

Correspondence

Pattern of airway physiology in children with severe asthma

To the Editor:

Sorkness et al¹ obtained spirometry and plethysmographic lung volumes before and after maximal bronchodilation with salbutamol to characterize the airway physiology in their Emery Severe Asthma Research Program (SARP) cohort. They found that boys with severe asthma had greater baseline airflow limitation and air trapping than did girls with severe asthma and, unlike the girls, had incomplete postbronchodilation reversal. Sex differences in airway physiology were not observed in children with nonsevere asthma. The patterns of airflow limitation and air trapping related to severity group and sex were apparent in each of the age tertiles of the cohort, and there were no significant main effects or interactive effects of age in the multivariate models.

The data from the Emery SARP cohort are intriguing and add further speculation to the complex relationship between sex and asthma. They mainly confirm that male sex is a risk factor for lung function impairment in asthma. Males with asthma were twice more likely (23% vs 10%) than females to develop airflow limitation (using postbronchodilator FEV₁/forced vital capacity ratio) by 18 years² and had a lower FEV₁/forced vital capacity ratio at age 26 years as compared with females.³ The findings from the SARP cohort do not necessarily contradict the lack of relationship between progressive reduction in lung function and the severity of asthma found in the Childhood Asthma Management Program cohort, which indeed was characterized by a relatively narrow range of asthma severity.⁴

The early pattern of disturbed airway physiology identified in boys with severe asthma in the SARP study may actually be a clue to different lung growth between sexes. The structure of the lung is a crucial determinant of ventilatory function and contributes to

the sex differences in airway behavior across the human life span. Such sex differences are mainly attributable to the different growth patterns of airways in relation to air spaces (dysanapsis).⁵ Future studies addressed to evaluate the different aspects of the lung growth between sexes should consider the investigation of the pathophysiologic mechanisms (such as loss of elastic recoil and reduced closing volume), immunologic processes, hormonal determinants, and genetic markers of airway remodeling.

Fernando Maria de Benedictis, MD

Virgilio Carnielli, MD

Luigi Pietroni, BSc

From the Department of Mother and Child Health, Salesi Children's Hospital, Ancona, Italy. E-mail: debenedictis@ospedaliriuniti.marche.it.

Disclosure of potential conflict of interest: The authors have declared that they have no conflict of interest.

Editor's note: There is no accompanying reply to this correspondence.

REFERENCES

1. Sorkness RL, Teague WG, Penugonda M, Fitzpatrick AM. Sex dependence of airflow limitation and air trapping in children with severe asthma. *J Allergy Clin Immunol* 2011;127:1073-4.
2. Sears MR, Greene JM, Willan AR, Wiecek EM, Taylor DR, Flannery EM, et al. A longitudinal, population-based cohort of childhood asthma followed to adulthood. *N Engl J Med* 2003;349:1414-22.
3. Rasmussen F, Taylor DR, Flannery EM, Cowan JO, Greene JM, Herbison GP, et al. Risk factors for airway remodeling in asthma manifested by a low post-bronchodilator FEV₁/vital capacity ratio: a longitudinal population study from childhood to adulthood. *Am J Respir Crit Care Med* 2002;165:1480-8.
4. Covar RA, Spahn JD, Murphy JR, Szefer SJ. Progression of asthma measured by lung function in the childhood asthma management program. *Am J Respir Crit Care Med* 2004;170:234-41.
5. Mead J. Dysanapsis in normal lung assessed by the relationship between maximal flow, static recoil, and vital capacity. *Am Rev Respir Dis* 1980;121:339-42.

doi:10.1016/j.jaci.2011.06.024