

The Dead Sea: Good for the Soul, Good for the Heart

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In the study by Gabizon et al. in the current issue of *IMAJ* [1], the safety and possible benefits of descent and stay at a Dead Sea resort were investigated in patients with chronic stable heart failure.

A total of 19 HF patients, New York Heart Association class 2-3, were followed at the resort by means of implantable cardioverter defibrillator-cardiac resynchronization therapy investigations, basic hemodynamic measurements, echocardiographic tests, the Minnesota Living with Heart Failure questionnaire and the 6-minute walk test. The main conclusions of the study were that during their sojourn in the low altitude environment of the Dead Sea, no significant arrhythmia occurred and the patients' quality of life and functional status significantly improved.

Absence of significant arrhythmias during the stay at the Dead Sea is difficult to interpret in view of the very short period studied. A leisure-like atmosphere may contribute to enhanced parasympathetic tone and withdrawal of sympathetic activity, both contributing to a reduction in arrhythmia burden, although the decrease in heart rate variability noted by the authors may suggest a different interaction between these two limbs of the autonomic nervous system [2].

Despite the small number of patients in the study, the short stay at the resort

(several days) and inconsistency in B-type natriuretic peptide serum levels, this report further explores the possible benefits of the Dead Sea environment for cardiopulmonary patients. Abinader et al. [3,4] demonstrated increased maximal oxygen consumption in HF patients upon descent to the Dead Sea and increased exercise duration combined with decreased wall motion score index in patients with coronary artery disease. Improved exercise performance at the Dead Sea was also observed in patients with end-stage lung disease, including those with chronic obstructive pulmonary disease [5,6].

Circulatory response to acute exposure to high altitude is well studied and is characterized by an increase in blood pressure, heart rate, plasma catecholamines and renin activity. These changes occur abruptly even at relatively lower altitudes (< 1800 meters above sea level) and most commonly are attributed to the effect of hypobaric hypoxemia [7,8]. The rationale to deduce that the "opposite" of high altitude pathophysiological environmental conditions will cause the contradictory physiological effects is somewhat tempting. Indeed, the environmental characteristics of the Dead Sea, the lowest point on earth, are unique: high barometric pressure, partial oxygen saturation and dry air, all of which are combined with the resort's relaxed atmosphere, may work in concert to improve the cardiopulmonary status of these patients. However, the exact mechanisms of the repeated reports on exercise improvement in a wide range of cardiopulmonary conditions may not be trivial. Of note, the significant decrease in resting blood pressure and increased arterial oxygen

saturation observed by some authors [4,5] was not replicated by all [1]. It is possible that these changes may be less evident due to a different cohort of patients and medical regimens, but they also infer that other mechanisms may be involved as well. In a study done not far from the Dead Sea, in the Jordan Valley, el-Migdadi and co-researchers [9] demonstrated that exercise in healthy trained athletes induced a significant increase in adrenocorticotrophic hormone (ACTH) serum levels that was not observed following comparable exercise at a high altitude. Similarly, serum levels of lactate were decreased only at low altitude [9]. Accordingly, possible additional mechanisms such as metabolic and inflammatory adjustments may be involved in the cardiopulmonary benefits of staying at a Dead Sea resort, all of which deserve further future investigation.

Meanwhile, it is fair to say that staying at a Dead Sea resort is a safe and fun place for cardiac patients.

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HF = heart failure

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