
CASE REPORTS



Use of Sugars as Wound Dressings

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INTRODUCTION

Throughout history, sugars have been used in the treatment of a variety of conditions including the healing of wounds. In certain third-world countries sugar pastes are used as the treatment of choice as they offer a readily available, inexpensive, safe, and effective means of therapy. These same properties make it a useful, though under utilized, therapy in Canada for wound healing. Two cases are described and the rationale for utilization of sugars is presented.

CASE

A 49 year-old, quadriplegic male was noted to have a 3cm wound on his right buttock. Subsequent culture and sensitivity (C & S) reports indicated polymicrobial growth including beta-haemolytic streptococci, *E. coli*, *P. aeruginosa*, *P. mirabilis* and *Klebsiella species*. Despite surgical debridement, and topical and systemic antibiotics, the wound failed to heal, and therapy with sugar paste was started every eight hours with Tegaderm® dressing to cover. After ten days, repeat C & S revealed no growth except for the beta-haemolytic streptococci and povidone-iodine one percent irrigations were commenced. In response to this, the wound started to show signs of healing, and repeat C & S performed four days later revealed no bacterial growth. The only other medication

started was a zinc supplement in response to a laboratory proven deficiency which was expected to facilitate wound healing. Within two months the wound had diminished from a diameter of 3cm and a depth of 5cm to a diameter of 2cm and a depth of 0.5cm.

CASE

A 69 year-old insulin dependent diabetic male was admitted with a deep ulcer (3cm x 5cm) on his left ankle that had been present for several years and which had been unsuccessfully treated in the past with skin grafts. Following daily cleansing with 3% hydrogen peroxide until pink tissue was noted at the ulcer site, normal saline was used to irrigate the wound followed by daily application of thick sugar paste with 0.2% povidone-iodine held in place by a Tegaderm® dressing. By six weeks, the ulcer had healed to an area of 1.1cm x 1.5cm and was completely healed within three months.

Sugar pastes were among the earliest therapies employed for the healing of wounds, dating back to approximately 1600 B.C.¹ In that era, ointments were compounded using two-thirds grease and one-third honey. Also, Hippocrates made reference to the use of sugar (honey) as does the Koran and the Bible.²

In selecting a wound dressing several characteristics of the prepara-

tion should be assessed.^{3,4} These include ease of use, frequency of application, sterilizability, the compatibility of the dressing with other agents, the ability of the dressing to retain surface moisture, permeability of the dressing to oxygen, the pH of the preparation, freedom from toxic and particulate matter, lack of adhesiveness, the ability to provide an effective barrier and discourage bacterial growth, the ability to insulate the wound from temperature changes, acceptance by the patient, and cost. Sugar dressings have many of these attributes. They are relatively easy to apply with dressing changes as infrequently as every 12 to 24 hours. Because the dressing does not stick to the wound there is little chance of unwanted mechanical debridement upon dressing removal. Twelve hourly dressing changes allow for liquefaction and drainage of dead tissue and pus. As well, this prolonged time period helps maintain a relatively constant temperature at the wound site which facilitates wound healing.

Sugar pastes are permeable to gases and slightly acidic (pH 6). Honey has a lower pH of approximately 3.5, and therefore, produces more dissociation of oxyhaemoglobin at the wound site producing, theoretically, higher oxygen concentrations, and hence, encouraging more rapid healing.⁵ Unfortunately, honey

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contains varying proportions of fructose and glucose which may be absorbed, and hence, should not be used in diabetic patients. As well, the presence of other potential contaminants make it unsuitable for use in dressings.

Sugar pastes also destroy many bacteria.⁶⁻⁸ A concentration of sugar of about 183g per 100g of water completely inhibits the growth of *Staphylococcus aureus*. Microorganisms such as *E. coli*, *P. aeruginosa*, *P. mirabilis*, and *K. pneumoniae* are also inhibited but beta-haemolytic streptococci do not appear to respond. The addition of povidone-iodine to the paste, and as a one percent irrigation, will usually eradicate this organism. Sugar pastes provide little mechanical protection, and thus, usually require a secondary dressing. Sterilization is not possible but it is unlikely that micro-organisms can grow in this environment. Finally, these preparations are usually acceptable to the patients and even when one considers the cost of manufacturing sugar pastes they are relatively inexpensive.

There are a number of different formulations which may be used. Some workers use granulated sugar on its own but this has been found to cause some maceration around wound edges. Others have used straight icing sugar,⁹ whilst others have suggested mixing sugars with other agents.¹⁰ In Zanzibar there are two main formulations each containing granulated sugar. Formula one contains povidone-iodine and formula two contains chlorbutol and propylene glycol.¹⁰ The most versatile paste to use is the one used in the case reports, the formula for which may be obtained from the author.

Sugar pastes have been used in a diverse number of settings including

as a sprinkle on fungating tumors for odor control,⁹ in open mediastinitis following cardiac surgery¹² (in conjunction with intravenous antibiotics), in diabetic ulcers usually with a layer of protectant such as Skin-Prep® in burns, and in those patients with decubitus ulcers.¹¹

A number of potential problems are associated with the use of sugar pastes. Firstly, they melt with body heat and drain away from the wound. Positional changes and attention to the application of the secondary dressing may help this problem. As well, single case report of aggravation of renal insufficiency associated with very large quantities of sugar dressings has been reported. Removal of the sugar dressing resulted in an improvement in renal function. It would appear that in patients with renal insufficiency, sugar dressings, especially if applied extensively, may aggravate renal function, and regular monitoring of renal function should be done if this therapy is chosen.^{10,12-14} If icing sugar is being used it is quite important to make sure the product is free of additives. Many manufacturers add corn starch to their products as an anticaking agent. This will give the classic purple starch test when mixed with povidone-iodine giving an inelegant product. Cornstarch has also been shown to encourage fungal growth, and to cause granulomas if embedded in the skin.^{15,16}

All aspects of patient care including diet, physio- and occupational therapy support, pharmacy input, and nursing care need to be considered in the management of wounds. Sugar pastes may be an important therapeutic modality in these patients. ☐

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