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Cough Phytotherapy in Early Childhood

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Treatment of acute respiratory infections remains one of the most pressing problems in children. Mucolytic and expectorant therapy aimed at facilitating the expectoration of sputum and improvement of the drainage function of bronchi, is an integral part of this treatment. Expectorant herbal medicine occupies a special niche in the treatment of acute respiratory viral infections. This paper presents literature data on the efficacy and safety of herbal expectorants in children, as well as the results of a comparative analysis of single- and multicomponent herbal medications.
***Key words**: cough, acute respiratory viral infections, children suffered from recurrent respiratory infections, mucociliary clearance, expectorant phytotherapy.*

Phytotherapy (from Greek *herbal treatment*) as a method of treatment has its roots in the remote past. The foundation of the modern ideas of the application of medicinal plants or their compositions in the therapy of one or another disease is the centuries-old experience of our ancestors and scientific pharmacological studies of today. Today this term also applies to the method of disease treatment with the help of phytogenous drugs containing complexes of bioactive substances, extracted from the whole herb or its separate parts. Despite the huge number of synthetic drugs in the arsenal of a modern pediatrician, cases of using drugs with

herbal components as their bases are not rare. What makes doctors who have the most modern drugs, developed using high technologies, at their fingertips turn to folk medicine? Versatile directional effect of herbs may contribute to simultaneous treatment of fundamental and coexistent diseases. The majority of medicinal plants enjoy a general revitalizing effect at the expense of the stimulation of the host defenses. The possibility of long-term administration, verified safety profile and wide accessibility make phytotherapy indispensable in the treatment of body's functional illnesses, mild cases and in sustaining therapy course.

We are going to look at the role of herbal medicinal products in child treatment on the example of acute respiratory infections (ARI).

It is widely known that respiratory pathology is one of the most widespread in the childhood. ARI are diagnosed in 65% of cases with children younger than 3 years of age, and sickly children (SC) – ¼ of all children – have 6-12 episodes of respiratory infections a year. In 30% of cases bacterial superinfection causes complications to acute respiratory viral infections, and that leads to the development of an inflammatory disease of accessory sinuses of nose and of respiratory tract [1-4]. Such anatomico-physiological peculiarities of infancy as rich mucous tunic vascularity, which leads to a rapid inflammatory edema, and respiratory tract narrowness further rapid disease progress.

One of the most frequent and regular symptoms of acute respiratory viral infections in childhood is cough. It is widely known that every child normally expectorates several times a day. In that case cough is the bodily mechanism intended for respiratory tract clearance from mucus clusters or foreign microparticles getting in the body while breathing (air contaminants, dust, tobacco smoke). In case of bronchopulmonary system infectious-inflammatory process development alteration of cough character (frequency, intensity and duration increase) and impairment in ability to expectorate phlegm are noted. As a rule, in the beginning of acute respiratory infections dry or underproductive cough with a little amount of phlegm is noted. In the setting of the mucociliary clearance impairment (MCC) with respiratory tract mucous tunic inflammation cough

acquires defensive character intended for the bronchial drainage function improvement. The main doctor's objective in this situation is the arrangement of conditions for effective expectoration. Cough inefficiency may be caused by very viscous phlegm, insufficiently expressed cough reflex, insufficiently deep breathing, bronchial patency and other reasons [5, 6].

All pharmaceuticals intended to help a child with inefficient expectoration may be divided into 4 groups [7]:

- anti-tussive medications which arrest the cough reflex (of central and peripheral action);
- mucolytic medications which dilute phlegm (direct action type mucolytics, mucolytics-mucokinetics, mucolytics-mucoregulators);
- expectorants which stimulate processes of phlegm excretion from the respiratory tract;
- coformulated drugs.

It is necessary to remember that in most cases cough treatment should not boil down to its suppression. Application of anti-tussive medications which reduce the tracheobronchial tree receptors' sensitivity or suppress medulla oblongata tussive center is extremely limited in the pediatric practice. Indications for prescribing such medications may be either a dry agonizing cough leading to severe sleep disturbances, physical and psychological discomfort, consumption; or preparation of a child for bronchological studies. In all other cases anti-tussive medications are contra-indicated, and, given a huge amount of phlegm in the bronchial lumen, are even harmful as they may lead to the appearance of the "swamping syndrome" and lack of efficient expectoration [5-7].

Mucolytic drugs are intended for phlegm dilution as a result of a direct action of the drug's components on the tracheo-bronchial secretion and/or respiratory tract mucous membrane. Most often mucolytics on the basis of acetylcysteine and carbocisteine are used in the pediatric practice, and mucoregulatory effect is characteristic of the latter, which means normal secretory activity of the goblet cells and mucociliary clearance improvement. Mucolytics on

the basis of proteolytic enzymes (trypsin, chymotrypsin, chymopsinum) are almost out of the child therapy lately. The most called-for in the child therapy is the enzymatic drug Pulmozyme developed on the basis of the recombinant DNAse used for those suffering from muscoviscidosis. Mucolytics-mucokinetics which increase the oscillatory motion of the ciliated epithelium cilia together with MCC speed increase and activate surfactant synthesis mainly belong to the ambroxol derivatives and are widely used in the pediatric practice [7-9].

Mechanism of action of the **expectorant drugs** is the ciliated epithelium activity increase at the expense of the reflex stimulation. The mainly used drugs in the pediatric practice are the phytogenous expectorants that contain alkaloids or saponins which stimulate secretion of bronchial glands and phlegm movement from the lower segments of the respiratory tract and take bactericidal action. Essential oils as components of herbal medicinal products secure spasmolytic action on the unstriated bronchial muscles, mucolytic and antimicrobial action. Antioxidant activity in the vegetable drugs is secured by flavonoids [7, 9, 10].

More rarely synthetic and combined expectorants and also resorptive effect expectorants (sodium bicarbonate and iodides) are used, the latter, absorbed into the gastrointestinal tract, are then excreted by the bronchial mucous tunic diluting and increasing its secretion. Resorptive drugs are almost out of the child therapy. Application of reflex action expectorants is most effective in the respiratory tract acute inflammatory processes under dry underproductive cough. However, it is not advisable to combine such drugs with antihistamines and sedatives, and apply to children with broncho-obstructive syndrome. Prescription of the phytogenous expectorants to children with allergoses should be handled with care [11, 12]. As a rule, unlike synthetic drug formulations, vegetable drugs have a good safety profile.

Phytogenous expectorants may be monocomponent (on the basis of the common licorice root, ginger hand, anise fruits, plantain and marsh mallow leaves) and polycomponent (on the basis of the above-listed vegetable ingredients together with other components that have anti-inflammatory, spasmolytic, pain relieving or

antioxidant effect) [13]. Phytomixtures as polycomponent vegetable drugs are developed according to the main drug-induced effects of their ingredients and enjoy the best effect on the respiratory tract inflammatory process exactly because of their combined effect. Thus, for example, phytogenous expectorant “Doctor Mom” includes dried solubles extracted from flowers, leaves, seeds, bark, fruits or roots of the following plants: common licorice, cluster-flowered inula, ginger, Mediterranean aloe, holy basil, adhatoda vasika, turmeric, solanum incanum, cubeb pepper, terminalica berelica. To the unique phytocomposition that combines expectorant, broncholytic, mucolytic and anti-inflammatory effects levomenthol is added. As a rule, syrup taste does not cause a negative reaction among small children. It is advisable to prescribe 2.5ml TID for children of 3-5 years of age, 2.5-5 ml TID for children of 6-14 years of age, 5-10 ml TID for 2-3 weeks for children older than 14 years of age. The drug is used as comfort care for acute and chronic respiratory tract infections (pharyngitis, laryngitis, tracheitis and bronchitis) with dry cough or cough with the difficult-to-separate phlegm [14].

Nowadays phytogenous expectorants may be recommended for use in the pediatric practice only after safety and clinical efficacy research. The open comparative research of 59 children of 3-15 years of age with acute infectious-inflammatory respiratory tract diseases with underproductive cough determined that the vegetable syrup for cough “Doctor Mom” and licorice syrup are effective expectorants. Their application on children with ARI allowed cutting the cough off completely with 80-84% of the patients by the 8^{th}-12^{th} observation day respectively. Interestingly, in the age group of 3-6 the influence of the multicomponent syrup on reduction in cough intensity and frequency was reliably higher than of the monocomponent licorice syrup. The similar trend was noted at the expectoration time evaluation. No side or undesirable effects of the application of the multicomponent vegetable syrup for cough were noted, small dyspeptic and skin manifestations were noted only among 9.5% of the children receiving licorice-based syrup. Research results show that a multicomponent vegetable syrup containing dry extracts of 10 herbs and levomenthol is a therapeutically effective,

well-tolerated drug and may be recommended for the treatment of children from 3 years of age with acute infectious-inflammatory respiratory tract diseases with cough [7].

Thus, expectorant vegetable drugs take their special place in the treatment of the acute infectious-inflammatory respiratory tract diseases. Herbal medicinal products are undoubtedly effective in the treatment of cough among children with ARI of uncomplicated course, with acute tracheites and bronchites. The most effective are the combined herbal medicinal products containing extracts of herbs of versatile influence on the inflammatory process of the respiratory tract mucous tunic. Expectorant, broncho- and mucolytic effects together with the anti-inflammatory action inherent in the unique phytocomposition of the syrup “Doctor Mom” make this herbal drug in demand for the treatment of small patients with acute inflammatory diseases of the respiratory tract (pharyngites, laryngites, tracheites and bronchites). Reduction in duration and intensity of cough, as well as alleviation of phlegm expectoration lead to the improvement of a sick child’s quality of life and further a speedy recovery.

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