

A Rhinitis Primer for Family Medicine

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Abstract

Rhinitis and related problems such as facial pressure and nasal congestion are a very common reason people seek medical care. There are four, often overlapping, syndromes or conditions that account for most of what patients perceive as “nose” problems or rhinitis. These conditions are irritant rhinitis, the anterior nasal valve effect, migraine with vasomotor symptoms, and allergic rhinitis. Virtually all patients with allergic rhinitis have some concomitant irritant or nonallergic rhinitis. Many migraine sufferers with vasomotor nasal symptoms will have their nasal congestion, headaches, and runny noses exacerbated by irritant rhinitis, allergic rhinitis, and/or a preexisting nasal valve effect. Failure to consider all of the causes for the symptoms will result in poor clinical outcomes. The work-up and management of these common conditions is discussed in this article.

A Composite but Very Common Case

Ms Jones is a 35-year-old woman who has lived in San Diego for 12 years. She has had, in her own words, “sinus” since about age 15. Her family has a history of “sinus” on her mother’s side. She has noted nasal congestion that worsens when around strong odors and perfumes. She often notes a runny nose. Changes in weather and travel bother her. She is often fatigued. She had severe nasal itching and sneezing, but only for several weeks in September at age 22, the second year she was in Baltimore, MD for graduate school. She has never had significant nasal itching or sneezing in San Diego. She grew up in Boulder, CO, where she also did not note nasal itching or sneezing. She is a nonsmoker. She currently wakes up with a headache and/or has photophobia about 4 days a month. She commonly self-medicates with over-the-counter “allergy” and “sinus” preparations. She feels transiently better after 2 cups of coffee in the morning. Her multiple previous head and sinus computed tomography (CT) scans results have always been “normal” despite her obvious clinical “sinus” problems. She has received multiple courses of antibiotics over the

years, particularly when her headaches are worse after viral upper respiratory infections. If she tells her physician her “sinus” is worse, she gets a prescription of antibiotics almost every time. She has had delayed-onset rashes associated with sulfamethoxazole and amoxicillin. She saw an allergist in San Diego when she was 27, who told her she was allergic to pollens. She was given pollen immunotherapy for 3 years and noted no improvement in her symptoms. She then saw a head and neck surgeon for her nasal congestion and facial pain. A rhinoplasty was performed when she was 30. The sides of her nose now collapse when she breathes in and her nasal congestion has been worse since the operation. The rhinoplasty had no beneficial effect on her facial pain or headaches and her nose still runs. She then saw a neurologist when she was 34 years old who correctly diagnosed her with migraine and vasomotor nasal symptoms but recommended onabotulinumtoxinA injections, which she could not afford. Her head magnetic resonance imaging was normal. She then changed insurance because of her employer and she now is seeing you, her new Family Medicine physician at her new accountable care organization.

Commentary

Symptoms can have multiple underlying causes. Correctly attributing symptoms to the underlying pathophysiology can be difficult and is at the heart of clinical medicine. More time spent up front, correctly diagnosing the problem(s), helps limit return visits. This improves both the patient’s and the physician’s satisfaction. This can also help limit overtesting and overtreatment, and reduce the cost of medicine, and improve patient outcomes.

Rhinitis and related problems, such as facial pressure and nasal congestion, are a very common reason people seek medical care. Ten percent to 20% of all patients have some, if only mild, allergic rhinitis symptoms. Patients look at direct-to-consumer ads touting how “allergy” and “sinus” pills will clear their heads and alleviate their “sinus” headaches. They see ads from physicians pushing the newest “revolutionary” surgical procedure or other “therapy” to open up their sinus passages and relieve their headaches, and they want it *now*.

It is often hard to do the right thing in clinical medicine. A patient comes in to see you and “knows” s/he has a “sinus” infection because his/her face hurts. S/he essentially demands an antibiotic. Remember your oath to first do no harm. When evaluating an individual with nasal symptoms, try to avoid accepting without question the diagnosis that the patient gives you, particularly if s/he is seeing you for the first time for the problem (Table 1). If a patient tells you s/he is having a “sinus” problem and s/he is really having a migraine, you are doing them a great disservice if you do not ask a few questions to tease out the important points and then adequately treat all of the real problems. S/he will also keep coming back for the problems if they have not been addressed.

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Table 1. Clinical Pearls
Allergies itch
Antihistamines (less-sedating) only alleviate itching
Most rhinitis is irritant or nonallergic and nasal steroids do not help
Do not order food allergy tests for nasal symptoms or headaches
There is no such thing as a free lunch or a sinus headache
Migraines are often associated with vasomotor nasal symptoms
People hate to breathe through their mouth
People seek medical care for pain
People often call facial pain “pressure”
When someone seeks medical care for rhinitis, there is usually more than one thing going on
Do not treat clinically diagnosed sinusitis with antibiotics

Very Basic Nasal Anatomy and Physiology

The nose is essentially a wet, pleated filter with a rich vascular bed (Figure 1). The holes in the front of the face are the anterior nares and the narrowest point, just behind the openings, are the anterior nasal valves. Vasodilation in the head causes nasal congestion. In healthy individuals, one side of the nose is typically more vasodilated than the other and shifts on a several-hour cycle. Alternating nasal congestion is, to some degree, physiologic. Lying down increases nasal congestion because there is less gravity pulling the venous return out of the head. Everyone’s nose is more congested at night. Elevating the head of the bed reduces nocturnal nasal congestion.

The nose works to raise the humidity of inspired air to 100% relative. There has to be more blood flow to the nose, and more mucus production, to humidify cold air. An average adult nose makes about 2 cups of nasal mucus daily. The mucus normally goes down the throat and is swallowed. Some people find this irritating at times and try to spit it out. This can become a habit. “Postnasal drip” is not a pathologic condition, it is normal physiology. Throat irritation, vocal cord irritation, and associated coughing may be pathologic.

Cilia line the nasal mucosal surfaces and beat posteriorly in a coordinated fashion to clear the nose of particulate matter trapped in the mucus. It takes about 20 minutes for mucus to travel from the front of the nose to the base of the tongue. Viral infection, intranasal drug abuse, and surgery disrupt ciliary function. The paranasal sinus cavities have

no sensory nerves in their lining. This is why chronic sinusitis in individuals with immunodeficiency is not painful.

How to Approach the Workup of Patients Presenting with Rhinitis Symptoms

There are 4, often overlapping, syndromes or conditions that result in what patients perceive as “nose problems” or rhinitis (Table 2). Rhinitis is a common presenting complaint with which Family Medicine Physicians need to be familiar. Individually, these syndromes have chronic population prevalence rates of 5% to 25%. Collectively, symptoms associated with these syndromes have annual incidence rates near 100%. Most

individuals do not seek medical care for rhinitis. With clinically significant nasal symptoms bad enough that an individual seeks medical care, there is often a complex interplay between 2 to 4 of these common syndromes, with or without other rarer cofactors. This is one of the times you need to resist Occam’s razor and not account for all of the symptoms with a single diagnosis (see Sidebar: Questions Patients May Ask You about Their Rhinitis That Hint at Underlying Diagnoses). Virtually all patients with allergic rhinitis have some irritant or nonallergic rhinitis also. Many migraine sufferers with vasomotor symptoms will have those symptoms exacerbated by irritant rhinitis, allergic rhinitis, or a pre-existing nasal valve effect. About 10% of individuals with migraines have clinically significant environmental allergy, and about 25% of individuals with environmental allergy have recurrent headaches, many with migraines.

Diagnosis and Management of Irritant Rhinitis

In Southern California and other parts of the US with poor air quality, as determined by the Environmental Protection Agency, irritant rhinitis has the highest-population prevalence of all the causes of rhinitis. Irritant rhinitis is one of the main reasons that we have air-quality

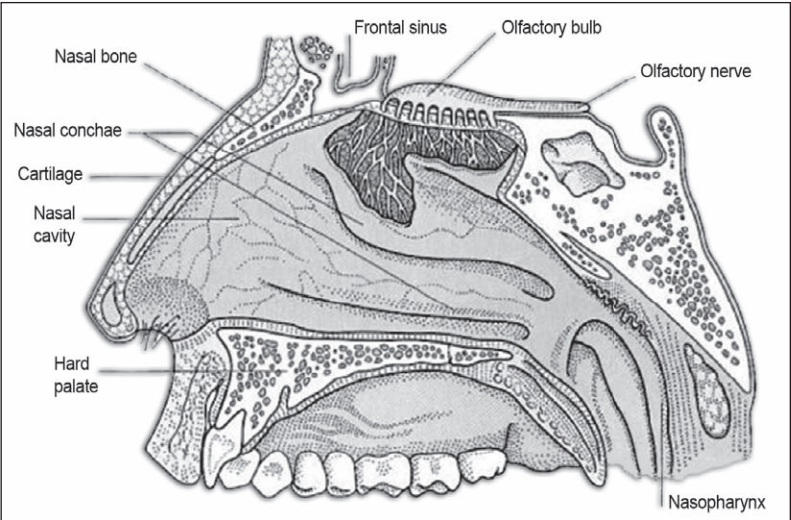


Figure 1. The nasal cavity.

Reprinted with permission [open access] from: Darling D. Nose: sagittal section of the nose [image on the Internet]. Encyclopedia of Science; 2012 [cited 2012 Sep 27]. Available from: www.daviddarling.info/encyclopedia/N/nose.html.

laws. Changes in temperature and humidity are two of the more common irritants that can also exacerbate irritant rhinitis. Irritant rhinitis is very common in patients with obstructive sleep apnea syndrome who are using continuous positive airway pressure. Other common factors associated with irritant rhinitis are particulate matter, dust, cleaning solvents, perfumes, other strong odors, and viral infections. Think of colds and clinically diagnosed rhinosinusitis as a subgroup of irritant rhinitis.

An average person catches about 4 viral upper respiratory infections per year, with children catching more colds than adults. Acute viral nasopharyngitis should never be treated with antibiotics. Antibiotics should only be used if sinus x-rays show air-fluid levels after at least 2 weeks of symptoms. True sinusitis is a rare complication of acute viral nasopharyngitis. Viral infections disrupt mucociliary clearance, and fluid can transiently accumulate in paranasal sinus cavities. If osteomeatal obstruction occurs for several days, there can

Table 2. Diagnosing common rhinitis syndromes	
Syndrome	Specific clinical symptoms and physical findings
Irritant rhinitis	Runny nose Congestion Nasal mucosal erythema
Migraine with vasomotor rhinitis symptoms	Runny nose Congestion Pain or pressure anywhere in the head Often normal nasal exam
Nasal valve effect	Nasal congestion worse with brisk inhalation Nasal congestion better when flaring the anterior nasal valve area open
Allergic rhinitis	Nasal itching Palatal itching Bilateral conjunctival itching Multiple sneezes in a row Pale nasal mucosa

be a clinically significant overgrowth of preexisting bacteria. In about 80% of individuals with clinically diagnosed rhinosinusitis, green, brown, or bloody mucus with nasal congestion, and the sensation of facial pain or fullness, symptoms clear within 2 weeks without

antibiotics. A prospective trial showed that 3 days of antibiotics work as well as 10 days of antibiotics for clinically diagnosed rhinosinusitis. A prospective trial of 240 adults in England showed neither nasal steroid and/or antibiotics significantly helped clinically diagnosed

Table 3. Primary modes of therapy for common rhinitis syndromes

Syndrome	Suggested therapy
Irritant rhinitis	Avoid irritants such as dust, fumes, smoke, smog, odors, and chemicals, and humidity and temperature changes as much as possible. Avoid chronic topical nasal decongestant use. Use nasal saline rinse (Neti pot or bulb syringe) for general irritation and excess nasal mucus. Use less-sedating antihistamines for mild itching. Use anticholinergic antihistamines for severe itching or for both itching and runny nose. Use topical anticholinergics (nasal ipratropium) for watery runny nose.
Migraine with vasomotor rhinitis symptoms	Avoid chemicals in foods that can affect blood vessel diameter or trigger migraine such as caffeine, alcohol, decongestants, tyramine in aged cheeses, nitrates, and monosodium-glutamate. Treat facial pain with pain medication. Use triptans for acute and infrequent migraine. Use divalproex sodium, sodium valproate, topiramate, metoprolol, propranolol, or timolol for migraine prevention. Use tricyclic antidepressants for frequent migraine to help reduce frequency and severity, to improve sleep, and to dry the nose through their anticholinergic side effects. Use topical anticholinergics (nasal ipratropium) for watery runny nose.
Nasal valve effect	Avoid chronic topical nasal decongestant use. No medical therapy is helpful for nasal congestion caused by a nasal valve effect. Use Breathe Right tape to prop the sides of nose open. Consider surgery to enlarge the anterior nares or stent the anterior nares open.
Allergic rhinitis	Promote allergen avoidance because it prevents all allergy symptoms. Routinely use nasal steroids to block mast cell-mediated allergic inflammation and raise the exposure threshold necessary to provoke clinical symptoms. Use less-sedating antihistamines if breakthrough itching or sneezing. Refer patient to the Allergy Department if symptoms are uncontrolled after one month of routine daily nasal steroid use.

Questions Patients May Ask You about Their Rhinitis That Hint at Underlying Diagnoses

Irritant Rhinitis

- Why does my nose bother me with exposure to perfumes, strong odors, weather changes, or smog?
- Why am I allergic to everything?
- Why do nasal steroids not help my allergies?
- Why do I catch so many colds?
- Why has my nose been irritated since I started using a continuous positive airway pressure mask for my sleep apnea?
- Why was I never allergic to anything until I moved to Los Angeles?

Migraine-Associated Vasomotor Symptoms

- Why is my nose stuffy and runny when I have frontal facial pain and pain around my eyes?
- Why do I always have sinus headaches?
- Why do weather changes, alcohol, and international travel make my allergies worse and give me headaches?

Nasal Valve Effect

- Why can't I breathe easily through my nose at night?
- Why do the sides of my nose collapse when I try to breathe in?
- Why has my nose been even stuffier since my rhinoplasty?
- Why does Breathe Right tape help me breathe better?

Allergic Rhinitis

- Why do I have nasal and throat itching with sneezing when I am around my cat?
- Why has my nose itched and I have often sneezed 6 times in a row since early childhood?
- Why did my nose and eyes itch every September when I lived on the East Coast, but not since I moved to Southern California?

There are also several much less common reasons that it is good to know a little about. These have population prevalence rates of less than 5%.

Rhinitis Medicamentosa

- Why is my nose always stuffy unless I use my over-the-counter decongestant nose spray (oxymetazoline)?
- Why is my nose even stuffier the day after I use my decongestant nose spray?

Nasal Turbinate Hypertrophy

- Why is my nose always stuffy, day and night?
- Why does Breathe Right tape not help my stuffy nose?

Nasal Polyps

- Why did my sense of smell go away 2 years ago?
- Why do I have these clear, grapelike sacks of mucus in my nose?

Nonallergic Rhinitis with Eosinophilia

- Why do nasal steroids help my runny nose and nasal congestion even though several allergists have told me I do not have any allergies?

There are many other very uncommon causes that can produce rhinitis symptoms and here are just a few of the more interesting.

Humoral Immune Deficiency

- Why have I had air-fluid levels noted on sinus x-rays and two different pneumonias noted on chest x-rays in the past 3 years?

Aspirin-Exacerbated Respiratory Disease

- Why does my nose stuff up, I get extremely short of breath, and almost die when I ingest any aspirin or any other nonsteroidal anti-inflammatory drug?

Primary Ciliary Dyskinesia

- Why do I get sinus infections, cannot have children, and my heart is on my right side?

rhinosinusitis.¹ Nasal saline rinse, oral decongestants, and pain medications are the treatments of choice for clinically diagnosed rhinosinusitis. If green, brown, or bloody mucus with nasal congestion and a sensation of facial pain or fullness persist for more than 2 weeks, then check sinus x-rays. A single Waters' view is generally adequate. Sinus CT scans should not be ordered because of the significant and unnecessary radiation exposure associated with them. If maxillary air-fluid levels or frontal or maxillary opacification is present, then amoxicillin for 10 days is generally adequate therapy. If clinical symptoms along with air-fluid levels or opacification persist 1 month later, then a referral to an allergist is a reasonable next step. Referral to the Head and Neck Surgery Department for sinus symptoms should be avoided unless there is a surgically correctable problem identified in advance. Head and neck surgeons may obtain sinus CTs before surgery, but leave it up to them.

General treatment of irritant rhinitis is based on avoiding irritants as much as possible. Nasal saline rinsing can help get the irritant particles out of the nose. Antihistamines can help with itching and sneezing. Anticholinergics can help with a watery runny nose. Nasal steroids are generally not helpful for irritant rhinitis or viral infections. Nasal steroids work by slowly depleting the nose of mast cells, the cells active in allergy. They do not help speed healing of the damage caused by viral infections or irritants. The immediate symptom relief some individuals note with nasal steroid sprays is just a rinsing effect from the propellant, which is essentially nasal saline.

Diagnosis and Management of Migraine-Associated Vasomotor Rhinitis

Vasomotor nasal symptoms occur in about 50% of individuals with underlying migraine and may be a very prominent symptom, even with relatively mild migraine pain. The key factor is identifying the underlying migraine. If there are recurrent headaches, associated with photophobia, worse with motion, and associated with nausea, the diagnosis of migraine is clear. If there is a sensation of facial pressure and nasal congestion

with a runny nose, it might not be so clear that migraine is a significant cofactor. If there are prolonged episodes of pain, verify the lack of maxillary sinus air fluid levels, via a single Waters' view sinus x-ray. Sinus x-rays should not be done for facial pain lasting hours to several days. Management of the migraine generally reduces the nasal symptoms (Table 3). A key question to ask is, "In an average month, how many days does your face hurt, or do you have pressure or pain in your head?" You will be surprised how often people suffer with migraine in silence and are happy you are addressing their real problem.

Diagnosis and Management of Nasal Congestion Associated with a Nasal Valve Effect

Look at the sides of the nose during brisk nasal inhalation. If the sides of the nose collapse, there probably is a clinically significant nasal valve effect. Perform a Cottle test. Place your fingers on the patient's face about 1 cm lateral of the anterior nares and pull gently outward while the patient is inhaling through the nose. There should be a dramatic increase in nasal airflow if there is a clinically significant nasal valve effect. Rounding out the airway in the nasal valve area, from the crushed oval shape present with a clinically significant anterior nasal valve effect into a circle, increases the cross-sectional area for airflow. If there is no significant increase in airflow and there is restricted airflow, then consider severe nasal septal deviation, turbinate hypertrophy, adenoidal hypertrophy, foreign body, or nasal polyps as the cause of nasal congestion (Table 3).

Diagnosis and Management of Allergic Rhinitis

Clinically significant environmental allergy symptoms are defined as nasal and palatal itching, sneezing, and/or conjunctivitis associated with exposure to airborne water-soluble protein allergens and the presence of antigen-specific IgE directed against those proteins. Antigen-specific IgE can be determined by prick skin testing or by enzyme-linked immunosorbent assay (ELISA) blood allergy testing. Just a positive blood allergy or

skin test result does not define clinical allergy. About half of environmental ELISA or skin-test positive individuals do not have either clinical symptoms with exposure or significant environmental exposure, thus no clinical allergy. No treatment is needed for isolated positive allergy tests without clinically significant nasal allergy symptoms (Table 3). The scale on the commercial ELISA used by Kaiser Permanente (KP) Southern California immunology laboratory runs from <0.35 kilounits of antibody per liter (KUA/L) to >100 KUA/L. Generally, values less than 1 KUA/L are not clinically significant. About 40% of 13,000 sequential environmental ELISA panels done by KP Southern California between December 2011 and April 2012 were completely negative. The ELISA panels used in KP Southern California include 2 grass pollens, 2 weed pollens, 2 tree pollens, 3 mold spores, mite, dog, cat, and roach. Only about one-third of environmental ELISA panels by KP Southern California have any significant positives. This level of positive test results is only slightly higher than what is noted in random population blood sampling. Food allergy testing does not help predict or manage nasal allergy symptoms. Ordering environmental and food allergy panels should be limited to allergists.

If a person has positive allergy test results and congestion, but no itching or sneezing, just treating the allergy with avoidance and nasal steroids will often not help the congestion. Antigen-specific IgE testing should not be done for environmental antigens that are not present where the patient is living. Skin testing a person for ragweed pollen allergy in San Diego is just as useless as ELISA testing a person for olive tree pollen in Boston. Food allergy testing should never be done for rhinitis symptoms and never done as a screening test for allergy. If you are thinking food allergy because someone has oral itching and hives when they ingest a particular food on more than one occasion, please refer them to the Allergy Department. Avoidance is probably the best treatment for environmental allergy resulting in rhinitis symptoms in Southern California. Pollen levels are generally only transiently measurable in the spring in Southern

California during wet years and, in some years, not significantly elevated at all.

Routine use of nasal steroids is the treatment of choice, after avoidance, for allergic rhinitis. The steroid nasal spray used today essentially works 2 weeks into the future. Nasal steroids deplete nasal and pharyngeal mucosa of mast cells. Since mast cells mediate the allergic reaction, intranasal steroids raise the threshold for exposure to airborne allergens necessary to provoke clinically significant nasal and pharyngeal allergy symptoms. There are no pharmacologically significant differences between any of the nasal steroid preparations. Some individuals prefer dry powders or aerosols over liquids. Cetirizine is the less-sedating antihistamine of choice. Up to 20 mg of cetirizine a day can be used in adults and 5 to 10 mg a day can be used in children. Fexofenadine and loratadine are even less effective at blocking itching, but also less-sedating. Less-sedating antihistamines are only helpful for itching and sneezing because they lack significant anticholinergic activity which helps dry up nasal secretions. Antihistamines do not significantly improve congestion.

If a person has pure allergic rhinitis symptoms, antigen avoidance and nasal steroids are very likely to completely control the itching and sneezing. If nasal steroids fail to work, something else is going on. ♦

Disclosure Statement

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will be
surprised
how often
people
suffer with
migraine in
silence ...**

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Such Little Upstart Disorders

I am suffering from my old complaint, the hay-fever (as it is called). My fear is, perishing by deliquescence; I melt away in nasal and lachrymal profluvia. My remedies are warm pediluvium, cathartics, topical application of a watery solution of opium to eyes, ears, and the interior of the nostrils. The membrane is so irritable, that light, dust, contradiction, an absurd remark, the sight of a Dissenter—anything, sets me sneezing; and if I begin sneezing at twelve, I don't leave off till two o'clock, and am heard distinctly in Taunton, when the wind sets that way—a distance of six miles. Turn your mind to this little curse. If consumption is too powerful for physicians, at least they should not suffer themselves to be outwitted by such little upstart disorders as the hay-fever.

— Letter to Dr Holland; Sydney Smith, 1771-1845, English author and Anglican cleric