

## NASAL DECONGESTION

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Clear nasal airways are essential for the proper function of the cilia and the mucous glands which are responsible for maintaining the moisture on the surface of the mucosa and the movement of foreign bodies and bacteria towards the pharynx.

Recovery from nasal and paranasal sinus disorders can very often be assisted by the use of a topical nasal preparations. For over thirty years, ephedrine has been employed for this purpose. Of proprietary preparations, more than forty are available in Great Britain. These fall into two main groups, the sympathico mimetic amines, and the imidazoline derivatives such as naphazoline, xylometazoline and oxymetazoline. Most of these have substantially greater vasoconstrictor and decongestant activity than does ephedrine but many produce the undesirable reactions of rebound congestion and habituation.

The medical practitioner will prescribe either ephedrine or one of the forty proprietary preparations. Rhinitis medicamentosa may result. The history is that of the solitary prescription of a nasal spray. Prolonged use requires the more frequent application of the preparation. The symptoms will increase in severity. Relief can only be obtained by the continued use of the preparation. Clinical examination reveals a profuse stringy mucoid nasal discharge, narrowed nasal airways with oedematous mucosa, later it more closely resembles hypertrophic rhinitis.

The syndrome of rhinitis medicamentosa may be relieved by explanation, cessation of the use of the preparation, together with such procedures as cauterisation and ionisation.

The purpose of this paper is to provide some guidance in the choice of vasoconstrictor and decongestant agents and in the manner of their use. In general three or four preparations will meet the requirements of all patients. Vasoconstriction and decongestion are apparently inevitably followed by some degree of rebound, but this is much more severe with some agents than with others. Further research will result in the production of preparations free from such side-effects.

### Recommendations

In the management of chronic rhinitis, after treating the cause, the objects should be to counteract infection, to reduce mucosal swelling, and to restore nasal airways, sinus ventilation and ciliary and seromucus gland activity. A mucous membrane shrinking agent should be rapid in onset, long lasting in effect and free from reactive hyperaemia, habituation and general reactions. It should be bland and non-irritating and cause no drying out of the mucosa.

Ephedrine 0.5-1% and naphazoline 0.1% approach the ideal. Preparations of naphazoline such as Privine and Fenox are, however, reported to be particularly liable to produce the rebound phenomenon.

The pH must be such that cell, gland and ciliary activity are not interfered with permanently. The mucous blanket covering the ciliated mucosa must be preserved or restored and its movement not unduly stayed or hastened. The recovery of normal cellular and glandular activity must be assisted, and drying out avoided.

Rapidity of onset and long duration of action are properties to be desired. The latter is of particular importance to the patient in order to provide nocturnal relief from his symptoms.

The addition of antiseptics, antibiotics, fungicides, antihistamines and steroids has been made to a number of proprietary preparations. Sensitisation and undesirable side-effects are likely to occur with each addition. Colloidal silver is still freely prescribed today. Argyrosis may result from prolonged use.

Sulphonamides and antibiotics are available in combination with some proprietary decongestants. In topical therapy, antibiotics should be employed which are unsuitable for systemic use and therefore less likely to produce sensitisation. Framycetin, neomycin, gramicidin, bacitracin, polymixin B and colomycin are suitable for combination with vasoconstrictor agents.

Some authors report that the effect of the local application of corticosteroids to the nose is disappointing. Some of the newer semi-synthetic steroids are more promising, being more soluble and possessing higher potency and penetration. Parenteral depo-medrone has proved of considerable value.

Antihistamines are available in a number of preparations and have proved of value in some cases of allergic rhinitis. They reduce sneezing and irritation. Recovery from acute coryza, influenza and the accompanying rhinitis of the acute specific fevers may be assisted by the use of nasal decongestants.

In chronic rhinitis care is required to exclude specific disorders such as syphilis, diphtheria, scleroma and both tumours and foreign bodies. Careful investigation must be carried out and treatment with decongestants may be started.

Sinusitis frequently responds dramatically to a decongestant. The general treatment of the disorder must still be undertaken, and the need for antral lavage, correction of septal deformities and other surgical procedures may still be present. With the increasing availability of more active decongestants there has been an apparent decrease in the incidence of chronic sinusitis in Britain.

Decongestants may also be useful in providing relief from inflammation of the nasopharynx and adenoid tissue; adenoidectomy may thus be postponed and temporary relief given to the patient.

Allergic disorders of the nose are not always benefited by decongestants. These patients often proceed to rhinitis medicamentosa. It would be wrong to condemn their use but there must be careful supervision of each individual case.

Decongestants are employed to prevent extension of infection from the nasal cavities. In shrinking the mucosa and thereby rendering the ostia patent, the spread of infection to the para-nasal sinuses and to the middle ear cavities and mastoid air cells may be promoted rather than prevented.

In eustachian tube infection and middle ear inflammation it is customary to prescribe a nasal decongestant. Ventilation and drainage into the nasopharynx may thus be assisted. If the technique is correctly taught then both drainage and ventilation may be assisted.

Decongestants are of particular value during the first week or ten days following nasal and sinus surgery. Some benefit may be obtained by their exhibition in the pre-operative period, particularly where inflammatory disorders are present.

It has been recommended that aircrew and passengers should not fly, even in pressurised aircraft, when they are suffering from upper respiratory tract infections, if otitic and sinus barotrauma are to be avoided. The use of a nasal decongestant, half to one hour before a descent is made, may assist in the prevention of these disorders.

In early childhood, care has to be taken to avoid overdosage and systemic effects from topical agents. Their use must be strictly limited.

Many nasal decongestants belong to the series of closely related chemical compounds possessing sympathicomimetic activity. The first of the known compounds is adrenaline.

The sympathicomimetics include adreline, ephedrine and the amphetamine derivatives. They are commonly employed as decongestant and vasoconstrictor agents, but in some instances are short acting and relatively ineffective, with marked side-effects, including reactive hyperaemia and inhibition of mucous gland secretion as well as general disturbances. Adrenaline produces maximum vasoconstriction and the greatest widening of the nasal airways but the effect does not last long and is followed by reactionary swelling. It produces inactive cilia and should not, therefore, be used except in considerable dilution. Adrenaline is, however, of value for diagnostic purposes. Ephedrine HCl, 0.5-1% in 0.9% saline, is the only nasal drop listed in the National Formulary. It approaches the ideal as regards absence of irritation and deleterious effect on cilia. Ephedrine, although slow in producing its effect, is longer in action than adrenaline.

Amphetamine and derivatives gained popularity some years ago as decongestants. Their action on the central nervous system had, however, led to their general disuse.

Preparations containing phenylephrine are popular with the patient on account of their rapid and long lasting action. They are particularly liable to lead to rebound congestion and obstruction.

Xylometazoline and oxymetazoline show a similarity to naphazoline. This similarity is more marked with tetrahydrazoline. Naphazoline and tetrahydrazoline are particularly liable to cause rebound congestion. Both these preparations produce rapid and prolonged decongestion and vasoconstriction.

Xylometazoline and oxymetazoline are two of the more recently introduced preparations. Both show promise as active vasoconstrictors with long lasting effect. There is an absence of impairment of ciliary function following the use of the former, the vasoconstriction commencing after 3 minutes, and lasting for 6 to 8 hours. Comparison with ephedrine showed xylometazoline to be markedly longer acting and associated with a much reduced incidence of hyperaemic rebound.

Oxymetazoline is more potent as a vasoconstrictor and has a longer duration

of action, than other members of the imidazoline series. In therapeutic concentrations it is non-irritant to mucous membranes.

The action of oxymetazoline persists for 3-6 hours is not complicated by local or general disturbances. Oxymetazoline is quicker in onset than xylometazoline and slower than naphazoline. It produces a marked and very long lasting decongestant effect on the nasal mucosa at a concentration lower than that of other known aqueous nasal drops.

In a recent clinical trial with oxymetazoline in fifty subjects, subjective improvement was reported by forty patients (95.2%). Sixteen patients (38.1%) appeared to have derived no objective benefit. Two patients (4.7%) reported a burning sensation within the nose.

Derivatives of imidazoline are now available that provide longer effective periods of action than do the sympathicomimetic amines when employed topically within the nose as vasoconstrictors and decongestants. Some of these preparations are apt to produce reactive hyperaemia and may give rise to rhinitis medicamentosa if their use is sufficiently prolonged. Oxymetazoline and xylometazoline are the least troublesome in this respect .

Adrenaline remains outstanding as a topical application for diagnostic purposes. The imidazoline derivatives offer more prolonged activity and relative freedom from side-effects.

### SUMMARY

In the management of chronic non-specific rhinitis nasal decongestants are commonly employed. Nasal vaso-constriction and decongestion are apparently inevitably followed by some degree of rebound, this being more severe with some agents than with others. Rhinitis medicamentosa may follow the prolonged use of such preparations.

The author has examined the commonly available nasal decongestants and has commented on their relative efficacy and their tendency to produce complications. He has proposed criteria for the choice of suitable preparations.

### RÉSUMÉ

Des dérivés d'imédazoline sont maintenant disponibles qui donnent, lorsqu'on les emploie localement dans le nez comme vasoconsticteurs et décongestives, une durée plus longue de l'action effective que les amines sympathomimétiques. Certains d'entre eux sont susceptibles d'occasionner une hyperémie réactive et peuvent provoquer une rhinite iatrogène quand leur usage est assez prolongé. L'oxymetazoline et la zylométazoline sont actuellement les moins gênants à cet égard. L'adrénaline reste marquante comme une application locale pour les buts diagnostiques.