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Topical Application of Sugar and Povidone-Iodine in the Management of Decubitus Ulcers in Aged Patients

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ABSTRACT

The efficacy of topical application of sugar and povidone-iodine in the treatment of decubitus ulcers was evaluated in 15 aged patients having 25 ulcers. The sizes of decubitus ulcers hardly decreased significantly and somewhat failed to debride the wound of eschar easily because of making the wound surface extremely dry. Meanwhile, the advantages of this treatment are that sugar and povidone-iodine has a painless germicidal effect as well as topical antibiotics and that it is cheaper than other standard care. Thus, there is the possibility that its use in therapy can be one of the useful methods to prevent the development of septicemia in the management of decubitus ulcers.

Decubitus ulcers are a common and uncontrollable complication since ancient times, especially in seriously ill patients of the aged. As the number and proportion of aged individuals in the population increases and recent medical progress keeps more and more chronically ill patients alive, decubitus ulcers will raise various serious problems in near future.

Recently some reports were undertaken to evaluate the efficacy of topical application of sugar and povidone-iodine compound in the management of decubitus ulceration[5,6].

We have had an opportunity to treat decubitus ulcers in the patients with such chronic disorders as Parkinson disease, senile dementia, arteriosclerosis, paraplegia and rheumatoid arthritis over the age of 65. Therefore, in this study, sugar and povidone-iodine compound was employed in the treatment of secreting decubitus ulceration in the aged patients with incapacitating disease.

METHODS AND MATERIALS

The study population consisted of 15 patients having 25 ulcers aged from 65 to 90 years who had a clinical diagnosis of decubitus ulceration with a history of one or more of the following: cerebrovascular accident, senile dementia, arteriosclerosis, rheumatoid arthritis, and so on. All patients failed to respond to standard medical and nursing care, including topical ointments and antibiotics. Most of their decubitus ulcers were located in sacral region and almost extended to sacral bone.

Serum total protein was determined as an indicator of the nutritional condition in each patient, and it was over 6.0 g/dl in 4 patients and below it in 11. And culture of the decubiti were obtained by cotton swab in some cases.

We produced a stable mixture of granulated sugar 310g, povidone-iodine solution 28ml, and povidone-iodine gel 90g (sugar/PI compound). The defect of decubitus ulceration was packed

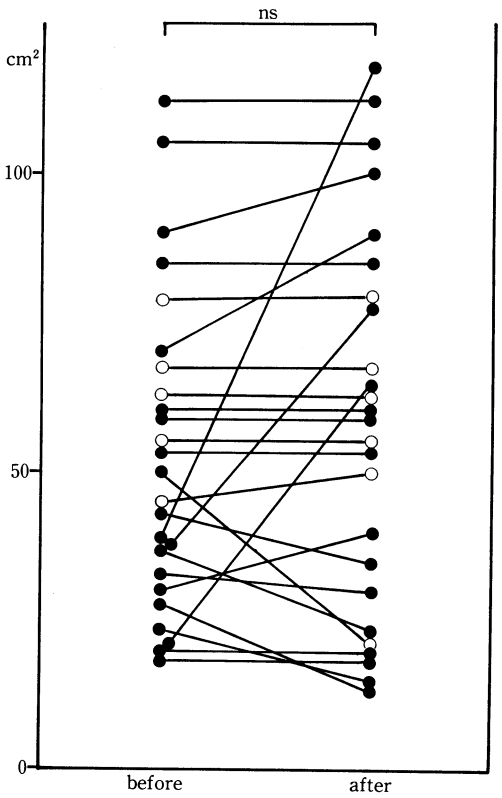

Fig. 1. Changes in surface area of decubitus ulcers before and after therapy.
The area of ulcer was calculated as follows:
$\frac{\pi}{4}$ × shorter diameter × longer diameter
Serum total protein was above 6g/dl in 4 patients (open circles) and was below it in 11 patients (solid circles).

with sugar/PI compound and then covered with gauze dressings. They were renewed one to three times daily depending upon the amount of wound exudate over a period of one-month. The ulcers were examined with regard to odor, itch, erythema and the size of ulceration. The size of ulceration was calculated as the product of $\frac{\pi}{4}$, its longer diameter and shorter one. During this study, topical antibiotics were not used with the exception of prophylactic therapy for septicemia with systemic antibiotics.

RESULTS

The results of sugar/PI compound in the treatment of decubitus ulcers in all patients are presented in Fig. 1. Their areas remained unchanged in 12 ulcers out of 25, and 6 of the remaining 13 ulcers decreased but 7 increased. Since the ulcers were rapidly cleaned of bacterial contamination, its odor was completely relieved and wound surface was accompanied by vascular granulation tissue on gross inspection at 4 weeks, and most patients experienced some degree of symptomatic relief within two weeks after initiation of therapy. While, a striking improvement did not take place with regard to erythema or itch around ulcers. A further deficiency of this compound is in greater or less degree the failure to debride the wound of eschar easily because of making the surface wound extremely dry, compared to other greasy ointment bases. Though bacteriologic cultures were done before, during, and after treatment in some patients, no significant trends were noted. The regimen of ulcer care was accepted and well tolerated by all patients, with no complaints of side effects or pain resulting from its application.

DISCUSSION

Many attempts were made to evaluate the efficacy of natural foodstuffs, such as sugar, honey and molasses in the decubitus treatment thus far. Herszage et al[4] reported 120 patients with infected lesions treated with sugar with a healing rate of 99.2%. Barnes et al[1] achieved a cure rate of almost 80%—262 of 334 decubitus ulcers over a five-year period by use of granulated sugar. Parish et al[9] showed dextranomer treatment to be significantly more effective than either collagenase or sugar and egg white treatments. But it is not yet completely known how sugar works on wound. Barnes et al[1] suggested that the stimulating effect of the sugar granules causes "local injury" and granulation tissue formation. Moreover, the sugar solution is bactericidal and its acid pH tends to increase vasodilatation. The experiments of Knutson et al[6] have shown that a simple sugar cube inhibited growth of both gram-positive and gram-negative bacteria on standard blood agar plates inoculated with a variety of bacterial organisms. In *in vitro* experiments with bacteria, such as *Escherichia coli*, *Pseudomonas aeruginosa*, *Klebsiella pneumoniae* and *Staphylococcus aureus*, some reports showed that water activity values of appropriate sugar solutions were low enough to inhibit bacterial growth[2,10].

Meanwhile, Lee et al[7] have shown the effica-

cy of topical applications of povidone-iodine for the control of infection associated with decubitus and stasis ulcers. Povidone-iodine has a wide range of rapid germicidal activity against common bacteria, especially *Staphylococcus aureus*, and is an effective fungicide[3,11]. In addition, povidone-iodine is not known to induce resistant organisms[12]. It does not interfere with epithelization[8], cause sensitization[11], or elicit pain upon application to open, raw wounds[12].

Concerning granulated sugar and povidone-iodine, Knutson et al[6] treated 605 patients for wounds, burns, and ulcers over a 56-month period, and rapid healing ensued in this treatment. But in their report, special consideration was hardly given to chronic ulceration including decubitus ulcers. According to Inoue et al[5], 15 patients with decubitus ulcers were treated with sugar and povidone-iodine, its use in therapy was effective. But 4 patients with deep decubitus ulcers among 15 patients, which extended to bones, died of septicemia, namely, remaining 11 patients are considered to have relatively shallow ulcers, which are relatively easy to be healed. According to Knutson et al[6], the greatest advantage of this treatment was that sugar and povidone-iodine reduced edema and debrided the wound of eschar. In our study, although edema and exudate could be reduced, the wound of eschar was toughly adherent to the lesion and this is considered to be one of the drawbacks of this treatment.

The topical antibiotics are also of limited value in ulcer management because they cause contact dermatitis and promote the development of resistant organisms[7]. Systemic antibiotics therapy may likewise be ineffective, in that it relies upon a compromised vasculature to reach the desired site of action. Sugar and povidone-iodine has an advantage of cleaning the wound and is their counterpart (antibiotics). Another advantage of this treatment is that sugar and povidone-iodine products are relatively inexpensive compared to alternative wound treatment methods, including antibiotics. Thus, confronted with rising costs for medical care, the reduction in costs from this treatment has significant potential for low medical expenses both personally and socially.

In general, deep decubitus ulcers which nearly to extend to bones tend to resist any treatment measures, though various methods of treatment have been advocated for those deep ones. Sugar and povidone-iodine has a possibility of being widely used to prevent the infection of decubitus ulcers from developing septicemia in near future.

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