

WHAT IS EOSINOPHILIC ASTHMA?

Eosinophilic asthma is a subtype of asthma that is often severe. It is commonly seen in people who develop asthma in adulthood, although it may occur in children and young adults.

Asthma is a chronic lung disease in which diseased airways are infiltrated by inflammatory cells (and thus thickened) and obstructed by fluid and mucous. This causes spasms in the bronchial tubes, making breathing difficult. Asthma may result from an allergy or other hypersensitivities; however, many patients who have eosinophilic asthma do not have a history of allergic conditions (e.g., hay fever, food allergy, eczema, or other allergic conditions).

In eosinophilic asthma, the numbers of eosinophils are increased in blood, lung tissue, and in mucus coughed up from the respiratory tract (known as sputum). The whole respiratory tract is involved in airflow obstruction from the sinuses to the small or distal airways. Patients with eosinophilic asthma frequently suffer from chronic sinus disease and nasal polyposis.

Research has shown that an elevated number of eosinophils in the blood correlates with future risk and severity of asthma attacks.

Asthma can range in severity and treatment may vary from patient to patient. To help outline the best course of treatment for an asthmatic patient, it is important for a health care provider to determine which subtype of asthma a person might have, because there are now new therapies that target specific subgroups of asthma, like eosinophilic asthma.

ABOUT APFED

Founded in 2001, the American Partnership for Eosinophilic Disorders (APFED) is a 501(c)(3) nonprofit organization with a mission to passionately embrace, support, and improve the lives of patients and families affected by eosinophil-associated diseases through education and awareness, research, support, and advocacy. To learn about the impact we are making in these areas, visit our website at apfed.org.

Our work is funded by grants, membership dues, and donations. If they wish, donors may choose to direct their gifts to specific programs, such as research or education.

APFED operates with integrity and transparency in accordance with nonprofit guidelines. APFED is an accredited charity of the BBB Wise Giving Alliance and is a Platinum Member of GuideStar. View our independently audited financial reports and annual reports on guidestar.org and apfed.org. On average, APFED directs more than 85% of its annual revenue to programs and services. This is 20% higher than the BBB Wise Giving Alliance standard of 65%.

Visit apfed.org for educational materials, community news, or information about events such as APFED's annual patient education conference and National Eosinophil Awareness Week (third week of May). To enroll in Eosinophil.Connect Patient Registry, visit apfed.org/connect.



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JOIN US

Become a member of APFED to stay up to date on news and initiatives related to eosinophil-associated diseases. For information about membership and benefits or to make a donation to support our work, visit apfed.org.

ACKNOWLEDGMENT

Support for the development of this brochure was provided by an unrestricted educational grant to PVI, PeerView Institute for Medical Education, and Icahn School of Medicine at Mount Sinai from Teva Pharmaceuticals.

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Printed 03/2020

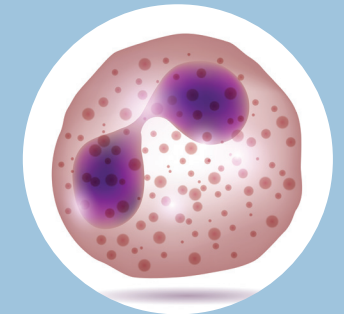
EOSINOPHILIC ASTHMA



WHAT IS AN EOSINOPHIL?

Eosinophils are a type of white blood cell that are important to our immune system, helping us to fight off certain types of infections.

Many different problems can cause high numbers of eosinophils in the blood including allergies (food and environmental), parasitic infections, and certain cancers, to name a few.



WHAT ARE THE SYMPTOMS OF EOSINOPHILIC ASTHMA?

People with eosinophilic asthma typically have the following symptoms:

- Wheezing
- Coughing
- Shortness of breath/difficulty breathing
- Chest tightness
- Lung function abnormalities (airflow obstruction)
- Chronic rhinosinusitis with nasal polyps
- Inflamed nasal mucous membrane

Symptoms are often severe and can be persistent.



CONNECTING THE EOSINOPHILIC COMMUNITY

HOW IS EOSINOPHILIC ASTHMA DIAGNOSED?

The diagnosis of eosinophilic asthma may be made by measuring the number of eosinophils in a patient's blood. Because other subsets of the eosinophil-associated disease may cause elevated blood eosinophils, including hypereosinophilic syndromes, results must be interpreted in context with the patient's history, reported symptoms, and clinical evaluation. The blood draw (venipuncture) is a minimally invasive procedure and may be performed in a doctor's office.

Eosinophilic asthma can also be diagnosed by examining a patient's sputum sample under a microscope. To get the sample of sputum for testing, a patient coughs up a mucous sample. This procedure is non-invasive and may be performed in a doctor's office.

A third way to diagnose eosinophilic asthma is by examining a bronchial biopsy or bronchial fluid from the lung. This procedure is invasive. To perform it, a doctor who specializes in lung disease (pulmonologist) performs a bronchoscopy by inserting an instrument called a bronchoscope through the nose or mouth. Several small samples of tissue (or fluid) are collected (biopsy) and are then analyzed to determine the infiltration of eosinophils. The procedure is performed under anesthesia (or conscious sedation) and may require a hospital stay.

Clinical symptoms and how well a patient responds to treatments also guide the diagnosis.

Eosinophilic asthma may be misdiagnosed as chronic obstructive pulmonary disease (COPD), which is characteristic of cigarette smokers.

HOW IS EOSINOPHILIC ASTHMA TREATED?

When treating eosinophilic asthma, the goal is to reduce the eosinophils in the airways and control a person's breathing. Many patients who have eosinophilic asthma respond to typical asthma therapies, including inhaled and/or oral corticosteroids and long-acting

bronchodilators. Other patients may have symptoms that are resistant to these therapies.

Biologic therapies that target eosinophils may also be prescribed to treat eosinophilic asthma. Biologics that are currently approved for use in the U.S. include:

- **Benralizumab** is a humanized monoclonal antibody. It blocks the action of interleukin-5 (IL-5), a signaling protein that is part of the immune system. It binds to the IL-5 receptor on eosinophils. It also targets natural killer cells, which are a type of white blood cell, to deplete eosinophils. It is approved for use in the U.S. for the add-on maintenance treatment of patients with severe asthma aged 12 and older with an eosinophilic phenotype of asthma. It is used in combination with other asthma medications.
- **Dupilumab** is an interleukin-4 (IL-4) and interleukin-13 (IL-13) inhibitor. It binds to the IL-4alpha receptor. It is approved as add-on maintenance therapy in patients with moderate-to-severe asthma aged 12 years and older with an eosinophilic phenotype or with oral corticosteroid-dependent asthma. It is also approved for those with severe atopic dermatitis and/or chronic sinusitis with nasal polyposis.
- **Mepolizumab** is a humanized monoclonal antibody. It recognizes and blocks IL-5. It is approved for use in the U.S. to treat patients aged 6 or older who have eosinophilic asthma. It is used in combination with other asthma medications.
- **Reslizumab** is another anti-IL-5 monoclonal antibody. It is approved for use in the U.S. as an add-on treatment for patients aged 18 years or older who have eosinophilic asthma.

In contrast to the above therapies that directly reduce the ability of the bone marrow to produce eosinophils, omalizumab is a monoclonal antibody directed against the allergy antibody, IgE that results in reduction of eosinophilia because of lessening of allergic reactivity (and, in fact, parts of omalizumab's benefit, might be due to this reduction). While not approved for eosinophilic asthma, omalizumab has shown positive benefit in



patients with eosinophilic asthma, with greater success in patients with higher eosinophil counts. It is approved for use in the U.S. to treat moderate to severe persistent allergic asthma in patients aged 6 years or older with a positive skin test or in vitro reactivity to a perennial aeroallergen and symptoms that are inadequately controlled with corticosteroids. However, most patients with the eosinophilic subtype of asthma do not have IgE-mediated allergy, and therefore, most will not benefit from omalizumab.

WHAT CAUSES EOSINOPHILIC ASTHMA?

The cause of eosinophilic asthma is unknown. Patients with eosinophilic asthma do not typically have underlying allergies (e.g., pollen, dust mites, smoke, pet dander) that trigger asthma symptoms.

WHO IS AFFECTED BY EOSINOPHILIC ASTHMA?

The exact prevalence of eosinophilic asthma is unknown; however, it is estimated that approximately 10% of all asthma is categorized as severe. Eosinophilic asthma is most commonly diagnosed in adults 35-50 years old, although it is sometimes seen in even older adults and pediatric patients. Eosinophilic asthma equally affects males and females.

Other Resources

- APFED, apfed.org
- Asthma & Allergy Foundation of America, aafa.org
- Allergy & Asthma Network, allergyasthmanetwork.org

WHAT IS THE PROGNOSIS?

People who have asthma may experience a decline in lung function faster than people who do not have asthma. This is particularly true for people who smoke and those who have not managed their asthma well.

Death from asthma is rare, especially if a person is receiving proper treatment. Most asthma fatalities are preventable.

Asthma can be debilitating and asthma-related episodes can be frightening. Uncontrolled asthma may interfere with daily activities, such as school and work.

Many patients with eosinophilic asthma are able to manage their symptoms with inhaled or oral steroids; however, some patients experience persistent asthma attacks that are relatively resistant to typical treatments. New and emerging biologics that target eosinophils may help these patients to fully control their asthma.

As with other subsets of asthma, patients who have eosinophilic asthma should receive ongoing medical care to maintain optimum health.