

## Short Communication

# Thermal Vasodilation as a Treatment of Congestive Heart Failure : A Novel Approach

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Although warm water immersion and sauna bathing promote physical and mental relaxation, they are usually considered to be inappropriate for patients with heart disease in general and congestive heart failure in particular. Recently, however, we have demonstrated the beneficial acute hemodynamic effects of thermal vasodilation by warm water immersion and sauna bathing in patients with severe congestive heart failure<sup>1)</sup>. Therefore, the chronic effect of repeated thermal vasodilation on the patients with congestive heart failure may have potentially significant clinical value.

The long-term effects of repeated warm water immersion and/or sauna bathing (1–2 times/day, 5 days/week) were assessed in 56 consecutive patients with moderate or severe congestive heart failure (44 idiopathic and 12 ischemic dilated cardiomyopathy). All patients received steady maintenance doses of anti-failure medications for at least 1 month preceding the study and this therapy was maintained during the follow-up. Thermal vasodilation for 4 weeks caused a significant improvement of clinical symptoms and ejection fraction, and decreased cardiac size on the echocardiogram and chest X-ray film (**Table 1**). It was also observed that repeated thermal vasodilation improved the quality of life of patients with heart failure by promoting appetite, sleep quality and general well-being. The redistribution of blood from the intrathoracic compartment or splanchnic circulation to the cutaneous or peripheral venous circulation with thermal venous dilatation may have resulted in a decrease in pulmonary and abdominal congestion<sup>2,3)</sup>. In addition, preliminary data showed that the effect of repeated thermal vasodilation was sustained and that this possibly improved the prognosis in patients with moderate or severe heart failure (**Table 1**).

**Table 1** Long-term effects of repeated thermal vasodilation

	Before (n=56)	After 4 weeks (n=53)
Ejection fraction	24 ± 7%	31 ± 9%*
Left ventricular dimension (end-diastole)	66 ± 6 mm	62 ± 5 mm*
Cardiothoracic ratio on X-ray film	61 ± 5%	55 ± 4%*
NYHA functional class		
	III : n=23	II : n=31
	IV : n=33	III : n=17
		IV : n= 3 (3 deaths)
One-year mortality (n=56)		9/56 (16%)
Class III (n=23)		1/23 ( 4%)
Class IV (n=33)		8/33 (24%)

\* $p < 0.01$  vs before thermal vasodilation.

Thus, thermal vasodilation may be a new non-pharmacological therapy for patients with congestive heart failure, based on the rationale of preload and afterload reduction, although further randomized controlled trials are necessary to demonstrate the survival benefit of thermal vasodilation therapy. The effect of thermal vasodilation appears to be similar to the effects of pharmacological vasodilators such as angiotensin-converting enzyme inhibitors which are known to improve hemodynamics, symptoms and survival in patients with heart failure<sup>4,5)</sup>.

Compared to pharmacological vasodilation therapy and physical exercise training, there are several advantages of thermal vasodilation therapy for congestive heart failure. First, it is non-pharmacological, devoid of adverse effects, and easily available and repeatable. Second, unlike exercise training, patients who are aged or have severe congestive

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heart failure and orthopedic limitations are not exempt from undergoing thermal vasodilation therapy. Third, this intervention promotes mental and physical relaxation and promises to be a very economical means of therapy even for severe heart failure. Thermal vasodilation therapy may thus be a valuable adjunct to pharmacological manipulation in the management of congestive heart failure.

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