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Effect of GERD on response to asthma treatment: A literature review

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Abstract

Asthma and Gastroesophageal Reflux Disease (GERD) are two conditions that are often found together, with the prevalence of GERD in asthma patients being higher than in the general population. The pathophysiological relationship between these two conditions is complex and influences each other. GERD can worsen asthma symptoms, increase the frequency of exacerbations, and reduce the effectiveness of asthma treatment. On the other hand, asthma can also worsen GERD symptoms through the mechanism of increased intra-abdominal pressure and the side effects of certain asthma medications. This literature explores pathophysiological mechanisms, the influence of GERD on asthma treatment, and management strategies that can improve asthma control. However, further research is needed to clarify the mechanism of the relationship between these two conditions and optimize treatment strategies.

Keywords: Asthma; GERD; Relationship; Treatment; Management

1. Introduction

Asthma is a heterogeneous disease in the form of chronic inflammation of the airways due to bronchial spasm which causes difficulty breathing (1,2,3). As a global health problem, asthma generally affects 1–18% of the population in various countries with a high probability that by 2025, another 100 million would be affected (3,4). Asthma management is an important aspect in efforts to optimize care and improve patient quality of life. The severity of asthma can be evaluated through symptoms and events characterized by worsening of the condition and decreased respiratory function compared to previous status, otherwise known as exacerbations (5,6). Research showed that the number of asthma exacerbations was higher in patients with uncontrolled asthma. The results recorded that 1 patient (1.4%) had no exacerbations, 30 patients (27.3%) experienced exacerbations 1-4 times, and 28 patients (63.6%) experienced exacerbations 5-10 times (7).

One of the comorbidities that is often found in asthma patients is Gastroesophageal Reflux Disease (GERD), a condition in which stomach contents flow back into the esophagus and cause irritation (8,9). Research shows that the prevalence of GERD in asthma patients is higher than in the general population, ranging from 30-80% (10). Asthma and GERD can have a significant impact on a patient's quality of life. The prevalence of GERD in patients was found to be higher in patients with uncontrolled asthma. Uncontrolled asthma may be a potential risk factor for exacerbations (11). Meanwhile, repeated exacerbations tend to be experienced by severe asthma patients and determine the severity of asthma (12,13). GERD not only worsens asthma symptoms but also affects the response to standard asthma treatment, so it is important to understand this relationship in depth. This literature review aims to exploring pathophysiological mechanisms linking GERD to asthma treatment response highlights the influence of GERD on the effectiveness of asthma therapy and reviews current clinical evidence regarding the management of GERD to improve asthma control.

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2. Review Content

2.1. Pathophysiological Relationship between GERD and Asthma

Asthma is mainly driven by Th2 cells, which secrete cytokines that stimulate IgE production and attract eosinophils. This process contributes to airway inflammation, leading to structural changes in the airways, such as smooth muscle thickening, remodeling of epithelial cells, and fibrosis. Airway hyperresponsiveness can cause airway obstruction, resulting in symptoms like wheezing, shortness of breath, chest tightness, and coughing (2, 14). Gastroesophageal reflux disease (GERD) is a medical condition characterized by the abnormal backflow of stomach contents into the esophagus. This reflux can lead to a range of symptoms, including heartburn and regurgitation, and may also result in various complications that affect the esophagus (15,16)

Gastroesophageal reflux and asthma are often found side by side in a complex interaction that occurs when asthma can trigger GERD and vice versa (17,18). There are 2 theories that researchers believe are the cause of how GERD affecting asthma. Reflux theory proposes that microaspiration of acidic gastric contents stimulates effects on respiration such as coughing, whereas reflex theory suggests that the same embryological origin of the bronchi and esophagus would have similar innervation. When reflux occurs in the distal esophagus, it will induce stimulation of the vagal nerve for bronchoconstriction (8,11,19). Meanwhile, the mechanism of how asthma patients can experience GERD can be explained through the process of lung hyperinflation. Lowering of the diaphragm during lung hyperinflation and increased work of breathing increases the pressure gradient between the stomach and chest and can cause the lower esophageal sphincter (LES) to herniate into the chest so that its function as a barrier is compromised (20). In addition, bronchoconstriction causes an increase in pressure between the thorax and abdomen above the LES pressure, thereby predisposing the patient to reflux (21). In addition, various studies have shown that drugs to control and relieve asthma, including β-adrenergic agonists such as SABA, and corticosteroids can relax smooth muscles and reduce lower esophageal sphincter (LES) pressure, thereby causing reflux of gastric contents (22,23,18).

2.2. Effect of GERD on Response to Asthma Treatment

GERD can significantly impair asthma control by triggering acute exacerbations. Research found a significant relationship between exacerbations and ACT scores, namely that the lower number of exacerbations was dominant among patients who were well controlled while the higher number of exacerbations was dominant among patients who were not controlled (7). In addition, several studies examining the association of asthma exacerbations with GERD reported a significant positive association, up to a 400% increase in the odds of frequent exacerbations in patients with GERD compared with patients without GERD (24). Asthma control has become an important focus for optimizing care and improving patient quality of life. It is very important for asthma patients to maintain their treatment, either by using inhaled steroids, a combination of inhaled steroids and bronchodilators, or corticosteroid monoclonal antibody therapy without making independent dose adjustments or stopping treatment (25).

The inflammation caused by GERD can alter the structural integrity of the esophagus. The damaged mucosa may become less effective at absorbing medications, including corticosteroids. The inflammation caused by GERD can alter the structural integrity of the esophagus (26). The damaged mucosa may become less effective at absorbing medications, including corticosteroids. Corticosteroids require a healthy mucosal surface for optimal absorption; thus, when the esophagus is inflamed or ulcerated, as seen in severe cases of GERD, their bioavailability may be reduced (27). Thus, patients with GERD tend to have more frequent asthma attacks and may require more medical intervention. On the other hand, GERD can also be worsened by various medications taken by patients to treat asthma, including β-agonists and high doses of corticosteroids. These asthma drugs are involved in the pathogenesis of GERD because they increase gastric acid secretion, relax smooth muscle and reduce LES pressure thereby allowing reflux (23).

2.3. Management of GERD to Improve Response to Asthma Treatment

Management of gastroesophageal reflux disease (GERD) is crucial for improving asthma treatment outcomes, as the two conditions often coexist and influence each other. Pharmacological interventions, particularly proton pump inhibitors (PPIs). These are generally recommended as first-line treatment for GERD. PPIs like omeprazole or esomeprazole significantly reduce gastric acid production, thereby reducing symptoms of GERD and potentially alleviating asthma symptoms (18). Additionally, maintaining a healthy life style can aid in controlling reflux. Excess weight can put additional strain on the abdomen, increasing intra-abdominal pressure and contributing to GERD. Weight loss through exercise and balanced nutrition can help mitigate these pressures (28). Avoiding foods that trigger acid reflux, such as spicy or fatty foods, can help manage GERD symptoms (29). By personalizing therapy based on the patient's GERD status, it is hoped that the patient's quality of life can improve significantly.

3. Conclusion

The conclusion of this literature review shows that GERD has a significant impact on the response to asthma treatment, especially in patients with uncontrolled GERD symptoms. The pathophysiological relationship between GERD and asthma is bidirectional, where GERD can worsen asthma symptoms and reduce the effectiveness of treatment, while asthma can also worsen GERD conditions. GERD therapies, such as the use of medications and lifestyle modifications, have been shown to be helpful in managing GERD symptoms as well as improving asthma control in some patients, although study results are variable. Therefore, a multidisciplinary approach involving pulmonologists, gastroenterologists and nutritionists is needed to provide optimal management. Further research is needed to understand the mechanisms of the relationship between GERD and asthma and to optimize treatment approaches for patients with this comorbidity.

Compliance with ethical standards

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Disclosure of conflict of interest

No conflict of interest to be disclosed.

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