

Abstract

Background: Inhaled corticosteroid is widely used in the management of mild to moderate persistent asthma including those receiving specific immunotherapy. Results of recent studies indicate the improvement of lung functions test, quality of life and lack or minimal side effects. Immunological mechanism underlie the improvement until now has not fully elucidated.

Objective: To elucidate the modulation of immune response in long-term use of budesonide inhalation in asthmatic children receiving specific immunotherapy.

Material and Method: Parents signed informed consent after receiving information of the study prior to enrollment. Randomization was done using "systematic random sampling", stratified into two strata according to age, less than 11 years and more than 11 years. Sample size was calculated to be 20 patients each group to meet the statistical analysis. We did a randomized observational analytic study in moderate asthmatic children to assess the effect of inhaled budesonide in children receiving immunotherapy who had had moderate persistent asthma for less than 2 years and who had not had previous regular treatment with corticosteroids. Patients were divided into three groups: group A receiving inhaled budesonide, group B receiving specific immunotherapy, and Group C receiving both specific immunotherapy and inhaled budesonide. Patients aged 6-16 years received either inhaled budesonide or specific immunotherapy for 3 months. The daily budesonide dose was 400 µg for children aged 11 to 16 years or 200 µg for children younger than 11 years. The primary outcome was IL-4, IL-5, IFN-γ, and IL-2 and FEV-1 reversibility. Ethical clearance was approved by Ethical Committee of Dr. Soetomo Hospital Surabaya.

Results: Significant differences were observed between pre and post treatment in all group ($p < 0.05$). Patients receiving inhaled corticosteroid showed attenuation of IL-4, IL-5, IFN-γ, IL-2 and 29% failure of FEV-1 reversibility. Patients receiving immunotherapy showed attenuation of IL-4, IL-5, elevation of IFN-γ, IL-2 and 24% failure of FEV-1 reversibility. Patients receiving inhaled corticosteroid and immunotherapy showed attenuation of IL-4 and IL-5, elevation of IFN-γ and IL-2, and improvement of FEV-1 reversibility. Analysis of discriminant yielded IL-2 as primary discriminator and correlated with the decrease of IL-5.

Conclusion: Long-term use of inhaled corticosteroid in childhood asthma receiving immunotherapy results in elevation of IFN-γ and IL-2, diminish IL-4 and IL-5. Addition of inhaled corticosteroid to immunotherapy results in elevation of IL-2 correlates with attenuation of IL-5 and play an important role in the modulation of immune response resulting in the improvement of FEV-1 reversibility.

Key words: Childhood asthma, combined specific immunoterapy and inhaled corticosteroid, immune modulation, FEV-1 reversibility.