Aqueous Versus Aerosol Intranasal Corticosteroid Spray for Allergic Rhinitis: Systematic Review and Meta-Analysis

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Abstract

Background: Allergic rhinitis (AR) affects millions of people worldwide, impacting quality of life and causing economic burden. Intranasal corticosteroids (INCs) are the mainstay treatment for AR, delivered via aerosol or aqueous sprays.

Methods: Two independent reviewers searched four databases (Embrace, Cochrane Central Register of Controlled Trials (CENTRAL), PubMed, and Web of Science) for English language, prospective randomized controlled trial (RCT), comparing aqueous and aerosol INCs for AR treatment. Studies were excluded for specific reasons (wrong comparisons, full text unavailable, insufficient data for extraction, wrong patient population, incorrect route of administration (non-intranasal), unverifiable inclusion criteria). Primary outcomes were Total Nasal Symptom Score (TNSS) and subset scores; secondary outcome were physician/patient assessments and adverse event (AEs).

Results: No significant difference in overall TNSS was found between the delivery methods. However, aqueous sprays showed a slight edge in reducing specific symptoms like congestion, itching, sneezing, and rhinorrhea. Physician/patient assessments and AEs did not differ significantly.

Conclusions: Our findings suggest no significant difference in efficacy or safety between aerosol and aqueous INCs for AR treatment. Patient preference should be a primary consideration when choosing a delivery method to optimize adherence and symptom control.

Objective

This systematic review and meta-analysis investigate the comparative efficacy and safety of aerosol and aqueous delivery methods in AR treatment.

Results

	Aqueous	Aerosol	Total
Number of Patients	1363	1071	2185
Mean age (Range)	30.07	28.26	29.15 (6-67)
% Male	43.88	43.41	47.66
Allergic Rhinitis type			
Seasonal	12	12	12
Perennial	2	2	2

TABLE 1: Group characteristic comparison of aqueous and aerosol studies

Results

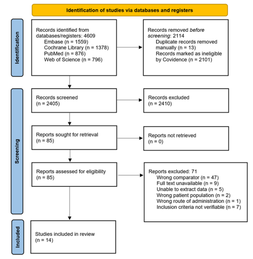

FIGURE 1: PRISMA Flow diagram of the literature search and selection process

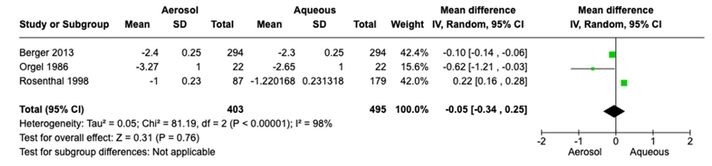

FIGURE 2: Comparative analysis of TNSS in aerosol and aqueous INCs delivery methods

FIGURE 3: Comparative analysis of TNSS subset scores in aerosol and aqueous INCs delivery

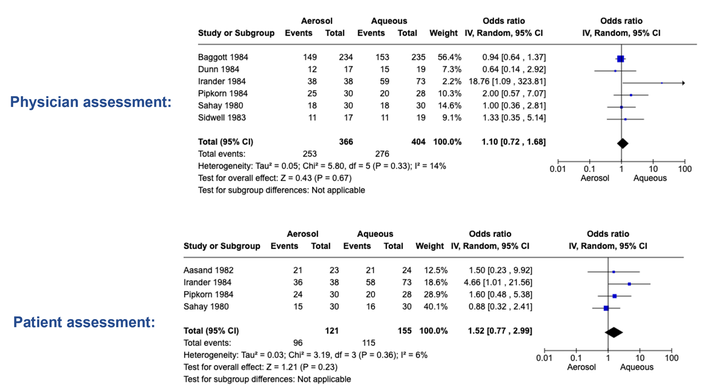

FIGURE 4: Comparative analysis of Physician and patient assessment between delivery methods

Results

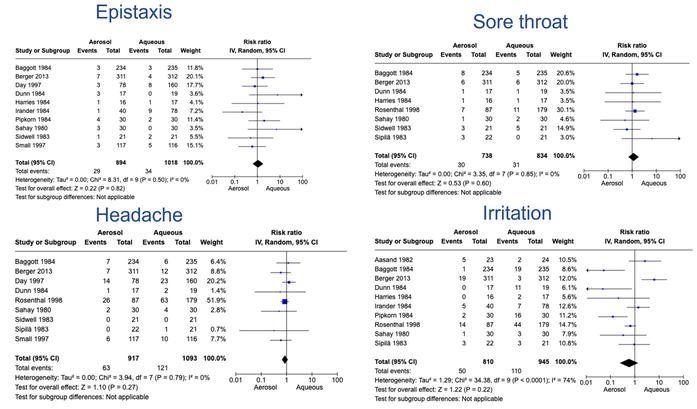

FIGURE 5: Comparative analysis of adverse events between delivery methods

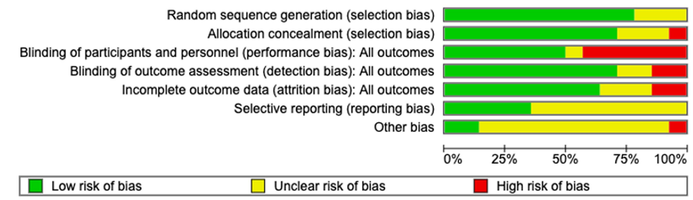

FIGURE 6: Assessment of risk of bias in selected studies

Conclusion

Our study highlights the lack of difference in efficacy and AEs between aerosol and aqueous delivery methods of INCs in treatment of AR. Therefore, physicians should consider patient preferences when making treatment decisions to ensure optimal adherence. This personalized approach can lead to better treatment outcomes for patients with AR.

Reference

- Berger WE, Prenner B, Turner R, Meltzer EO. A patient preference and satisfaction study of ciclesonide nasal aerosol and mometasone furoate aqueous nasal spray in patients with perennial allergic rhinitis. *Allergy Asthma Proc.* 2013;34(6):542-550.
- Dunn AM, Wilson RS, Baggott PJ. A comparison of beclomethasone dipropionate aqueous nasal spray and beclomethasone dipropionate pressurized nasal spray in the management of seasonal rhinitis. *Postgrad Med J.* 1984;60(704):404-406.
- Orgel HA, Meltzer EO, Kemp JP, Welch MJ. Clinical, rhinomanometric, and cytologic evaluation of seasonal allergic rhinitis treated with beclomethasone dipropionate as aqueous nasal spray or pressurized aerosol. *J Allergy Clin Immunol.* 1986;77(6):858-864.
- Harries MG, Anderson PB, Gibson GJ, Hof ZE, Baggott PJ. A comparison of an aqueous and a pressurized nasal spray of beclomethasone dipropionate in the management of seasonal rhinitis. *Pharmatherapeutica.* 1984;3(9):623-625.
- Sahay JN, Chatterjee SS, Engler C. A comparative trial of flunisolide and beclomethasone dipropionate in the treatment of perennial allergic rhinitis. *Clin Allergy.* 1980;10(1):65-70.
- Rosenthal R, Berger W, Bronsky E, et al. Tri-Nasal triamcinolone acetonide nasal spray 200 and 400 micrograms qd versus placebo and Nasacort triamcinolone acetonide nasal aerosol 440 micrograms qd in patients suffering from seasonal allergic rhinitis during the grass season. *Am J Rhinol.* 1998;12(6):427-433.
- Small P, Houle PA, Day JH, et al. A comparison of triamcinolone acetonide nasal aerosol spray and fluticasone propionate aqueous solution spray in the treatment of spring allergic rhinitis. *J Allergy Clin Immunol.* 1997;100(5):592-595.
- Aasand G, Etholm BO, Skjostad M, Volden J. Flunisolide nasal spray compared to beclomethasone dipropionate in the treatment of seasonal rhinitis. *Rhinology.* 1982;20(4):205-211.
- Baggott PJ, Dash CH, Haydock A, Pover GM, Sidwell S. A double-blind study comparing two nasal sprays of beclomethasone dipropionate in the management of seasonal rhinitis. *Drugs exp clin res.* 1984;10(4):287-292.
- Irander K, Geterud A, Lindqvist N, Pipkorn U. A single blind clinical comparison between 2 preparations of budesonide in the treatment of seasonal allergic rhinitis. *Clin Otolaryngol Allied Sci.* 1984;9(4):235-241.
- Pipkorn U, Geterud A. A comparative trial testing budesonide and flunisolide nasal sprays in patients with seasonal allergic rhinitis. *Ann Allergy.* 1984;52(3 Pt 1):183-186.
- Sidwell S. A comparison of the efficacy and tolerance of an aqueous beclomethasone dipropionate nasal spray with the conventional pressurized spray. *Curr Med Res Opin.* 1983;8(0300-7995 (Print)):659-664.
- Day J, Alexander M, Drouin M, et al. Budesonide aqueous nasal spray and pressurized metered dose inhaler in the treatment of adult patients with seasonal allergic rhinitis. *Am J Rhinol.* 1997;11(1):77-83.
- Sipila P, Sorri M, Ojala K, Palva A. Comparative trial of flunisolide and beclomethasone dipropionate nasal sprays in patients with seasonal allergic rhinitis. *Allergy.* 1983;38(5):303-307.
- van Bavel JH, Ratner PH, Amar NJ, et al. Efficacy and safety of once-daily treatment with beclomethasone dipropionate nasal aerosol in subjects with seasonal allergic rhinitis. *Allergy Asthma Proc.* 2012;33(5):386-396.