THALASSOTHERAPY AND PROPHYLAXIS IN BRONCHIAL ASTHMA

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Abstract

Bronchial asthma is a common disease of the respiratory system in children and adults. The disease proceeds with repeated symptoms of airway obstruction, cough and shortness of breath, which are paroxysmal in nature. To reduce the frequency of attacks and the severity of the disease in non-attack periods, it is recommended to apply sea treatment (Thalassotherapy) in combination with other natural physical factors.

The purpose of this report is to investigate the possible therapeutic effects of the application of natural physical factors and Thalassotherapy in bronchial asthma.

Materials and methods: a review of available scientific articles in Bulgarian and in foreign literary sources, which contain publications on the application of natural physical factors and sea treatment in patients with bronchial asthma, was made.

Results: During the review of the scientific literature at Pub Med, Google Scholar, Science Direct, evidence for the effectiveness of the application of natural physical factors (procedures such as: aerotherapy, inhalations, aeroheliotherapy), including Thalassotherapy in patients with bronchial asthma, was found. Sea treatment, carried out outside the acute period of the disease, is an important part of the preventive and rehabilitation programs for Bronchial asthma.

Conclusion: Application of Thalassotherapy and treatment with natural physical factors can reduce the severity of bronchial asthma by non-specific reduction of allergic hyperreactivity of the body, reduction of inflammatory reactions of the respiratory system and possible other focal areas of inflammation (chronic rhinitis, rhinosinusitis, tonsillitis and etc.), and can lead to an improvement in the functional state of the lungs and external breathing.

Key words: *Bronchial asthma, sea treatment, prevention, rehabilitation, natural physical factors.*

Introduction:

Bronchial asthma is a common, chronic disease of the respiratory system in children and adults [1]. It is characterized by inflammation of the mucosa of the airways and increased sensitivity of the bronchioles to various external stimuli [2]. This leads to recurrent attacks of inflammation, spasm of the bronchial tree musculature, edema in the bronchioles with dyscrenia, which in turn obstructs the passage of air in the airways [3]. The disease progresses with recurrent symptoms of airway obstruction, cough and shortness of breath, which are recurrent in nature [4]. The main symptoms of bronchial asthma include: a paroxysmal painful cough, shortness of breath, non-productive expectoration and a feeling of tightness in the chest due to shortness of breath. In addition to the chronic damage to the respiratory system, bronchial asthma reduces the functional capacity of patients [5-7]. Conducting rehabilitation activities is a complex therapy that aims to improve the physical and mental health of people with chronic respiratory diseases. This type of treatment is likely to encourage long-term implementation of various rehabilitation programs to improve health behaviours [8].

Physical therapy and rehabilitation [9-11], and prevention with natural factors are part of the management strategy for bronchial asthma [12]. For reducing the frequency of episodes and the severity of the disease in the non-attack periods, the use of thalassotherapy in combination with other natural physical factors is recommended [13].

Thalassotherapy and Sea climatic SPA treatment have been used since ancient times for prevention and treatment of various diseases [14]. Hippocrates was one of the first healers to study and describe the healing effect of sea water. He believed that sea therapy was an effective pain

reducing treatment for various diseases [13,15]. In 1865, the French physician De La Bonnarder, presented his concept of thalassotherapy and is considered its contemporary founder.

Thalassotherapy is a therapeutic approach that uses the healing properties of the sea climate zone [16-19] and medicinal coughs that have anti-inflammatory and mucolytic activity [22]. The relaxing environment of the sea reduces stress, which is often a provoking stimulus for asthma. Stress and emotions, can trigger the activation of inflammation and increase symptoms in asthma [23]. Some studies have found increased amygdala activity accompanied by an increase in sputum IL-1R1 iRNA and an increase in alpha-amylase activity. This suggests that asthma may be triggered by increased amygdala activity via downstream activation of proinflammatory sympathetic signalling pathways [24].

The Bulgarian Black Sea coast is characterized with favourable thermo-energetic conditions during the warm months, rich and diverse aerochemical complex, lack of industrial pollutants, the air is clean and rich in salts [25]. Seawater contains various micro and macro elements and minerals such as: iodine, iron, phosphorus, calcium, manganese, magnesium, sodium, etc. These compounds, in combination with the humidity of the sea air, have an anti-inflammatory effect and improve the protective function of the mucous membrane of the respiratory system. The low level of animal, plant and industrial allergens also contribute to the healing properties of sea air [26,27].

The purpose of this report is to investigate the possible therapeutic effects of the application of natural physical factors and Thalassotherapy in bronchial asthma.

Materials and Methods

We conducted a review of available scientific articles in Bulgarian and in foreign literary sources at Pub Med, Google Scholar, Science Direct, which contain publications on the application of natural physical factors and sea treatment in patients with bronchial asthma, was made.

Results and discussion

During the review of the scientific literature, evidence for the effectiveness of the application of natural physical factors (procedures such as: aerotherapy, inhalations, aeroheliotherapy), including Thalassotherapy in patients with bronchial asthma, was found. Sea treatment, carried out outside the acute period of the disease, is an important part of the preventive and rehabilitation programs for Bronchial asthma.

Marine climatotherapy and balneotherapy, and thalassotherapy [28-30], include various physical procedures such as: inhalation and aerotherapy, air and aero-helio-procedures, sea baths, psamotherapy, application of healing peloids and others [22, 31-33].

Thalassotherapy for bronchial asthma can be carried out all year round, but during the cold months it is applied with caution because it stresses the thermoregulatory mechanisms of the organism [34].

When conducting treatment and prevention of bronchial asthma procedures, it is necessary to comply with the recommended therapy safety measures [35]:

- ✓ Exact assessment of patient health status and comorbidities;
- ✓ Strict supervision of thalassotherapy by a Physical Medicine physician and medical specialists;
- ✓ Reduction of allergens to the possible minimum;
- ✓ Individual dosage and frequency of treatments;
- ✓ Optimal hygiene and dietary regimen;
- ✓ Dosed physical activity;
- ✓ Monitoring of adverse reactions;
- ✓ Patient's informed consent for ongoing treatment and rehabilitation.

During the warmer months of the year, a positive effect is reported in both non-atopic infectious-allergic and atopic forms of bronchial asthma. During the cooler months, higher effectiveness is observed in patients with atopic bronchial asthma. According to Stamatov et al. better clinical results are reported in patients with mild and moderate clinical form (in 14% of them, cessation of asthma attacks after thalassotherapy is observed within 6 months) [22,32].

According to a number of authors, non-specific immunobiological reactivity is increased and specific allergic tuning of the organism is decreased during climate therapy [32]. In patients with bronchial asthma, marine climatotherapy passes through several stages, which are related to the adaptation of the organism to the climatic conditions. The first phase is related to the organism's labile adaptation and covers the first week until day 9. Stable adaptation can be expected only after the 4th week. Adaptation and meteorotropic reactions can be observed up to day 28 from the beginning of thalassotherapy [34].

The aerosol-rich sea air has an improving effect in terms of secretion, which reduces the exposure time of the secretion on the airway mucosa and promotes the inhibition of airway mucosal inflammation. Aeration is one of the most accessible and easily applicable methods of aerotherapy. It does not require precise dosing and is implemented when staying outdoors near the seashore. Seawater inhalation is a commonly used procedure. In a study, they were found to improve the condition of the respiratory mucosa in 67% of children studied [34]. As adaptation to new climatic conditions progresses, air and air-sun baths should also be included. According to Georgieva S. (2017), especially in childhood, it is appropriate to conduct sea bathing, barefoot walking including in the sea water, all of them accompanied with appropriate physical activity [34].

An exposure helioprophylaxis is suitable during the first week as the procedure is performed in comfortable conditions, gradually the duration increases to 4-6 heliobiodoses and the procedure can be performed in subcomfort conditions. In the rehabilitation program, air-sun baths are often combined with sea bathing. Due to the lower temperature of the water compared to the surface of the human body, the body's first reaction is bronchospasm. In healthy patients, this reaction poses no particular risks, but in patients with bronchial asthma it requires caution. The dosage requires taking into account the cold load, i.e. the amount of heat loss that can be compensated by the body (43KJ/m2). Low cold load treatments should be administered by the second week and medium cold load treatments after the 3rd week. There should be an interval of 40-60 minutes between two sea baths, during which sunlight treatments can be carried out. If there are no contraindications, psamotherapy (sand applications), baths with warm seawater, usually at indifferent temperature, and mud applications can also be included [32,34].

Peloidtherapy as a method has been used since antiquity, but today it is also used for treatment and prevention [36]. Although the mechanism of action on the human organism is still not fully understood. The effects of peloid therapy are probably due to the complex chemical, physical, biological and other properties of the mud, as well as their complex action. Evidence of beneficial therapeutic effect of peloid therapy in children with bronchial asthma in the non-acute period is reported from conducting applications on the chest with mud thickness 1-2 cm, mud temperature 38-40ºC, for 15 minutes, treatment course 10-15 procedures conducted daily. At the end of the treatment, the authors found improvement in the general condition, as well as improvement in appetite, reduction in the sputum finding up to the complete disappearance of the sputum [34].

Very often the natural physical factors that are used in climatotherapy and thalassotherapy are combined with reformulated physical modalities that have anti-inflammatory, anti-spastic and hypodesensitizing effects. Reflexively, in order to activate the endogenous production of corticosteroids by the adrenal cortex, low-frequency pulsed magnetic field, microwaves, ultrashort-wave therapy are applied in this area. Locally on the chest are applied suberythemic ultraviolet ray

oscillations, ultrasound by labile methodology of three fields bilaterally, laser therapy and reflex therapy [32].

It is also appropriate to include various forms of physical and motor activity: therapeutic exercises, elements of sports, terrain treatment with dosed walking, respiratory gymnastics [33], therapeutic massage, underwater shower or brush massage. Incorporating therapeutic exercise and kinesitherapy into rehabilitation programs for diseases of the respiratory system aims to: stimulate blood and lymph flow in the lungs; enhance resorption of inflammatory exudate; improve expectoration and reduce the risk of bronchiectasis; improve respiratory muscle strength and airway cell mechanics; improve the adaptation of the respiratory system to physical exertion; optimize the work of the cardiovascular, nervous and other systems in the human body, and also maintain the physical performance and mental stability of the patient [37].

In recent years, various forms of psychotherapy, art therapy and music therapy have been recommended [32].

In asthma prophylaxis, one of the main tasks is to prevent patients from recurrence and chronicity of attacks in order to protect lung tissue from structural emphysematous damage [32].

Recommended rules for attack prevention and prophylaxis of bronchial asthma:

- ✓ Trigger avoidance [38];
- ✓ Maintaining good air quality;
- ✓ Physical activity [37];
- ✓ Regular preventative and routine medical checkups;
- ✓ Prevention and increasing resilience with natural physical factors [32];
- ✓ Immunization [39];
- ✓ Stress Management [24].

An Essential part of the treatment and prevention plan for patients with bronchial asthma is the implementation of tempering procedures. It is recommended that they begin during the warmer months. Tempering begins with aeration, air baths, sun-air baths with a gradual increase of the cold load. These methodologies have good tolerability and therapeutic effectiveness in the treatment and prevention of patients with bronchial asthma. The tempering is carried out gradually and systematically, it is most appropriate to carry it out after spirometric analysis of breathing. After such evaluation, according to Georgieva S. (2017), prolonged exposure close to the seaside improves ventilatory parameters and a significant improvement of obstructive phenomena and enhancement of the secretory effects of marine aerosol is observed [34].

Numerous clinical studies have established and demonstrated the effectiveness of thalassotherapy and natural physical factor treatments in reducing bronchial asthma symptoms and improving lung function [13, 22,34].

According to literature data from studies conducted in Bulgaria and on the northern coasts of Europe, the maritime climate [33] has a beneficial effect on both atopic and infectious-allergic forms of bronchial asthma. Better results are observed in mild and moderate-severe forms of the disease [22].

Stamatov St. et al. conducted a study of the effects of dosed talassotherapy in patients with bronchial asthma. They found: reduction of clinical symptoms and improvement of imaging and functional tests in 82% of the studied patients. Talassotherapy led to a reduction in the number of attacks in 63% of patients. Functional reserves were increased and nonspecific immune protection of the organism was improved [22, 34].

The sea-healing factors improve the indicators of the cardiopulmonary system, the mechanical work of the heart, the vital capacity of the lungs, the clearance of the bronchial passages, and the functional reserves of the organism. There is an increase in the non-susceptibility to cold factors

during the cold months after the sea treatment. A dose-dependent effect is found: the longer the treatment course (20-25 days), the better the therapeutic result [22, 34, 40].

Treatment and prevention of focal outbreaks. The effectiveness of nasal mucosal rinses with isotonic seawater solution has been demonstrated [41,42]. This procedure improves ciliary clearance, optimizes peak expiratory flow, and is easy to administer without significant side effects and high financial costs [13,43]. Inhalation with 2% lye solution is suitable for a number of respiratory diseases (bronchitis, inflammation of lung tissue, including post-COVID conditions) and also for the remediation of focal pathological areas (sinusitis, tonsillitis, pharyngitis). A number of studies have reported on the immunostimulatory effect of mud treatments. The mechanism by which mud influences immune processes is not yet fully understood, but there is evidence of the positive effects on humoral and cellular immunity of spa and mud therapy. The positive results of treatment with lye (Lye is a subdescence that contains all the elements dissolved in sea and lake water, in a changed concentration of salt) are probably due to its anti-inflammatory effect, and also to the improvement of the immunobiological protective capabilities of the organism and the phagocytic activity of leukocytes. On the other hand, the hyposensitizing effect, the stimulation of regeneration and granulocytes probably also play a role. There is also an improvement in tissue trophicity due to the vasodilating action of the lye, as well as a decrease in increased muscle tone, leading to a reduction in spastic phenomena [31,44,45].

Conclusion

Application of Thalassotherapy and treatment with natural physical factors can reduce the severity of bronchial asthma by non-specific reduction of allergic hyperreactivity of the body, reduction of inflammatory reactions of the respiratory system and possible other focal areas of inflammation (chronic rhinitis, rhinosinusitis, tonsillitis and etc.), and can lead to an improvement in the functional state of the lungs and external breathing.

Conflicts of Interest

The authors declare no conflict of interest.

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