

WAON THERAPY, CAN IT BE NEW THERAPEUTIC MODALITY IN HEART FAILURE PATIENTS?

GOO-YEONG CHO, MD¹ AND JONG-WON HA, MD²

¹DIVISION OF CARDIOLOGY, SEOUL NATIONAL UNIVERSITY BUNDANG HOSPITAL, SEOUL NATIONAL UNIVERSITY COLLEGE OF MEDICINE, SEONGNAM, KOREA

²DIVISION OF CARDIOLOGY, YONSEI CARDIOVASCULAR CENTER, YONSEI UNIVERSITY COLLEGE OF MEDICINE, SEOUL, KOREA

REFER TO THE PAGE 37-42

In general, sauna bathing (Finnish bath) has dry air and high temperature with 80°C to 100°C and has a relative humidity of 10% to 20%. Sauna bathing is a popular recreational activity that is generally considered to be safe. Although most people are safe and feel relax, sudden hyperthermic death can occur. Most of victims were middle-aged men, 84% were under the influence of alcohol, and 27% had cardiovascular diseases. Therefore, systemic hyperthermia is often prohibited for heart failure (HF) patients because it increases heart rate by 60% to 70%, change in blood pressure or hormone status, and, thereby potentially serious arrhythmia or cardiac arrest. However, it has potential benefits in regard to reduction of afterload from vasodilation and salt loss, and it is well tolerated by patients with chronic stable HF patients. In some reports, sauna bathing appears to improve left ventricular ejection fraction and decrease brain natriuretic peptide (BNP) level in chronic systolic HF (Table 1).

Waon therapy, which means soothing warmth in Japanese and is not a typical (Finnish) sauna but an experimental infrared-ray dry sauna, is a form of thermal treatment in a dry sauna maintained at a temperature of 60°C and has been studied exclusively by Tei et al.¹⁾ in Japan. Waon therapy warms entire body in a uniformly heated chamber for 15 min and maintains the soothing effect at outside the sauna for a further 30 min. Waon therapy also has proven beneficial effects on peripheral arterial disease.²⁾ By now, Waon therapy is safe and has some beneficial effects and well tolerated by patients with HF. The common mechanisms of action of Waon therapy are improvement of endothelial function by upregulating the endothelial nitric oxide (NO) synthase protein and salt loss, which reduces cardiac preload

and afterload from vasodilation. However, sauna bathing may be risky in patients receiving beta-blocker and nitrate, and contraindicated in severe aortic stenosis, unstable angina, recent myocardial infarction, or decompensated HF. Furthermore, sauna bathing should be cautious in patients who are prone to develop orthostatic hypotension. The question arises whether proscription on sauna bathing is overly restrictive.

In this issue of the Journal, the study by Sohn et al.³⁾ evaluated the safety and efficacy of Waon therapy in HF patients on the top of conventional medical therapy. Before this study, Waon therapy has never been introduced in Korea. Although it is a preliminary experience, they concluded that Waon therapy was safe and well tolerated and had some beneficial effects for patients with HF. However, one of the major limitations of the study is its small sample size. Original plan was to evaluate 10 patients, but difficulties in recruitment and follow-up led to the ultimate analysis of only 5 patients. All subjects were safe and well tolerated Waon therapy and there were no serious adverse events. However, it is still unclear whether it is safe on the top of medical therapy. In this paper, the authors included the patients whose medication did not change within previous 3 months but their medications were not presented. In regard to efficacy, we do not know the clinical benefits in 5 patients who did not continue Waon therapy more than 2 weeks. In addition, one patient did not have improvement in clinical symptoms even after complete session of Waon therapy. Therefore, only 4 out of 10 patients have benefits in clinical symptom and echocardiographic variables. Furthermore, there was no control group with bath in room temperature in this paper and this was not a cross-over design. And thereby, it is too impetuous to conclude its clinical benefit based on the results of the current study. Because this study only included patients with

• Editorials published in the Journal of Cardiovascular Ultrasound do not necessarily represent the views of JCU or the Korean Society of Echocardiography.
• Address for Correspondence: Goo-Yeong Cho, Division of Cardiology, Seoul National University Bundang Hospital, Seoul National University College of Medicine, 166 Gumi-ro, Bundang-gu, Seongnam 463-707, Korea Tel: +82-31-787-7024, Fax: +82-31-787-4051, E-mail: cardioch@medimail.co.kr

Table 1. Sauna bathing or Waon therapy in patients with heart failure

No.	EF (%)	NYHA	AE	Bathing effect	Author, year
15	30±1	II, III	No	EF; increase Peak VO ₂ : improve 6 MWD: improve	Miyamoto H, 2005 ⁴⁾
9*	20±7	III, IV	No	QoL, exercise duration: no change Noradrenaline: 24%↓	Basford JR, 2009 ⁵⁾
34	25±9	≥ II	No	EF, CI: increase LV dimension: decrease	Tei C, 1995 ⁶⁾
188		≥ II	N/A	NYHA class: improve	Miyata M, 2008 ⁷⁾
W: 112	35±11			EF: improve	
C: 76	37±14			BNP: decrease	
47	N/A (CAD)	N/A	1: fatigue	Number of PVC: decrease HRV, BNP: decrease	Giannetti N, 1999 ⁸⁾
129		III, IV	N/A	Death or readmission at 60 months: decrease	Kihara T, 2009 ⁹⁾
W: 64	39±15				
C: 65	36±11				
30		II, III	No	FMD: improve BNP: decrease	Kihara T, 2002 ¹⁰⁾
W: 20	38±18				
C: 10	32±13				

*cross-over design. AE: adverse events, BNP: brain natriuretic peptide, C: control, CAD: coronary artery disease, CI: cardiac index, EF: ejection fraction, FMD: flow mediated vasodilation, HRV: heart rate variability, MWD: minute walking distance, No.: enrolled patients number, NYHA: New York Heart Association, N/A: not available, QoL: quality of life, W: Waon therapy

chronic stable HF, we should not extrapolate clinical benefits of Waon therapy to all HF patients.

In conclusion, although Waon therapy has been proven its efficacy in chronic stable HF in small, retrospective studies or one prospective study with relatively small sample size, we do not have large prospective randomized trials. Further large clinical research into the safety and clinical benefits of Waon therapy on the top of conventional medical therapy appears warranted.

REFERENCES

- Miyata M, Tei C. Waon therapy for cardiovascular disease: innovative therapy for the 21st century. *Circ J* 2010;74:617-21.
- Tei C, Shinsato T, Miyata M, Kihara T, Hamasaki S. Waon therapy improves peripheral arterial disease. *J Am Coll Cardiol* 2007;50:2169-71.
- Sohn IS, Cho JM, Kim WS, Kim CJ, Kim KS, Bae JH, Tei C. Preliminary clinical experience with Waon therapy in Korea: safety and effect. *J Cardiovasc Ultrasound* 2010;18:37-42.
- Miyamoto H, Kai H, Nakaura H, Osada K, Mizuta Y, Matsumoto A, Imaizumi T. Safety and efficacy of repeated sauna bathing in patients with chronic systolic heart failure: a preliminary report. *J Card Fail* 2005;11:432-6.
- Basford JR, Oh JK, Allison TG, Sheffield CG, Manahan BG, Hodge DO, Tajik AJ, Rodeheffer RJ, Tei C. Safety, acceptance, and physiologic effects of sauna bathing in people with chronic heart failure: a pilot report. *Arch Phys Med Rehabil* 2009;90:173-7.
- Tei C, Horikiri Y, Park JC, Jeong JW, Chang KS, Toyama Y, Tanaka N. Acute hemodynamic improvement by thermal vasodilation in congestive heart failure. *Circulation* 1995;91:2582-90.
- Miyata M, Kihara T, Kubozono T, Ikeda Y, Shinsato T, Izumi T, Matsuzaki M, Yamaguchi T, Kasanuki H, Daida H, Nagayama M, Nishigami K, Hirata K, Kihara K, Tei C. Beneficial effects of Waon therapy on patients with chronic heart failure: Results of a prospective multicenter study. *J Cardiol* 2008;52:79-85.
- Giannetti N, Juneau M, Arsenault A, Behr MA, Grégoire J, Tessier M, Larivée L. Sauna-induced myocardial ischemia in patients with coronary artery disease. *Am J Med* 1999;107:228-33.
- Kihara T, Miyata M, Fukudome T, Ikeda Y, Shinsato T, Kubozono T, Fujita S, Kuwahata S, Hamasaki S, Torii H, Lee S, Toda H, Tei C. Waon therapy improves the prognosis of patients with chronic heart failure. *J Cardiol* 2009;53:214-8.
- Kihara T, Biro S, Imamura M, Yoshifuku S, Takasaki K, Ikeda Y, Otuji Y, Minagoe S, Toyama Y, Tei C. Repeated sauna treatment improves vascular endothelial and cardiac function in patients with chronic heart failure. *J Am Coll Cardiol* 2002;39:754-9.