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NASAL DECONGESTANTS

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ABSTRACT: A topical nasal decongestant (NDC) is widely prescribed in ENT practice and used as self-medication because it is available over the counter, which makes it an easily accessible medication. Due to its common and long-term use, it is associated with serious nasal complications. It is commonly self-administered in many otolaryngology diseases like the common cold, sinusitis, and acute or chronic rhinitis. The long-term usage of nasal decongestants is associated with significantly increased side effects.

KEYWORDS: Allergic rhinitis, Awareness, Nasal decongestants, Side effects

I. INTRODUCTION

Nasal decongestants are widely used drugs which are used to treat different ENT diseases including allergic rhinitis. These are vasoconstrictive drugs that aim to decrease nasal congestion by decreasing the size of the edematous mucous membrane. The use of these drugs is associated with side effects especially with long term use.

Allergic rhinitis is a common disease that may affect people of all ages. It is frequently misdiagnosed and mistreated. Although allergic rhinitis is not a critical illness, it is clinically diagnosed because it underlies many complications, and may affect quality of life and productivity at school or work.

Allergic rhinitis, is the most common form of atopic disease, has an estimated prevalence ranging from 5 to 22%. Perennial AR is defined as occurring during approximately 9 months of the year. AR affects 20--40 million people in the United States, and the incidence is increasing; 20% of cases are seasonal allergic rhinitis; 40% of cases are perennial rhinitis; and 40% of cases are mixed.

The pathophysiology of seasonal allergic rhinitis is complex. There is strong genetic component to the allergic response, which is driven through mucosal infiltration and action on plasma cells, mast cells, and eosinophils.^[1]

The signs and symptoms of allergic rhinitis is characterized by sneezing, nasal congestion rhinorrhea, and pruritus of the nose. Other symptoms, such as "popping" of the ears, and coughing, are less common

Lines of treatment are intranasal glucocorticoids, oral and nasal antihistamines, leukotriene-receptor antagonists, and, when pharmacotherapy is not effective or produces unacceptable side effects, we must discontinue and use other lines.

The most common line of treatment of allergic rhinitis is nasal decongestant but this type of treatment has a lot of side effect and people don't have full awareness about nasal decongestant and how to use it. Systemic and topical nasal decongestant medications are commonly used by general practice among the general population and otorhinolaryngology.

Systemic and topical nasal decongestant medications are used systemically or locally in the form of drops or nasal spray. These medications are most commonly used for opening of the airway, reduce obstruction and secretions, relieve pain in common cold, sinusitis, acute or chronic rhinitis, allergic rhinitis, nasal polyps, etc.,. However, users should be informed of the type preparation, the active substance it contains and the correct dosage regimen.^[2]

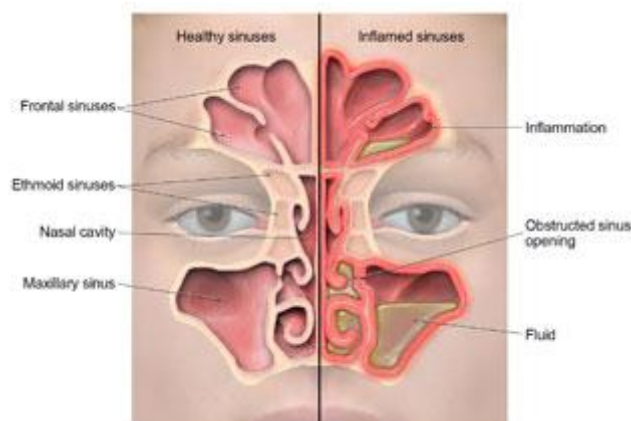
The medications that can act as sympathomimetic agents are decongestants. They cause local vasoconstriction, thereby reducing nasal mucosal obstruction and edema. Nasal decongestant drugs are alpha-adrenergic agonists such as oxymetazoline, xylometazoline, phenylephrine hydrochloride, pseudoephedrine, naphazoline, hydrochloride, tetrahydrozoline, hydrochloride, clomazone, hydroxyamphetamine, tuaminoheptane, and phenylpropanolamine, which are sympathomimetic agents that imitate sympathetic central nervous system activity in the body. Rebound congestion is characterized by decay of the sensation of nasal blockage for which skin nasal decongestants were at first recommended during rehashed use or in the wake of halting this treatment.

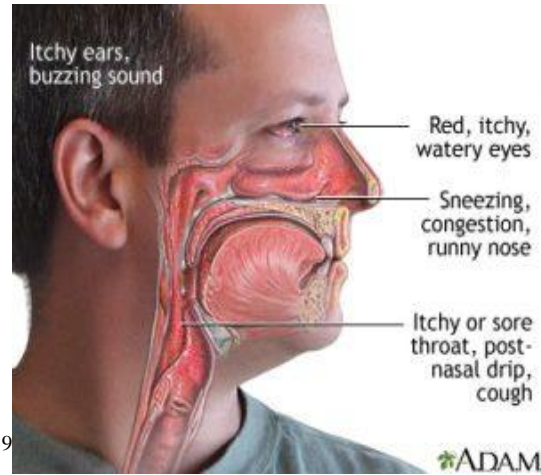
Two pharmacobiological theories have been detailed based on these investigations in solid subjects to clarify rebound congestion.

Theory 1: this impact might be because of ischemia of the nasal mucosa; incitement of α_2 receptors prompts exceptional vasoconstriction of submucosal arterioles. This ischemia would incline to the advancement of interstitial edema.

Theory 2: the quantity of film α adrenergic receptors would be diminished by downregulation and endogenous noradrenaline creation would be diminished by presynaptic negative criticism. These impacts would initiate relative dilatation of the submucosal sinusoid venous plexuses because of loss of dynamic venous vasoconstriction.

Adrenergic receptors could likewise get obstinate to nasal decongestants, making the patient increment the portions of nasal decongestants (tachyphylaxis). This wonder would be related with diminished affectability to endogenous catecholamines, particularly influencing α_1 receptor.^[3]





II. TYPES OF NASAL SPRAY

A. CORTICOSTEROID NASAL SPRAYS

The nonprescription market recently expanded with the Rx-to-OTC switch of triamcinolone acetonide nasal spray (Nasacort Allergy 24HR).¹ The product is indicated for temporary relief of the following symptoms of allergic rhinitis or other upper respiratory allergies: nasal congestion, rhinorrhea, sneezing, and nasal pruritus. This is the first nonprescription product to relieve all four of the cardinal symptoms of allergic rhinitis. Each spray delivers 55 mcg of active ingredient.

As Nasacort Allergy 24HR is the first nonprescription glucocorticoid, its labeling is radically different from that of other OTC products.¹ First, it is contraindicated in those <2 years of age, and in patients who have had an allergic reaction to any of the ingredients. Second, patients who are pregnant or breastfeeding should speak to a healthcare professional before use.

Patients who ask about the product should be directed to speak to a physician first if they have or have recently had ulcers in the nose, nasal surgery, an unhealed nasal injury, an ophthalmic infection, glaucoma, or cataracts, or if they are currently using a corticosteroid product for asthma, allergies, or a dermatologic rash.

Pharmacists may be asked to clarify the product's directions. Some specific steps are not on the outer package, but are found on a package insert that is inaccessible to the user prior to purchasing the product.² First, the spray bottle must be primed. The patient does this by removing the cap, shaking the bottle, and repeatedly pressing and releasing the spray nozzle (taking care not to point it toward the face). After a few repetitions, a fine mist will be seen, and the product is ready to use. (If the product is not used for a period of ≥ 2 weeks, the priming steps must be repeated.)

Adults and children aged ≥ 12 years should spray Nasacort Allergy 24HR twice into each nostril once daily.¹ Patients aged 6 to <12 years should spray only once into each nostril once daily and they may increase the dosage to two sprays in each nostril if allergy symptoms do not improve; however, the dosage should be reduced to one spray in each nostril once daily when the allergy symptoms have improved. Due to the complexity of this dosing process, an adult should supervise product use in patients <12 years of age.

Patients should be instructed to always shake the bottle well before use, never to use more than directed, not to double the dose if a dose has been forgotten, not to spray the product into the eyes or mouth, and to stop use and speak to a physician if symptoms do not improve.¹ They are not to use the product for the common cold^[4]

**B. DECONGESTANTS NASAL SPRAY**

Patients with nasal congestion may choose either oral or topical nasal decongestants.³ Topical nasal decongestants are formulated as inhalers, drops, or sprays. Nasal decongestant sprays contain such ingredients as oxymetazoline (e.g., Afrin), phenylephrine (e.g., Neo-Synephrine), or naphazoline (limited availability).

The label of Afrin Original Nasal Spray serves as an example of FDA-approved patient instructions for a nasal decongestant. The product provides temporary relief of nasal congestion due to the common cold, hay fever, or upper respiratory allergies. It temporarily relieves sinus congestion and pressure and also shrinks swollen nasal membranes so the patient can breathe more freely. Nasal decongestant sprays should not be used if the patient has heart disease, diabetes mellitus, hypertension, thyroid disease, or trouble urinating due to an enlarged prostate gland. Patients who are pregnant or breastfeeding should speak to their physician before use.

Package warnings caution patients not to share the container to prevent the spread of infection, and also warn users that the product may cause temporary discomfort, such as burning, stinging, sneezing, or an increased nasal discharge.

If nasal decongestant sprays are used too often and/or for an extended period of time, they can cause nasal congestion to worsen, a well-documented rebound condition known as rhinitis medicamentosa. A possible etiology behind this phenomenon is that the mechanical vasoconstriction induced by the topical decongestant allows waste products to build in nasal tissues that are also experiencing decreased oxygenation. As the product wears off, nasal tissues undergo a process known as reactive hyperemia, in which blood vessels dilate to correct the effects of the decongestant.^[5]

C. SALINE NASAL SPRAYS

Hypotonic sodium chloride nasal sprays are a third type of nonpre-prescription nasal spray. These products (e.g., Ayr, Ocean) are 0.65% sodium chloride sprays, also available as drops or gels. The products are advertised for several beneficial purposes:

- 1) relieving nasal dryness due to allergies, colds, flu, rhinitis, and sinusitis;
- 2) thinning mucus to relieve congestion;
- 3) reducing the incidence of dryness-induced nosebleeds;
- 4) moisturizing and irrigating nasal membranes after nasal surgery;
- 5) relieving dryness associated with oxygen treatments and continuous positive airway pressure (CPAP) equipment used for sleep apnea;
- 6) providing nasal moisture in cold and dry climates; and
- 7) moisturizing the nasal passages when the patient must spend time in enclosed spaces such as airplanes.

The directions for Ocean Nasal Spray are to squeeze the bottle twice in each nostril as often as needed or as directed by a physician. If the patient is an infant, the bottle can be inverted and used as a nasal drop. However, the product can be held upright to produce a spray for older children and adults.

Patients should not touch nasal mucosa while spraying these products to prevent contamination of the contents. Each bottle should only be used on one patient to prevent viral and/or bacterial cross-contamination among users.^[6]

**D. CROMOLYN NASAL SPRAYS**

Cromolyn nasal spray (e.g., NasalCrom) is indicated for prevention and relief of nasal allergy symptoms, including rhinorrhea, nasal pruritus, sneezing, and allergic stuffy nose.¹³ Patients should be advised to speak to a physician before use if they have fever, sinus pain, discolored nasal discharge, or wheezing, and are cautioned to speak to a healthcare professional before use if they are pregnant or breastfeeding. Patients >2 years of age spray the product once into each nostril and repeat three to four times daily (every 4-6 hours). If needed, the product can be used up to six times daily. For prevention, the patient can initiate pretreatment 1 to 2 weeks before exposure to the cause of allergies (e.g., pollen, mold, pets, dust mites).

Patients should be cautioned to discontinue use and contact a physician in any of the following situations: if they experience shortness of breath, wheezing, or chest tightness; if hives or swelling of the mouth or throat occurs; if symptoms worsen or new symptoms develop; if symptoms do not begin to improve in 2 weeks; or if the product needs to be used for more than 12 weeks.^[7]

E. TRIACINOLONE NASAL SPRAYS

Triamcinolone nasal spray (Nasacort Allergy 24HR) is a newly released OTC product for patients 2 years and older. It is the first nasal corticosteroid available without a prescription. Nasacort relieves symptoms of hay fever or other upper respiratory allergies, specifically nasal congestion, runny nose, sneezing, and itching of the nose. Speak to your doctor before use if you:

- 1) have a history of recent nose ulcers or nose surgery;
- 2) have a nose injury that has not healed or an eye infection;
- 3) presently have or ever had glaucoma or cataracts; or
- 4) are using a steroid medication for such conditions as asthma, allergies, or skin rash.

III. PHARMACODYNAMICS

Xylometazoline is a sympathomimetic agent that causes vasoconstriction of the nasal mucosa. In one study comprising subjects with nasal congestion associated with the common cold, the median time of onset of subjective relief of nasal congestion was about 1.7 minutes and the time of subjective peak relief of nasal congestion was 30 minutes.² Previous studies reported rebound swelling, rebound nasal congestion, rhinitis medicamentosa, and shorter duration of decongestant effect from the long-term use of xylometazoline in healthy volunteers, suggesting that the drug is most effective if used temporarily.

An early *in vitro* study demonstrated xylometazoline to exert anti-oxidant actions, where it inhibited microsomal lipid peroxidation and mediated hydroxyl radical scavenging activity. This suggests that xylometazoline has a beneficial effect against oxidants, which play a role in tissue damage in inflammation.^[8]

IV. MECHANISM OF ACTION

Nasal congestion is caused by various etiologies, such as rhinosinusitis and allergic or non-allergic rhinitis, leading to congestion of the venous sinusoids lining the nasal mucosa. Activation of α -adrenergic receptors leads to vasoconstriction of the blood vessels of the nasal mucosa and resumption of nasal airflow. As the most abundantly expressed in the human nasal mucosa, α_{1A} - and α_{2B} -adrenoceptors may play the most important role in vasoconstriction of the human nasal mucosa. Xylometazoline is a more selective agonist at α_{2B} -adrenoceptors, with affinity at α_{1A} -, α_{2A} -, α_{2C} -, α_{1B} -, and α_{1D} -adrenoceptors. Xylometazoline decreases nasal resistance during inspiration and expiration and



increases the volume of nasal airflow. Compared to [oxymetazoline](#), another imidazoline nasal decongestant, xylometazoline had a slightly faster onset of action although they had a similar duration of action. In one study, subjects with nasal congestion reported relief of earache and sore throat in addition to nasal decongestion: it is speculated that oxymetazoline mediates this effect by causing vasoconstriction of the nasal mucosa that contains the venous sinuses and nasal decongestion allows breathing through the nose, providing relief from sore throat caused by mouth breathing that dries and irritates the throats.

A. MEDICAL USES

Decongestants are used to treat [nasal congestion](#), for instance in [allergies](#), [infections](#) like the [common cold](#), [influenza](#), and [sinus infection](#), and [nasal polyps](#). Besides, decongestants are being used to treat simple conjunctivitis by reducing redness.

A 2016 [Cochrane review](#) found insufficient evidence to support the use of intranasal corticosteroids in the relief of common cold symptoms, however, the review was based on three trials and the quality of the evidence was regarded as very low.^[9]

B. CONTRAINDICATION

Many nasal decongestants are also contraindicated for patients who have glaucoma, heart problems or high blood pressure since they can increase your heart rate and blood pressure

ADVANTAGES

Nasal sprays are often preferred over oral medication because they provide fairly immediate relief of nasal congestion

C. RISKS

Though many nasal decongestants are available over-the-counter you should always check with your doctor or pharmacist before using a nasal decongestant

V. SIDE EFFECTS

A. HYPERTENSION

Lots of case reports revealed that oral sympathomimetic agents used as decongestants causes serious blood pressure elevation but published reviews about this issues suggest, the blood pressure of these agents were exaggerated.

B. ACUTE MYOCARDIAL INFARCTION

Atherosclerotic plaque rupture and thrombus formation on ruptured plaque are usually responsible for acute myocardial infarction [AMI] Etiology.

Arrhythmias

Although there are case reports which mention that therapeutic dosage of PDE is not increase the arrhythmic events there are many arrhythmic case reports with sympathomimetic agents that used as decongestant

- Headaches
- Nausea
- Nervousness
- Restlessness
- Dizziness
- Sleep issues
- sinus congestion^[10]



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VI. CONCLUSION

Nasal congestion is a very common symptom. Today's availability of nasal decongestants as OTC drugs causes the increase of their use. Many patients do not visit their family doctor/general practitioner in the case of prolonged nasal congestion, but they just keep going on with nasal decongestant therapy on their own instead. Prolonged use of decongestants may lead to rebound congestion and rhinitis medicamentosa. Use of topical and systemic decongestants should be restricted to no more than five days. It may be useful to use moisturising nasal ointments, gels or sprays simultaneously with decongestant agents to protect the nasal mucosa from drying. Potential problem is that both moisturising agents and decongestants are OTC drugs so patients may not be encouraged to buy additional medication (moisturising ointment, gel or spray) and pay more.

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