Allergic Rhinitis and Chronic Rhinosinusitis

Their Impact on Lower Airways

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KEYWORDS

• Unified airway • Inflammation • Sinusitis • Asthma • Nasal polyps

KEY POINTS

- Several inflammatory mechanisms exist that connect the upper and lower airways through infectious, allergic, and nonallergic pathways.
- Patients with the most severe disease will benefit from thorough consideration, workup, and management of coexisting upper and lower airway disease.
- Long-lasting benefits may be achieved for lower airway disease with aggressive management of the upper airways.
- Surgical treatment of the nose and sinuses is known to improve nasal airflow, sleep quality, sense of smell, and sinonasal symptoms. There are also anatomic benefits that facilitate topical drug distribution, and the potential for decreased systemic inflammation related to the underlying disease.

INTRODUCTION

The notion that coincident inflammation commonly affects both the upper and lower airways via similar mechanisms has been well established. This idea has been reinforced over recent years with both basic and clinical research findings as well as with clinical observation.

Chronic airway inflammation commonly presents clinically as allergic rhinitis (AR) and chronic rhinosinusitis (CRS) in the upper airway, and as asthma in the lower airway. These conditions often coexist in the same patient, and are seen by a variety of general and specialty practitioners including family physicians, pediatricians, internists, pulmonologists, allergists, and otolaryngologists, as well as mid-level providers

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such as nurses and physician assistants. The incidence and prevalence of these disorders are high, and for allergy and asthma appear to be increasing over time. In addition, it is common for patients complaining of upper airway symptoms to have their lower airway overlooked, and vice versa.

Because of these factors, it is important for clinicians to be aware of the relationship between these disorders and how they can affect one another, to ensure optimal diagnosis and treatment. In patients with asthma, it is important to also evaluate the upper airway for symptoms and signs of AR and/or CRS. Diagnosing and treating these upper airway disorders can have a direct impact on lower airway inflammation and are important for optimizing patient outcomes. The impact on the lower airway of these upper airway conditions and their treatment are discussed here in detail.

UNIFIED AIRWAY THEORY

The unified airway theory has several suppositions.[1] First, pathophysiologic mechanisms ought to be similar despite the distance between the upper and lower airways. Anatomically the upper and lower airways are lined entirely with the same respiratory type of ciliated, pseudostratified columnar epithelium, which includes the mucosa of the middle ear, nose, sinuses, larynx, trachea, and down to the distal bronchioles. The unified airway theory considers these distinct anatomic units as a single functional unit. Continuing along this line of reason, when a pathophysiologic process, such as inflammation, affects one anatomic unit, the same process can be stimulated in another anatomic unit. This phenomenon can occur because of a local or systemic stimulus, and presents clinically when a patient with AR and asthma presents with worsening wheezing and chest tightness after an allergy exacerbation with increased nasal obstruction. The second postulate of the unified airway theory is that as the severity of airway disease fluctuates, both the upper and lower airways are affected to similar degrees. This notion implies that when effective treatment is initiated for upper airway symptoms, lower airway symptoms are expected to improve, and vice versa. Basic science and translational clinical research have largely supported these theories.[1] Understanding the pathophysiologic mechanisms affecting the respiratory system is essential for better understanding of how to optimally treat these patients. It is beyond the scope of this article to thoroughly review the concepts of the unified airway theory, but the general concept is presented as an underlying framework for the remainder of the article.

RHINITIS AND LOWER AIRWAYS

The understanding of the relationship between rhinitis and asthma has evolved over the years to reveal some important associations. Many studies have shown that patients with rhinitis often have coexisting asthma, and that treatment of rhinitis can improve the control of asthma. In this section, the epidemiology, pathophysiology, and clinical relevance are explored in detail.

Epidemiology

AR occurs with a prevalence of somewhere between 15% and 40%,[2] making it one of the most prevalent conditions among the general population. Asthma is estimated to affect about 7% of the general population.[2] As many as 38% of patients with AR have been shown to have concurrent asthma.[3] Overall, the epidemiologic data suggest that these conditions occur together more frequently than expected for either condition alone. In addition, several studies have shown that patients diagnosed with rhinitis have a significantly increased risk of developing asthma over time.[4–6]