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Review on allergic rhinitis

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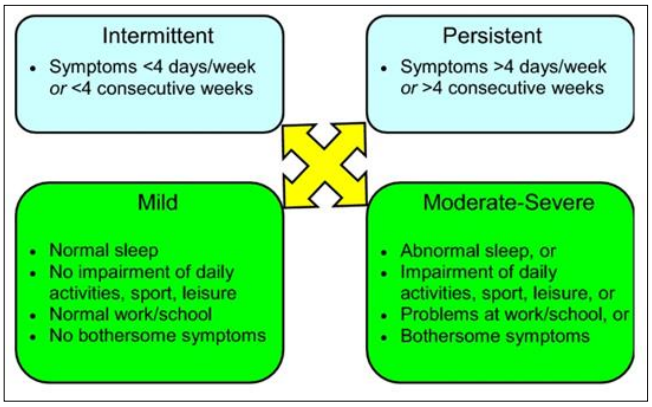
Abstract
Allergic rhinitis is a very common disorder that affects people of all ages. It is strongly linked to asthma and conjunctivitis. It is ignored, underdiagnosed, misdiagnosed, and mistreated. Allergic rhinitis is not a serious illness. but, major risk is that poor asthma control and affects quality of life and productivity at work or school. Allergic rhinitis is shows same symptoms as common cold. so, difficult to identify.to confirm the diagnosis, specific IgE reactivity needs to be recorded. Many classes of drug are available, effective, and safe. In meta-analyses, intranasal corticosteroids are superior to other treatments, have a good safety profile, and treat all symptoms of allergic rhinitis effectively. First-generation antihistamines are associated with sedation, psychomotor retardation, and reduced academic performance. Third-generation antihistamines shows less sedation. Proper management of drugs must follows for reduced sedation and side effects.

Keywords: allergic rhinitis, allergic disorder

Introduction
Rhinitis is defined as inflammation of the nasal mucosa. It is a common disorder that affects up to 40% of the population [1]. Allergic rhinitis is the most common type of chronic rhinitis, affecting 10 to 20% of the population, and evidence suggests that the prevalence of the disorder is increasing. Severe allergic rhinitis has been associated with significant impairments in quality of life, sleep and work performance [2].Allergic rhinitis is characterised by sneezing, rhinorrhoea, and nasal congestion. It is mediated by early-phase and late-phase hypersensitivity responses—similar to those in allergic asthma—to indoor and outdoor environmental allergens [3]. In children, the combination of rhinoviral infection, allergic sensitization and allergen exposure gives an odds ratio of 19 for admission to hospital for asthma [6]. Allergic rhinitis adversely affects social life, school performance, and work productivity [1]. Particularly in patients with severe disease [11]. Rhinitis symptoms have a detrimental effect on academic performance [12]. The ARIA (Allergic Rhinitis and its Impact on Asthma) guideline1, 15 focuses on quality of life as a principal consideration in assessment and treatment. It provides a global, evidence-based, pragmatic, stepwise approach to treatment of allergic rhinitis and has been updated and evaluated in recent years with GRADE (grading of recommendations assessment, development, and evaluation) methodology [15]. Immunotherapy is available via sublingual and subcutaneous routes at present, mainly for individuals with allergic rhinitis uncontrolled by pharmacotherapy and allergen avoidance. Immunotherapy is also the only treatment currently available that probably alters disease course, reducing progression not only of sensitisation but also of rhinitis to asthma [1]. This article provides an overview of the recommendations provided in these guidelines as well as a review of current literature related to the pathophysiology, diagnosis, and appropriate management of allergic rhinitis.

Pathophysiology
In allergic rhinitis, numerous inflammatory cells, including mast cells, CD4-positive T cells, B cells, macrophages, and eosinophils, infiltrate the nasal lining upon exposure to an inciting allergen (most commonly airborne dust mite fecal particles, cockroach residues, animal dander, moulds, and pollens). The T cells infiltrating the nasal mucosa are predominantly T helper (Th) 2 in nature and release cytokines (e.g., interleukin [IL]-3, IL-4, IL-5, and IL-13) that promote immunoglobulin E (IgE) production by plasma cells. IgE production, in turn, triggers the release of mediators, such as histamine and leukotrienes, that are responsible for arteriolar dilation, increased vascular permeability, itching, rhinorrhea (runny nose), mucous secretion, and smooth muscle contraction [1, 2]. Crosslinking of IgE bound to mast cells by allergens, in turn, triggers the release of mediators, such as histamine and leukotrienes, that are responsible for arteriolar dilation, increased vascular permeability, itching, rhinorrhea, mucous secretion, and smooth muscle contraction in the lung [11, 2]. A non-IgE mediated hyperresponsiveness can develop due to eosinophilic infiltration and nasal mucosal obliteration. The nasal mucosa now becomes hyperreactive to normal stimuli (such as tobacco smoke, cold air) and causes symptoms of sneezing, rhinorrhea, and nasal pruritis [4].



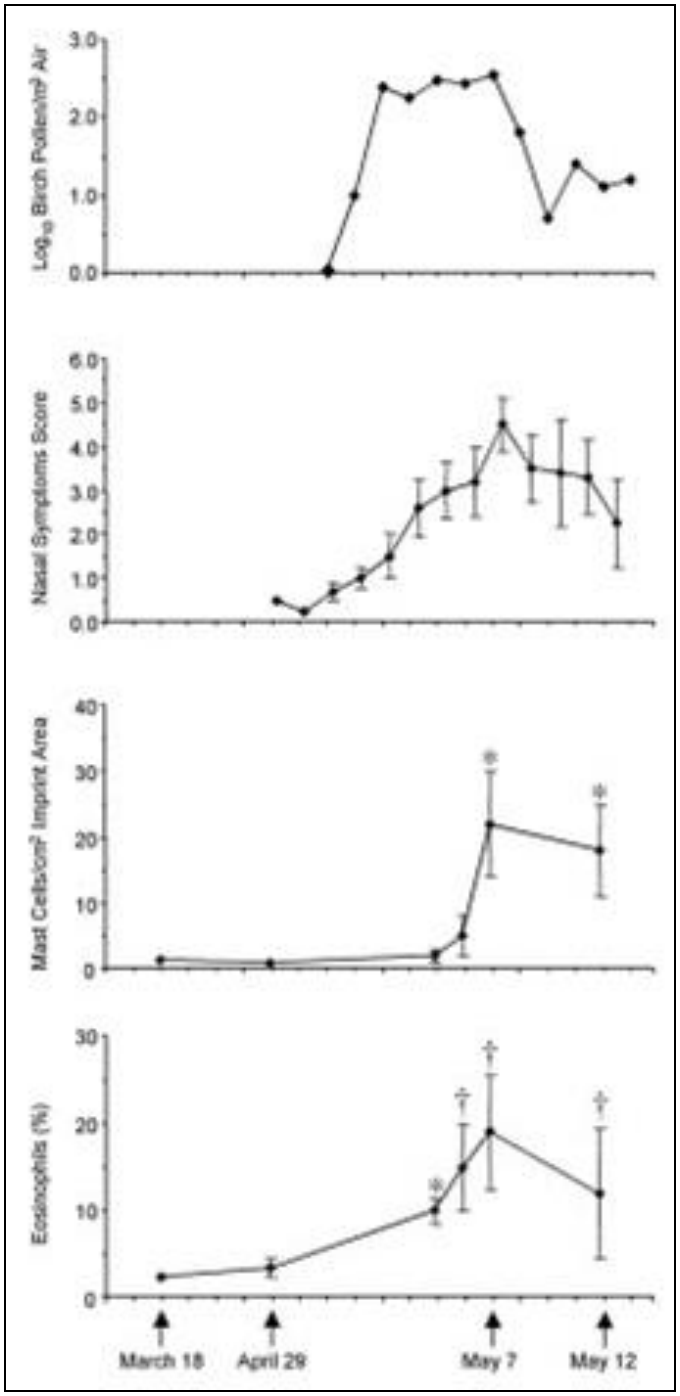


Fig 1: During an allergy season when birch pollen levels were increased (A), associated nasal symptom scores gradually increased (B) and correlated significantly with the logarithm of the pollen count ($r = 0.68$, $P < .01$). A significant increase in the number of mast cells in the imprint area (C) and the percentage of eosinophils in nasal lavage fluid (D) also occurred during the allergy season compared with preseason values.

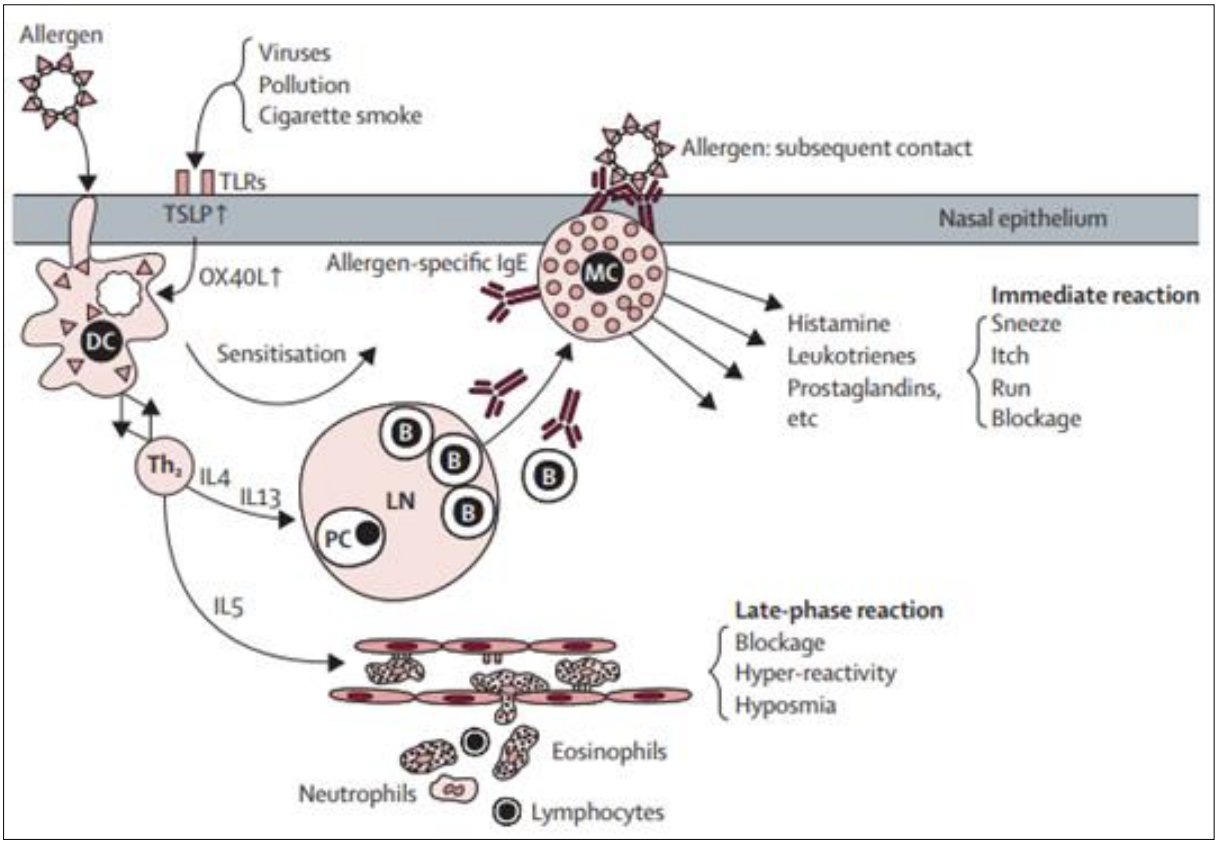


Fig 2

Diagnosis and investigations

Allergic rhinitis is usually a long-standing condition that often goes undetected in the primary-care setting. Patients suffering from the disorder often fail to recognize the impact of the disorder on quality of life and functioning and, therefore, do not frequently seek medical attention. In addition, physicians fail to regularly question patients about the disorder during routine visits [1, 14]. Therefore, screening for rhinitis is recommended, particularly in asthmatic patients since studies have shown that rhinitis is present in up to 95% of patients with asthma [15, 16, 17, 18]. A thorough history and physical examination are the cornerstones of establishing the diagnosis of allergic rhinitis (see Table 2). Allergy testing is also important for confirming that underlying allergies cause the rhinitis [1]. Referral to an allergist should be considered if the diagnosis of allergic rhinitis is in question.

Treatment

The treatment goal for allergic rhinitis is relief of symptoms. Therapeutic options available to achieve this goal include avoidance measures, nasal saline irrigation, oral antihistamines, intranasal corticosteroids, combination intranasal corticosteroid/antihistamine sprays; leukotriene receptor antagonists (LTRAs), and allergen immunotherapy (see Fig. 2). Other therapies that may be useful in select patients include decongestants and oral corticosteroids. If the patient's symptoms persist despite appropriate treatment, referral to an allergist should be considered. As mentioned earlier, allergic rhinitis and asthma appear to represent a combined airway inflammatory disease and, therefore, treatment of asthma is also an important consideration in patients with allergic rhinitis.

Antihistamines

The second-generation oral anti-histamines (e.g., desloratadine [Aerius], fexofenadine [Allegra], loratadine [Claritin], cetirizine [Reactine]) are the first-line pharmacological treatments recommended for all patients with allergic rhinitis. Recently, two new second-generation antihistamines—Bilastine (Blexten) and rupatadine (Rupall)—have been introduced in Canada. At present, these antihistamines are available by prescription only (The second-generation oral anti-histamines have been found to effectively reduce sneezing, itching and rhinorrhea when taken regularly at the time of maximal symptoms or before exposure to an allergen. Although the older (first-generation) sedating antihistamines (e.g., diphenhydramine, chlorpheniramine) are also effective in relieving symptoms, they have been shown to negatively impact cognition and functioning and, therefore, they are not routinely recommended for the treatment of allergic rhinitis [1, 14].

Intranasal corticosteroids

Intranasal corticosteroids are also first-line therapeutic options for patients with mild persistent or moderate/severe symptoms and they can be used alone or in combination with oral antihistamines. When used regularly and correctly, intranasal corticosteroids effectively reduce inflammation of the nasal mucosa and improve mucosal pathology. Studies and meta-analyses have shown that intranasal corticosteroids are superior to antihistamines and leukotriene receptor antagonists in controlling the symptoms of allergic rhinitis, including nasal congestion, and rhinorrhea [19, 20, 21, 22]. They have also been shown to improve ocular symptoms and reduce lower airway symptoms in patients with concurrent asthma and allergic rhinitis [23, 24, 25].

It is important to note that most patients with allergic rhinitis presenting to their primary-care physician have moderate-to-severe symptoms and will require an intranasal corticosteroid. Bousquet *et al*. [30] noted improved outcomes in patients with moderate-to-severe symptoms treated with a combination of these agents.

Combination intranasal corticosteroid and antihistamine nasal spray

If intranasal corticosteroids are not effective, a combination corticosteroid/antihistamine spray can be tried. Combination fluticasone propionate/azelastine hydrochloride (Dymista) is now available in Canada. This combination spray has been shown to be more effective than the individual components with a safety profile similar to intranasal corticosteroids [31, 32, 33, 34].

Leukotriene receptor antagonists (LTRAs)

The LTRAs montelukast and zafirlukast are also effective in the treatment of allergic rhinitis; however, they do not appear to be as effective as intranasal corticosteroids [35, 36, 37]. Although one short-term study found the combination of LTRAs and antihistamines to be as effective as intranasal corticosteroids [38], longer-term studies have found intranasal corticosteroids to be more effective than the combination for reducing nighttime and nasal symptoms [20, 39]. It is important to note that in Canada, montelukast is the only LTRA indicated for the treatment of allergic rhinitis in adults.

LTRAs should be considered when oral antihistamines, intranasal corticosteroids and/or combination corticosteroid/antihistamine sprays are not well tolerated or are ineffective in controlling the symptoms of allergic rhinitis. If combination pharmacological therapy with oral antihistamines, intranasal corticosteroids, combination corticosteroid/antihistamine sprays and LTRAs is not effective or is not tolerated, then allergen immunotherapy should be considered [1, 14].

Allergen immunotherapy

Allergen immunotherapy involves the subcutaneous administration of gradually increasing quantities of the patient's relevant allergens until a dose is reached that is effective in inducing immunologic tolerance to the allergen (see *Allergen-specific Immunotherapy* article in this supplement). Allergen immunotherapy is an effective treatment for allergic rhinitis, particularly for patients with intermittent (seasonal) allergic rhinitis caused by pollens, including tree, grass and ragweed pollens [40, 41, 42, 43]. It has also been shown to be effective for the treatment of allergic rhinitis caused by house dust mites, Alternaria, cockroach, and cat and dog dander (although it should be noted that therapeutic doses of dog allergen are difficult to attain with the allergen extracts available in Canada). Allergen immunotherapy should be reserved for patients in whom optimal avoidance measures and pharmacotherapy are insufficient to control symptoms or are not well tolerated. Since this form of therapy carries the risk of anaphylactic reactions, it should only be prescribed by physicians who are adequately trained in the treatment of allergy and who are equipped to manage possible life-threatening anaphylaxis [1].

Evidence suggests that at least 3 years of allergen-specific immunotherapy provides beneficial effects in patients with allergic rhinitis that can persist for several years after discontinuation of therapy [44, 45]. In Canada, most allergists consider stopping immunotherapy after 5 years of adequate treatment. Immunotherapy may also reduce the risk for the future development of asthma in children with allergic rhinitis [41].

Typically, allergen immunotherapy is given on a perennial basis with weekly incremental increases in dose over the course of 6–8 months, followed by maintenance injections of the maximum tolerated dose every 3–4 weeks for 3–5 years. After this period, many patients experience a prolonged, protective effect and, therefore, consideration can be given to stopping therapy. Pre-seasonal preparations that are administered on an annual basis are also available [1, 14].

Sublingual immunotherapy is a way of desensitizing patients and involves placing a tablet of allergen extract under the tongue until it is dissolved. It is currently available for the treatment of grass and ragweed allergy, as well as house dust mite-induced allergic rhinitis (with or without conjunctivitis). At present, four sublingual tablet immunotherapy products are available in Canada: Oralair®, Grastek®, Ragwitek® and Acarizax™ [46, 47, 48, 49]. The sublingual route of immunotherapy offers multiple potential benefits over the subcutaneous route including the comfort of avoiding injections, the convenience of home administration, and a favourable safety profile. Like subcutaneous immunotherapy, sublingual immunotherapy is indicated for those with allergic rhinitis who have not responded to or tolerated conventional pharmacotherapy, or who are adverse to the use of these conventional treatments.

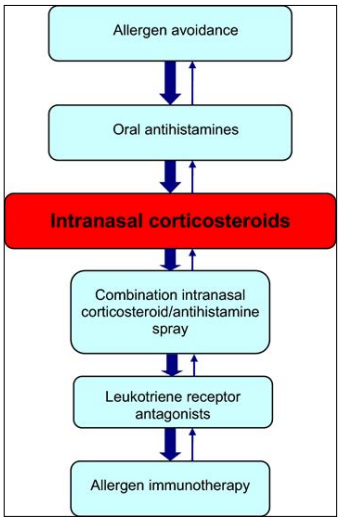


Fig 3

References

1. Bousquet J, Van Cauwenberge P, Khaltaev N. Allergic rhinitis and its impact on asthma. J Allergy Clin Immunol,2001:108(5):S147-334.
2. Maurer M, Zuberbier T. Undertreatment of rhinitis symptoms in Europe: fi ndings from a cross-sectional questionnaire survey. Allergy,2007:62:1057-63.
3. Durham SR. The inflammatory nature of allergic disease. Clin Exp Allergy,1998:28(6):20-24
4. Cirillo I, Marseglia G, Klersy C, Ciprandi G. Allergic patients have more numerous and prolonged respiratory infections than nonallergic subjects. Allergy,2007:62:1087-90.
5. Murray CS, Simpson A, Custovic A. Allergens, viruses, and asthma exacerbations. Proc Am Thorac Soc,2004:1:99-104.
6. Tang RB, Tsai LC, Hwang HM, Hwang B, Wu KG, Hung MW. The prevalence of allergic disease and IgE antibodies to house dust mite in schoolchildren in Taiwan. Clin Exp Allergy,1990:20:33-8. III
7. https://www.ncbi.nlm.nih.gov/books/NBK538186/
8. O'Meara TJ, Sercombe JK, Morgan G, Reddel HK, Xuan W, Tovey ER. The reduction of rhinitis symptoms by nasal fi lters during natural exposure to ragweed and grass pollen. Allergy,2005:60:529-32.
9. Li H, Sha Q, Zuo K *et al*. Nasal saline irrigation facilitates control of allergic rhinitis by topical steroid in children. ORL J Otorhinolaryngol Relat Spec,2009:71:50-55
10. Bousquet J, Lund VJ, Van Cauwenberge P *et al*. Implementation of guidelines for seasonal allergic rhinitis: a randomized controlled trial. Allergy,2003:58:733-4
11. Weiner JM, Abramson MJ, Puy RM. Intranasal corticosteroids versus oral H1 receptor antagonists in allergic rhinitis: systematic review of randomised controlled trials. BMJ,1998:317:1624-29.
12. Adams RJ, Fuhlbrigge AL, Finkelstein JA, Weiss ST. Intranasal steroids and the risk of emergency department visits for asthma. J Allergy Clin Immunol,2002:109:636-42.
13. Tilles SA, Bardana EJ Jr. Seasonal variation in bronchial hyperreactivity (BHR) in allergic patients. Clin Rev Allergy Immunol,1997:15:169-85.
14. https://www.sciencedirect.com/science/article/pii/S0149291817310068
15. https://aacijournal.biomedcentral.com/articles/10.1186/s13223-018-0280-7
16. Kuo CH, Wang WL, Chu YT, Lee MS, Hung CH. Sublingual immunotherapy in children: an updated review. Pediatr Neonatol,2009:50:44-49.
17. Baroody FM, Foster KA, Markaryan A, DeTineo M, Naclerio RM. Nasal ocular refl exes and eye symptoms in patients with allergic rhinitis. Ann Allergy Asthma Immunol,2008:100:194-99
18. Fokkens W, Lund V, Mullol J, and the European Position Paper on Rhinosinusitis and Nasal Polyps group. European position paper on rhinosinusitis and nasal polyps 2007. Rhinol,2007:20:1-136
19. Lasisi AO, Abdullahi M. The inner ear in patients with nasal allergy. J Natl Med Assoc,2008:100:903-05.
20. Tewfi k TL, Mazer B. The links between allergy and otitis media with eff usion. Curr Opin Otolaryngol Head Neck Surg,2006:14:187-90
21. Canonica GW, Bousquet J, Mullol J, Scadding GK, Virchow JC. A survey of the burden of allergic rhinitis in Europe. Allergy,2007:62(85):17-25.
22. Bousquet J, Bachert C, Canonica GW, *et al*, on behalf of the extended Global Allergy and Asthma European Network, World Allergy Organization and Allergic Rhinitis and its Impact on Asthma Study Group. Unmet needs in severe chronic upper airway disease (SCUAD). J Allergy Clin Immunol,2009:124:428-33.
23. Van Den Oord RAHM, Sheikh A. Filaggrin gene defects and risk of developing allergic sensitisation and allergic disorders: systematic review and meta-analysis. BMJ,2009:339:86-88.
24. Miyata M, Hatsushika K, Ando T, *et al*. Mast cell regulation of epithelial TSLP expression plays an important role in the development of allergic rhinitis. Eur J Immunol,2008:38:1487-92.

25. Smurthwaite L, Durham SR. Local IgE synthesis in allergic rhinitis and asthma. Curr Allergy Asthma Rep,2002:2:231-38.
26. Braunstahl GJ, Overbeek SE, Kleinjan A, Prins JB, Hoogsteden HC, Fokkens WJ. Nasal allergen provocation induces adhesion molecule expression and tissue eosinophilia in upper and lower airways. J Allergy Clin Immunol,2001:107:469-76.
27. Raap U, Braunstahl GJ. The role of neurotrophins in the pathophysiology of allergic rhinitis. Curr Opin Allergy Clin Immunol,2010:10:8-13.
28. Kündig TM, Bachmann MF. Allergen-specifi c immunotherapy: regulatory T cells or allergen-specifi c IgG? Hum Vaccin,2010:6:673-75.
29. Naclerio RM, Pinto J, DeTineo M, Baroody FM. Elucidating the mechanism underlying the ocular symptoms associated with allergic rhinitis. Allergy Asthma Proc,2008:29:24-28.
30. van Cauwenberge P, Watelet JB, Van Zele T, *et al*. Does rhinitis lead to asthma? Rhinology,2007:45:112-21.
31. Fleming DM, Crombie DL. Prevalence of asthma and hay fever in England and Wales. BMJ,1987:294:279-83.
32. Björkstén B, Clayton T, Ellwood P, Stewart A, Strachan D, and the ISAAC Phase III Study Group. Worldwide time trends for symptoms of rhinitis and conjunctivitis: phase III of the International Study of Asthma and Allergies.
33. Pearlman DS. Pathophysiology of the inflammatory response,1999:104:S132– S137. IV
34. Bascom R, Pipkorn U, Lichtenstein LM, Naclerio RM. The influx of inflammatory cells into nasal washings during the late response to antigen challenge: effect of systemic steroid pretreatment. Am Rev Respir Dis,1988:138:406-12. IIa
35. Otsuka H, Denburg JA, Befus AD, Hitch D, Lapp P, Rajan RS, *et al*. Effect of beclomethasone dipropionate on nasal metachromatic cell sub-populations. Clin Allergy,1986:16:589-95. III
36. Pipkorn U, Proud D, Lichtenstein LM, Kagey-Sobotka A, Norman PS, Naclerio RM. Inhibition of mediator release in allergic rhinitis by pretreatment with topical glucocorticosteroids. N Engl J Med,1987:316:1506-10. Ib
37. Schoeneich M, Pecoud AR. Effect of cetirizine in a conjunctival provocation test with allergens. Clin Exp Allergy,1990:20:171-4. Ib