

THE ASTHMA RHINITIS LINK*

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The reports and similarities between rhinitis and asthma are presented - common triggers, common inflammatory mechanisms and incidence of association of both diseases are analysed. Personal data on the frequency of asthma in rhinitis and of rhinitis in asthma are presented. The effect of nasal provocations tests in peak expiratory flow in patients with and without rhinitis is compared being greater in presence of nasal allergy. Finally the ARIA recommendations are discussed.

Rhinitis - Asthma - Airways inflammation.

The connection between rhinitis and asthma is a current clinical concept from many years. The similarities and differences the common triggers, mechanisms and the prevalence of asthma in rhinitis and rhinitis in asthma are worthwhile a reappraisal.

■ **Asthma and allergic rhinitis:** Asthma and allergic rhinitis are inflammatory diseases of airways sharing common mechanisms (1, 2, 3, 4, 6, 7, 8, 16, 17, 18) (Figure 1).

■ **Rhinitis and Asthma Associated Diseases:** In the last years the concept of a common disease or of associated diseases has been largely discussed. Various denominations have been suggested, namely: One airway one disease unified respiratory disease common asthma and allergic rhinitis syndrome - CARAS -. This last nomenclature seems to be more correct. In fact if there are more similarities than differences between asthma and allergic rhinitis, some points are clearly different namely the muscle component in bronchi the filter function of the nose. Allergic rhinitis and asthma share similar triggers (Allergic and non allergic) similar patterns of mucosal inflammation and similar physiopathologic phenomena (1, 2, 3, 4, 6, 7, 8, 10, 17, 18) (Figure 2).

■ **Similar Triggers:** Asthma and rhinitis have similar triggers, smoke, other irritants, cold air, mites, pollen, molds, animal danders, NSAIDS (Figure 3, 4).

■ **Similar patterns of inflammation:** Both asthma and allergic rhinitis are inflammatory conditions. Asthma is fundamentally a disease of inflammation inflammation of the lower airway causes broncho-

ASTHMA AND ALLERGIC RHINITIS

Asthma and allergic rhinitis are inflammatory diseases of airways sharing common mechanisms

Figure 1.

RHINITIS AND ASTHMA

ASSOCIATED DISEASES

- One Airway, One Disease
- Unified Respiratory Disease
- Common Asthma and Allergic Rhinitis
- Syndrome

- CARAS -
or
- SARA -

- Síndrome Asma y Rinitis Alérgica

Figure 2.

ALLERGIC RHINITIS AND ASTHMA

- Similar triggers (Allergic and non Allergic)
- Similar patterns of mucosal inflammation
- Similar physiopathologic phenomena

Modified from Slavin, AAAAAI, 2004

Figure 3.

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constriction and airway hyperresponsiveness resulting in asthma symptoms. Allergic rhinitis is an IgE-mediated inflammatory disorder inflammation of the nasal membranes in response to allergen exposure results in nasal symptoms. Asthma and allergic rhinitis are two related conditions linked by one common airway frequently overlapping conditions involvement of similar tissues common inflammatory processes, common inflammatory cells and mast cells, eosinophils, basophils, TH2 lymphocytes, common inflammatory mediators (12, 3, 4, 6, 7, 8, 17, 18) histamine, tryptase, ECP, Leucotriene/L4, Prostaglandin D2, PAF, cytokines, chemokines (1, 2, 3, 4, 6, 7, 8, 17, 18) (Figure 5).

■ **Allergic Mediators in Nasal Obstruction** – Histamine decreases nasal calibre and induces nasal obstruction symptoms. Leucotriene C4/D4 increases nasal airway resistance and increases mucosal blood flow. Prostaglandin D2 causes nasal obstruction in an early-phase response mediator (6, 7, 8, 12, 13, 17, 18) (Figure 6).

■ **Similar physiopathology phases:** Asthma and rhinitis have two physiopathology phases correlating well with clinical symptoms. Acute phase and late-phase. Hyperresponsiveness symptoms correlate with the early and late-phase responses in allergic rhinitis and in asthma (6, 7, 8, 12, 13, 17, 18).

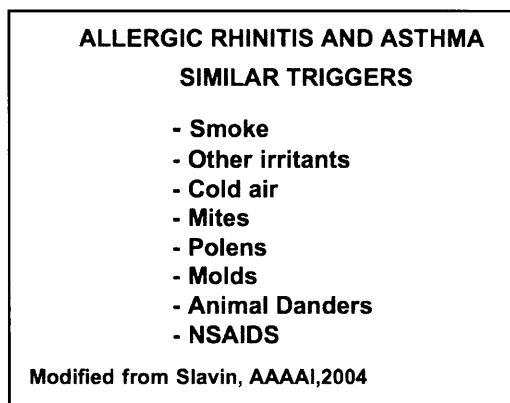


Figure 4.

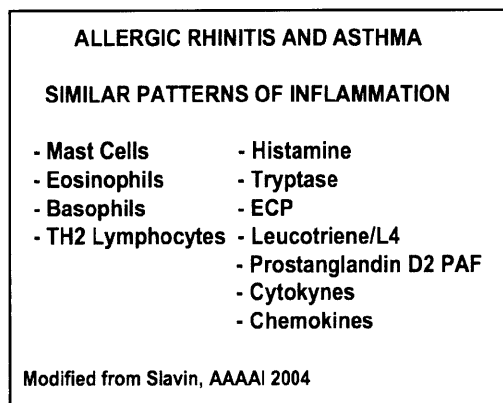


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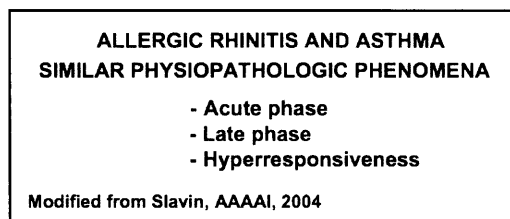


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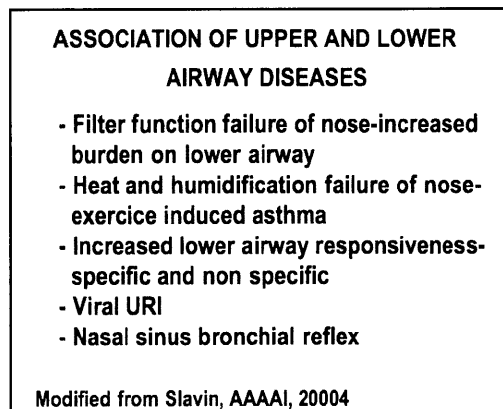


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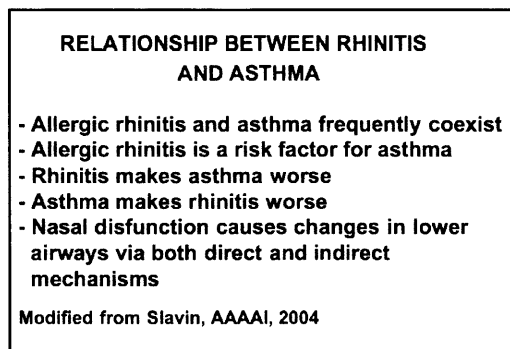


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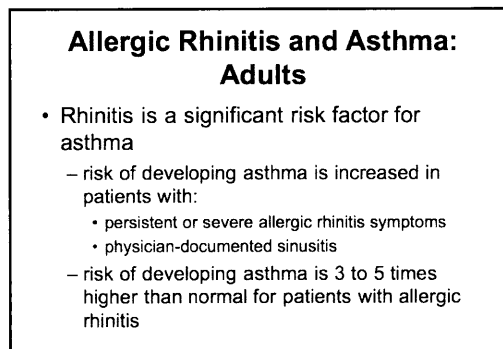


Figure 9.

■ **Shared physiopathology of allergic rhinitis and asthma:** Allergic rhinitis and asthma share several physiopathology characteristics, common triggers, similar inflammatory cascade on exposure to allergen histamine and Cysteinyl leukotrienes are common mediators in upper and lower airway diseases. In asthma and rhinitis there are a similar pattern of early-and late-phase responses, infiltration by the same inflammatory cells (e.g. eosinophils) and several potential connecting pathways including systemic transmission of inflammatory mediators (6, 7, 8, 12, 17, 18).

■ **Association of upper and lower airway diseases:** Filter function failure of nose-increased the burden

on lower airway; heat and humidification failure of nose-exercise induced asthma increased lower airway responsiveness (6, 11). Specific and non-specific viral URI (upper respiratory infection) nasal sinus and post nasal drip can trigger bronchial reflex. Allergic rhinitis and asthma frequently coexist. Allergic rhinitis is a risk factor for asthma. Rhinitis makes asthma worse and asthma makes rhinitis worse. Nasal disfunction causes changes in lower airways via both direct and indirect mechanisms (6, 11). Rhinitis is a significant risk factor for asthma. Risk of developing asthma is increased in patients with persistent or severe allergic rhinitis symptoms. In physician-documented sinusitis risk of developing asthma is 3 to 5 times higher than normal for patients with allergic rhinitis (6, 11). Allergic rhinitis and asthma are clinical aspects of a systemic disease affecting the nose and the lung. Genetic predisposing factors are common, TH2+TREG paradigm is common. Elevated IgE mast cells, eosinophils are not organ specific. Hyper responsiveness occurs in nose as well as bronchi. Autonomic nervous system abnormalities are systemic (6, 7, 8, 11, 17, 18) (Figures 7, 8, 9, 10).

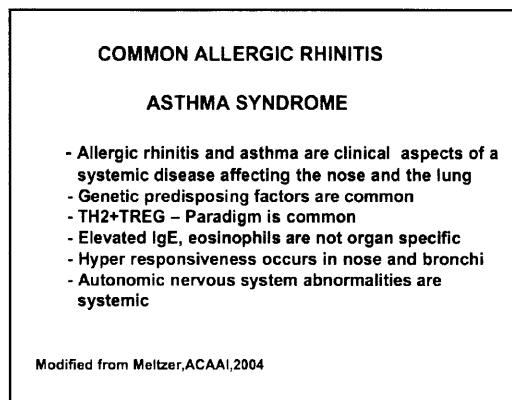


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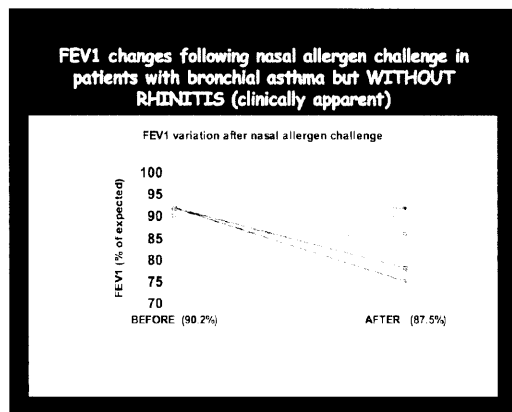


Figure 11.

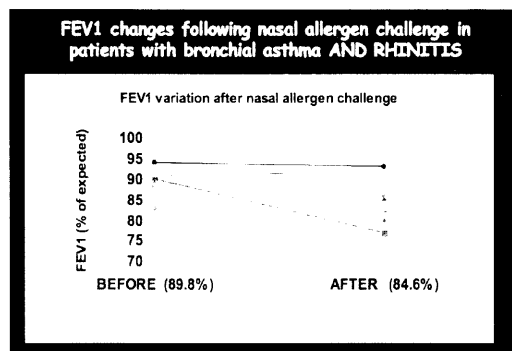


Figure 12.

■ **Nasal allergen provocation:** After allergen provocation increase in circulating mature basophils and eosinophils increase in eosinophils/basophils progenitors and increase in CD34+cells in our previous assays (6, 11). In our previous assays FEV1 changes following nasal allergen challenge in patients with bronchial asthma but without rhinitis (clinically apparent) are not significant but FEV1 changes following nasal allergen challenge in patients with bronchial asthma and rhinitis are significant. PEF variability in the week following allergen nasal challenge is greater in patients with asthma and rhinitis (5, 11) (Figures 11, 12, 13).

■ **Rhinitis and/or Asthma prevalence:** We have studied the prevalence of atopy by usual methods in a group of 2 448 patients with rhinitis and/or asthma.

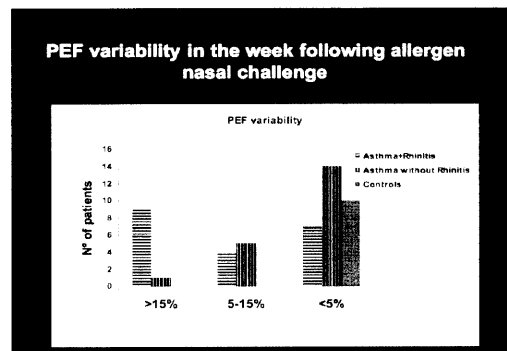


Figure 13.

From these patients 38% had only rhinitis 56% rhinitis and asthma and 9% only asthma. Prevalence of asthma in patients with rhinitis is 65% in non-atopic and 68% in atopics. Prevalence of rhinitis in patients with asthma is 72% in non-atopic and 88% in atopics (14, 15). Globally 62% of the rhinitic patients have asthma, and 86% of the asthmatic had rhinitis (9, 10) (Figures 14, 15, 16, 17, 18).

■ **Clinical classification of asthma and rhinitis:** Classification of asthma and of rhinitis were very similar in the last few years according to GINA and ARIA (1, 2). Asthma: Intermittent persistent, mild, moderate, severe. Rhinitis: inter-

mittent, persistent, mild, moderate, severe. This classification is still valuable for rhinitis but has been corrected in terms of control of diseases in last GINA revision (9).

■ **ARIA recommendations:** Following ARIA recommendations (2, 3) rhinitis and asthma should be evaluated and treated considering both directly. 1. Patients with persistent rhinitis should be evaluated for asthma 2. Patients with persistent asthma should be evaluated for rhinitis 3. A strategy should combine the treatment of upper and lower airways in terms of efficacy and safety (1, 2) (Figure 19).

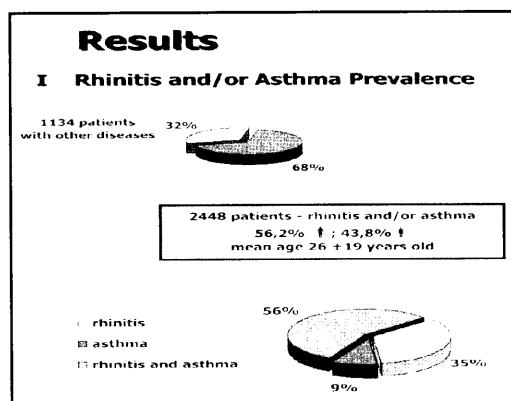


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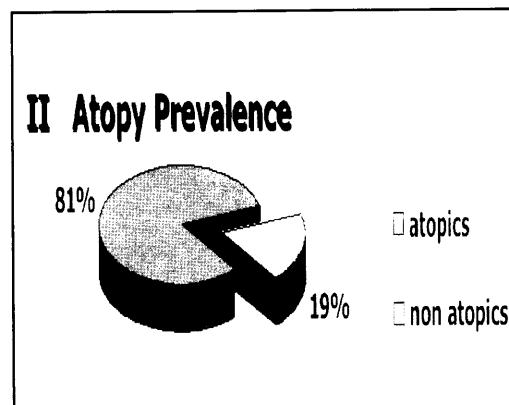


Figure 15.

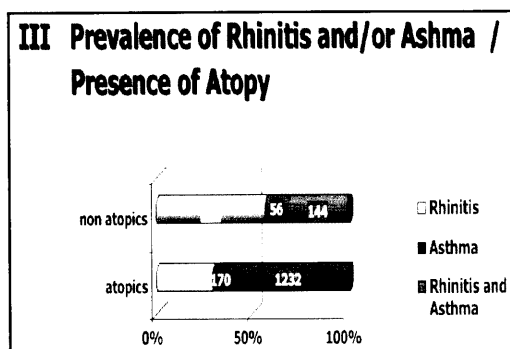


Figure 16.

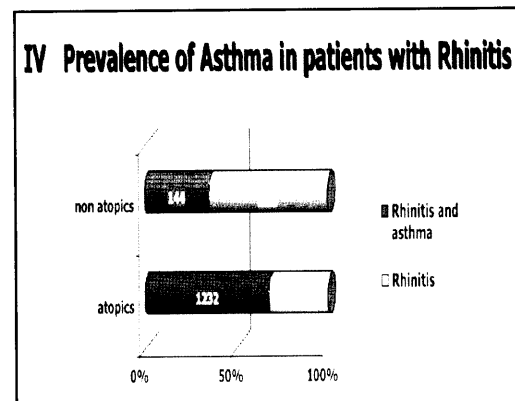


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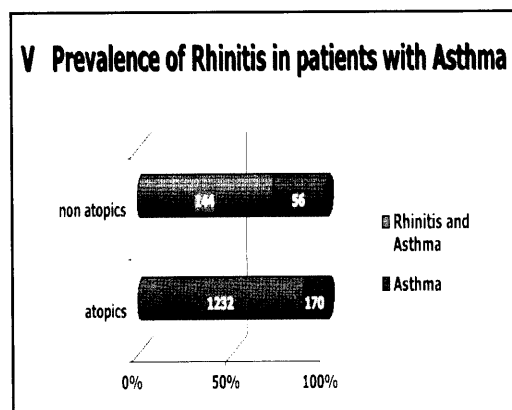


Figure 18.

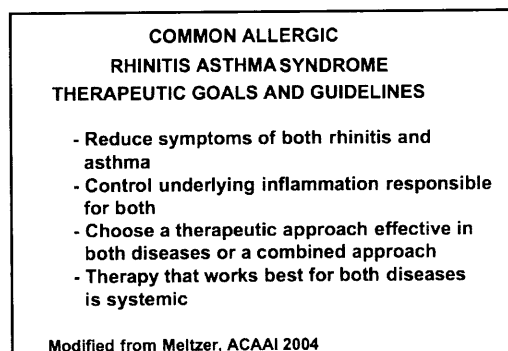


Figure 19.

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