Hygienic estimation of training conditions of pupils with chronic respiratory diseases

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Among the chronic respiratory diseases, children frequently suffer of recurrent bronchitis and chronic asthma. Statistics show that recurrent and persistent chronic bronchitis represents 26-42% of all bronchopulmonary diseases. Some of the most common diseases recorded in medical practice, both in children and adults, are diseases of the respiratory system. Respiratory diseases in the Republic of Moldova have little tendency to increase, and the average prevalence consists of 37,4% of general morbidity. However, chronic bronchitis and asthma morbidity have a high tendency to increase. The prevalence of chronic bronchitis in Republic of Moldova is 3,21±0,12‰, and 1,34±0,08‰ for asthma.

A decisive role in the pathogenesis of these diseases is evaluating risk factors such as ecological harmful factors, food, passive smoking, intra and extra domicile environment (habitual exhaust, household chemicals, dust, pollen and damp), weather conditions, additives and alimentary dyes, pharmaceutical remedies used without a medical prescription, and the lifestyle of the family.

The training conditions of children in the schools were investigated from 6 rural locations. We evaluated 2000 microclimatic indices, 2000 of concentration of CO2 and CO, and 70 probes for determination of fungals poluation. During the study in the winter, air temperatures were very low. In the school Gordinești, district Edineț, temperatures were registered at 15°C. At the beginning of the lessons the average temperature was 12,8 °C ±0,4, and 13,6 °C ±0,1 at the end of the day. Temperatures were recorded as lower than the hygienic norm temperature levels (18-20 °C) in the following schools: „Fetești", the district of Edineț, „Mihai Eminescu", and „Mihai Sadoveanu" from the district of Cahul. Relative air humidity in the classrooms varied during the lessons, but exceeded the hygienic normative levels (the hygienic norm being 30-60%) in all investigated schools. The concentration of carbon dioxide exceeded admissible limits at the end of the lschool day in all schools, the biggest values being registered in Fetești, „Ion Inculeț" and „Mihai Eminescu", which exceeded the hygienic normative (MAC - 0,1%) 3 times during the day. Air pollution in the buildings from fungus (Penicillium, Mucor) and high relative air humidity presented the main factors in the development of chronic respiratory diseases amongst children.

Key words: chronic bronchitis, bronchial asthma, children, risk factors.

Frequency and impact of glutathione-S-transferase gene polymorphisms on lung function and bronchial asthma susceptibility in Moldovan children

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Asthma is a highly prevalent chronic inflammatory disease of the respiratory tract with genetic predisposition. However, the complex mechanisms of its inheritance, from the genetic predisposition of atopy to allergic diseases, are still not completely understood. Recent data suggest that the pathogenesis of atopic diseases is complex and might be caused by gene-gene and/or gene-environmental interactions. Polymorphisms of the glutathione-S-transferase (GST) genes are known risk factors for some environmentally related diseases.

The aim of the present study was to investigate the frequency of polymorphisms in the GSTT1, GSTM1, GSTP1 and NAT2 genes in the population groups of healthy Moldovans and children with asthma, and to analyze their role on lung function.

The studied population included 180 subjects – 90 children with asthma, aged 5 to 17 years (mean ± VEM age of 10,9 ± 0,4 years) and 90 healthy controls who showed no signs or history of allergic diseases (mean age 13,5 ± 0,2 years). The asthma group included 51 males and 39 females, who were randomly selected from asthmatic children referred by the Allergy Clinic of the Research Institute for Maternal and Child Healthcare, Chisinau, Moldova, during 2009-2010. Asthma was defined according to the criteria of the Global Initiative for Asthma (GINA). A complete clinical history, physical examination, and pulmonary function test (PFT) were performed for all the subjects in accordance with standards. Forced expiratory volume in 1 s (FEV1) and forced vital capacity (FVC) were measured using a portable spirometer (Spirobank G, Mir, Italy). Genes coding for the xenobiotic-metabolizing enzymes (GSTT1, GSTM1, GSTP1 and NAT2) were evaluated by polymerase chain reaction (PCR).

Analysis of the xenobiotic-metabolizing enzyme genes'

frequency in the studied population showed an equally distributed prevalence of GST genes genotypes in the patient group in comparison with the controls. However, the heterozygous genotype of the GSTP1 *341 C>T* Ala114Val polymorphism was found significantly more frequent in healthy subjects (14,4±9,7% in patients vs 26,7±9,0% in controls; $\chi^2 = 3,4$, gl = 1, p=0,06). The GSTM1 null genotype was overrepresented in asthmatic males in comparison with controls (54,9±9,4% vs 35,3±11,3%; $\chi^2= 3,21$, gl=1, p=0,07). The GSTT1 null genotype was associated with a significant decrease in the FEV1/FVC% ratio when compared with the GSTT1 wild genotype (89,3±3,4 vs 95,8±1,3, respectively, p<0,05) and the homozygous GSTP1 Val105Val genotype was associated with the decrease of FEV1 (64,4±8,2 vs 87,3±2,5 in patients with GSTP1 Ile^{105}/x genotypes, p<0,001) and the FEV1/FVC% ratio (82,6±5,7 vs 95,8±1,2 in patients with GSTP1 Ile^{105}/x genotypes, p<0,01). However, there was no association between GSTM1 polymorphism and lung function tests.

Our results suggest that GST gene polymorphisms may play an important role in asthma susceptibility in Moldovan children. Also GST gene polymorphisms may affect asthma pathogenesis as polymorphisms influence lung functioning in asthmatic children. These findings suggest a potentially raised susceptibility to negative environmental influences and predisposition to respiratory morbidity in this particular group.

Key words: asthma, candidate genes, glutathione-S-transferase, polymorphism, children.

Kinésithérapie dans la bronchiolite du nourrisson et la mucoviscidose

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Née dans les années 1960 dans le monde anglo-saxon, et référencée par la «Conventional Chest Physio Thérapie (cCPT)» au travers de trois techniques, la Kinésithérapie respiratoire (KR) a été reprise en France dans les années 1970. Elle ensuite reconsidérée dans le monde francophone par la Belgique qui conjointement avec les équipes françaises a présenté de nouvelles formes de prise en charge. Si depuis quelques temps, des discussions interviennent sur les applications et les indications de certaines techniques, personne aujourd'hui ne remet en cause la nécessité de la KR, et de son apport dans la prise en charge des syndromes obstructifs entre autre.

La cCPT fut transférée de la mucoviscidose vers le nourrisson bronco obstructif et reste encore pour certains le « golden standard » de la physiothérapie chez le petit enfant comme chez l'adolescent. Néanmoins les écoles du monde francophone et latin ont abandonnées ces techniques pour évoluer vers celle prenant plus en compte la physiopathologie respiratoire. C'est une approche différentielle qui a été faite depuis les années 1970 en France confortée en 1994 et 2000 puis 2008 successivement par la « conférence de consensus sur la prise en charge de la bronchiolite « , reprise par l'Agence Nationale d'Accréditation en Santé et enfin par l'Européen Respiratory Society à Berlin.

L'évolution s'est faite ainsi des techniques de clapping, de drainage postural, et de la Force Expiration Technique ou ACB, vers l'AFE (Accélération du Flux Expiratoire), et surtout pour le nourrisson vers l'ELPr (Expiration Lente Prolongée) ou en appellation internationale, la PSET (Prolonged Slow Expiation Technique). Ces applications sont complétées par la PEP (Positive Expiratory Pressure) et la CP (Coughing provoked), et le DRP (Drainage Rhinopharyngé Postérieur).D'autres techniques font aujourd'hui autorité pour la mucoviscidose comme le Drainage Autogène (Le Chevalier).

Dans la bronchiolite l'ELPr passive consiste en une technique d'AFE lente pour accéder aux bronches distales et ne pas entraîner de collapsus bronchique, risque rencontré sur l'utilisation d'une AFE qui par principe se fait à vitesse élevée. Cette technique est difficile, précise et à appliquer avec discernement suivant l'état clinique (score de WANG) et physiologique du jeune patient. Elle est souvent précédée d'un DRP. Une ELPr passive peut aussi techniquement devenir un drainage autogène passif.

Dans la mucoviscidose, l'utilisation de toutes les techniques sus citées est nécessaire pour dégager les grosses bronches proximales (AFE) le distales (ELPR active) et, pour assurer une prise en charge qui doit être régulière et faite aussi au domicile, le Drainage Autogène est à apprendre au patient. Cette méthode consiste à drainer l'ensemble des volumes pulmonaires, suivie de CP. La KR instrumentale se développe largement soit par instrumentation telle que le percussionnaire ou les appareils à Pression Expiratoire positive, soit plus simplement par des petits instruments visant à utiliser la spirométrie incitative suivant l'âge du patient.

En conclusion, la kinésithérapie respiratoire est riche de techniques manuelles et instrumentales aujourd'hui très en accord avec la physiologie respiratoire du nouveau né et de l'enfant. Suffisamment d'indices valorisent l'application de ces techniques avec leurs ajustements respectifs mais sans pour autant, reconnaissons le, avoir fait la preuve scientifique de leur indéniable efficacité l'une par rapport à l'autre. Elles sont souvent praticien dépendant.

Key words: kinésithérapie respiratoire, bronchiolite, mucoviscidose, enfant.