

Review: Allergen-specific immunotherapies reduce symptoms, medication requirements, and bronchial hyperreactivity in asthma

Abramson MJ, Puy RM, Weiner JM. Allergen immunotherapy for asthma. *Cochrane Database Syst Rev.* 2003;(4):CD001186.

QUESTION

In patients with asthma, how do different allergen-specific (AS) immunotherapies compare for reducing asthma symptoms, medication requirements, and improving bronchial hyperreactivity (BHR)?

DATA SOURCES

Studies were identified by searching MEDLINE (1966 to December 2001), the Cochrane Airways Group trials register (up to June 2001), EMBASE/Excerpta Medica, CINAHL, and *Current Contents*; and scanning abstracts of dissertations and reference lists.

STUDY SELECTION AND ASSESSMENT

Studies in any language were selected if they were randomized controlled trials (RCTs) comparing AS immunotherapy with placebo, antigenically inactive controls, untreated controls, or inhaled steroids; or comparing house dust extract with placebo. Studies were assessed for methodological quality using the Jadad scale.

OUTCOMES

Asthma symptoms, medication requirements, lung function (including peak expiratory flow rate, FEV₁, and thoracic gas volume), nonspecific BHR (to histamine or methacholine), and AS BHR.

MAIN RESULTS

75 RCTs met the selection criteria ($n = 3506$). Patients who received AS immunotherapy (particularly mite, pollen, and animal dander allergens) had greater symptomatic improvement, had reduced asthma medication requirements, and were less likely to develop increased nonspecific or AS BHR than those who received placebo (Table). When compared with untreated controls, patients in the AS immunotherapy group had greater improvement in lung function (2 RCTs; weighted mean difference [WMD] -15.20 [95% CI -23.09 to -7.31]); and greater reduction in asthma symptoms (3 RCTs; WMD -6.93 [CI -13.83 to

-0.04]), medication requirements (1 RCT; WMD -4.00 [CI -4.79 to -3.21]), and nonspecific BHR (1 RCT; WMD -0.77 [CI -1.11 to -0.43]). No other comparison groups differed for lung function.

CONCLUSION

In patients with asthma, allergen-specific immunotherapies reduce asthma symptoms, medication requirements, allergen-specific bronchial hyperreactivity (BHR), and the development of increased nonspecific BHR.

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Allergen-specific immunotherapies (ITs) vs placebo for reducing asthma symptoms*

Outcomes	Comparisons	Number of trials	Weighted event rates	RRR (95% CI)	NNT (CI)
Asthmatic symptoms	Mite IT vs placebo	12	30% vs 51%	38% (13 to 56)	5 (1 to 3)
	Pollen IT vs placebo	3	21% vs 62%	75% (10 to 93)	3 (2 to 4)
	Animal dander IT vs placebo	4	27% vs 69%	54% (6 to 78)	3 (2 to 17)
	Overall IT vs placebo	22	29% vs 60%	49% (35 to 59)	4 (3 to 5)
Asthma medication requirements	Overall IT vs placebo	16	48% vs 72%	34% (24 to 42)	5 (4 to 7)
Nonspecific BHR	Overall IT vs placebo	5	30% vs 64%	53% (30 to 69)	3 (2 to 6)
Allergen-specific BHR	Overall IT vs placebo	16	32% vs 63%	49% (37 to 59)	4 (3 to 5)
	House dust vs placebo	1	11% vs 39%	71% (29 to 88)	4 (3 to 13)

*WMD = weighted mean difference; BHR = bronchial hyperreactivity. Other abbreviations defined in Glossary; weighted event rates, RRR, NNT, and CI calculated from data in article using a fixed-effects model. Follow-up not reported.

COMMENTARY

The updated review by Abramson and colleagues “confirms the efficacy of immunotherapy in terms of a reduction in asthma symptoms and use of asthma medication.”

This review discusses information about the benefits of immunotherapy but does not assess the risks or costs. The biggest concern is anaphylaxis. Using data from 1985 to 1992, the FDA estimated that the crude annual death rate for allergenic extracts is low—0.7 per million injections (1)—roughly similar to fatal reactions to injected penicillin, which range from 0.13 to 0.4 fatalities per million injections (2). Clearly, precautions are needed. Although local reactions for AS immunotherapy injections are common, they are simple to manage.

The second relevant consideration regarding AS immunotherapy is cost. In 1996, the cost of AS immunotherapy for the first year was estimated to be U.S. \$800 per year and \$170 for each year thereafter (3). In contrast, the newest therapy for asthma (Xolair) may cost U.S. \$12 000 per year. Immunotherapy decreases asthma medication use, offsetting its own cost, and may also further decrease costs by limiting the need for concurrent treatment of allergic rhinitis.

Finally, a recent European study tested the hypothesis that AS immunotherapy might prevent the development of asthma. After 3

years of therapy, children with allergic rhinitis who received AS immunotherapy were about half as likely to develop asthma as those who did not (4).

AS immunotherapy is safe and effective when administered by trained health care professionals who observe high standards of care.

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