseases: I

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Eosinophilic Lung Diseases: I

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INTRODUCTION

Eosinophils are terminally differentiated, nondividing granulocytes that normally constitute a tiny proportion of the peripheral blood leukocyte population. They spontaneously undergo apoptosis in the absence of specific cytokine factors, including interleukin (IL)-5, granulocyte-macrophage colony-stimulating factor (GM-CSF), and IL-3; IL-5 is the prototypical eosinophil viability enhancing factor. The physiologic role of the eosinophil appears to be in the host defense against parasitic infections, where they may effect the death of the organism by releasing toxic granule proteins (eg, major basic protein, eosinophil-derived neurotoxin, eosinophil cationic protein, eosinophil peroxidase).

Normal values for circulating eosinophils are generally considered to be 0% to 6% of the leukocyte differential, or more relevantly, an absolute count of blood eosinophils below 500/mm³, with some variation in normal values among different laboratories. These cells are not found in appreciable numbers in the normal human airway or alveolus: bronchoalveolar lavage (BAL) fractions typically range between 0% and 1%. *Peripheral eosinophilia* refers to abnormally elevated levels of circulating eosinophils and is broadly characterized as mild (500–1500/mm³), moderate (1500–5000/mm³), or severe (> 5000/mm³). An elevated lung lavage eosinophil fraction above 5% or peripheral eosinophilia implies the presence of disease. Two common etiologies of peripheral and tissue eosinophilia are allergic disease (eg, rhinitis and asthma) and parasitic infection. Both helminth infection and the response to simple allergens have been extensively modeled and provide a basis for understanding tissue eosinophilia in general. Recruitment of these cells to sites of inflammation requires the induction of specific patterns of adhesion molecules along with local generation of eosinophil-active chemokines and cytokines in a process that is orchestrated by T helper type 2 (Th2) lymphocytes.¹

Although the list of disorders associated with peripheral eosinophilia is long, pneumonia with excess accumulation of eosinophils in the lung suggests a limited number of diagnoses. These diagnoses are

clinically and pathogenically varied but have been classically grouped under the headings *pulmonary eosinophilia*,² *pulmonary infiltration with eosinophilia* (PIE syndrome),³ or simply *eosinophilic lung diseases*,⁴ implying that the eosinophil is involved in disease pathogenesis and is not simply a bystander. The major categories of eosinophilic lung diseases have been modified since the useful initial efforts by Reeder³ and Crofton² and currently include (1) simple pulmonary eosinophilia, (2) asthma, (3) tropical pulmonary eosinophilia, (4) Churg-Strauss syndrome (CSS), (5) allergic bronchopulmonary aspergillosis (ABPA), (6) chronic eosinophilic pneumonia, (7) acute eosinophilic pneumonia, and (8) hypereosinophilic syndrome.⁴ In this review, drug reactions and parasitic infections (other than filarial) are discussed in the section on simple pulmonary eosinophilia, and bronchocentric granulomatosis is discussed in the section on ABPA.

This manual is the first of a 2-part review of the eosinophilic lung diseases. Part 1 discusses a general initial approach to patients with eosinophilia, with a focus on simple pulmonary eosinophilia, tropical pulmonary eosinophilia, CSS, and ABPA. Prototypical cases are presented to introduce each topic. Part 2 will review acute and chronic eosinophilic pneumonia and hypereosinophilic syndrome.

INITIAL WORK-UP OF PULMONARY EOSINOPHILIA

Eosinophilic lung disease is typically considered when a patient presents with peripheral eosinophilia in the setting of pulmonary symptoms. However, certain disorders may have trivial peripheral eosinophilia and thus may not be considered initially (eg, acute eosinophilic pneumonia). In the evaluation of pulmonary eosinophilia, important information is usually found in the history. When considering eosinophilic lung disease, special consideration should be given to the presence of asthma or rhinitis, symptoms in other organ systems besides the lungs, and the patient's medication history. A detailed social history is critical, with special attention to country of origin, lifelong travel experience, unusual