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Allergic rhinitis

Overview

Background

Allergic rhinitis (perennial and seasonal) affects around 10-40% of the population worldwide, and can have a substantial health and economic impact on the community.(Sibbald 1991)

The condition can affect several organ systems, and cause many symptoms. Typical symptoms include sneezing, nasal itching, nasal blockage, and watery nasal discharge.(Lund 1994)

Other symptoms include eye symptoms (e.g. red eyes, itchy eyes, tearing), coughing, wheezing and shortness of breath, oral allergy syndrome (i.e. an itchy, swollen oropharynx on eating stoned fruits), and systemic symptoms such as tiredness, fever, a pressure sensation in the head, and itchiness.

Risk factors include a personal or family history of atopy or other allergic disorders, male sex, birth order (increased risk being seen in first born), and small family size.(Parikh 1997; Ross 1994) Allergic rhinitis may impair quality of life, interfering with work, sleep, and recreational activities.(Blaiss 1999)

The aim of conventional treatments for hay fever is to minimise or eliminate symptoms, improve quality of life, and reduce the risk of developing coexistent disease. Drug treatments include oral and topical antihistamines, oral and intranasal corticosteroids, leukotriene receptor antagonists and decongestants.

Clinical Evidence

Evidence from systematic reviews suggests that acupuncture and moxibustion may be a safe and effective treatment for allergic rhinitis with benefits over conventional medicine (Xiao 2009), that acupuncture can help to relieve symptoms of perennial rhinitis (Lee 2009) and that ear acupressure has a similar efficacy to antihistamines (Zhang 2010). However, the reviews also state that the evidence is mixed and the trials generally of poor quality and that more high-quality randomised controlled trials are needed to assess the effectiveness of acupuncture for allergic rhinitis, particularly seasonal (hay fever).(Roberts 2008; Lee 2009; Xiao 2009; Zhang 2010). Recent randomised controlled trials have found that acupuncture used as an adjunct to routine care for allergic rhinitis has clinically relevant and persistent benefits (Brinkhaus 2008) and is cost effective (Witt 2009). Such trials have also found that acupuncture is effective in the symptomatic treatment of perennial rhinitis (Xue 2007) and that active acupuncture is more effective

than sham acupuncture in decreasing the symptom scores for persistent allergic rhinitis and increasing the symptom-free days (Ng 2004). (see Table below)

Potential mechanisms

In general, acupuncture is believed to stimulate the nervous system and cause the release of neurochemical messenger molecules. The resulting biochemical changes influence the body's homeostatic mechanisms, thus promoting physical and emotional well-being. Stimulation of certain acupuncture points has been shown to affect areas of the brain that are known to reduce sensitivity to pain and stress (Hui 2010)

Acupuncture may help to relieve pain and congestion in people with allergic rhinitis by:

- regulating levels of IgE and cytokines, mediators of the allergic reaction to extrinsic allergens (Ng 2004; Rao 2006; Roberts 2008)
- stimulating nerves located in muscles and other tissues, which leads to release of endorphins and other neurohumoral factors, and changes the processing of pain in the brain and spinal cord (Pomeranz, 1987; Han 2004; Zhao 2008; Cheng 2009);
- reducing inflammation, by promoting release of vascular and immunomodulatory factors (Zijlstra 2003; Kavoussi 2007);
- enhancing natural killer cell activities and modulating the number and ratio of immune cell types (Kawakita 2008);
- increasing local microcirculation (Komori 2009), which aids dispersal of swelling.

References

Blaiss MS. Quality of life in allergic rhinitis. Ann Allergy Asthma Immunol 1999; 83: 449-454.

Lund VJ, Aaronsen D, Bousquet J, et al. International consensus report on the diagnosis and management of rhinitis. Allergy 1994; 49: 1-34.

Parikh A, Scadding GK. Seasonal allergic rhinitis.BMJ 1997; 314: 1392.

Ross AM, Fleming DM. Incidence of allergic rhinitis in general practice, 1981-92. BMJ 1994; 308: 897-900.

Sibbald B, Rink E. Epidemiology of seasonal and perennial rhinitis; clinical presentation and medical history. Thorax 1991; 46: 895-901.

Evidence summaries

Research	Conclusion
Systemic reviews	
Zhang CS et al. Ear-acupressure for allergic rhinitis: a systematic review. Clinical Otolaryngology. 2010; 35: 6-12.	A systematic review that assessed the effectiveness and safety of ear-acupuncture or ear-acupressure for the treatment of allergic rhinitis. It included five randomised controlled trials No details about randomisation were given, and none of the studies used blinding or intention-to-treat analysis. Ear-acupressure was found to be more effective than herbal medicine, and of similar effectiveness to body acupuncture or antihistamines in the short term. Also, it was more effective than antihistamines in the long term. The reviewers concluded, however, that the benefit of ear-acupressure for symptomatic relief of allergic rhinitis is unknown due to the poor quality of research.
Lee MS et al. Acupuncture for allergic rhinitis: A systematic review. Annals of Allergy, Asthma and Immunology 2009; 102: 269-79.	A systematic review that evaluated the effectiveness of acupuncture for treating or preventing allergic rhinitis. A total of 7 randomised controlled trials were included. Three trials failed to show superiority of acupuncture for treating or preventing symptoms for seasonal allergic rhinitis compared with placebo acupuncture. One trial reported favourable effects with acupuncture on a rhinitis symptoms score, and one trial found positive results for a nasal symptoms score compared with placebo acupuncture (p=0.006). Two trials compared acupuncture with drugs given orally, and their results were in favour of acupuncture. The reviewers concluded that the evidence for the effectiveness of acupuncture for the symptomatic treatment or prevention of allergic rhinitis is mixed. The results for seasonal allergic rhinitis failed to show specific effects of acupuncture but, for perennial allergic rhinitis, the results provided suggestive evidence of the effectiveness of acupuncture.
Xiao L et al. Systematic evaluation of the randomized controlled trials about acupuncture and moxibustion treatment of allergic rhinitis. *Chinese acupuncture & moxibustion* 2009; 29: 512-6.	A systematic review that evaluated the clinical effect and safety of acupuncture and moxibustion treatment for allergic rhinitis Data from twelve randomised controlled trials involving a total of 1,076 patients were pooled. There were significant differences in both cure rate (p<0.00001) and marked improvement rate (p<0.00001) between acupuncture and moxibustion treatment and the routine medicine treatment for allergic rhinitis. The reviewers concluded that acupuncture and moxibustion is an effective and safe treatment for allergic rhinitis and may have certain advantage over the routine medicine treatment. However, no definitive conclusion can be drawn because of the low quality of research.

Research	Conclusion
Roberts J et al. A systematic review of the clinical effectiveness of acupuncture for allergic rhinitis. BMC complementary and alternative medicine 2008; 8: 13.	A systematic review that assessed the evidence for the clinical effectiveness of acupuncture in patients with allergic rhinitis. It included seven randomised controlled trials, five of which were of poor quality and two of which were of high quality. A meta-analysis failed to show any summary benefits of acupuncture treatment for symptom severity scores or serum IgE measures, which could not have been accounted for by chance alone. Acupuncture was not associated with any additional adverse events in the trials. The reviewers concluded that there is currently insufficient evidence to support or refute the use of acupuncture in patients with allergic rhinitis.
Randomised controlled trials	
Brinkhaus B et al. Acupuncture in patients with allergic rhinitis: A pragmatic randomized trial. Annals of Allergy, Asthma and Immunology 2008; 101: 535-43.	A randomised controlled trial that assessed the effectiveness of acupuncture in addition to routine care in patients with allergic rhinitis compared with treatment with routine care alone. Patients were allocated to receive up to 15 acupuncture sessions during a period of 3 months or to a control group receiving no acupuncture. All were allowed to usual medical care. The Rhinitis Quality of Life Questionnaire (RQLQ) and general health-related quality of life (36-Item Short-Form Health Survey) were evaluated at baseline and after 3 and 6 months. Of 5,237 patients, 487 were randomly assigned to acupuncture and 494 to control, and 4,256 were included in the nonrandomized acupuncture group. At 3 months, the RQLQ improved by a mean) of 1.48 in the acupuncture group and by 0.50 in the control group ($p<0.001$). Similarly, quality-of-life improvements were more pronounced in the acupuncture verses the control group ($p<0.001$). The researchers concluded that results suggest that treating patients with allergic rhinitis in routine care with additional acupuncture leads to clinically relevant and persistent benefits.
Witt CM et al. Cost-effectiveness of acupuncture in women and men with allergic rhinitis: A randomized controlled study in usual care. American Journal of Epidemiology 2009; 169: 562-71.	Overall costs (direct and indirect) in the acupuncture group were significantly higher than those in the control group (Euro 763 vs. Euro 332) but this was more than balanced by the improvement in quality of life. The incremental cost-effectiveness ratio was 17,377 per quality-adjusted life year. The researchers concluded that acupuncture, supplementary to routine care, was cost-effective according to international benchmarks. However, because of the study design, it remains unclear whether the effects are acupuncture specific.

Research	Conclusion
Randomised controlled trials	
Xue CC et al. Acupuncture for persistent allergic rhinitis: a randomised, sham-controlled trial. The Medical journal of Australia 2007; 187: 337-41.	A randomised controlled trial that investigated the effectiveness and safety of acupuncture in persistent allergic rhinitis. A total of 80 patients were assigned to receive real or sham acupuncture. Participants were treated twice weekly for 8 weeks and followed up for another 12 weeks. Nasal obstruction, sneezing, rhinorrhoea and nasal itch were each self-assessed daily on a 5-point scale, and scores were aggregated weekly. The sum of the symptom scores (total nasal symptom score, TNSS) was also determined. After 8 weeks' treatment, the weekly mean difference in TNSS from baseline was greater with real acupuncture ($p=0.01$). It was also superior for rhinorrhoea ($p<0.01$) but not the other symptoms. At the end of follow-up, the superiority of real acupuncture in TNSS was still apparent ($p=0.001$). Moreover. it out-performed the sham group in all four individual symptom scores ($p<0.05$). Both real and sham acupuncture were well tolerated. The researchers concluded that the results showed that acupuncture is effective in the symptomatic treatment of perennial rhinitis.
Rao YQ, Han NY. [Therapeutic effect of acupuncture on allergic rhinitis and its effects on immunologic function]. Zhongguo Zhen Jiu. 2006;26(8):557-60.	150 patients were randomly assigned to receive either acupuncture (daily), auricular point pressing (twice per week) or Western medication. Short- and long-term therapeutic effects were better in the two acupuncture groups than in the medication control. Serum IgE and IL-4 levels decreased in all three groups but IFN-gamma did not significantly change. They concluded that the therapeutic effect of acupuncture involves regulating the imbalance of Th1/Th2 cells and reducing IgE synthesis.
Ng DK et al. A double-blind, randomized, placebo-controlled trial of acupuncture for the treatment of childhood persistent allergic rhinitis. Pediatrics 2004; 114: 1242-7.	A randomised controlled trial that compared active acupuncture with sham acupuncture for the treatment of persistent allergic rhinitis in 72 children. Patients were allocated to active acupuncture or sham acupuncture. There were significantly lower daily rhinitis scores and more symptom-free days for the group receiving active acupuncture, during both the treatment and follow-up periods. The visual analogue scale scores for immediate improvement after treatment were also significantly better for the active acupuncture group. There was no significant difference in the following outcome measures between the active and sham acupuncture groups: daily relief medication scores, blood eosinophil counts, serum IgE levels, and nasal eosinophil counts, except for the IgE levels before and 2 months after acupuncture. The researchers concluded that the results showed that active acupuncture was more effective than sham acupuncture in decreasing the symptom scores for persistent allergic rhinitis and increasing the symptom-free days. No serious adverse effect was identified.

Research	Conclusion
Research on mechanisms for acupuncture	
Hui KK et al. Acupuncture, the limbic system, and the anticorrelated networks of the brain. Auton Neurosci 2010; 157: 81-90.	A paper that discusses research showing that acupuncture mobilises the functionally anti-correlated networks of the brain to mediate its actions, and that the effect is dependent on the psychophysical response. The research used functional magnetic resonance imaging studies of healthy subjects to show that acupuncture stimulation evokes deactivation of a limbic-paralimbic-neocortical network, which encompasses the limbic system, as well as activation of somatosensory brain regions. It has also been shown that the effect of acupuncture on the brain is integrated at multiple levels, down to the brainstem and cerebellum.
Cheng KJ. Neuroanatomical basis of acupuncture treatment for some common illnesses. Acupunct Med 2009;27: 61-4.	A review that looked at acupuncture treatment for some common conditions. It is found that, in many cases, the acupuncture points traditionally used have a neuroanatomical significance from the viewpoint of biomedicine. From this, the reviewers hypothesize that plausible mechanisms of action include intramuscular stimulation for treating muscular pain and nerve stimulation for treating neuropathies.
Komori M et al. Microcirculatory responses to acupuncture stimulation and phototherapy. Anesth Analg 2009; 108: 635-40.	Experimental study on rabbits in which acupuncture stimulation was directly observed to increase diameter and blood flow velocity of peripheral arterioles, enhancing local microcirculation.
Kawakita K et al. Do Japanese style acupuncture and moxibustion reduce symptoms of the common cold? eCAM 2008; 5: 481-9.	A review of research into the effects of Japanese style acupuncture and moxibustion on the symptoms of the common cold. It reports that research has shown acupuncture to reduce common cold symptoms, and that acupuncture stimulation enhances natural killer cell activities and modulates the number and ratio of immune cell types.
Zhao ZQ. Neural mechanism underlying acupuncture analgesia. Prog Neurobiol 2008; 85: 355-75.	Review article that discusses the various peripheral and central nervous system components of acupuncture anaesthesia in detail.
Kavoussi B, Ross BE. The neuroimmune basis of anti-inflammatory acupuncture. Integr Cancer Ther 2007; 6: 251-7.	Review article that suggests the anti-inflammatory actions of traditional and electro-acupuncture are mediated by efferent vagus nerve activation and inflammatory macrophage deactivation.
Han JS. Acupuncture and endorphins. Neurosci Lett 2004; 361: 258-61.	A literature review of studies relating to the release of endorphins by acupuncture.

Research	Conclusion
Research on mechanisms for acupuncture	
Zijlstra FJ et al. Anti-inflammatory actions of acupuncture. Mediators Inflamm 2003; 12: 59-69.	An article that suggests a hypothesis for anti-inflammatory action of acupuncture: Insertion of acupuncture needles initially stimulates production of beta-endorphins, CGRP and substance P, leading to further stimulation of cytokines and NO. While high levels of CGRP have been shown to be pro-inflammatory, CGRP in low concentrations exerts potent anti-inflammatory actions. Therefore, a frequently applied 'low-dose' treatment of acupuncture could provoke a sustained release of CGRP with anti-inflammatory activity, without stimulation of pro-inflammatory cells.
Pomeranz B. Scientific basis of acupuncture. In: Stux G, Pomeranz B, eds. Acupuncture Textbook and Atlas. Heidelberg: Springer-Verlag; 1987: 1-18.	Needle activation of A delta and C afferent nerve fibres in muscle sends signals to the spinal cord, where dynorphin and enkephalins are released. Afferent pathways continue to the midbrain, triggering excitatory and inhibitory mediators in spinal cord. Ensuing release of serotonin and norepinephrine onto the spinal cord leads to pain transmission being inhibited both pre- and postsynaptically in the spinothalamic tract. Finally, these signals reach the hypothalamus and pituitary, triggering release of adrenocorticotropic hormones and beta-endorphin.