Efficacy of mometasone furoate nasal spray in the treatment of allergic rhinitis: meta-analysis of randomized, double-blind, placebo-controlled, clinical trials
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CRD summary
The authors concluded that mometasone furoate nasal spray effectively reduced total and individual symptoms scores in patients with allergic rhinitis. This was a well-conducted and clearly reported review. The authors’ conclusions are likely to be reliable.

Authors’ objectives
To evaluate the efficacy of mometasone furoate nasal spray (MFNS) in patients with allergic rhinitis.

Searching
MEDLINE, LILACS, SCOPUS and The Cochrane Library were searched from 1966 to October 2007. Search terms were reported. No language restrictions were applied. Reference lists of identified publications, recent reviews and abstracts of unspecified relevant meetings were screened.

Study selection
Double-blind placebo-controlled randomised controlled trials (RCTs) that evaluated any dose or duration of MFNS treatment in patients with allergic rhinitis were eligible for inclusion. Participants had to have a history of allergic rhinitis with or without allergic asthma and/or conjunctivitis with the causal allergen identified and IgE (immunoglobulin E) sensitisation verified by prick test and/or specific IgE assays. Post-challenge studies were included.

The review evaluated 200 μg MFNS once per day for adults and 100 μg per day for children. In addition to placebo, approximately half of the included studies compared different doses of MFNS or compared other active medications for allergic rhinitis. One study was solely in children (mean age nine years); in the other studies mean age ranged from 27 to 48 years. About half of the studies were in patients with moderate to severe allergic rhinitis; other studies included patients with all grades of severity. In most studies patients had seasonal allergic rhinitis. The review assessed the following outcomes: total nasal symptom scores; individual nasal symptom scores (congestion, rhinorrhoea, sneezing and nasal itching); non-nasal symptom scores; nasal airflow; and adverse events. Included studies used different scoring systems and scales to measure outcomes. Treatment duration ranged from a single dose to 12 weeks.

Two reviewers independently conducted searches. Two reviewers subsequently selected studies and selections were checked by a third reviewer.

Assessment of study quality
Validity was assessed using the Jadad criteria (randomisation, blinding and reporting of withdrawals). The maximum possible score was 5 points.

Two reviewers independently assessed validity.

Data extraction
Data were extracted for patients who received a final assessment; it was not possible to extract intention-to-treat data. Authors were contacted if required for missing data. Post-treatment means and standard deviations (SD) were obtained for each study; standard deviations were estimated if necessary. Standardised mean differences (SMD) were used for continuous data and odds ratios (OR) used for dichotomous data.

Two reviewers independently extracted data and resolved disagreements by consensus.
Methods of synthesis
Pooled standardised mean differences and odds ratios with 95% confidence intervals (CI) were calculated using the DerSimonian and Laird random-effects model when $I^2>50$%; the assumption of a normal distribution for effect sizes was checked using Q-Q plots. Fixed-effect models were used when $I^2<50%$. Heterogeneity was assessed using the Q and the $I^2$ statistics.

For total nasal symptom score, studies of children, pre-seasonal treatment and post-challenge effects were analysed separately. Sensitivity analysis was used to examine the influence of treatment duration, classification of allergic rhinitis, model used to weight studies and exclusion of studies in which standard deviations were calculated from $p$ values. Publication bias was assessed with a funnel plot.

Results of the review
Sixteen RCTs were included ($n=2,998$ analysed): 11 parallel-group studies; three double-dummy studies; and two crossover studies. Seven studies scored 5 out of 5 points on the Jadad scale and nine scored 4 points. Drop-out rates ranged from 0 to 23%.

Compared to placebo, MFNS was associated with a statistically significant reduction in the following outcomes: total nasal symptom scores (SMD -0.56, 95% CI -0.71 to -0.41, $p<0.00001$; 10 RCTs, $n=1,878$); nasal stuffiness (SMD -0.41, 95% CI -0.56 to -0.27, $p<0.00001$), rhinorrhoea (SMD -0.44, 95% CI -0.66 to -0.21, $p=0.0001$), sneezing (SMD -0.40, 95% CI -0.57 to -0.23, $p<0.00001$) and nasal itching (SMD -0.39, 95% CI -0.53 to -0.25, $p<0.00001$) all based on seven studies ($n=1,582$); and non-nasal symptoms scores (SMD -0.30, 95% CI -0.43 to -0.18, $p<0.00001$; four RCTs, $n=1,009$). Heterogeneity was significant for total nasal symptoms scores ($I^2=58$%), nasal stuffiness ($I^2=51$%), rhinorrhoea ($I^2=79$%) and sneezing ($I^2=64$%).

MFNS was associated with a significant increase in nasal airflow (SMD 0.32, 95% CI 0.08 to 0.56, $p=0.01$; three RCTs, $I^2=33$%), but studies used different methods to measure air flow.

There was no statistically significant difference in adverse events between MFNS and placebo (nine RCTs).

The funnel plot showed no evidence of publication bias.

Authors’ conclusions
Mometasone furoate nasal spray effectively reduced total and individual symptoms scores in patients with allergic rhinitis.

CRD commentary
The review question was clearly stated and inclusion criteria were appropriately defined. Several relevant sources were searched and no language restrictions were applied, but it was unclear how extensive any attempts were to minimise publication bias. Funnel plots showed no evidence of publication bias. Appropriate methods were used to minimise reviewer error and bias during the review process. Only higher-quality RCTs were included. Appropriate methods were used for the meta-analyses. Heterogeneity was assessed. Although heterogeneity was significant for some analyses, studies showed consistent direction of treatment effect. The clinical significance of the improvement in symptoms was not discussed. This was a well-conducted and clearly reported review. The authors’ conclusions are likely to be reliable.

Implications of the review for practice and research
Practice: The authors stated that the review provided evidence that 200 $\mu$g of mometasone furoate nasal spray once daily was effective in reducing symptoms of allergic rhinitis.

Research: The authors stated that double-blind placebo-controlled RCTs should be used to evaluate the long-term efficacy of MFNS in patients with perennial allergic rhinitis. Studies should also assess the effect of MFNS on airflow.

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