

Hot-spring-bathing accelerates wound healing of pressure ulcer of an unconscious patient

Toyoki Maeda*, Naoki Makino

The Department of Cardiovascular, Respiratory and Geriatric Disease, Kyushu University Beppu Hospital,
Beppu, Oita, 874-0838, (JAPAN)
E-mail: maedat@beppu.kyushu-u.ac.jp

ABSTRACT

An old bed-rest patient with subarachnoid hemorrhage in a chronic stage was complicated with a large sacral pressure ulcer with chronic infection and perianal fistula. This chronic intractable pressure ulcer was shrinking by biweekly tank bathing with hot spring water, and finally, about a year after the start of hot spring tank bathing, the pressure ulcer was completely closed and healed. Thus, hot spring bathing possibly helps the wound-healing process even in intractable cases of pressure ulcer with chronic infection and/or fistula.

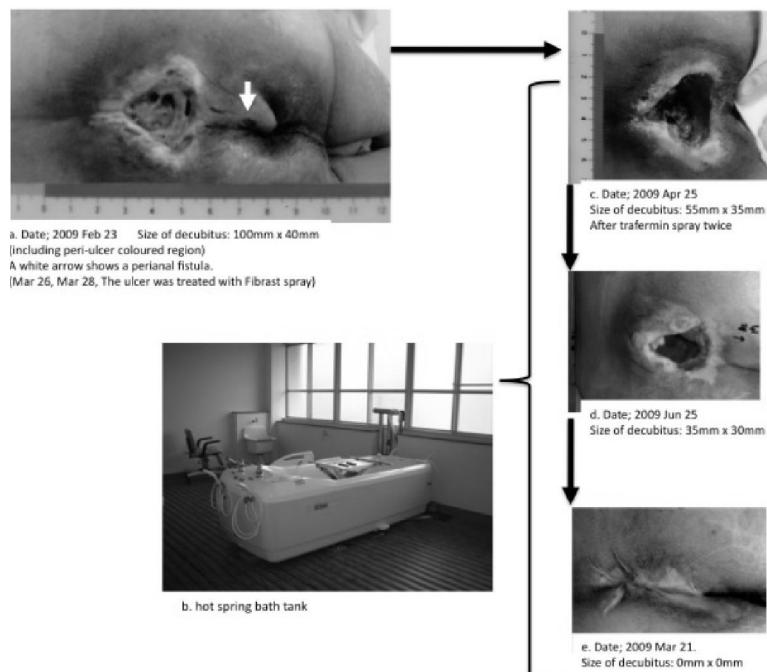
! 2015 Trade Science Inc. - INDIA

CASE REPORT

A 60-year-old man admitted to our hospital two months after having received an acute phase neuro-surgical treatment of subarachnoid hemorrhage. He was completely bedridden, and his consciousness level was Japan coma scale 30. When he was transferred to our hospital, he bore already a sacral pressure ulcer with a fistula to perianal region. Its size was 50mm x 55mm, and the depth was 30mm (Figure 1a). This ulcer was contaminated with *pseudomonas aeruginosa* and methicillin-resistant *staphylococcus aureus*. After admission, antibiotics administered intravenously to treat systemic infection with bacteremia. The pressure ulcer was also treated with sulfadiazine silver cream and mixture of sugar and povidone-iodine stimulates. Trafermin spray containing basic fibroblast growing factor was used twice, but the ulcer size was not changed significantly. After the disappearance of systemic infection, the patient was transferred to a chronic dis-

ease ward equipped with a bathing room supplied with hot-spring water. Then he was subjected to hot-spring-bathing twice a week. The sacral ulcer was sealed with OPSITE Flexifix to prevent wound wetting during the hot spring bathing. In the bath-room, after the patient's body was cleansed with soap and warmed tap water, and then was immerced in hot-spring bath tank at 40°C with head-up for 2 minutes (Figure 1b). After starting this regular hot-spring-bathing, the wound was shrinking rapidly (Figure 1c-d). Finally after one-year-admission, the pressure ulcer disappeared completely. No recurrence of pressure ulcer was observed for a following year with twice-a-week hot-spring-bathing until discharge from hospital. To our knowledge, this is the first report showing a possible therapeutic effect of repeated hot-spring-bathing on pressure ulcer. The healing course of the present pressure ulcer indicates that systemic warming is helpful to wound healing and recurrence prevention of pressure ulcer probably with enhancement of subcutaneous vasculariza-

Regular Paper



(a) Date; 2009 Feb 23; Size of decubitus: 100mm x 40mm including peri-ulcer colored region; A white arrow shows a perianal fistula; (Mar 26, Mar 28, The ulcer was treated with trafermin spray)

(b) hot spring bath tank

(c) Date; 2009 Apr 25; Size of decubitus: 55mm x 35mm; After trafermin spray twice

(d) Date; 2009 Jun 25; Size of decubitus: 35mm x 30mm;

(e) Date; 2009 Mar 21; Size of decubitus: 0mm x 0mm.

Figure 1 : The healing course of sacral pressure ulcer by a regular hot-spring-bathing; (a) pressure ulcer with a perianal fistula; (b) The equipped hot-spring-bath tank of a chronic disease ward for immobile patients; (c-d) The shrinking ulcer by twice-a-week hot-spring-bathing

tion leading to increasing local blood flow. Moreover, the maintenance of cutaneous cleanliness might be also helpful to prevent recurrence. The enhancement of blood flow would contribute to normalize local immune function and promote subcutaneous tissue recovery. The hot-spring water used contained low salt (contents: 1.5g/kg of solute containing sodium ion 366mg/kg and chloride ion 616mg/kg). After hot-spring-bathing, no rinsing the patient's body with warmed tap water, and just wiping the excess of hot-spring water on skin kept the contents of the hot-spring on skin and it delayed the sweat evaporation from skin surface, retaining the warmed body temperature. One of recent reports shows that the local temperature at ulcer region is important for wound healing^[1]. During the entire course of treatment, debridement was performed once, and no skin grafting was performed. In addition, trafermin spray used before regular hot-spring-bathing was not so effective at an initial stage in this case, and vacuum

assisted closure technique was not applicable to skin ulcer with perianal fistula as in the present case. From the present course of hot-spring-bathing treatment seemed to serve as a cost effective pressure ulcer treatment. However, careless systemic bathing should not be applied for patients with pressure ulcer in an acute inflammatory phase. We avoided the bathing, when the patient had tachycardia (pulse rate >100/min). Hot-spring-bathing of the patient started after his condition became calm and stable. After the early accelerated healing, the wound healing proceeded more slowly probably because of the complicated fistula and local bacterial infection. A complete healing of sacral ulcer, however, was achieved finally with no following recurrence. Thus, systemic hot-spring-bathing can be an auxiliary but safe and effective treatment for pressure ulcer. Further, regular systemic hot-spring-bathing can be a preventive procedure for pressure ulcer. A pressure ulcer is a localized injury to the cutaneous and sub-

REFERENCES

- [1] M.P.Rapp, N.Bergstrom, N.S.Padhye; Contribution of skin temperature regularity to the risk of developing pressure ulcers in nursing facility residents, *Advances in Skin and Wound Care*, **11**, 506-513 (2009).
- [2] M.G.Woodbury, P.E.Houghton; Prevalence of pressure ulcers in canadian health care settings, *Ostomy Wound Management*, **50**, 22–38 (2004).
- [3] B.Pham, A.Stern, W.Chen, B.Sander, A.John-Baptiste, H.H.Thein, T.Gomes, W.P.Wodchis, A.Bayoumi, M.Machado, S.Carcone, M.I.Krahn; Preventing pressure ulcers in Long-Term Care: A Cost-Effectiveness Analysis, *Archives of Internal Medicine*, **171**, 1839-1847 (2011).

ACKNOWLEDGMENT

There is no conflict of interest about this report.

AUTHOR CONTRIBUTIONS

This is a case report. M.N. recorded the patient's disease history and prescribed medicine. M.T. treated the patient with prepared hot-spring foot-bath, and prepared the case report.