1. Heart failure as an autonomic nervous system dysfunction.

Abstract

In heart failure, it has been recognized that the sympathetic nervous system (SNS) is activated and the imbalance of the activity of the SNS and vagal activity interaction occurs. The abnormal activation of the SNS leads to further worsening of heart failure. Many previous clinical and basic studies have demonstrated that the abnormal activation of the SNS is caused by the enhancement of excitatory inputs including changes in: (1) peripheral baroreceptor and chemoreceptor reflexes; (2) chemical mediators that control sympathetic outflow; and (3) central sites that integrate sympathetic outflow. In particular, the abnormalities in central SNS regulation due to the renin angiotensin system-oxidative stress axis have recently been in focus. In the treatment of heart failure, the inhibition of the activated SNS, such as with beta-blockers and/or exercise training, is important. Furthermore, many experimental studies have demonstrated that vagal stimulation has beneficial effects on heart failure, and recently several clinical studies have also demonstrated that vagal stimulation is a possible novel therapy for heart failure.

In conclusion, we must recognize that heart failure is a complex syndrome with an autonomic nervous system dysfunction, and that the autonomic imbalance with the activation of the sympathetic nervous system (SNS) and the reduction of vagal activity should be treated.

2. Improvement of autonomic nervous activity by Waon (Far Infrared) therapy in patients with chronic heart failure.

Abstract

BACKGROUND AND PURPOSE: We have reported previously that Waon (Far Infrared) therapy improves cardiac and vascular function, and prognosis of patients with chronic heart failure (CHF). CHF is characterized by generalized sympathetic activation and parasympathetic withdrawal. The purpose of this study was to evaluate the effect of Waon (Far Infrared) therapy on autonomic nervous activity in patients with CHF.

METHODS AND SUBJECTS: Fifty-four patients with CHF, who were receiving conventional therapy for CHF, were divided into Waon therapy and control groups. In the Waon (Far Infrared) therapy group, 27 patients were treated with medication and Waon (Far Infrared) therapy. In the control group, 27 patients were treated with only conventional CHF therapy. Cardiac function including cardiac output (CO) and left ventricular ejection fraction (LVEF) was evaluated by echocardiography. The heart rate variability, such as the coefficient of variation of RR intervals (CVRR), the low-frequency (LF) component, high-frequency (HF) component, the LF norm [LF/(LF+HF)], and HF norm [HF/(LF+HF)], were measured at admission and 4 weeks after treatment.

RESULTS: Echocardiography demonstrated that CO and LVEF significantly increased after 4 weeks in the Waon therapy group, but did not change in the control group. In the Waon (Far Infrared) therapy group, CVRR, HF, and HF norm significantly increased 4 weeks after Waon (Far Infrared) therapy. In addition, the LF/HF ratio and LF norm significantly decreased 4 weeks after Waon (Far Infrared) therapy. In contrast, these parameters remained unchanged in the control group. Moreover, the HF and HF norm were significantly higher, and the LF/HF ratio and LF norm were significantly lower after 4 weeks of Waon (Far Infrared) therapy group than after 4 weeks of only conventional therapy.

CONCLUSIONS: Waon (Far Infrared) therapy improved cardiac function and autonomic nervous activity by increasing parasympathetic and decreasing sympathetic nervous activity in patients with chronic heart failure.

Abstract
Generally, the sauna bathing has been contraindicated for patients with chronic heart failure. However, it has been well tolerated and improved hemodynamics has been shown in patients with chronic heart failure after a single exposure and after a four-week period of sauna bathing (five days per week). Left ventricular ejection fraction increased from 24±7% to 31±9% and left ventricular end-diastolic dimension decreased from 66±6 mm to 62±5 mm after four weeks. In the present review, the mechanisms of action, the clinical data available to date and the possible beneficial effects of sauna bathing for patients with heart failure are discussed, as well as the precautions and the contraindications in this specific group of patients with chronic heart failure.

Conclusion:
It seems that sauna treatment may help improve clinical symptoms and hemodynamic parameters secondary to an improvement in the endothelial function of patients with CHF whose endothelial function is impaired.