

Title: "Chronic Bronchial Asthma: A Case Study of Recurrent Symptoms, Pulmonary Function Abnormalities, and Therapeutic Management"

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Abstract:

This case study examines a 40-year-old male presenting with recurrent respiratory symptoms consistent with bronchial asthma exacerbation, including breathlessness, cough, and chest tightness. With a history of similar episodes over five years, the patient was diagnosed with Bronchial Asthma. Investigation revealed an elevated eosinophil count, mild obstruction in pulmonary function tests, and significant post-bronchodilator reversibility in Forced Expiratory Volume₁ (FEV₁). Despite a normal CT chest, prompt treatment with antibiotics, bronchodilators, steroids, and inhalers yielded positive outcomes. This case underscores the importance of early diagnosis, appropriate investigations, and tailored therapy in managing bronchial asthma effectively. Comprehensive management, including ongoing symptom monitoring, pulmonary function testing, and patient education, is essential for long-term control. Collaboration between patients, healthcare providers, and communities is crucial for optimal asthma management and improved quality of life.

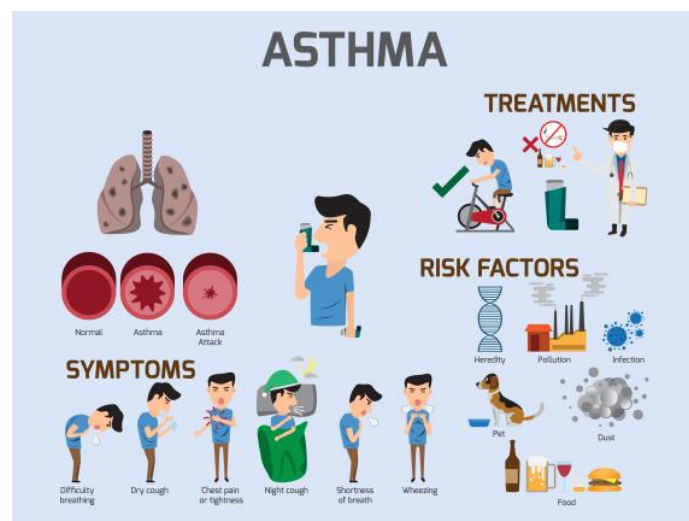
Introduction:

Asthma is a common chronic lung disease in which the airways (bronchi) become inflamed and are abnormally sensitive to certain triggers. Asthma can affect people of all races and ages, and although there is no known cure, there are many ways to control it. The

symptoms of asthma include coughing, shortness of breath, wheezing and chest tightness. (1)

Asthma afflicts more than 350 million people worldwide and is the most common chronic disease of childhood (2). The prevalence of asthma has been rising for the past three decades [4]. Additional research is needed to better understand the earliest origins of asthma, the causes of exacerbations, and reasons for its rising prevalence in many countries (3). Elimination is a distant vision.

Definition of Bronchial Asthma: Asthma is a disease characterized by episodic airway obstruction and airway hyperresponsiveness usually accompanied by airway inflammation. In most cases, the airway obstruction is reversible, but in a subset of asthmatics, a component of the obstruction may become irreversible. In a large proportion of patients, the airway inflammation is eosinophilic, but some patients may present with differing types of airway inflammation, and in some cases, there is no obvious evidence of airway inflammation. (4)



Epidemiology of Asthma: (5)

The prevalence of asthma varies widely among countries/geographical regions and also within countries with different geographies and socioeconomic strata 6,7. The Indian Study on Epidemiology of Asthma, Respiratory Symptoms and Chronic Bronchitis in Adults (INSEARCH) estimated the national burden of asthma at 17.23 million with an overall prevalence of 2.05% (8). The recent Global Burden of Disease (GBD, 1990–2019) estimated the total burden of asthma in India as 34.3 million, accounting for 13.09% of the global burden (9). It also attributed that there were 13.2 per thousand deaths due to asthma in India (9). Asthma accounted for 27.9% of disability-adjusted life years (DALYs) in the Indian population (9). On the whole, India has three times higher mortality and more than two times higher DALYs compared to the global proportion of asthma burden. The

disproportionate mortality and morbidity can be explained by global studies with uniform methodology.

Types of Asthma: (10)

Asthma is broken down into types based on the cause and the severity of symptoms.

Intermittent: This type of asthma comes and goes so you can feel normal in between asthma flares.

Persistent: Persistent asthma means you have symptoms much of the time. Symptoms can be mild, moderate or severe. Healthcare providers base asthma severity on how often you have symptoms. They also consider how well you can do things during an attack.

Asthma has multiple causes:

Allergic: Some people's allergies can cause an asthma attack. Allergens include things like molds, pollens and pet dander.

Non-allergic: Outside factors can cause asthma to flare up. Exercise, stress, illness and weather may cause a flare.

Asthma can also be:

Adult-onset: This type of asthma starts after the age of 18.

Pediatric: Also called childhood asthma, this type of asthma often begins before the age of 5, and can occur in infants and toddlers. Children may outgrow asthma. You should make sure that you discuss it with your provider before you decide whether your child needs to have an inhaler available in case they have an asthma attack. Your child's healthcare provider can help you understand the risks.

In addition, there are these types of asthma:

Exercise-induced asthma: This type is triggered by exercise and is also called exercise-induced bronchospasm.

Occupational asthma: This type of asthma happens primarily to people who work around irritating substances.

Asthma-COPD overlap syndrome (ACOS): This type happens when you have both asthma and chronic obstructive pulmonary disease (COPD). Both diseases make it difficult to breathe.

Pathology, Pathophysiology and Pathogenesis of Asthma

Asthma is a chronic inflammatory condition of the airways characterized by episodes of wheezing, breathlessness, chest tightness, and coughing.

1. *Pathology:* Asthma involves inflammation of the airways, which leads to narrowing and obstruction of airflow. This inflammation is characterized by an infiltration of various immune cells, including eosinophils, mast cells, T lymphocytes, and macrophages. Structural

changes such as airway remodeling, including thickening of the smooth muscle layer and increased mucus production, may also occur over time.

2. *Pathophysiology*: The pathophysiology of asthma involves a complex interplay of genetic, environmental, and immunological factors. Triggers such as allergens, respiratory infections, exercise, cold air, and irritants can activate the immune response in susceptible individuals, leading to airway inflammation and hyperresponsiveness. This inflammation causes the airway walls to swell and produce excess mucus, leading to narrowing of the airways and symptoms of asthma.

3. *Pathogenesis*: The exact pathogenesis of asthma is not fully understood, but it is believed to involve a combination of genetic predisposition and environmental factors. Genetic susceptibility may contribute to abnormalities in the immune system and airway structure, while environmental factors such as allergens, pollution, and respiratory infections can trigger or exacerbate asthma symptoms by inducing airway inflammation and hyperresponsiveness.

Overall, asthma is a complex and multifactorial condition with a wide range of contributing factors, making it challenging to fully understand and treat.

Clinical Manifestation: (11).

Asthma is characterized by repetitive episodes of wheezing, dyspnea, chest constriction, and coughing. Mucus may be expelled from the lungs via coughing but is often difficult to expel. Following an asthma attack (exacerbation), it may appear purulent due to elevated levels of eosinophils, a type of white blood cell. Symptoms typically worsen during nighttime and early morning or in reaction to physical exertion or cold temperatures. Some individuals with asthma seldom encounter symptoms, usually triggered, while others may react frequently and readily, enduring persistent symptoms.

Asthma diagnosis typically relies on observing symptom patterns, gauging the effectiveness of treatment over a period, and conducting spirometry lung function tests. The categorization of asthma is determined by the frequency of symptoms, the measure of forced expiratory volume in one second (FEV1), and the peak expiratory flow rate. Additionally, asthma can be classified as either atopic or nonatopic, with 'atopy' denoting a predisposition to develop type 1 hypersensitivity reactions, such as allergies. Essentially, this classification system helps healthcare professionals to better understand and manage the condition, tailoring treatment approaches accordingly based on individual patient characteristics.

Yes, that danger cannot be overlooked. Inadequately managed asthma exacerbates over time, and the pulmonary capacity of individuals with untreated asthma diminishes compared to those without asthma. Recent advancements in asthma therapy haven't undergone sufficient long-term observation to conclusively determine whether treated asthma leads to accelerated lung function decline as individuals age. Nonetheless, the consensus among most asthma specialists is that consistent, preemptive asthma management can halt the progression of asthma and safeguard pulmonary function.

Preventive Measures: (11)

Creating an asthma management strategy with your healthcare provider empowers you to regulate your condition rather than allowing it to dictate your life. This personalized plan should enable you to:

1. Engage in physical activities without experiencing asthma flare-ups.
 - This means being able to exercise or play sports without the fear of triggering asthma symptoms like coughing, wheezing, or shortness of breath.
2. Participate fully in exercise and sports.
 - You should be able to enjoy physical activities to the fullest extent without limitations imposed by asthma, allowing you to maintain a healthy lifestyle.
3. Enjoy uninterrupted sleep without asthma disturbances.
 - A well-controlled asthma plan ensures that you can sleep soundly through the night without being awakened by coughing fits or breathing difficulties.
4. Attend school or work consistently.
 - With asthma well-managed, you can attend school or work regularly without frequent absences due to asthma exacerbations.
5. Maintain optimal lung function.
 - The goal is to keep your lungs as clear as possible, allowing for easy breathing and preventing the buildup of mucus or inflammation that can obstruct airflow.
6. Minimize or eliminate side effects from asthma medications.
 - By tailoring your treatment plan, you can reduce the risk of experiencing adverse effects from asthma medications, ensuring comfort and safety while managing your condition.
7. Avoid emergency visits or hospitalizations.
 - With a comprehensive asthma management plan in place, the aim is to prevent severe asthma attacks that necessitate emergency medical care or hospitalization, promoting stability and peace of mind."

long-term outlook:

The outlook for adult asthma, in terms of long-term expectations, is not as widely understood as that of chronic obstructive pulmonary disease (COPD). While it's possible for asthma to go into complete remission, this occurrence is uncommon and typically seen in severe cases and older individuals. Certain asthmatic patients may experience lasting damage to lung function, especially if they smoke. This impairment can become permanent and have lasting effects on respiratory health.

Study Type: Observational Retrospective case study.

Case Study

40 years male patient history of Breathlessness and Cough with chest tightness for 15 days. History of repeated episode of above symptoms since last 5years and he has been diagnosed as Bronchial Asthma. Investigation CBC eosinophils count increased 8.6, CT chest no significant abnormality detected, Pulmonary Function test : Mild Obstruction, Significant Post Bronchodilator reversibility in Forced Expiratory Volume1FEV1 and small airways and advised for DLCO. Patient responded to Antibiotics, Bronchodilator and Steroids, inhaler steroids and Bronchodilator give.

Discussion: 40-year-old male with a history of bronchial asthma, presented with breathlessness, cough, and chest tightness for 15 days. This exacerbation is consistent with asthma symptoms. The history of repeated episodes over the past 5 years suggests chronicity.

The elevated eosinophil count in the CBC indicates an allergic component to the asthma exacerbation, which is common in asthma exacerbations. The normal CT chest suggests no structural abnormalities such as pneumonia or pneumothorax.

The pulmonary function test showing mild obstruction and significant post-bronchodilator reversibility in FEV1 indicates reversible airway obstruction, which is characteristic of asthma. DLCO testing would help assess gas exchange and lung function further.

The patient's positive response to antibiotics, bronchodilators, and steroids supports the diagnosis of asthma exacerbation. Inhaler steroids and bronchodilators are indicated for long-term management to prevent future exacerbations.

In summary, this case highlights a typical presentation of bronchial asthma exacerbation in a middle-aged male with a history of recurrent episodes. Proper management with medications targeting inflammation and bronchoconstriction is essential for controlling symptoms and preventing future exacerbations. Long-term follow-up and patient education on trigger avoidance and proper medication use are crucial for optimal asthma control.

In conclusion, the case study illustrates a 40-year-old male with a history of bronchial asthma experiencing an exacerbation characterized by breathlessness, cough, and chest tightness. The patient's history of recurrent episodes over the past 5 years, along with elevated eosinophil count and pulmonary function test findings consistent with asthma, supports the diagnosis. The absence of significant abnormalities on CT chest suggests no structural lung disease. Prompt treatment with antibiotics, bronchodilators, and steroids resulted in symptom improvement. Long-term management with inhaler steroids and bronchodilators is essential to prevent future exacerbations. This case underscores the importance of proper diagnosis, treatment, and long-term management in optimizing outcomes for patients with bronchial asthma.

Summary:

The patient, a 40-year-old male, presents with a history of breathlessness, cough, and chest tightness for 15 days. He has a history of repeated episodes of similar symptoms over the past 5 years and has been diagnosed with Bronchial Asthma. Investigations revealed an

increased eosinophil count in the CBC, while CT chest showed no significant abnormalities. Pulmonary Function Test indicated mild obstruction with significant post-bronchodilator reversibility in Forced Expiratory Volume₁ (FEV₁) and small airways, with a recommendation for DLCO testing. The patient responded well to antibiotics, bronchodilators, steroids, and inhalers.

Message

1. Community Message:

"Understanding bronchial asthma is crucial for our community's health. If you experience symptoms like breathlessness, cough, or chest tightness, it's essential to seek medical attention promptly. Early diagnosis and proper management can significantly improve your quality of life. Let's raise awareness and support those affected by asthma in our community."

2. Clinical Message:

"In this case study, a 40-year-old male with a history of bronchial asthma presented with recurrent respiratory symptoms. Key findings included increased eosinophil count, mild obstruction in pulmonary function tests, and significant reversibility post-bronchodilator therapy. Treatment with antibiotics, bronchodilators, steroids, and inhalers led to a positive response. Clinical vigilance, appropriate investigations, and tailored therapy are vital in managing bronchial asthma effectively."

3. Way Forward:

"The case underscores the importance of comprehensive management in bronchial asthma. Moving forward, continued monitoring of symptoms, regular pulmonary function testing, and DLCO testing as recommended will help assess disease progression and treatment response. Emphasizing patient education, adherence to medication, and avoidance of triggers are essential for long-term control. Collaborative efforts between patients, healthcare providers, and the community are pivotal in achieving optimal outcomes in managing bronchial asthma."

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