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Sinuses and Common Rhinologic Conditions

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Synopsis:

Some of the most common rhinologic disorders which may present to the primary care provider include disorders of hemostasis such as epistaxis or sinonasal inflammatory disorders such as allergic rhinitis and acute or chronic rhinosinusitis. This article is written with the intent to review these common rhinologic conditions for primary care providers and to summarize symptoms, diagnostic testing, differential diagnosis, and management/treatment approaches.

Keywords

Allergic rhinitis; acute rhinosinusitis; chronic rhinosinusitis; epistaxis

Introduction

Some of the most common rhinologic disorders which may present to the primary care provider include disorders of hemostasis such as epistaxis or sinonasal inflammatory disorders such as allergic rhinitis and acute or chronic rhinosinusitis. Management of these conditions varies greatly. The goal for epistaxis is to control active bleeding, elicit the underlying etiology, and to offer preventive strategies to prevent future episodes often targeting reducing nasal dryness. Allergic rhinitis is an IgE mediated disease characterized by rhinorrhea, congestion, sneezing, and nasal itching from allergen exposure. First line treatment includes avoiding known allergic triggers and intranasal steroid sprays. Acute and chronic rhinosinusitis are characterized by similar symptoms including nasal congestion, purulent rhinorrhea, facial pain/pressure, and change in sense of smell but differ in duration < 4 weeks or > 12 weeks respectively. Management for acute rhinosinusitis from viral etiology centers around symptom management while uncomplicated bacterial sinusitis may include observation versus treatment with antibiotics. Chronic rhinosinusitis in contrast is characterized by dysregulation of underlying inflammatory pathways and management centers on control of sinonasal inflammation. This article is written with the intent to review and summarize these common rhinologic conditions for primary care providers.

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Epistaxis

Symptoms—Epistaxis is often a self-limiting event that 60% of individuals experience at some point during their life¹. The degree of epistaxis one may experience however ranges from minor bleeding requiring little intervention to life threatening hemorrhage. The variance in hemorrhage may depend on multiple factors including the origin of bleeding as well as multiple patient co-morbidities such as hypertension, thrombocytopenia, anti-coagulation, underlying vascular malformations/tumors, and concurrent medication use such as steroid nasal sprays^{2,3}. Greater than 90% of nosebleeds originate in the anterior nasal cavity⁴. Here on the nasal septum there is a convergence of multiple arterial supplies known as Kisselbach's plexus. Epistaxis arising from an anterior source may be much more straightforward to control than a posterior nosebleed arising from the sphenopalatine artery posterior blood supply^{2,5}. When evaluating a patient for epistaxis it is important to take a thorough history and characterize the episode(s) of epistaxis with details such as degree of bleeding, frequency, laterality, and any resultant symptoms such as lightheadedness or syncope.

Diagnostic testing—The decision to perform diagnostic testing, if any, is predicated upon the story, physical exam findings, and contributory medical history. On presentation to the primary care provider, diagnostic analysis should include obtaining vital signs whereby tachycardia or hypotension may demonstrate disease severity or urgency for intervention. Hypertension, however, has been associated with epistaxis on meta-analysis and adequate control of hypertension may help to reduce active epistaxis in some patients as well as prevent future episodes⁶. Next, one should consider anterior rhinoscopy to examine the nasal cavities and distinguish the origin of the epistaxis. Furthermore, the primary care provider may consider obtaining a hemoglobin/hematocrit level, especially if the bleeding was severe or the patient has been symptomatic. Additional diagnostic testing may include coagulation studies for patients on anti-coagulants or for concern for a bleeding disorder³. Radiographic studies generally are not indicated as routine diagnostic work-up for epistaxis.

Differential diagnosis—The differential diagnosis of causes of epistaxis is vast. The most common cause of epistaxis is trauma from digital manipulation⁵. Additional sources of trauma include fractures or drying of nasal mucosa from air delivered via nasal cannula or exposure to non-humidified environments. Use of intranasal steroid sprays are also well known to contribute to epistaxis^{7,8}. Furthermore, the technique whereby patients apply the nasal spray may also contribute to increased episodes of epistaxis. Additional etiologies of epistaxis include nasal masses or malignancies, anti-coagulative medication or inherited coagulopathies, and platelet abnormalities². Keeping a broad differential diagnosis in regards to the etiology of epistaxis may aid in reversal of active bleeding as well as enacting means to prevent future episodes.

Management/Treatment—Initial management and treatment of epistaxis is predicated on first stopping active bleeding. As previously mentioned, >90% of episodes originate anteriorly. Therefore, gentle finger pressure should be applied to pinch the cartilaginous nasal tip so as to apply pressure to the anterior nasal septum. This should be performed for an adequate duration to achieve hemostasis and may take 15 to 20 minutes. One may also

consider an ice pack for initial first aid management although there is not strong evidence of efficacy³. If oxymetazoline is available and there are no contraindications this may be sprayed into the nasal cavity to aid in vasoconstriction and achieving hemostasis. Oxymetazoline also acts as a decongestant and should not be used for more than 72 hours to prevent rebound congestion. The use of these gentle finger pressure and oxymetazoline is adequate to stop the majority of epistaxis.

For epistaxis refractory to these initial management strategies one may consider anterior nasal packing. Anterior nasal packing is often left in place for 2–3 days prior to removal along with antibiotic administration for *Staphylococcus* coverage while the packing is in place. Depending on the etiology of epistaxis, control of hypertension or reversal of anticoagulation or correction of platelet abnormalities if applicable may also aid on achieving hemostasis. More aggressive interventions for control of epistaxis are outside the scope of this article. After achieving hemostasis, it is important to consider the etiology of the epistaxis so that preventive measures may be considered including nasal saline sprays, humidification, and night time nasal moisturizers such as Ayr gel. We typically avoid intranasal application of petrolatum ointment as a nasal moisturizer due to reports of development of exogenous lipoid pneumonia⁹. During the management and treatment process one should also consider the applicability of Otolaryngology consultation or referral¹⁰. Referral to an Otolaryngologist is particularly important in the setting of recurrent epistaxis so that nasal endoscopy may be performed to rule out more sinister causes of epistaxis. There have yet to be national guidelines developed for epistaxis although the American Academy of Otolaryngology (AAO-HNS) has announced guidelines to come in June 2019^{3,11}.

Allergic Rhinitis

Symptoms—Allergic rhinitis is an IgE mediated disease of the nasal cavity resulting from exposure of the sinonasal cavity to allergens¹². Symptoms resulting from these exposures include rhinorrhea, congestion, sneezing, and nasal itching^{13–15}. Allergic rhinitis is very common and estimated to affect 1 in 6 Americans¹⁴. Some of the most common allergens include house dust mite antigen, pollen, environmental exposures, and animal dander¹⁵. Allergic rhinitis can be divided based on the duration and degree of symptoms. Patients may suffer from symptoms year round (perennial), seasonally, and episodically. Symptoms can be further classified as intermittent (less than 4 days a week or 4 weeks per year) or persistent (more than 4 days a week or 4 weeks per year)^{13,14}. Severity may be further distinguished as mild if there is no impingement on quality of life or severe if impairment in quality of life is apparent¹⁴.

Diagnostic testing—Prior to initiating any diagnostic testing, a primary care provider should first take a complete history and perform a physical exam. This should include characterizing the symptoms, duration, and impact on quality of life as well as discussion of any known triggers. Symptoms which may suggest an alternative diagnosis than allergic rhinitis should also be elicited during the patient encounter. These findings may include epistaxis, anosmia, cranial nerve deficits, and unilateral nature of rhinorrhea¹⁴. Anterior rhinoscopy should also be performed during physical examination. While referral to an

allergist for allergy testing may be beneficial, this is typically reserved for patients with an uncertain diagnosis or those who do not respond to empiric therapy¹⁴. Skin prick testing may be performed by an allergist to ascertain specific allergic response to a battery of common perennial, seasonal, and episodic exposures. Imaging is also typically not recommended for a diagnosis of allergic rhinitis but may be considered if alternative diagnoses are considered. Referral to an Otolaryngologist may also be considered for nasal endoscopy and direct visualization of the nasal mucosa or if an alternative diagnosis is suspected.

Differential diagnosis—There are many conditions that mimic symptoms found in allergic rhinitis. As previously mentioned, these alternative diagnoses should be considered if atypical symptoms are present. This includes rhinorrhea that is present unilaterally, especially with a history of previous sinus surgery or recent trauma. There is overlap and concurrent nature between patients with allergic rhinitis as well as other chronic sinonasal inflammatory conditions such as chronic rhinosinusitis (CRS). If the patient endorses symptoms including facial pain/pressure or loss of sense of smell one should also consider a diagnosis of CRS. In addition to allergic IgE-mediated sinonasal inflammation, there are a multitude of additional possible causes of rhinorrhea, nasal congestion, and nasal itching termed non-allergic rhinitis. Some of these include drug-induced, rhinitis medicamentosa, occupational, infectious, pregnancy/hormone-related, gustatory, non-allergic rhinitis with eosinophilia syndrome, vasomotor rhinitis, or autoimmune related^{13,16,17}. Thus when taking a patient history it is also important to consider non-allergic causes of rhinitis.

Management/Treatment—When a diagnosis of allergic rhinitis is made and the allergen is known, the first step in management may be avoidance of allergen exposure. In many cases, however, this is challenging for patients to adhere to. For example, while removal of pets from the household may be beneficial for patients with an allergy to animal dander, many patients are reluctant to do so¹⁴. Additional approaches that may reduce allergen exposures include air filtration systems or allergen impermeable bed covers¹⁴ however these measures may or may not be efficacious in symptom management. Empiric medical therapy is indicated for patients with symptoms that affect quality of life. According to AAO-HNS guidelines, first-line treatment are intranasal steroids. It is important to inform patients initiating intranasal steroid use that it may take weeks to demonstrate efficacy and that these sprays should be used on a daily rather than intermittent basis to achieve maximum benefit¹⁴. The most common side effects from intranasal steroid use are epistaxis and nasal dryness. Oral second generation or intranasal anti-histamines are generally reserved for patients with nasal itching and sneezing. Patients who do not respond to empiric therapy should be referred to an allergist for allergen testing. Additional treatment approaches including subcutaneous or sublingual immunotherapy may be considered by an allergist for long term symptom control^{13,18}.

Acute and chronic rhinosinusitis

Symptoms—Rhinosinusitis is common and can affect up to 1 in 8 adults¹⁹. Acute rhinosinusitis (ARS) is defined as nasal congestion, purulent rhinorrhea, facial pain/pressure, and change in sense of smell of less than 4 week duration^{19,20}. This is in contrast to chronic

rhinosinusitis (CRS) in which these symptoms are present for greater than 12 weeks. Despite these similar set of symptoms, the pathophysiology of ARS often arises from infectious etiology (viral or bacteria) and may be influenced by predisposing factors including anatomic allergic and environmental factors whereas CRS is regarded as dysregulated endogenous Th1 or Th2 mediated inflammatory pathways. CRS has been further subdivided in the past into two main groups dependent on the absence of nasal polyps (CRSsNP) or presence of nasal polyps (CRSwNP). In spite of this simplification, the pathophysiology is far more complex and further clusters known as ‘endotypes’ have recently been described²¹. These endotype clusters are based on correlation of inflammatory cytokines including interleukin-5 and biomarkers such as IgE and albumin concentrations with phenotypes including the presence of polyps and asthma. The hypothesis is that sub-dividing patients into endotypes will help develop and identify targeted therapies for patients suffering across the spectrum of CRS pathophysiology. Another concept in sinonasal inflammatory pathology popularized over the past several decades is the unified airway²². Overlap has been noted between upper sinonasal inflammatory disease such as rhinitis and CRS and inflammatory disease of the lower airway (asthma). These diseases often occur concurrently and exacerbation of upper airway sinonasal disease may negatively impact lower airway inflammatory disease and vice versa^{22–24}. Thus patients who present to the primary care provider with sinonasal inflammatory symptoms may also be suffering from asthma²⁵.

Diagnostic testing—The diagnosis of ARS is largely clinical and supported by a complete history and physical exam with correlation of sinonasal symptoms²⁰. Anterior rhinoscopy to examine the nasal mucosa may also aid in diagnosis. Additional diagnostic testing is often not necessary in uncomplicated cases²⁰. However, imaging techniques should be considered when ocular or intracranial complications of ARS are suspected^{20,26,27}. One challenge with ARS for the primary care provider where nasal endoscopy is not immediately available is diagnostically distinguishing between ARS arising from a viral or bacterial etiology. In this setting, ARS is often assumed to arise from a bacterial etiology if symptom duration is greater than 7 to 10 days or if there is a period of improvement followed by worsening of symptoms^{20,28}. Unilateral localized pain has also been proposed as a potential signal of bacterial etiology although this is not widely accepted²⁰.

Obtaining a diagnosis of CRS is challenging in the absence of nasal endoscopy and CT imaging studies. A patient that has not responded to empiric treatment measures by the primary care provider should be referred to an Otolaryngologist so nasal endoscopy can be performed. While anterior rhinoscopy can reveal mucopurulent drainage or nasal polyposis, nasal endoscopy can allow for improved visualization as well as the ability to obtain site directed cultures²⁰. Typically an Otolaryngologist will obtain a sinus CT scan after trial of maximum medical therapy to ascertain the presence of radiographic mucosal changes resistant to medical therapy.

Differential diagnosis—Multiple diseases mimic aspects of rhinosinusitis and should be included on the differential diagnosis for ARS and CRS including allergic rhinitis, dental disease, facial pain syndromes, and headache²⁰. Although allergic rhinitis can also be characterized by nasal congestion and rhinorrhea, often the onset occurs with allergen

exposure and facial pressure/pain is uncommon. Many types of headache are known including tension, migraine, and cluster headache and should thus be considered when evaluating a patient for 'sinus' headache. Orofacial pain syndromes²⁰ should also be considered however these patients will frequently be lacking of other characteristics of rhinosinusitis. The differential diagnosis when evaluating patients who present with nasal obstruction, facial pain, and a nasal mass is also vast and includes nasal polyps, inverted papilloma, antrochoanal polyp, encephalocele, and multiple tumors such as esthesioneuroblastoma, lymphoma, and squamous cell carcinoma²⁹. A heightened awareness should be maintained when the mass is unilateral or if there are associated cranial neuropathies.

Management/Treatment—The management of ARS depends on whether the etiology is viral or bacterial. Viral rhinosinusitis is very common, generally resolves within 2 weeks, and can be associated with cough, sore throat, rhinorrhea, and nasal congestion¹⁹. Viral rhinosinusitis is often self-limiting but may progress to secondary bacterial infection in a small number of cases. Initial management of viral rhinosinusitis centers around symptom management including analgesics, decongestants, nasal saline irrigation, and consideration of intranasal steroids¹⁹. According to guidelines for uncomplicated acute bacterial rhinosinusitis, a provider should either prescribe antibiotics or offer observation if there is assurance of follow-up whereby antibiotics may be initiated if the condition fails to improve seven days after diagnosis or if their condition worsens¹⁹. If antibiotics are initiated, according to guidelines amoxicillin with or without clavulanate should be utilized for five to ten days in most adults¹⁹. Surgery for patients with acute bacterial rhinosinusitis is often reserved for patients with complications from infections or found to have an anatomic abnormality contributing to recurrent episodes.

The management of CRS differs from ARS due to differences in pathophysiology. As CRS is based on underlying dysregulation of inflammatory pathways, treatment is centered on means of controlling sinonasal inflammation³⁰. One common treatment for CRS are nasal saline irrigations. Use of nasal saline irrigations, which may be performed several times per day, has been reported to improve quality of life scores²⁰. The risks and side effects of nasal saline irrigations are minimal, however, the patient must use sterile or distilled saline as cases of primary amebic meningoencephalitis have been reported from use of contaminated water³¹. Control of sinonasal inflammation can often be achieved with a course of oral corticosteroids. However, multiple side effects including gastrointestinal, weight gain, dysregulation of blood sugar levels, among others limit the duration and frequency of oral corticosteroid use. Maximum medical therapy also includes several weeks of an antibiotic with anti-inflammatory properties. Additional therapeutic options include intranasal administration of steroids via either nasal steroid sprays or Budesonide rinses. Surgery is generally reserved for patients resistant to maximum medical therapy. Endoscopic sinus surgery allows for opening of sinonasal passages to improve intranasal administration of steroid rinses.

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Key Points:

- Epistaxis predominantly arises from an anterior nasal source and is often controlled with gentle finger pressure and oxymetazoline. Preventive measures may be used to limit recurrent epistaxis episodes.
- Allergic rhinitis is an IgE mediated disease of the nasal cavity resulting from exposure of the sinonasal cavity to inhaled allergens. Symptoms include rhinorrhea, congestion, sneezing, and nasal itching and empiric first line therapy includes intranasal steroid sprays.
- Acute rhinosinusitis is defined as nasal congestion, purulent rhinorrhea, facial pain/pressure, and change in sense of smell of less than 4 week duration and often arises from an acute viral or bacterial etiology.
- Chronic rhinosinusitis presents with similar symptoms but of greater than 12 week duration. Underlying dysregulated inflammatory pathways are at the center of chronic rhinosinusitis and treatment focuses on means of reducing sinonasal inflammation including nasal saline irrigations, corticosteroids, and prolonged antibiotics.