Balneotherapy and hydrotherapy in chronic respiratory disease

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CRD and UN SDG 3.4

- Chronic respiratory diseases (CRD),along with cardiovascular diseases, cancers, and diabetes belong to major noncommunicable diseases (NCDs)
- They are targeted by World Health Organization (WHO) NCD Action Plan and United Nations Sustainable Development Goal (STG) 3.4 “to achieve 30% decline of mortality by the year 2030 against a 2015 baseline”.

CRD and UN SDG 3.4

- CRD are responsible for 7% of total mortality or 3.8 million deaths per year.
- Fortunately, they are largely preventable through public policies addressing NCD common risk factors: tobacco use, unhealthy diets, harmful use of alcohol, physical inactivity and air pollution.
- Their implementation at country level between 2000 and 2019 led globally to the declines in NCD deaths the biggest were for CRD a 37% drop followed by cardiovascular diseases (27%) and cancer 16%. Mortality due to diabetes increased slightly by 3% in the same period.

CRD and UN SDG 3.4

Despite this progress the pace of change is too slow to achieve SDG target 3.4.

Balneotherapy and hydrotherapy in CRD prevention and control

- Balneotherapy and hydrotherapy have a huge potential in the prevention and control of major NCDs and in particular CRD.
- The use of natural mineral waters, gases and peloids in form of bathing, drinking, inhalation, etc. is now internationally called Balneotherapy. The use of water (regardless its chemical / physical characteristics and its geological origin) for therapy is referred to as Hydrotherapy.
- Medical Hydrology/Balneology have a great potential for healthy life style modifications through information/education concerning primary and secondary prevention of NCD and by itself as an independent medical competence.

Balneotherapy/Hydrotherapy and CRD

- While the impact of medical hydrology/balneology on the prevention and management of allergic conditions and bronchial asthma exists, we stress the role of Balneotherapy/Hydrotherapy in the prevention and management of chronic obstructive pulmonary disease (COPD), which is the most prevalent CRD characterized by the highest mortality.
- Based on multiple large-scale epidemiological studies, global prevalence of COPD was estimated as 11,7% in 2010, with the number of cases of 384 million. The prevalence of COPD is expected to rise and by 2030 there might be more than 4.5 million deaths.

Pulmonary rehabilitation and COPD

- Pulmonary rehabilitation (PR) is the most effective intervention to improve the quality of life in established COPD, and therefore it is an integrated component of the disease management strategy.
- All COPD patients with breathlessness when walking at their own pace on ground level appear to benefit from rehabilitation and maintenance of physical activity.

Hydrotherapy and pulmonary rehabilitation in COPD patients

- High-intensity water-based physical training in patients with moderate-to-severe COPD three times per week (45 min per session) for 12 weeks, improved exercise performance and health-related quality of life, compared to a control group without intervention.
- High intensity physical training once per week for 6 months seemed to be sufficient to avoid respiratory function deterioration compared to baseline, and to reach a significant functional improvement of respiratory muscles performance.
- High intensity physical training in water is of benefit for patients with COPD.

Hydrotherapy and COPD at primary health care (PHC)

- 101 patients with mild or moderate COPD registered at South London General Practice were invited to a swimming pool-based PR programme.
- Two sessions per week over 6 weeks at 29°C pool temperature led to significant improvements in dyspnea score and walking distance.
- Most patients enjoyed exercising in water, overcame their fears, valued learning about COPD and socializing with fellow sufferers.
- The swimming pool is a feasible and positive alternative venue for PR for COPD patients in PHC.

Hydrotherapy and depression in COPD patients

- Exercise in water is interesting from the view point of overcoming patients fears and their socialization, since depression is a major confounding COPD condition.
- Depression/anxiety in COPD are often under-diagnosed, and associated with poor health status and prognosis.
- The anxiety-depressive disorders were diagnosed in 59.2% out of 142 COPD grade I-III patients; treated at the health resort facility located on the southern coast of Crimea.
- Depression intensity correlated with the severity of COPD.
- A course of the SPA and health resort-based treatment produced beneficial effect on the psycho-functional status of the patients with COPD that was especially well seen in those with the mild form of COPD.

Water based exercise and obesity control

- Obesity in COPD has been associated with increased symptoms of dyspnea, poorer health-related quality of life, elevated levels of fatigue and exercise performance limitations, comprising a decreased tolerance to weight-bearing exercise such as walking.
- A group of 24 obese (defined as body mass index ≥32 kg·m2) individuals with moderate COPD were randomized to either 8 weeks water-based exercise (n=8), land-based exercise (n=8) or control (without exercise) (n=8).

Water based exercise and obesity control

- Within-group comparisons showed that participants in the water-based exercise group lost the greatest amount of weight over the eight-week period.
- Between-group comparisons demonstrated a significant difference in weight change between the water-based exercise group and the control group.
- However, it should be noted that exposure to chlorinated water in swimming facilities may aggravate preexisting asthma or cause new onset asthma.
- This problem is overcome by Balneotherapy, in which mineral water is not chlorinated (to preserve their natural chemical composition) and patients are treated individually.

Hydrotherapy, infection and CRD

- Susceptibility to infections plays a role in exacerbations of COPD.
- Balneotherapy including hydrogen sulfide (H2S) containing water and bromide-iodine thermal water have antibacterial and anti-inflammatory effect.
- Exogenous H2S is effective in reducing acute Mycoplasma induced inflammation. Treatment with inhaled salt -bromide-iodine thermal water has a mild anti-inflammatory effect on the airways in COPD patients.

Sauna and respiratory diseases

- Sauna bathing can reduce the risk of pneumonia, based on the results of a long–term prospective cohort study in Finland.
- A population-based prospective cohort of 1935 middle-aged (42-61 years) Caucasian men in Kuopio, who had no apparent pre-existing respiratory diseases at baseline (COPD, asthma or pneumonia), was followed-up for 25.6 years in 379 hospitals, and all diagnoses of respiratory diseases (COPD, asthma, or pneumonia) were recorded.
- Results showed that frequency of sauna bathing is inversely associated with future risk of respiratory diseases. Participants who had 2-3 and ≥4 sauna sessions per week respectively had a lower risk of CRD compared with participants who had ≤1 sauna session per week.
- The ability of sauna baths to decrease the risk of respiratory diseases may be explained by its ability to reduce oxidative stress.

Sauna and respiratory diseases

- The heat associated with sauna baths may also have direct effects on the lung tissue by reducing pulmonary congestion and increasing tidal volume, vital capacity, ventilation, and forced expiratory volume in 1 second (FEV1) of the lungs.
- On the other hand, repeated cold water stimulations in COPD patients after 10 weeks treatment with 3 cold effusions and 2 cold washings of the upper part of the body (self-treatment) reduced frequency of infections; increased peak expiratory flow, lymphocyte counts, and expression of gamma-interferon; modulated interleukin expression; and improved quality of life in COPD patients.

Clinical impact of SPA therapy on COPD

- Inhalation therapy with sulphurus and salsojodic mineral waters improve symptoms as cough and sputum and functional indices as (FEV1) in COPD. SPA therapy of COPD is based on the inhalation of sulphurus and salsojodic mineral water.
- Sulphurous mineral waters have vasodilating activity on bronchial mucosa, improving its trophic state, and increase the production of secretory IgA and muco-ciliary clearance; they have fluidificant activity on bronchial secretion. Clinical trials showed improvement of cough, sputum and functional indexes as FEV1 and exhaled carbon monoxide (CO).

Clinical impact of SPA therapy on COPD

- Salsojodic mineral waters increase the fluidity of the bronchial mucus and muco-ciliary clearance. Inspiratory resistive breathing (IRB) challenges affect respiratory muscle endurance in healthy individuals.
- Baldi et al compared the effects of 12 sessions of the mud bath therapy (MBT) on endurance time (ET) and plasma IL-6 concentration following an inspiratory resistive breathing (IRB) challenge in forty-two patients (aged 42-76 years) suffering from mild to severe COPD in a thermal SPA center. Plasma mediators and ET and endurance oxygen expenditure were measured following IRB challenge at 40% of maximum inspiratory pressure. Improved ET upon a moderate IRB challenge, indicated the appearance of a training effect in COPD patients.

Conclusion

- Along with high prevalence and mortality, CRD is a cause of increasing pharmaceutical and hospital costs.
- In view of this Health Resort Medicine should not be ignored as a potential resource in the WHO NCD strategy and Universal Health Coverage policy which provides a multi-stakeholder platform including network of health resorts and their facilities which promote achievement of STG 3.4 by the year 2030.