JOURNAL of CARDIOLOGY

Reprinted from 2006 Apr; Vol. 47 No. 4: 163−164

Important Message

Successful Thermal Therapy for End-Stage Peripheral Artery Disease

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We had demonstrated that repeated thermal therapy using infrared-ray dry sauna improved hemodynamics and ameliorated symptoms in patients with chronic heart failure[1–4]. Vascular endothelial function in patients with chronic heart failure and coronary risk factors were also improved by this treatment[5,6]. The mechanism by which repeated thermal therapy improved vascular flow and endothelial function is through the increase in endothelial nitric oxide synthase (eNOS) protein expression[7,8]. Since nitric oxide is a mediator of angiogenesis[9], increased eNOS by thermal therapy suggests that this therapy also have the potential to improve peripheral artery disease (PAD)[10]. We report here beneficial effect of thermal therapy in a patient with severe PAD.

A 64-year-old male had intermittent claudication since 2004. He was admitted to a hospital with the diagnosis of angina pectoris, diabetes mellitus and PAD. Although he underwent femoro-popliteal bypass surgery in both legs in November, 2004, toe cyanosis and necrosis became worse. Finally all toes except for the right fifth, and left second and fifth toes had to be amputated. After the surgery, the patient developed a severe right foot ulcer in 7 months and the below-knee amputation was considered. However, the patient declined and was subsequently referred to our department to undergo the thermal therapy for PAD.

On admission, we could not measure the ankle-brachial index (ABI) of right leg. The size of ulcer in right foot was 4.5 × 5.0 cm. He was placed in a supine position in a far infrared-ray dry sauna at 60 ℃ for 15 minutes, and once removed, allowed to rest on a bed with a blanket to keep him warm for an additional 30 minutes. He underwent this thermal therapy once a day for 15 weeks. During admission, the medications were left unchanged.

After 15-week thermal therapy, the ulcer of the right foot drastically improved and completely healed (**Fig. 1**) and the pain disappeared. The right ABI increased up to 0.37. After discharge, the thermal therapy was continued at our outpatient clinic twice a week, and there have been no recurrences of symptoms or skin ulcer for 3 months.

As clearly shown in the **Fig. 1**, a daily-thermal therapy for 15 weeks in this patient has cured his foot ulcer, sparing him from the leg amputation. This case suggests the beneficial effect and a potential application of thermal therapy with infrared-ray dry sauna in treating PAD and merits further investigation.

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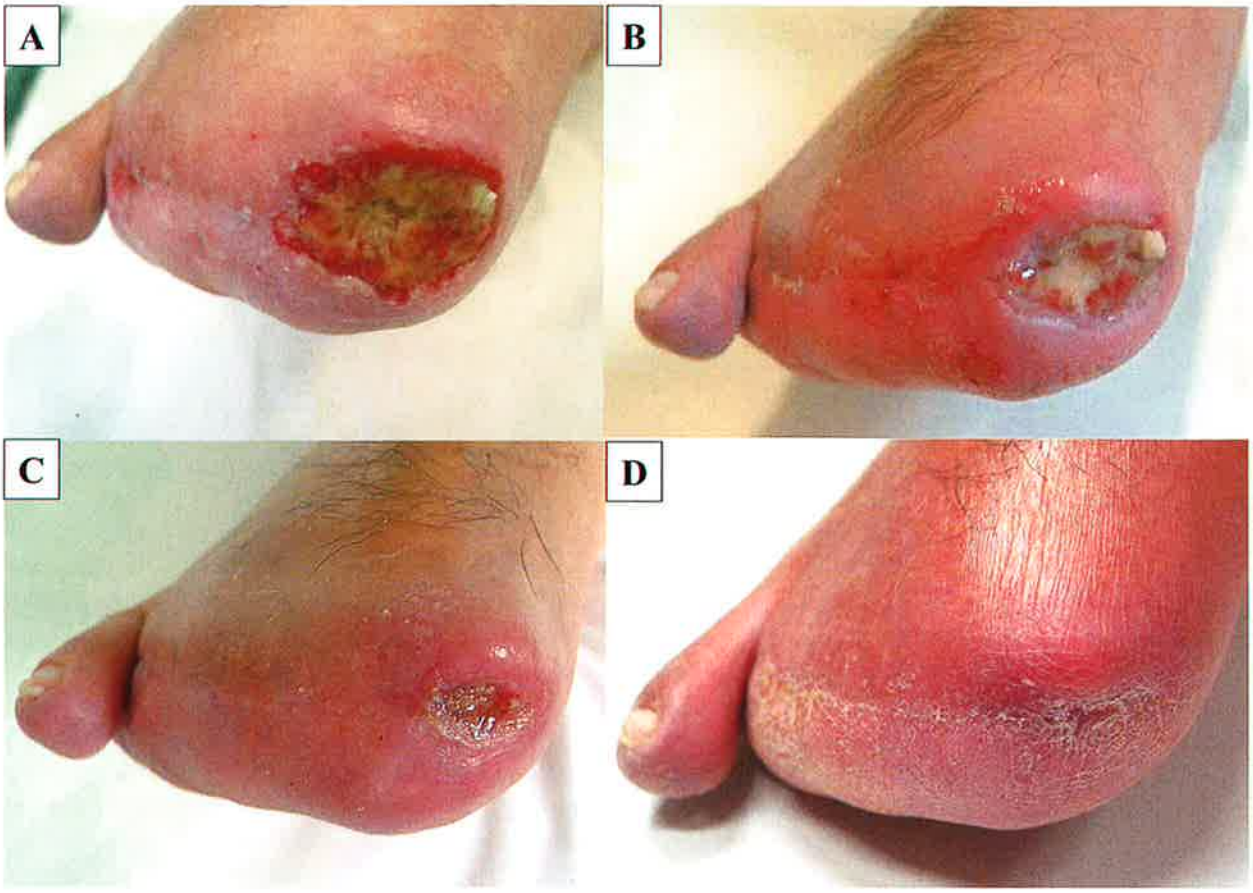

Fig. 1 Chronological changes of the ischemic foot ulcer by thermal therapy
A: Before thermal therapy. *B*: 5 weeks after thermal therapy.
C: 10 weeks. *D*: 15 weeks.

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