Small Airway Function in Predicting Asthma Control in Preschool Children

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Abstract

\textbf{Background:} Asthma control level is much lower in children. This study aimed to determine the role of small airway function in predicting asthma control in preschool children. \textbf{Method:} In this retrospective cohort study, we enrolled preschool children who initially diagnosed with asthma and followed up 2 to 3 months by pediatric pulmonary physicians. Clinical history and lung function results were collected. Multivariable regression model was applied to determine risk factors in predicting poor asthma control. \textbf{Results:} The cohort study was comprised of 219 preschool children. Sixty-nine of them (31.5\%) had poor asthma control. Poor adherence (14.5\% vs 6.0\%, \textit{p}=0.038) and severe airway hyperresponsiveness (AHR) (20.6\% vs 1.6\%, \textit{p}<0.05) were more common in poor controlled group. Baseline FEV\textsubscript{1}\% (94.5 vs 101.4, \textit{p}=0.001), FEF\textsubscript{50}\% (66.1 vs 86.0, \textit{p}<0.001), FEF\textsubscript{75}\% (60.9 vs 75.3, \textit{p}=0.001), FEF\textsubscript{25-75}\% (70.9 vs 86.0, \textit{p}<0.001) were significantly lower in poor controlled patients than those of well controlled group. While, FVC\% was similar between the two groups (92.4 vs 96.7, \textit{p}=0.093). Multivariable regression models showed severe AHR (OR 9.500, 95\%CI 1.404-64.000, \textit{p}=0.020), lower baseline FEF50\% (OR 0.972, 95\%CI 0.950-0.994, \textit{p}=0.012) were significantly associated with short-term poor asthma control (AUC, 0.740, 95\%CI 0.661-0.818). \textbf{Conclusion:} Preschool asthma children with severe AHR and decreased FEF50 were at risk of poor asthma control in next 2 to 3 months.

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Figure 1. Flow diagram of study progression.

6149 preschool children were diagnosed with asthma from January 2019 to December 2020

Excluded (N=5298)
1. Diagnosed with asthma and followed up by general physician (n=4916)
2. Cannot complete spirometry (n=374)
3. Other diseases which affected the results of spirometry (n=8; congenital heart defect=2; Stenosis of trachea=1; Funnel chest=5)

Visit1 Included (n=851)

Excluded (N=632)
1. Failed to visit at the appointed time (n=428)
2. Loss of spirometry results (n=204)

Visit2 Included (n=219)

Data analysis

ROC Curve

AUC 0.740 95% CI [0.663-0.818]