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**Title:** Inflammatory patterns in asthmatic children based on the measurement of alveolar nitric oxide

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**Body:** Background: Nitric oxide (NO) can be measured in proximal [maximum airway NO flux ( $J'aw_{NO}$ )] and distal [alveolar NO concentration ( $CA_{NO}$ )] airway. Objective: To measure  $J'aw_{NO}$  and  $CA_{NO}$  due to define four inflammatory categories in asthmatic children. Methods: A cross-sectional study was performed in healthy and asthmatic children. Exhaled NO at multiple flow rates (50, 100 y 200ml/s) was carried out by CLD88sp® analyzer. According to the two-compartment model,  $CA_{NO}$  and  $J'aw_{NO}$  were calculated. A forced spirometry was performed in asthmatic subjects who were classified as follows; type I (normal  $J'aw_{NO}$  and  $CA_{NO}$ ), type II (elevated  $J'aw_{NO}$ ), type III (elevated  $J'aw_{NO}$  and  $CA_{NO}$ ) and type IV (elevated  $CA_{NO}$ ). Correlation between fractional exhaled NO ( $FE_{NO,50}$ ),  $J'aw_{NO}$  and  $CA_{NO}$  was studied using Spearman's rho. Paired comparison were applied with Bonferroni's multiple comparison adjustment. Results: We studied 162 children; 49 (32.23%) were healthy and 103 (67.76%) asthmatic.  $J'aw_{NO}$  and  $CA_{NO}$  were reproducible. In controls  $FE_{NO,50}$  (ppb) (median and range) was 11.5 (1.6-27.3),  $J'aw_{NO}$  (pl/s) was 516 (98.3-1470) and  $CA_{NO}$  (ppb) was 2.2 (0.1-4.5). Asthmatic subjects were classified: 44 (42.7%) in type I, 41 (39.8%) in type II, 14 (13.5%) in type III and 4 (3.88%) in type IV. Strong correlation was found between  $J'aw_{NO}$  and  $FE_{NO,50}$ . A significant increase was found in the number of exacerbations in type III and IV. There was no association between  $J'aw_{NO}$  and  $CA_{NO}$ . Conclusions: The results for  $CA_{NO}$  and  $J'aw_{NO}$  in healthy controls were similar to those found in other reports. There was no correlation between proximal and distal inflammation. Asthmatic patients with elevated  $CA_{NO}$  presented higher morbidity.