Nasal sprays: a short review

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Abstract
Numerous types of nasal sprays are available from the pharmacy, both as over-the-counter or as prescription products. These include decongestants, glucocorticosteroids, antihistamines, mast cell stabilisers, saline and antimicrobials. This article provides a brief review of nasal sprays.

Introduction
Allergic rhinitis, sinusitis and the common cold are a few common conditions that are most associated with nasal symptoms. These include congestion, itching, sneezing and rhinorrhoea, and all may be effectively managed through selection of an appropriate nasal spray.

Topical decongestants (sympathomimetics)
Ephedrine, oxymetazoline and xylometazoline offer useful adjunctive therapy for nasal congestion that is associated with rhinitis, the common cold, sinusitis, hay fever, or other allergies.1 They work by constricting the dilated blood vessels in the nasal mucosa.2 In effect, the nasal membranes shrink so that drainage of mucus and circulation of air is improved. This reduces nasal stuffiness.2 Generally, they are used two to three times daily. Paediatric preparations are also available. They provide almost immediate symptomatic relief.3,4 The decongestant effects resulting from preparations containing oxymetazoline and xylometazoline are longer lasting (up to six hours) than those containing ephedrine.2 Adverse events in adults are rare and mild, and include dryness of the nasal mucosa, temporary nasal irritation and sneezing.1,5 Nasal decongestants can cause rebound congestion (rhinitis medicamentosa), especially with prolonged use. Therefore, they should not be used for longer than three to five consecutive days.6 Decongestants may be used to provide rapid relief of allergy symptoms while waiting for the preventative treatment to take effect. Treatment of rhinitis medicamentosa includes immediate withdrawal of topical decongestants, with possible use of steroid nasal sprays, perhaps combined with oral steroids, systemic decongestants and antihistamines.6 Patients with heart disease, hypertension, thyroid disease, diabetes, or those who have difficulty urinating as a result of an enlarged prostate should use nasal decongestants with caution, and preferably under advice from a doctor.6,7 Women who are pregnant or breastfeeding should not use nasal decongestants without consulting their doctor.6

Mast cell stabilisers
Sodium cromoglycate is indicated for the prevention and treatment of seasonal and perennial allergic rhinitis.1 It is helpful in inhibiting a runny nose, sneezing, and, in mild cases, congestion. However, in more severe cases of congestion, it may not be effective.6 Sodium cromoglycate acts on mast cells to stabilise them, thereby preventing the release of histamine and other inflammatory mediators.8 It also blocks symptoms associated with immediate and late-phase nasal allergen challenge.8 It is particularly useful in individuals who experience episodic symptoms after exposure to allergens.5 It should be started at least one week before the hay fever season is likely to begin, and should then be used continuously to attain a good effect.2 One to two sprays in each nostril four times daily are required to treat seasonal allergic rhinitis.2 Sodium cromoglycate is a particularly well-tolerated medication with minimal side-effects; these usually take the form of sneezing, nasal irritation, or stinging.1,8 There are no systemic side-effects.8,9 It is more effective than placebo in the treatment of seasonal allergic rhinitis. However, most studies show it to be less effective than intranasal glucocorticosteroids or second-generation antihistamines for this indication.9 Its usefulness is limited by the need for frequent dosing and lower efficacy relative to other agents.9

Topical antihistamines
Topical azelastine and levocabastine are useful in the treatment of seasonal and perennial allergic rhinitis.1 In addition to their antihistaminic effect, they provide some anti-inflammatory relief.7 They are effective at the site of administration only for itching, rhinorrhoea, sneezing and nasal congestion.10 These topical antihistamines should be administered twice daily, and may be given to children. It is important to check the package insert for full prescription details.7 Due to the rapid onset of their action (less than 15 minutes), they can be administered “on demand”. Azelastine and levocabastine are similarly effective. Their therapeutic effects are superior to oral antihistamines for rhinitis symptoms.8,9 Compared with intranasal corticosteroids, azelastine nasal spray has a faster onset of action and a better safety profile, showing at least comparable efficacy with fluticasone propionate.12 Topical antihistamines are well
tolerated in both adults and children.\textsuperscript{12} A bitter taste, which seems to be associated with an incorrect dosing technique, is the most common side-effect reported by patients, but this problem can be minimised by correcting the way they are applied, i.e. by keeping the head tilted forward, while spraying into the nose.\textsuperscript{12}

**Intranasal corticosteroids**

Intranasal corticosteroids (INS) are available as beclomethasone dipropionate (over-the-counter) and fluticasone propionate, fluticasone furoate, mometasone furoate, triamcinolone acetonide and budesonide (prescription). The various intranasal corticosteroid nasal sprays differ with respect to delivery device and propellant, as well as potency and dosing frequency. When used daily, INS significantly reduce nasal congestion, sneezing and rhinorrhoea.\textsuperscript{1,12} They are the first choice in the treatment and prevention of seasonal and perennial allergic rhinitis.\textsuperscript{2,13}

INS inhibit allergic inflammation in the nose.\textsuperscript{2,13} They down-regulate inflammatory responses by binding to intracellular glucocorticoid receptors in the cytoplasm of inflammatory cells.\textsuperscript{2} High drug concentrations can be achieved at the receptor sites in the nasal mucosa, with a minimal risk of systemic adverse events. A meta-analysis of randomised, controlled trials found that INS produced significantly greater relief than oral antihistamines with regard to nasal blockage, nasal discharge, sneezing, nasal itch, postnasal drip, and total nasal symptoms.\textsuperscript{9}

Onset of action is six to eight hours after the first dose. Clinical improvement may not be apparent for a few days, and the maximum effect may not be apparent until two weeks later.\textsuperscript{10} Regular use is essential if the full benefit of the treatment is to be obtained, and treatment should continue throughout the allergy season.\textsuperscript{2} This information must be carefully explained to the patient to ensure compliance.\textsuperscript{2} Evidence shows that the long-term use of INS is free of the concerns associated with the long-term use of oral glucocorticosteroids.\textsuperscript{13} Patients are sometimes alarmed by the term ‘steroid’, associating it with potent oral steroids and possible side-effects. These concerns need to be taken into account, and the patient should be given an explanation about the drug and how it works.\textsuperscript{2} INS may be divided into first-, second-, and third-generation preparations. These products are equally efficacious, although the total bioavailability of second- and third-generation intranasal steroids is markedly lower than that of first-generation agents, resulting in lower risk of systemic effects: 1

- First generation: beclomethasone (unknown bioavailability);
- Second generation: budesonide (10-34\% bioavailability);
- Third generation: fluticasone propionate (< 2\%), mometasone furoate (undetectable), and fluticasone furoate (< 1\%).

The potential for systemic absorption of intranasal steroids and the resultant effect on the hypothalamic-pituitary-adrenal axis, and how it affects growth in children, has been evaluated in many studies. Most of these showed no effect, or a limited effect at recommended doses; especially the second- and third-generation agents.\textsuperscript{9} Overall, the nasal corticosteroids are well tolerated and patients experience few, if any, adverse effects.\textsuperscript{11} Local irritation of the nasal mucosa, including drying, burning, and irritation, is reported by two to ten per cent of patients.\textsuperscript{9} Formulations containing alcohol, or propylene glycol are more irritating than aqueous preparations. Preparations with once-daily dosing are convenient, and can help optimise long-term compliance. These include triamcinolone acetonide, budesonide, fluticasone propionate, mometasone furoate, or fluticasone furoate. Most intranasal glucocorticoids are used at a dose of one to two sprays in each nostril, once or twice a day. Some are licensed for use in children. However, they should not be recommended to pregnant women or anyone with glaucoma.\textsuperscript{2} INS, of any type, should be tapered to the lowest effective dose in all patients once symptoms are controlled. There is no convincing evidence that doses greater than the recommended maximum amount for each preparation increase efficacy.\textsuperscript{9}

**Nasal saline (sodium chloride)**

Intranasal administration of saline is used to treat dryness inside the nasal passages. It helps by adding moisture to the inside of the nose, which can then be used to dissolve and soften a thick or crusty mucus. In babies and young children who have stuffy noses and who cannot blow them, use of this product will help to make the mucus easier to remove with a nasal bulb syringe. This helps relieve stuffiness and makes breathing easier.\textsuperscript{4} Saline sprays can be used immediately prior to the administration of other intranasal preparations, so that the mucosa is freshly cleansed when the medications are used.\textsuperscript{4} These preparations have the advantage of being safe for daily use, and can be used in infants, children and adults. Usually, side-effects do not occur with use of this product.\textsuperscript{9}

**Antimicrobial sprays**

Fusafungine is indicated for the treatment of local infections of the nasal passages and upper respiratory tract.\textsuperscript{7} It may be used as a throat or nasal spray, and should be applied four times daily, for seven to ten days.\textsuperscript{7} Common side-effects include dryness of the nose or throat, a transient stinging sensation, sneezing, coughing, an unpleasant taste in the mouth and ophthalmic congestion.\textsuperscript{7} These side-effects do not usually necessitate discontinuation of treatment.

**Tips for proper use of nasal sprays**

Using a good technique in applying nasal sprays will help to achieve the maximum benefits provided by the medications, and to avoid certain side-effects, such as nasal bleeding.

Correct spray technique guidelines: 4

- When starting nasal steroids, clear the nasal passages with gentle nose blowing or a nasal decongestant for a few days.
- Shake the container.
- Place one finger over one nostril to close it off.
- Place the tip of the spray into the open nostril, pointing away from the nasal septum, and direct the spray straight back, not up, into the tip of your nose.
- Activate the spray, sniffing in gently and deeply as you do so.
• Exhale through the mouth.
• Repeat these steps for the other nostril.
• Never “double” spray. Always spray one nostril at a time, and alternate nostrils on each occasion.

References