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Balneotherapy: An Effective Approach In The Management Of Various Diseases

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ABSTRACT
As the world advances towards new developments in the field of medicine, the menace of dreadful diseases keeps on posing a new challenge to the healthcare systems. There are myriads of diseases afflicting the mankind which so far remain completely or partially unanswered by pharmacological interventions. Even in some of the cases where drug modalities are multitude, only symptomatic relief is obtained. The cure at times appears unrealistic and the subjects continue to suffer for not only the lack of treatment, but also due to undesired harmful effects. Consequently, the emphasis is being placed on utilization of every bit of the scientific knowledge available thereby reinforcing the interestin complementary and alternative forms of treatment, used simultaneously with drug modalities or in isolation. Balneotherapy is one such technique employed since ancient times for remission, rehabilitation and treatment of various diseased states. The technique utilizes medicinal water or mud with chemical constituents that provide nourishment and healing effects. Recent scientific literature has examined the potential of balneological treatments in differentclinical stateswith varyingdegrees of infirmity. The present review summarizes the mechanisms involved behind the restorative effects of balneological treatments and their effectiveness in various disease conditions.

Keywords: Balneotherapy, Healthcare system,Balneological treatments

1. INTRODUCTION

Global shortages as well as detrimental pharmacological effects have restricted the scope of drug challenge to the evolving spectrum of diseases. Conventional drug development mired with complexities of disease pathologies and patient characteristics finds it difficult to rise to enhanced responsibilities of efficacy and safety[1]. To remedy this dismal situation, people have increasingly begun resorting to complementary and alternative forms of treatments.Balneotherapy is one of the answers to the innumerable puzzles of the universe of diseases.It forms a significant part of traditional system of medicines across various cultures[2]. The techniqueinvolves the use of natural mineral sources including spring

waters and mud for bathing, drinking and sometimes, for inhalation. Natural mineral waters and mud is known to be a rich supply of constituents such as sulphur, silica, selenium which can successfullycombat various ailments[3].A growing body of evidence indicates thatbalneotherapy has significantly improved patients' conditions in a number of diseased states such as rheumatoid arthritis[4], psoriasis [5]and many more. Treatment with mud alleviates the levels of prostaglandins and counters the inflammation in arthritic patients. It positively regulates the balance between reactive oxygen species and antioxidants [6]and enhances the quality of life in geriatrics with osteocartilagedisorders[7].Striking revelations have been brought into light in subjects with flare-ups of psoriasis indicating lowered severity determinants andC- reactive proteinlevels [8].Several promising results have been evidenced in stress and fatigue patients who are thenoteworthy recipients of the rejuvenating effects of mineralized warm water [9]. While numerous such examples exist, a chief advantage of balneotherapy is the lack of serious adverse effects[2] which has led to its popularity at health resort medicine centres across the globe[10].

Mechanisms behind healing

The restorative effects of balneotherapy may be exercised by multiple mechanisms. The exact mechanism is not completely unravelled and may vary depending on the source of thermal water or mudemployed, which largely determines the chemical composition[3], [11].In terms of chemical composition, the desired presence and the concentration of each constituent is questionable and determined by the stage and type of disease[3].The duration of treatment is a criticalinfluence on the results obtained[12]. Heat seems to be a centralmechanistic parameter in the beneficial effects of balneotherapy. Its efficacy has been scientifically established in rehabilitation of various ailments particularly inflammatory disorders.Thermal effects derived from hot spring water lead to vasodilatation,enhanced blood circulation and cell oxygenation throughout the body. Not only the thermal treatment exerts anti-inflammatory effects but also seems to add towards normalized gland function, digestion and lyses of harmful microbes[3], [13].

Chemical constituents also catalyze the therapeutic benefits offered by balneological treatments. Sulphur combines with cysteine and its metabolites in the skin leading toanti-inflammatory and keratoplasticeffects. It also exhibits antioxidant activity. Magnesium, on the other handleads to increased production of cAMP and counters psoriatic states. Selenium

in low doses enhances cellular proliferation. It also displays antioxidant, anti-inflammatory properties[4].

Immunomodulatory effects of balneotherapy have been reported in autoimmune conditions such as psoriasis and atopic dermatitis[2], [3].Sulphur exercises inhibitory effects on T lymphocytes and suppresses immune response. Hyperthermia is an important contributory factor towards immunosuppressive effects[3]. Treatment with medicinal water also exerts mechanical effects leading to improvements in joint function [4].

2. INDICATIONS FOR BALNEOTHERAPY

Balneotherapy and skin disorders

The efficacy of balneotherapy in skin related disorders is thought to be derived from interaction between skin surface and mineral constituents present in mud and water. Various skin ailments such as psoriasis, atopic dermatitis etc can be tackled to a great extent using these techniques[3]. Psoriasis is a long-lasting inflammatory skin condition with complex pathophysiology. A three-week retrospective work has demonstrated symptomatic relief and lowering of inflammatory marker C-reactive peptide (CRP) and Psoriasis area severity index (PASI)[8]. Another therapy based on magnesium has also indicated significant improvement in condition of psoriatic subjects[14]. Further, balneological treatments have been found to be useful in conditions such as seborrheic dermatitis, rosacea and acne[3], [15]. Selenium is known to minimize harmful effects of ultraviolet radiations of natural light[3].

Among other cases, use of mineralized spring water has resulted in amelioration of experimentally induced atopic dermatitis condition in mice based on immunomodulatory mechanisms[16]. Medicinal waters containing sulphur have demonstrated activities against bacterial and fungal infections including tinea corporis and leg ulceration[3]. Combination treatment of balneotherapy and narrow band-UVB therapy has generated far better outcomes in terms of onset and duration of relief. It has reportedly lowered the amount of NB-UVB to be administered to the psoriasis subjects(Eysteinsdóttir, Ólafsson, Agnarsson, Lúdhviksson, & Sigurgeirsson, 2014).

Joint disorders

Balneological interventions are amongst the most frequently sought after approaches for joint disorders including rheumatoid arthritis. A variety of factors are likely to produce the resultant beneficial effects. The thermogenic effect of water influences muscular tone and enhance the tolerability towards pain. On the other hand, mud results in lowering of proinflammatory cytokines including TNF-α, interleukins and leukotrienes[4], [13], [17].It also modulates the levels of β-endorphin and cortisol[18]. Research in osteoarthritis demonstrated promising results especially when used in combination with other modalities[7], [19]. Balneotherapy when combined with physical therapy have shown greater efficacy than just the physical therapy in geriatrics with knee osteoarthritis [20]. Treatment using mud has also been employed in fibromyalgia. Subjects with this musculoskeletal disorder reported alleviation of pain and inflammation besides correction of metabolic abnormalities[21], [22].Furthermore, it has been suggested that balneotherapy alleviates low back pain and offers improvement in mobility[23], [24].

Balneotherapy and cardiovascular disorders

Despite so many recent advancements in the therapeutics, the management of cardiovascular complications has been still a challenge to the health care providers.Balneohydrotherapy seems to improve quality of life of patients with chronic venous insufficiency[25]. The efficacy of balneotherapy in chronic heart failure is established bya two-week retrospective work demonstrating improvements in cardiac function including left ventricular ejection fraction. The benefit mainly was associated with vasodilation due to nitric oxide and decrease in levels of interleukin-6 and heat sensitive C- reactive protein[26].

Balneotherapy in other disorders

Balneotherapyexerts favourable effects in mental stress and sleep disorders and is known to provide general health benefits[27]. Compared with control groups and those on music based therapy, it has been shown to ameliorate fatigue and stress situations to a greater extent [9]. Other applications include metabolic disorders such as obesity wherein such treatments have been found to reduce waist circumferences in obesesubjects[28]. Spasticity that follows stroke is also benefitted by medicinal water loaded with sulphur as indicated by a three week long study. A considerable improvement in muscle tone as well as pain tolerance was reported in the study[29-30].

3. CONCLUSION

Balneotherapeutic treatments have been employed in European countries since many centuries to overcome ailments andto ensure general well being. In the present date, these are employed at various health resort medicine centres for relaxation and detoxification purposes. Retrospective scientific studies cited in this review havecorroborated their efficacy in various medical health problems. These have the potential to offer favourable outcomes in joint disorders, relieve oxidative stress in skin diseases and decreases C-reactive protein in inflammatory conditions.Not only do these alleviate stress but also provide nourishment by virtue of diverse chemical constituents in mud and mineral water.

Therefore, balneotherapy is an important modality with claimed efficacy in many diseases. The veracity of these assertions in some diseases remainscontentious as regards the quantification of benefits and their durability. In many cases, balneotherapy has been used in conjunction with other therapies, both pharmacological and non-pharmacological, to obtain discernible outcomes and might not offer complete remission.Nevertheless, the need remains both to search for newer treatment options for diseases and to completely investigate and objectively analyze the beneficial effects of such treatments. Therefore, it is a field which needs to be explored for maximum exploitation of its therapeutic potential. To-date, there exist numerous beneficiaries of the technique in all age groups in all countries. Balneotherapy may not be a panacea for all health woes but definitely adds to the quality of life.

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