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Title: High altitude stay reduces eosinophil load in airways in children with asthma

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Body: A normal sputum eosinophil count in children with asthma could result from corticosteroid treatment or reduction in eosinophil recruitment. In order to differentiate this we have described a new marker of eosinophilic inflammation (eosinophil protein content in airway macrophages) [1]. At high altitude children with asthma show significant reduction in eosinophil count due to reduced exposure to allergens. The aim was to determine the macrophage eosinophil protein content at baseline (T0) and after stay at high altitude (T1). Sputum induction was performed at T0 (n=54) and T1 in children attending High Altitude Children's Asthma Center in Misurina. Differential count was obtained by counting 400 non-squamous cells (eosinophilic asthma defined as ≥ 3%). One hundred macrophages were imaged at high-resolution using digital camera. The percentage of macrophage cytoplasm with red hue was determined by image analysis. The groups were compared using Mann-Whitney and Wilcoxon t tests. There was no significant difference (p=0.39) between median airway macrophages (AM) red hue percentage in eosinophilic (n=30) [median (range)] [5.9(0.6-57.6)] and non-eosinophilic asthma (n=24) [8.7(0.34-71.2)]. Children at T1 had significantly lower i) eosinophil count Median (range) [p = 0.001, 1(0-30) vs 3(0-52)] ii) AM red hue percentage [p = 0.005, 3.82(0.41-59.82) vs 7.04(0.72-71.23)] than at T0. The high AM red hue in non-eosinophilic asthma on arrival suggests ongoing eosinophilia in the absence of sputum eosinophilia. The reduction in eosinophil count after stay at high altitude is due to reduction in eosinophil recruitment in airways. [1] Kulkarni NS et al. JACI 2010; 126(1):61-9.