Journal of Cardiology (2009) **53**, 301—305

ELSEVIER

JOURNAL of CARDIOLOGY
Official Journal of the Japanese College of Cardiology
www.elsevier.com/locate/jjcc

CASE REPORT

Experience of appendicular thermal therapy applied to a patient with a left ventricular assist device awaiting heart transplantation

Haruhiko Higashi (MD)[a], Kazuo Komamura (MD, PhD, FJCC)[b,*], Noboru Oda (MD)[c], Tomoko S. Kato (MD, PhD)[c], Masanobu Yanase (MD)[c], Akiko Mano (MD, PhD)[c], Shuji Hashimoto (RMS)[d], Kyoichi Wada (PhD)[c], Toshiaki Shishido (MD, PhD)[b], Kazuhiko Hashimura (MD)[a], Masafumi Kitakaze (MD, PhD, FJCC)[a], Soichiro Kitamura (MD, PhD, FJCC)[e], Takeshi Nakatani (MD, PhD, FJCC)[c]

[a] *Division of Cardiology, National Cardiovascular Center, 5-7-1 Fujishirodai, Suita-shi, Osaka 565-8565, Japan*
[b] *Department of Cardiovascular Dynamics, Research Institute, National Cardiovascular Center, 5-7-1 Fujishirodai, Suita-shi, Osaka 565-8565, Japan*
[c] *Department of Organ Transplantation, National Cardiovascular Center, 5-7-1 Fujishirodai, Suita-shi, Osaka 565-8565, Japan*
[d] *Department of Physiologic Laboratory, National Cardiovascular Center, 5-7-1 Fujishirodai, Suita-shi, Osaka 565-8565, Japan*
[e] *Department of Cardiovascular Surgery, National Cardiovascular Center, 5-7-1 Fujishirodai, Suita-shi, Osaka 565-8565, Japan*

Received 29 May 2008; received in revised form 23 July 2008; accepted 24 July 2008
Available online 23 September 2008

KEYWORDS
Assisted circulation;
Cardiomyopathies;
Dilated;
Heart failure;
Treatment;
Thermal therapy;
Transplantation

Abstract Thermal therapy for heart failure is recognized to improve clinical symptoms. We describe our experience with appendicular thermal therapy applied to a patient fitted with an extracorporeal left ventricular assist device (LVAD) who was wait-listed for a heart transplant. A 21-year-old male with end-stage heart failure due to dilated cardiomyopathy was fitted with a LVAD. His general condition stabilized after LVAD placement and the status of his heart failure has remained at NYHA class II for the past 13 months. However, his cardiac function did not sufficiently recover to discontinue LVAD support. We conducted appendicular thermal therapy using a steam foot bath and heated gloves for 2 weeks. Immediately after thermal

* Corresponding author. Tel.: +81 6 6833 50121; fax: +81 6 6872 7485.
E-mail address: kkoma@hsp.ncvc.go.jp (K. Komamura).

0914-5087/$ — see front matter
doi:10.1016/j.jjcc.2008.07.020

therapy, his average sublingual temperature increased from 36.3 to 37.0 °C and the grade of mitral regurgitation, as well as LV ejection fraction and endothelial function improved. Furthermore, levels of oxidative and anti-oxidative stress markers decreased and increased, respectively, after 2 weeks of therapy. No complications developed. We conclude that appendicular thermal therapy was safe in this patient waiting for a heart transplant and who had an extracorporeal LVAD, and that the procedure might be beneficial for others with end-stage heart failure.

Introduction

Previous studies have demonstrated the safety and efficacy of systemic thermal therapy for patients with chronic heart failure (CHF) [1—5]. A large number of patients in Japan have been implanted with a left ventricular assist device (LVAD) because of prolonged waits for heart transplants [6]. Although we wished to apply sauna thermal therapy to patients with LVAD, we do not have an appropriate sauna facility. Thus, we attempted to apply appendicular thermal therapy to a patient with LVAD awaiting a heart transplant. We describe for the first time the safety and effectiveness of this strategy for a patient with end-stage heart failure.

Case report

A 21-year-old man with dilated cardiomyopathy refractory to maximal medical therapy was admitted to our hospital in April 2006. Regardless of intensive care with intravenous inotropic agents, his heart failure rapidly progressed to cardiogenic shock. He was fitted with an extracorporeal LVAD (VCT-50; Toyobo Ltd., Osaka, Japan) 1 week after admission. His general condition stabilized thereafter and the status of heart failure at that time was NYHA class II. Although this status remained stable for 6 months, his cardiac function did not sufficiently recover to discontinue LVAD support. He has remained stable in NYHA class II for 13 months with the LVAD. The patient provided written informed consent to enter into a clinical trial of appendicular thermal therapy for patients with LVAD awaiting for a heart transplant. The Ethics Committee at the National Cardiovascular Center approved the protocol, and the study was conducted in accordance with the Declaration of Helsinki. The study consisted of clinical examinations before and after daily thermal therapy for 2 weeks using a steam bath at 42 °C for the lower legs and feet, and heated gloves at the same temperature for both arms (Fig. 1). After 15 min of therapy at 42 °C,

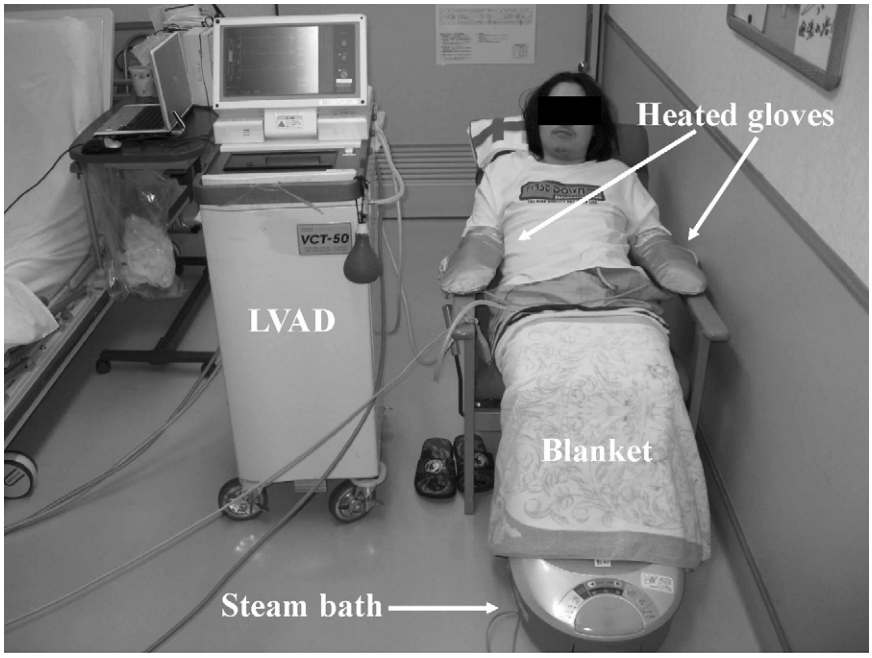

Fig. 1 Setup of appendicular thermal therapy for patient fitted with extracorporeal left ventricular assist device. Patient is fully reclined and relaxed.