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Successful Intervention for Pressure Ulcer by Nutrition Support Team: A Case Report

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Key Words
Pressure ulcer · Heart failure · Anorexia · Nutrition support team

Abstract
A 23-year-old woman with heart failure developed pressure ulcer on her sacral area due to a long-term bed rest and impaired hemodynamics. The ulcer improved only slightly after 2 months with povidone-iodine sugar ointment because of severe nausea and anorexia. Then, the nutrition support team (NST) started intervention and estimated the patient's malnutrition from her body weight (30.1 kg), body mass index (BMI) (13.9), triceps skinfold thickness (TSF) (3.5 mm), arm circumference (AC) (17.2 cm) and serum albumin (2.6 g/dl). The NST administrated an enteral nutrition formula through a nasogastric tube and tried to provide meals according to the patient's taste. Although DESIGN score improved to 7 (DESIGN: d2e1s2i1g1n0 = 7) 2 months later, severe nausea prevented the patient from taking any food perorally. However, after nasogastric decannulation, her appetite improved and 1 month later her body weight increased to 32.8 kg, her BMI to 15.2, TSF to 7.5 mm, AC to 19.7 cm and serum albumin to 4.1 g/dl, and the wound completely healed.

Case Report

A 23-year-old Japanese woman, using a cardiac assist device for heart failure caused by dilated cardiomyopathy, developed pressure ulcer on her sacral area due to a long-term bed rest and impaired hemodynamics (fig. 1). The DESIGN score [1] was D4e2s4i2G3n1 = 16. In spite of applying povidone-iodine sugar ointment, the ulcer only slightly improved for 2 months (DESIGN: D4e1s4i1G3n1 = 14) because severe nausea and anorexia reduced the patient's food intake to only about one fruit a day. Then, the intervention by nutrition support team (NST) started intervention and estimated her nutritional status. Her body weight was 30.1 kg, body mass index (BMI) 13.9 (standard = 22; height = 147 cm), triceps skinfold thickness (TSF) 3.5 mm (standard = 14.0 mm), arm circumference (AC) 17.2 cm (standard = 24.6 cm) and serum albumin 2.6 g/dl (normal: 3.8~5.3 g/dl), demonstrating her severe

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malnutrition. The administration of an enteral nutrition formula containing low residue was started through a nasogastric tube. Since the patient's basal energy expenditure, calculated by using the Harris-Benedict formula based on her putative standard weight (47.5 kg), was 1,283 kcal/day (27 kcal/kg/day), the total energy intake, including oral feeding, was decided to be 1,384 kcal/day. Additionally, the NST tried to provide meals according to her taste. Although the DESIGN score improved to 7 (DESIGN: d2e1s2i1g1n0 = 7) 2 months later, the severe nausea still prevented the patient from taking any foods perorally. Therefore, expecting an increase of her appetite, we decided nasogastric decannulation, which resulted in the disappearance of her nausea. Her peroral food intake, including food and enteral nutrition formula, became approximately 1,600 kcal/day. Finally, 1 month later, her body weight increased to 32.8 kg, her BMI to 15.2, TSF to 7.5 mm, AC to 19.7 cm and serum albumin to 4.1 g/dl, and subsequently the wound completely healed (**fig. 2**).

Discussion

Strategies taking various aspects into account, including body pressure dispersion, local wound control, nutrition management and systemic condition improvement, are necessary for preventing and treating pressure ulcers [2]. We have previously reported that the systemic condition is pivotal in the cure of pressure ulcers in cirrhosis, which healed after liver transplantation in two cases [3], and we also reported that local maceration control was significant in another case with recalcitrant pressure ulcer [4]. Although nutrition intervention seems indispensable to manage pressure ulcers, a systemic review concluded that it reduces the risk of developing pressure ulcers but its preferable effect on healing of pressure ulcers remains to be further confirmed [5]. However, Oka et al. [6] from Japan reported usefulness of nutrition intervention in a similar case of pressure ulcer complicated by malnutrition. Furthermore, the recent guidelines from the Japan Society of Pressure Ulcers recommend the administration of proper energy and protein for existing pressure ulcers as a recommendation level B [2]. Moreover, the more recent reference guide from the European Pressure Ulcer Advisory Panel and National Pressure Ulcer Advisory Panel [7] emphasizes the role of nutrition in pressure ulcer healing and estimates strength of evidence rating for recommendations about various nutritional interventions, such as nutritional assessment and regulation of calories, proteins, vitamins, minerals and hydration (**table 1**). In support of this, the intervention and evaluation by an NST was very helpful for the treatment of our case, also indicating the importance of collaboration and a common understanding of the patients' situation among medical staff, including the pressure ulcer advisory group and the NST.

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Table 1. Summary of recommendations concerning nutritional interventions according to 'Treatment of Pressure Ulcers: Quick Reference Guide' [7]

Strength of Evidence B
Calories
Provide sufficient calories
Provide enhanced foods and/or oral supplements between meals if needed
Proteins
Provide adequate protein for positive nitrogen balance for an individual with a pressure ulcer
Vitamins and minerals
Provide adequate vitamins and minerals
Encourage consumption of a balanced diet that includes good sources of vitamins and minerals
Offer vitamin and mineral supplements when dietary intake is poor or deficiencies are confirmed or suspected
Strength of Evidence C
Assessment
Screen and assess nutritional status for each individual with a pressure ulcer at admission and with each condition change – and/or when progress toward pressure ulcer closure is not observed. Refer all individuals with a pressure ulcer to the dietitian for early assessment of and intervention for nutritional problems.
Assess weight status for each individual to determine weight history and significant weight loss from usual body weight (>5% change in 30 days or >10% in 180 days).
Assess the individual's ability to eat independently.
Assess the adequacy of total nutrient intake (food, fluid, oral supplements, enteral/parenteral feedings).
Calories
Provide 30–35 kcal/kg body weight for individuals under stress with a pressure ulcer. Adjust formula based on weight loss, weight gain, or level of obesity. Individuals who are underweight or who have had significant unintentional weight loss may need additional kcal to cease weight loss and/or regain lost weight.
Revise and modify (liberalize) dietary restrictions when limitations result in decreased food and fluid intake.
These adjustments are to be managed by a dietitian or medical professional.
Consider nutritional support (enteral or parenteral nutrition) when oral intake is inadequate. This must be consistent with the individual's goals.
Proteins
Offer 1.25 to 1.5 g protein/kg body weight daily for an individual with a pressure ulcer when compatible with goals of care, and reassess as condition changes.
Assess renal function to ensure that high levels of protein are appropriate for the individual.
Hydration
Provide and encourage adequate daily fluid intake for hydration.
Monitor individuals for signs and symptoms of dehydration: changes in weight, skin turgor, urine output, elevated serum sodium, or calculated serum osmolality.
Provide additional fluid for individuals with dehydration, elevated temperature, vomiting, profuse sweating, diarrhea, or heavily draining wounds.

Strength of Evidence A: the recommendation is supported by direct scientific evidence from properly designed and implemented controlled trials on pressure ulcers in humans (or humans at-risk for pressure ulcers), providing statistical results that consistently support the guideline statement; Strength of Evidence B: the recommendation is supported by direct scientific evidence from properly designed and implemented clinical series on pressure ulcers in humans (or humans at-risk for pressure ulcers), providing statistical results that consistently support the recommendation; Strength of Evidence C: the recommendation is supported by indirect evidence (e.g., studies in normal human subjects, humans with other types of chronic wounds, animal models) and/or expert opinion.

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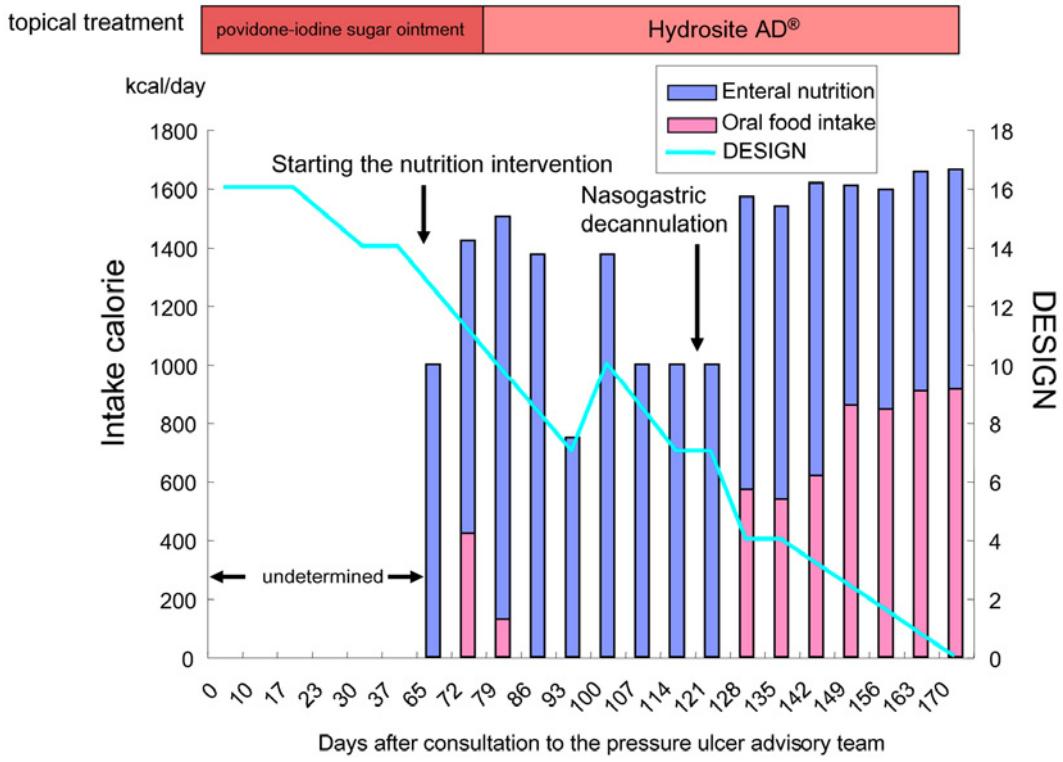
Fig. 1. Clinical appearance of the pressure ulcer. The DESIGN score was D4e2s4i2G3n1 = 16.

Fig. 2. Intake energy, topical treatment and DESIGN score in our case.



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