



Helicobacter pylori and asthma

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A potential role of *Helicobacter Pylori* (HP) infection in several extra-intestinal disorders, such as anemia, failure to thrive, idiopathic thrombocytopenic purpura, asthma and allergic disorders has been recently suggested (1).

The HP infection seems to be able to induce chronic inflammation which cause remote effects from the primary site of infection (2).

Recent data suggest an inverse association between HP infection and asthma (3). Furthermore HP positive serology was inversely related to many allergic disease, as recent wheezing, allergic rhinitis, dermatitis and eczema (3).

The prevalence of HP positive serology reported to date for age-matched healthy children is very high. Chen and coll. found a prevalence of HP positive serology of 22.5% in 3327 children (age 3-19 years) (3). Siai et al. reported a rate of 51.4% serology prevalence in Tunisian school children (9).

Yucel et al. showed a 30.9% prevalence rate HP serology positive in Turkish children (mean age 6.8 ± 3.0 years) (10). Kori et al. evaluated *H. pylori* infection prevalence by using a monoclonal stool antigen test.

They observed a prevalence rate of 24.7% in day care children from Israel with higher rates in the 13- to 60-month-old group (32.5%) compared to the 3- to 12-month-old group (7.1%), suggesting that HP infection is acquired after the first year of life (11).

The prevalence of HP infection differs in various populations and in developed countries the acquisition of infection occurs later and at lower rates.

Risk factors for infection include a low socioeconomic background but day care attendance did not increase the risk of acquisition of infection (12).

Recently, several epidemiological studies suggest a consistent negative association between HP infection and allergic disorders (13, 14).

In HP infection, a predominant activation of Th1 cells, with the subsequent production of IFN- γ , IL-12, IL-18, IL-23 and TNF- α occur. The neutrophil-activating protein of HP (HP-NAP) has the potential to redirect the in vitro allergen-specific T-cell response from a predominant Th2 to a Th1 response (15). HP-NAP, by acting on both neutrophils and monocytes via TLR2 agonistic interaction significantly contributes toward inducing an IL-12- and IL-23-enriched differentiation of antigen-stimulated T cells toward a polarized Th1 phenotype (15). Furthermore, HP-NAP administration in vivo resulted in inhibition of the typical Th2-mediated bronchial inflammation of allergic bronchial asthma (16). To support this findings, HP positive subjects have shown a higher level of T-reg gastric cells than HP negative (17) and an increased number of circulating T-reg cells (18).

Recent data shown that in HP infected mice, bronchial inflammation and airway hyperresponsiveness decrease (19).

Moreover, even eosinophils, Th2 cells and Th17 cells in bronchial infiltration induced by allergen challenge decrease (19). Protection against asthma was more effective in mice infected neonatally and was suppressed by antibiotic eradication of HP (19). Asthma protection was associated with impaired maturation of lung-infiltrating dendritic cells and the accumulation of highly suppressive Tregs in the lung. IL-10 production in the lung by Tregs was implicated in preventing Th2 responses to allergens. (20). Expression of ICOS by human Foxp3+ Tregs inhibited dendritic cell function via IL-10, and T cells via TGF- β (20).

Systemic Tregs depletion abolished asthma protection and conversely, the adoptive transfer of purified Tregs populations was sufficient to transfer protection from infected donor mice to uninfected recipients (20). Existing therapies including corticosteroids and allergen immunotherapy may act on Tregs, in part to increase IL-10 production, while vitamin D3 and long-acting beta-agonists enhance IL-10 Tregs function (21).

Other possibilities may be enhancement of Treg function via histamine or prostanoid receptors, or by blocking pro-inflammatory pathways that prevent suppression by Tregs (activation of Toll-like receptors, or production of cytokines such as IL-6 and TNF- α) (21). In conclusion, HP infection may have a protective effect on airway inflammation and bronchial hyperresponsiveness.

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