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Association between gastroesophageal reflux and spirometric finding in children with bronchial asthma

I. Adam

Department of Pediatrics, Nicolae Testemitanu State Medical and Pharmaceutical University
93, Burebista Street, Chisinau, Republic of Moldova

Corresponding author: +37379514096. E-mail: ianos.adam@gmail.com

Gastroesophageal reflux disease (GERD) is one of the most common diseases that affects the upper gastrointestinal tract. GERD includes endoscopically positive, endoscopically negative, and extraesophageal reflux disease. In the past few years attention and discussion of the extraesophageal symptoms of GERD has been growing. One of the most discussed topics is the relation of GERD to bronchial asthma.

The aim of this study was to assess lung function disorders using spirometric measurements in a group of children with asthma, with and without gastroesophageal reflux disease.

The study included 114 children with moderate to severe asthma, aged from 5 to 16 years. The main group entered 58 children with association of asthma with GERD; controls included 56 GERD-free asthmatic children. Asthma diagnosis was established according to GINA criteria (2010) and GERD was diagnosed on the basis of ESPGHAN (2009) recommendations.

Analysis of the mean forced expiratory volume (FVC) values showed restrictive characteristics of changes in lung functioning. Thus, FVC values in the first group were reduced down to $64,03 \pm 2,42\%$ in children with moderate asthma and $64,6 \pm 3,42\%$ in those with severe progression of the disease, compared with the same subgroups with GERD ($69,12 \pm 2,49\%$ and $71,93 \pm 2,56\%$, respectively, $p > 0,05$). According to the European Respiratory Society's standards, obstructive type changes include following spirometric criteria: a decrease in dynamic lung function variables that characterize the “airflow-volume” relationship (FVC, FEV1, PEF and MEF25-75). Our study results showed lower levels of

FEV1 in children with asthma and GERD ($61,74 \pm 2,58\%$ in moderate asthma and $61,05 \pm 3,84\%$ in severe asthma), compared with GERD-free cases ($72,35 \pm 2,13\%$ and $73,8 \pm 2,53\%$, respectively; $p < 0,01$). Peak expiratory flow (PEF) showed significantly different severe obstructive changes between the studied groups: $46,55 \pm 2,53\%$ in moderate asthma+GERD and $45,45 \pm 2,93\%$ severe asthma+GERD vs $56,0 \pm 3,26\%$ in moderate asthma and $55,1 \pm 2,98\%$ in severe asthma, respectively ($p < 0,05$). MEF25-75 levels were significantly lower in the asthma+GERD group, in comparison with asthma cases: $58,26 \pm 3,84\%$ and $56,8 \pm 4,94\%$ vs $71 \pm 3,42\%$ and $73,47 \pm 3,64\%$, respectively ($p < 0,05$). Noticeably, significantly more obstructive changes were expressed in distal airways, and lung functioning variables were observed in the same subgroups of children: $56,68 \pm 2,95\%$ and $59,2 \pm 4,9\%$ vs $67,65 \pm 3,16\%$ ($p < 0,02$) and $64,47 \pm 3,18\%$ ($p > 0,05$), respectively for MEF75 levels; $59,9 \pm 3,98\%$ and $54,85 \pm 5,16\%$ vs $75,76 \pm 3,55\%$ and $72,5 \pm 3,72\%$ ($p < 0,01$) for MEF50 levels; $68,81 \pm 5,64\%$ and $65,25 \pm 6,9\%$ vs $87,94 \pm 6,16\%$ and $84,03 \pm 4,58\%$ ($p < 0,05$) for MEF25.

Analysis of the spirometric variables indicated more severe obstructive changes in the lung functioning in children with the association of asthma and GERD, showed by lower values of FEV1, PEF, MEF25-75, MEF75 and MEF25, when compared with asthmatic children who are GERD-free. The obtained results demonstrate the relationship between the reflux disease and bronchial asthma.

Key words: gastroesophageal reflux disease, lung functioning, children.