

# Eosinophilic Lung Diseases: From Diagnosis to Management

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## Abstract

Eosinophilic lung diseases encompass a group of conditions characterized by the accumulation of eosinophils in the lungs, leading to inflammation and tissue damage. These diseases can be broadly categorized into eosinophilic pneumonia, Eosinophilic Granulomatosis with Polyangiitis (EGPA), and Hypereosinophilic Syndrome (HES). Eosinophilic pneumonia includes acute and chronic forms, with symptoms such as cough, dyspnea, fever, and infiltrates on chest imaging. Causes may include infections, medications, or environmental exposures. EGPA, formerly known as Churg-Strauss syndrome, is a rare autoimmune condition characterized by asthma, eosinophilia, and systemic vasculitis affecting small to medium-sized blood vessels. It can involve multiple organs, including the lungs, leading to respiratory symptoms, such as cough, wheezing, and infiltrates on imaging. HES is a heterogeneous disorder characterized by persistent eosinophilia and organ damage. Lung involvement may manifest as cough, dyspnea, infiltrates, or fibrosis. Diagnosis of eosinophilic lung diseases involves clinical evaluation, laboratory tests (including blood eosinophil count), imaging studies (such as chest X-ray or CT scan), and sometimes lung biopsy. Treatment depends on the underlying cause and severity of the disease but often includes corticosteroids to reduce inflammation and suppress eosinophil activity. Other immunosuppressive agents may be used in refractory cases. Management may also involve treating underlying conditions, such as asthma or parasitic infections, and avoiding triggers, such as allergens or certain medications. Close monitoring and follow-up are essential to assess treatment response and disease progression.

**Keywords:** Eosinophils • Eosinophilic pneumonia • Eosinophilic Granulomatosis with Polyangiitis (EGPA) • Hypereosinophilic Syndrome (HES)

## Introduction

Eosinophilic lung diseases encompass a diverse group of respiratory conditions characterized by the infiltration of eosinophils into lung tissues, leading to inflammation, tissue damage, and potential organ dysfunction. These diseases pose diagnostic challenges due to their heterogeneous presentations and overlapping clinical features. From initial evaluation to long-term management, a comprehensive understanding of eosinophilic lung diseases is crucial for healthcare providers to optimize patient care and outcomes. Eosinophils are a type of white blood cell involved in immune responses, particularly in allergic reactions and parasitic infections. While their presence is essential for host defense, dysregulated eosinophil activation and accumulation can contribute to tissue damage and disease pathogenesis. Eosinophilic lung diseases arise from various etiologies, including allergic reactions, autoimmune processes, infections, and systemic disorders. The most common eosinophilic lung diseases include eosinophilic asthma, eosinophilic pneumonia, Eosinophilic Granulomatosis with Polyangiitis (EGPA), and Hypereosinophilic Syndrome (HES). Lung diseases encompass a wide range of conditions that affect the function and structure of the lungs. These diseases can be acute or chronic, mild or severe, and may result from various factors, including infections, environmental exposures, genetic predispositions, autoimmune disorders, and lifestyle factors such as smoking [1].

## Literature Review

Common lung diseases include, Chronic Obstructive Pulmonary Disease (COPD) is a group of progressive lung diseases, including emphysema and chronic bronchitis, characterized by airflow obstruction and breathing difficulties. Asthma is a chronic inflammatory condition of the airways,

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**Received:** 03 June, 2024, Manuscript No. jprm-24-142840; **Editor assigned:** 05 June, 2024, PreQC No. P-142840; **Reviewed:** 17 June, 2024, QC No. Q-142840; **Revised:** 22 June, 2024, Manuscript No. R-142840; **Published:** 29 June, 2024, DOI: 10.37421/2161-105X.2024.14.678

resulting in recurrent episodes of wheezing, breathlessness, chest tightness, and coughing, often triggered by allergens, exercise, or irritants. An acute infection of the lungs (Pneumonia), typically caused by bacteria, viruses, or fungi, leading to inflammation, fluid accumulation, and impaired gas exchange. A malignant tumor arising from the cells of the lungs or bronchi (lung cancer), often associated with smoking but can also occur in non-smokers due to other risk factors such as exposure to environmental pollutants or genetic predisposition. Interstitial lung diseases (ILDs) A group of disorders characterized by inflammation and scarring (fibrosis) of the lung tissue, leading to impaired gas exchange and restrictive lung function, with various underlying causes, including autoimmune diseases, environmental exposures, and genetic factors. Pulmonary embolism can be potentially life-threatening condition caused by the blockage of one or more pulmonary arteries by blood clots, leading to decreased blood flow to the lungs and impaired oxygenation. Cystic fibrosis refers to as a genetic disorder affecting the lungs and other organs, characterized by the production of thick, sticky mucus that can obstruct airways and predispose to recurrent infections and respiratory complications. Pulmonary hypertension is a condition characterized by elevated blood pressure in the pulmonary arteries, leading to increased strain on the heart and potential complications such as heart failure [2].

Diagnosis and management of lung diseases involve a combination of clinical evaluation, diagnostic testing (such as imaging studies, pulmonary function tests, and laboratory tests), and individualized treatment approaches tailored to the specific disease and patient needs. Treatment may include medications, pulmonary rehabilitation, supplemental oxygen therapy, lifestyle modifications (such as smoking cessation), and in some cases, surgical interventions or lung transplantation. Early detection, prompt intervention, and comprehensive care are essential for optimizing outcomes and improving quality of life for individuals with lung diseases.

Diagnosis of eosinophilic lung diseases relies on a combination of clinical evaluation, laboratory testing, imaging studies, and sometimes invasive procedures such as lung biopsy. Key diagnostic considerations include:

Symptoms of eosinophilic lung diseases vary widely depending on the underlying condition and disease severity. Common respiratory manifestations include cough, dyspnea, wheezing, chest pain, and hemoptysis. Systemic symptoms such as fever, weight loss, fatigue, and skin rashes may also occur in certain conditions. Measurement of peripheral blood eosinophil levels is a useful screening tool for eosinophilic lung diseases. Eosinophilia, defined as an elevated eosinophil count above normal reference ranges, may prompt

further diagnostic evaluation. Chest imaging, including chest X-ray and Computed Tomography (CT) scan, helps assess lung parenchymal changes, airway involvement, and the extent of disease. Findings may include pulmonary infiltrates, consolidation, ground-glass opacities, nodules, or pleural effusions. Pulmonary function tests (PFTs) provide objective measures of lung function, including spirometry, lung volumes, and diffusion capacity. Characteristic patterns of airflow limitation, air trapping, or impaired gas exchange may aid in diagnosing and monitoring eosinophilic lung diseases. Bronchoscopy with Bronchoscopy with bronchoalveolar lavage (BAL) allows direct visualization of the airways and collection of bronchoalveolar lavage fluid for analysis. BAL fluid analysis, including cell counts, differentials, and cytokine levels, can help identify eosinophilic inflammation and rule out alternative diagnoses. In select cases, lung tissue biopsy may be necessary to obtain tissue samples for histopathological examination and definitive diagnosis. Transbronchial lung biopsy, Video-Assisted Thoracoscopic Surgery (VATS), or open lung biopsy may be performed depending on clinical indications and accessibility of lesions [3].

## Discussion

Once a diagnosis of eosinophilic lung disease is established, appropriate management strategies can be initiated to address underlying inflammation, control symptoms, and prevent disease progression. Treatment approaches may vary depending on the specific disease entity, severity of symptoms, and individual patient factors. Broadly, management strategies for eosinophilic lung diseases encompass Pharmacological interventions play a central role in the treatment of eosinophilic lung diseases, targeting inflammation, eosinophil activation, and associated symptoms. Commonly used medications include: Corticosteroids: Systemic corticosteroids, such as prednisone or methylprednisolone, are often used as first-line therapy to suppress eosinophilic inflammation and reduce airway hyperresponsiveness. Inhaled corticosteroids may be utilized for maintenance therapy in eosinophilic asthma. Short-Acting Beta2-Agonists (SABAs) and long-acting beta2-agonists (LABAs) help alleviate bronchoconstriction and improve airflow in eosinophilic asthma. Leukotriene receptor antagonists (e.g., montelukast) inhibit the actions of leukotrienes, lipid mediators involved in airway inflammation and bronchoconstriction including Monoclonal antibodies targeting specific cytokines or cell surface receptors, such as anti-Interleukin-5 (IL-5) antibodies (e.g., mepolizumab, reslizumab) or anti-IL-4/IL-13 antibodies (e.g., dupilumab), offer targeted therapy for severe eosinophilic asthma and EGPA [4].

In refractory cases or autoimmune-mediated eosinophilic lung diseases, immunosuppressive agents such as azathioprine, methotrexate, or cyclophosphamide may be considered to modulate aberrant immune responses and reduce eosinophilic inflammation. Identifying and avoiding triggers of eosinophilic inflammation, such as allergens, environmental pollutants, occupational exposures, or medications, can help minimize disease exacerbations and symptom flare-ups. Smoking cessation is paramount in the management of eosinophilic lung diseases, particularly in eosinophilic asthma and EGPA, as tobacco smoke can exacerbate airway inflammation and worsen respiratory symptoms. Pulmonary rehabilitation programs, comprising exercise training, education, and psychosocial support, can improve exercise tolerance, respiratory muscle strength, and quality of life in individuals with eosinophilic lung diseases. Long-Term monitoring by regular follow-up visits with healthcare providers, including pulmonologists, allergists, or rheumatologists, are essential for ongoing assessment of disease activity, treatment response, and potential adverse effects of medications. Periodic lung function testing, imaging studies, and biomarker monitoring help guide treatment adjustments and optimize long-term outcomes. Collaborative care involving a multidisciplinary team of healthcare professionals, including physicians, nurses, respiratory therapists, dietitians, and social workers, facilitates comprehensive evaluation and management of eosinophilic lung diseases. Shared decision-making, patient education, and support services are integral components of multidisciplinary care models [5,6].

## Conclusion

In conclusion, eosinophilic lung diseases represent a heterogeneous group of respiratory conditions characterized by eosinophilic inflammation

and tissue damage. Diagnosis requires a systematic approach integrating clinical evaluation, laboratory testing, imaging studies, and sometimes invasive procedures. Management strategies focus on reducing inflammation, controlling symptoms, and improving quality of life through pharmacotherapy, allergen avoidance, smoking cessation, pulmonary rehabilitation, and long-term monitoring. Multidisciplinary collaboration and patient-centered care are essential for optimizing outcomes and addressing the complex needs of individuals with eosinophilic lung diseases. Ongoing research efforts are needed to elucidate the underlying mechanisms, identify novel therapeutic targets, and improve the long-term prognosis of these challenging respiratory disorders.

## Acknowledgement

None.

## Conflict of Interest

None.

## References

1. Mycroft, Katarzyna, Rafał Krenke and Katarzyna Górka. "Eosinophils in COPD—Current concepts and clinical implications." *J Allergy Clin Immunol Pract* 8 (2020): 2565-2574.
2. Trivedi, S. G. and C. M. Lloyd. "Eosinophils in the pathogenesis of allergic airways disease." *Cell Mol Life Sci* 64 (2007): 1269-1289.
3. Nakagome, Kazuyuki and Makoto Nagata. "Possible mechanisms of eosinophil accumulation in eosinophilic pneumonia." *Biomolecules* 10 (2020): 638.
4. Carpentier, Caroline, Liliane Schandené, Laurent Dewispelaere and Pierre Heimann, et al. "CD3- CD4+ lymphocytic variant hypereosinophilic syndrome: diagnostic tools revisited." *The J Allergy Clin Immunol Pract* 9 (2021): 2426-2439.
5. Skolnik, Neil S. and Sean P. Carnahan. "Primary care of asthma: New options for severe eosinophilic asthma." *Curr Med Res Opin* 35 (2019): 1309-1318.
6. Castro, Mario, Sameer Mathur, Frederick Hargreave and Louis-Philippe Boulet, et al. "Reslizumab for poorly controlled, eosinophilic asthma: A randomized, placebo-controlled study." *Am J Respir Crit Care Med* 184 (2011): 1125-1132.

**How to cite this article:** Harle, Amelie. "Eosinophilic Lung Diseases: From Diagnosis to Management." *J Pulm Respir Med* 14 (2024): 678.