

A Review of the Efficacy and Safety of Nasaleze™ in the Prevention and Management of Allergic Rhinitis

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Abstract: Nasaleze™ is an inert cellulose powder which has been on sale in the UK since 1994 and is used as a remedy for hay fever. It is applied to the nasal passage where it forms a gelatinous coating, thereby trapping aero-allergens and preventing the initial allergic response. Some limited clinical studies have been conducted in predominantly adults but also in children: outcome measures included the reporting of symptoms by volunteers (sneezing, itching, blocked nose, etc) using questionnaires; prevention of symptoms when challenged to aerosolized allergens; concomitant use of rescue medication and the measurement of inspiratory air flow across the mucosa as well as the release of ECP in nasal washings. The product has been reported to be safe and well tolerated by all volunteers and warrant further investigation in larger studies.

INTRODUCTION

Seasonal and/or perennial allergic rhinitis is on the increase world wide, having increased two- or three fold over the last 15 years and current prevalence studies indicate that almost 15 million individuals are affected in the UK and 50-60 million people having been diagnosed in the USA alone [1]. It is often left undiagnosed due to the heterogeneity of the presenting symptoms, notably sneezing, itching, nasal congestion and very often, rhinorrhoea. Rhinitis is possibly one of the most debilitating conditions for sufferers due to the fact that the symptoms are often so severe that medications used during such crises are not fast-acting enough to provide relief and almost always induce side-effects which prevent the users from participating in normal day-to-day activities.

Nasaleze™, is an inert, micronized cellulose powder delivered in a patented delivery system. This proprietary grade powder is registered since 1994 and is currently on sale in many countries, including the UK. It is applied to the nasal mucosa where it forms a gelatinous coating, thereby preventing the airborne allergens from triggering the release of vasoactive substances from the mast cells lining the mucosa. It can therefore be considered not only as an effective measure to prevent the initial immunological reaction but also as a management strategy for reducing the symptoms of the allergic rhinitis once triggered.

This product has recently been commercialized in South Africa and is sold mostly through health store outlets or through some prescribing clinicians. It is relatively unknown although it has been available in the UK and some European countries. A mini-review of its properties and clinical benefits was therefore necessitated and this is presented herein:

no other reviews of this product have been previously conducted.

METHODS

A computerized literature search using the National Library of Medicine's Medline database and ScienceDirect journal access was conducted and any relevant articles referring to the product was extracted. Key words used for the search included: rhinitis & cellulose powder, Nasaleze, allergen challenge & powder, inert powder & rhinitis. This search yielded 5 published papers [2-6] and 4 poster presentations at congresses. They all referred to the work conducted using Nasaleze™, the product containing an inert cellulose powder. The congress poster presentations were often abstracts of the full articles and for this reason, they were excluded from this analysis: only the data of the published literature were extracted and is presented under the following categories:

- Study designs and patient population studied
- Study outcome measures, safety and product acceptability
- Possibilities of product development

This review is no attempt to represent a meta-analysis of the published data since the literature is too limited and the study outcomes are too varied to conduct such an analysis.

RESULTS

A. Study Designs and Patient Populations Studied

Most of the published works deal with patients recruited by means of advertisements placed in national and local press media. The patients were required to complete pretrial questionnaires which pre-selected the patients based on pre-defined criteria for eligibility such as range of rhinitis symptoms, severity (requiring medication for management), time of the year when symptoms were at their worst, etc. The self-reporting questionnaire graded the patients on a point scale

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system (1 for severe uncontrolled symptoms to 5 for an indication of well-being, no symptoms): changes in any of the scores could be used to determine the eventual outcome of the interventional study.

In some studies, recruited patients participating in the study had recourse to rescue medication and this was recorded in daily journals since the use of concomitant medication was an indirect measurement of the efficacy of the Nasaleze™ product in the control of the patients' symptoms. In other studies, a new formulation (Nasaleze™ Travel) was compared to the routine preparation in the prevention of airborne infections which could have been acquired whilst traveling. Yet another study challenged volunteers to house-dust mite allergens and determined the efficacy of the Nasaleze™ product in preventing the allergic reaction. The studies are summarized hereunder in Table 1.

All of the above studies made use of selected patient population either recruited *via* the general practitioners who referred their patients to the study sites or volunteers who responded to recruitment advertisements *via* the local press. The respondents were screened for participation in the studies and the criteria used included severity of symptoms based on allergy medication history, seasonality of symptoms (pollen counts also used to determine whether the symptoms corresponded to high allergenic challenge), accessibility for follow up, etc. In most studies, compliance was never compromised and fall out from the study was minimal since most volunteers benefited from the intervention. This in itself was an indication of the efficacy of the product in controlling the symptoms. The intervention periods were relatively short (4-8 weeks) and yet, efficacy outcomes were achieved and these were reported by the authors.

Although questionnaires were used to determine study outcomes (these could be considered as biased tools to measure efficacy), some studies made use of biomarkers which provided unbiased, quantitative laboratory data to corroborate the clinical outcome measures. These are reported in the following section.

B. Study Outcome Measures, Safety and Product Acceptability

The studies made use of questionnaires which was scored by the volunteers and these recorded their sense of well-being. Some limited laboratory biomarkers of successful intervention were also recorded in some studies. Furthermore, accessibility to rescue medication during some of the studies was considered as an unbiased measurement of the ability of the product being investigated to manage the symptoms of the patients. These results are summarized hereunder (Table 2).

All of the studies clearly showed efficacy of the cellulose powder in reducing symptoms associated with either seasonal or chronic rhinitis without the need of the patient to make use of pharmaceutical drugs (although very few patients had such recourse). The most significant findings are that the product is well tolerated, safe and easy to apply. The independent measurements of efficacy included measurements of improved inspiration and expiration air flow implying that the use of the product lead to less inflammation and oedema at the mucosal surfaces. The use of the inert powder by children (and possibly pregnant women) is an added advantage: not many drugs can be used by these target populations without medical advice and warning.

The lack of significant difference in the symptoms scores between the placebo and active group in the study by Emberlin & Lewis [4] deserves some discussion: the authors reported that at the 1% significance level, no differences existed between the groups. However, at the 5% level, differences were reported by the volunteers for some symptoms such as "running nose" or "blocked nose" and this tended to correspond to days with lower pollen count days. However, these significant differences were lost when the total Likert score was compared between the groups.

C. Possibilities of Product Development

The study conducted using the cellulose powder as a carrier of bioactive molecules, in this case, an extract of garlic,

Table 1. Summary of Published Studies Making Use of Nasaleze™

Authors	Number of Patients Recruited	Patient Population	Type of Study	Duration of Study Period
Josling & Steadman (2003)	102 (66 females, 36 males).	Adults (mean age = 44 yrs): reporting seasonal rhinitis.	Open labeled: volunteers compared present product to previously used drugs.	6 weeks.
Aivazis W <i>et al.</i> (2005)	100 (47 girls, 53 boys).	Children (age range 1.5 – 18 years, mean age = 7.96 years).	Open labeled: measurement of mucociliary clearance in allergic rhinitis pre- and post therapy with Nasaleze™	6 weeks.
Emberlin & Lewis (2006)	97 (57 females, 40 males).	Adults (mean age = not reported): hay fever sufferers.	Randomised, double blind, placebo-controlled. Patients recorded symptoms including Likert scores. Rescue medication permitted.	4 weeks.
Emberlin & Lewis (2007)	15 (7 females, 8 males).	Adults (modal age range 38-47 yrs): selected specifically for house dust mite allergy.	Double blind, cross over challenge study using Der p1 and Der f1 sensitivity.	1 month recruitment and 2 week actual study at clinic.
Hiltunen <i>et al.</i> (2007)	52 (gender distribution not stated)	Adults (mean ages not reported).	Randomised, double-blind study of Nasaleze™ vs Nasaleze™ Travel (with garlic extract) to determine prevention of airborne infections.	8 weeks.

Table 2. Outcomes, safety and Product Acceptability

Study	Significant Findings	Compliance and Safety	Conclusions Drawn by Authors
Josling & Steadman (2003):	77% of volunteers reported success (either good or excellent) by end of 6 weeks; average scores of 3.8 by men and 3.9 by women (5 indicating symptom free) were achieved: this was better when compared to pharmaceutical drugs used in the past; symptoms controlled within 0.1 – 3 hours after use.	No major problem: some volunteers reported some discomfort in throat due to powder. Only 8 patients required additional treatments.	Pilot study which clearly indicated that further investigations were warranted. Inert powder not medicated hence no side-effects with added advantage. Product well tolerated and provided fast relief.
Aivazis <i>et al.</i> (2005):	Only study conducted in children: statistically significant improvement in mucociliary clearance (39 mins. to 18.15 mins and this was directly related to improved peak nasal inspiratory flow rate (114.9 L/min to 144.4 L/min) implying less oedema and inflammation following use of product.	Excellent tolerance to product: no safety issues raised by volunteers.	The results imply the regeneration of ciliary epithelium. Product can be used by children.
Emberlin & Lewis (2006):	Blinded study in hay fever sufferers with significant differences in outcomes between groups: placebo used more rescue medication ($p < 0.05$) although Likert scores showed no differences.	No adverse effects reported during trial: both powders well tolerated. The placebo powder (lactose) may have provided some protection to the users.	The inert cellulose powder provides safe and effective protection thereby obviating the need for anti-histamine and other pharmaceutical drugs for the symptoms.
Emberlin & Lewis (2007)	Allergen challenge in house dust mite allergic individuals: significant decrease in biomarker ECP ($p < 0.05$) in nasal secretions as well as significant increase in measurements of nasal air flow ($p < 0.05$) when placebos compared to active. Cross over period of study proves efficacy of cellulose powder in preventing allergic reaction.	No adverse effects reported by any volunteer.	Nasaleze™ has ability to significantly reduce symptoms of persistent rhinitis due to house dust mite and possibly provides effective barrier to inhaled allergens.
Hiltunen <i>et al.</i> (2007):	Significantly less infections (all combined) reported by volunteers using powder enriched with garlic extract compared to users of powder alone ($p < 0.001$) and days affected by airborne pathogens also different between groups (less days reported ill, $p < 0.05$).	Volunteers continued with their daily travel plans and this study (albeit small) shows that garlic extract enriched cellulose powder provided effective barrier to airborne pathogens. No adverse effects reported by volunteers.	Cellulose powder can be used as effective carrier of bioactive molecules to prevent airborne pathogens during traveling.

presents exciting novel applications of the technology to address other important medical challenges. This trial showed that the active could be absorbed *via* a well vascularized mucosa and provide the efficacy sought (prevention of airborne infections). Numerous studies are currently searching for ways to deliver small amounts of antigenic peptides for immunization purposes since the immune cells of these surfaces are extremely powerful antigen presenting cells and are thus able to induce an immune response in the draining lymphoid organs. Also, the delivery of other natural molecules which have been described as effective anti-inflammatory compounds [7] for the management of chronic conditions affecting the mucosal surfaces is another area of research which warrants investigation by the manufacturers of the product.

CONCLUSIONS

The treatment of allergic rhinitis to date has relied heavily on drugs that act either as membrane stabilizers thereby preventing the degranulation of the immune cells lining the nasal mucosae and which contain vasoactive peptides (steroid based drugs) or on drugs that neutralize the release of histamines (generic anti-histamines). Most of these drugs are not without side effects: they cause drowsiness and cannot be used by pregnant women. The novel product Nasaleze™

represents a new management strategy in the control and management of allergic rhinitis: this inert cellulose powder is administered into the nasal passages and forms an impervious barrier to the aero-allergens to which the individual may be sensitized. It is a natural and safe product, does not contain any drugs and above-all, has shown itself to be effective under trial conditions (albeit small studies).

The powder was tested not only as a preventative approach to attacks of hay fever but also as a treatment to the symptoms of allergic reactions, it stops the sneezing within minutes (response within 0.3 hours) and allows the improvement of air flow into and out of the nasal passages, thereby implying that it decreases the degree of on-going inflammation and oedema which normally accompanies an allergic reaction. These findings were corroborated by the laboratory measurement of decreases in the nasal washings of released ECP (Eosinophilic Cationic Protein), a biomarker of cellular degranulation.

The use of the inert powder as a carrier medium for bioactive molecules such as garlic extract to prevent travel-associated infections showed interesting results: fewer infections were reported by the volunteers who applied this enriched powder during their travels locally and even internationally. The study however is not clearly defined due to the fact that some patients traveled internationally using air

travel while others may have been using local train travel. The study implies that other molecules could be tested using this safe carrier. Further studies using larger patient groups are certainly warranted and these should include other immune biomarkers of efficacy, such as IgE levels, specific IgE titers to offending allergens, etc.

DISCLOSURE

The author would hereby like to declare that he has no vested interest (financial or otherwise) in the product being reviewed in this article. The need for such a review was necessitated by the fact that the product was unknown at the time of its launch in South Africa.

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