Expression of biosynthetic enzymes for leukotrienes B4 and C4 in tonsillar tissue of children with OSA

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Objective: Cysteinyl leukotrienes potentially promote adenotonsillar hypertrophy in children with obstructive sleep apnea (OSA). In adults, 5-lipoxygenase (5-LO) is expressed by tonsillar B-lymphocytes, but conflicting data have been presented regarding 5-LO in T-lymphocytes. We hypothesized that in children with OSA, leukotriene biosynthetic enzymes [5-LO; 5-LO activating protein (FLAP); LTA4 hydrolase (LTA4H); and leukotriene C4 synthase (LTC4S)] are expressed by both T- and B-tonsillar lymphocytes. Study design: Tonsillar tissue from children with OSA or controls with recurrent tonsillitis (RT) was studied for expression of biosynthetic enzymes by RT-PCR and flow cytometry (FC). Results: Thirteen children with OSA and 12 subjects with RT were included. mRNA for all enzymes was detected in both T- and B-lymphocytes. Children with OSA had higher LTC4S mRNA copies obtained from CD19+ B-lymphocytes than subjects with RT (RT-PCR: 1.72 ± 0.14 vs. 1.14 ± 0.92; p=0.04). There were no other differences in mRNA copies for the other enzymes from T- or B-lymphocytes. In OSA participants, LTC4S + fractions of CD3+ T-lymphocytes or CD19+ B-lymphocytes were significantly higher than in children with RT (FC: 22.5 ± 13.8% vs. 11.8 ± 6.7% or 28.9 ± 18% vs. 14.5 ± 11%, respectively; p<0.05). The two groups were similar regarding T- or B-lymphocytes fractions expressing other enzymes. Conclusions: Enzymes of the leukotriene biosynthetic pathway are detected in both T- and B-tonsillar lymphocytes. Children with sleep apnea and hypertrophic tonsils have enhanced expression of LTC4S, a key enzyme for cysteiny1 leukotriene synthesis.