8. Visockienė Ž, Narkauskaitė-Nedzinskienė L, Puronaitė R, Mikaliūkštienė A. Validation of the LITHUANIAN version of the 19-item audit of diabetes dependent quality of life (ADDQOL – LT) questionnaire in patients with diabetes. *Health Qual Life Outcomes.* 2018;16(1):206. doi:10.1186/s12955-018-1033-5.

DOI https://doi.org/10.30525/978-9934-26-226-5-49

## FEATURES OF THE COURSE OF COMMUNITY-ACQUIRED PNEUMONIA IN CHILDREN UNDER THE INFLUENCE OF HIGH-FREQUENCY CHEST WALL OSCILLATION

## ОСОБЛИВОСТІ ПЕРЕБІГУ ПОЗАЛІКАРНЯНОЇ ПНЕВМОНІЇ У ДІТЕЙ ПІД ВПЛИВОМ ВИСОКОЧАСТОТНОЇ ОСЦИЛЯЦІЇ ГРУДНОЇ КЛІТКИ

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Diseases of the respiratory system remain a topical issue in modern pediatrics. Pneumonia is one of the most common nosologies of the respiratory tract and remains the main infectious cause of morbidity and mortality in children throughout the world, in particular in Ukraine [1;2].

Complex effective protection of the respiratory system is provided by the natural mechanism – mucociliary clearance (MCC), which provides rehabilitation of the bronchopulmonary system and the necessary potential of the barrier, immune and cleansing function of the respiratory tract [3]. In children with community-acquired pneumonia (CAP), the occurrence of most clinical symptoms, such as cough, shortness of breath, are associated with impaired functioning of the MCC [4]. Basic drug therapy is not fully effective in the case of MCC disorders in children with CAP.

High-frequency chest wall oscillation (HFCWO) is a modern method of restoring bronchial tree drainage based on the vibration-compression effect of the Vest Airway Clearance System [5; 6]. The Vest device has proven its effectiveness in the treatment of children with cystic fibrosis who had improvement of MCC of the bronchopulmonary system [7; 8].

**The aim:** to study the effect of high-frequency chest wall oscillation on the clinical course of community-acquired pneumonia in children.

**Materials and methods.** A clinical study was conducted in 123 children aged 6 to 17 years (11.8±0.5 years), including 66 boys (53.7%) and 57 girls (46.3%) at the pulmonology department of the Odessa Regional Children's Clinic hospitals with a confirmed diagnosis of CAP of acute and uncomplicated moderate severity. The children were divided into groups: the main group consisted of 62 children (35 – boys and 27 – girls) who received basic therapy (BT) with additional administration of HFCWO procedures using 1-6 modes of the device The Vest, model 105 (Hill-Rom, USA) [9,10]. The comparison group consisted of 61 children (32 – boys and 29 – girls) who received only BT. The children underwent a comprehensive clinical examination: study of complaints, general examination and evaluation of the objective status of the child at the beginning of treatment and in the dynamics.

**Results.** Upon admission to the pulmonology department, children of the main group complained of general weakness in 58 children (93.6%), subfebrile body temperature in 14 children (22.6%), febrile body temperature in 39 children (62.9% ), dry cough in 8 children (12.9%), nonproductive cough in 43 children (69.4%), productive cough in 11 children (17.7%), shortness of breath in 54 children (87.1%). Children of the comparison group, upon admission to the hospital, complained of general weakness in 59 children (96.7%), subfebrile body temperature in 12 children (19.7%), febrile body temperature in 35 children (57.4%), dry cough in 9 children (14.8%), nonproductive cough in 40 children (65.5%), productive cough in 12 children (19.7%), shortness of breath in 56 children (91.8%).

During the objective examination, the general condition of all children with CAP at the time of admission to the hospital was of moderate severity. Mixed dyspnea was observed in 54 children (87.1%) of the main group and expiratory dyspnea in 4 children (6.5%). Auscultatively, in the 58 children (93.6%) of the main group harsh breathing was heard, moist râles in 43 children (69.4), dry râles in 14 children (22.6), crepitation in 28 children (45, 2%) and during percussion in 57 children (91.9%) determined the area of lung sound dulling. Mixed shortness of breath was noted in 56 children (91.8%) of the comparison group. During auscultation in the 59 children (96.7%) of the comparison group had harsh breathing, 45 children (73.8%) moist râles, 16 children (26.2%) dry râles, 25 children (41.0%) crepitus and in almost all 59 (96.7%) children, the dullness of lung sounds was determined by percussion. Respiratory insufficiency in children of the main group of the first degree was observed in 42 children (67.7%) compared to children in the comparison group – in 49 children (80.3%), manifestations of respiratory failure of the second degree were observed in 6 children (9.7%) in comparison with children of the comparison group – in 4 children (6.6%).

**Conclusions**. At the end of the 10-day complex treatment, children of the main group had a dry cough in 7.2% and a productive cough of minor intensity in 17.5% compared to the comparison group, which had a dry cough in 15.8% and a productive cough of greater intensity in 34 .4% of children. No manifestations of respiratory failure were found in the children of both studied groups. On the 10th day of CAP therapy, the physical examination of the children in the main group revealed harsh breathing in 38.3% and isolated moist râles in 20.7% during lung auscultation. In the children of the comparison group, auscultation revealed harsh breathing in a larger number – 53.6% and moist râles in 39.8% of children.

Thus, in children with CAP of acute and uncomplicated course, the leading syndromes were intoxication (in 81.5% of children), respiratory failure (in 73.4% of children) and obstructive syndrome (in 6.5% of children). The beneficial effect of the HFCWO on the course of clinical symptoms of pneumonia in children leads to the restoration of the pathophysiological mechanisms of MCC which is accompanied by an improvement in the drainage function of the bronchial tree and pulmonary gas exchange.

**References:**

1. Yu H-R, Hsu J-H. Editorial: Emerging Pneumonia in Children. Front. Pediatr. 2021. 9:813034.

2. Волосовець О.П., Больбот Ю.К., Абатуров О.Є., Кривопустов С.П., Стоєва Т.В. Динаміка змін показника захворюваності на пневмонію дітей України за останні 20 років. *Медичні перспективи.* 2020. № 4(25). С. 174-181.

3. Munkholm M., Mortensen J. Mucociliary clearance: pathophysiological aspects. *Clin Physiol Funct Imaging*. 2014. 34: 171–177.

4. Bennett W.D., Daviskas E., Hasani A. et al. Mucociliary and cough clearance as a biomarker for therapeutic development. *J Aerosol Med Pulm Drug Deliv*. 2010. 23: 261–272.

5. Mahajan A.K., Dietta G.B., Hatipoglu U. et al. High frequency chest wall oscillation for asthma and chronic obstructive pulmonary disease exacerbations: a randomized sham-controlled clinical trial. Resp Res. 2011. 12:120.

6. Paneroni M., Clini E., Simonelli C. et al. Safety and efficacy of short-term intrapulmonary percussive ventilation in patients with bronchiectasis. Resp Care. 2011. 56 (7): 984–988.

7. Fainardi V., Longo F., Faverzani S. et al. Short-term effects of high-frequency chest compression and positive expiratory pressure in patients with cystic fibrosis. *J Clin Med Rese.* 2011. 3(6): 279–284.

8. Laube B.L., Carson K.A., Evans C.M. et al. Characterizing muco-ciliary clearance in young children with cystic fibrosis. Pediatr Res. 2021.

9. Аряєв М.Л., Усенко Д.В. Оцінювання та вибір режимів високочастотної осциляції грудної клітки в дітей із позалікарняною пневмонією на основі пульсоксиметрії. *Запорізький медичний журнал.* 2020. № 3(120). С. 378-383.

10. Аряєв М.Л., Усенко Д.В. Спосіб визначення ефективності лікування гострих захворювань органів дихання в дітей. Пат. 114857 Україна: МПК (2017.01), A 61 B 10/00, A 61B 5/0205, A 61B 5/08. № u201609413; заявл. 12.09.2016; опубл. 27.03.2017. Бюл. № 6. С. 5.