
The Use of Antiseptics in Wound Management: A Community Nursing Focus

Pam Selim

Summary

The increased focus on research and evidence for practice has seen changes in wound management practice. In the community, district nurses now, more than ever, want to control and own their wound management practice. The increased awareness of evidence based wound management practice has, however, caused conflict with some medical colleagues. Some district nurses have been asked to defend their wound management practice. The evidence from this review highlights considerations that need to be taken into account when using antiseptics, particularly povidone iodine. Povidone iodine has use as a skin preparation and for the management of burns, however, it is ineffective in the presence of body fluids, is toxic to fibroblasts and not recommended for prolonged use. Effective use of povidone iodine requires frequent dressing changes and, in the community setting, this is not best wound management practice. Other cleansing options are briefly discussed and the paper highlights the considerable debate regarding the effectiveness and safety of antiseptics.

Introduction

In 1997, a survey of wound management within a large metropolitan community nursing organisation in South Australia was undertaken, as wound management constituted 35 per cent of district nursing practice. During the survey week, questionnaires were sent out and 1,046 wounds were surveyed. The findings and recommendations from the survey have been acted on within the organisation. The emphasis has been on clinical practice and moving towards evidence based practice.

Increased knowledge as a result of these strategies has meant that district nurses are increasingly keen to have more autonomy and ownership of their wound management practice. This trend, as well as an increased awareness of the use of evidence

based wound management practice, has caused some conflict with medical colleagues. Some district nurses have been asked by medical colleagues to defend their wound management practices. For example, a request was made by a surgeon for a district nurse to use povidone iodine solution to clean a wound. The nurse was able to argue the case for not using povidone iodine in this particular wound and the evidence provided in this review assisted in her discussions. In this paper, the author will review some of the issues surrounding current thoughts on antiseptic use in wound management.

Antiseptics

The concept of moist wound healing, following Winter's report which demonstrated that epidermal migration takes place more rapidly in a moist environment¹, and the availability of modern wound dressings have changed the way practitioners perform wound management. Different modern wound dressings are designed for usage during specific phases of wound healing. This literature review focuses on another evolving area of wound management, namely the use of antiseptics and particularly the use of povidone iodine in the management of wounds.

In 1867, Joseph Lister first described the use of antiseptics. He claimed that the use of carbolic spray, handwashing and clean dressings all reduced the risk of surgical wound infection. His ideas were opposed until the First World War when cleansing

*Pam Selim, BA, RN, RPN, Master of Nursing
(Research) [in progress]
Research Associate*

*Royal District Nursing Service (SA)
31 Flemington St
Glenside SA 5065*

*Telephone: (08) 8206 0071
Facsimile: (08) 8206 0017
E-mail: ps@rdns.sa.gov.au*

agents such as carbolic, phenol, iodine and chlorine (later known as Eusol) were used to reduce the mortality from gas gangrene². These antiseptics continued to be used until the discovery and use of antibiotics during the Second World War. Antiseptics continued to be used in conjunction with antibiotics, most commonly to combat infection in wounds, until Brennan and Leaper published their pivotal paper that questioned the routine use of antiseptics³.

Antiseptics that have been used in wound management include hypochlorite solutions (e.g. Eusol), hydrogen peroxide, acetic acid, povidone iodine, chlorhexidine gluconate and chlorhexidine gluconate with cetrimide (e.g. Savlon)^{4, 5}. These solutions have different properties and actions and yet most nursing texts refer to them under the umbrella term antiseptics. Increasingly in the last 25 years, debate continues over their safety and efficacy.

Although the term antiseptics will be used throughout this literature review, the focus of this paper is povidone iodine. Povidone iodine is available in several forms including an aqueous solution, an ointment, a cream and a surgical scrub that includes detergent. The form of povidone iodine most commonly used is a polyvinyl-pyrrolidone-iodine complex. It is a brown, amorphous, water soluble powder containing 9-12 per cent available iodine⁶.

Uses of povidone iodine

A search of the electronic databases and a subsequent review of the literature has shown that the most effective uses for povidone iodine are as a pre-surgical scrub and as a skin preparation for patients before the insertion of a foreign object, for example before the insertion of a central venous catheter.

Povidone iodine is appropriate for acute and superficial wound care use, including simple burns and abrasions (MacLellan DG. Presentation at the Third Asian Pacific Congress on Antisepsis, 1997). It is useful because it destroys viruses, yeast, fungi and bacteria⁷. The literature suggests that povidone iodine is widely used for patients with burns. Preparations that allow for slow release of the iodine are more suitable to reduce bacterial colonisation as this avoids high local concentrations of iodine (Van Der Merwe E. Presentation at the Third Asian Pacific

Congress on Antisepsis, 1997). Van Der Merwe found that with the use of Betadine[®] cream there were fewer allergies and reduced microbial concentrations. Research indicates that povidone iodine in a cream base is beneficial in wound healing⁸. However, this may only be because the cream base is consistent with moist wound healing principles and not because there is povidone iodine present⁹.

Disadvantages of povidone iodine

The literature suggests that antiseptics should not generally be used for the cleansing of clean granulating wounds¹⁰⁻¹². There is little evidence to support their use in cleansing and they can damage tissues. Evidence also suggests that antiseptics are ineffective for cleansing infected wounds because many are deactivated in the presence of organic material such as pus, slough and necrotic tissue within wounds^{13, 14}. Although antiseptics significantly alter the bacteriological content of wounds, as Lawrence reminds us, wounds do not need to be sterile to heal¹⁰. Kucan *et al.* reported that the application of 10 per cent povidone iodine every 6 hours to pressure ulcers was no more effective in reducing bacteria counts than using normal saline¹⁵. In fact, studies show that povidone iodine is ineffective if a wound is colonised with greater than five organisms per gram of tissue^{16, 17}. This is supported by Thomas who showed that, at low concentrations, antiseptics only act as an irrigant solution¹⁸. At high concentrations, they can reduce bacterial counts but can also damage tissues.

Gilchrist asserts that the debate regarding iodine use in wound management is far from being resolved¹⁹. Paradoxically, he noted that the published research relating to the effects of iodine could be criticised on methodological grounds, but then proceeds to say that they suggest efficacy of iodine products. Animal studies involving antiseptics have shown chlorhexidine, hydrogen peroxide and povidone iodine are toxic to fibroblasts³. It is therefore reasonable to conclude that most antiseptic cleansing agents are inactivated by body fluids.

Long-term use

Skin cells and granulation tissue in wound healing are the most susceptible to cytotoxic damage by antiseptics. This means that careful assessment of the benefits and risks of using povidone iodine must be made, especially if it is to be used frequently or

for a prolonged period (Niedner R. Presentation at the Third Asian Pacific Congress on Antisepsis, 1997). Lineweaver *et al.* reported from their study that povidone iodine should not be used in concentrations greater than 0.001 per cent and they caution clinicians against using it for prolonged periods²⁰.

In addition, system absorption of iodine can occur with repeated use²¹. Many antiseptics are known to cause allergic contact dermatitis, although when compared with other antiseptics, povidone iodine sensitivity is considered to be mild²².

In summary, therefore, it is unwise to continue using povidone iodine for long periods. Povidone iodine can be absorbed systemically, wound healing can be impaired and in some cases skin allergy can occur.

Community nursing considerations

Based on the findings summarised above, it would seem that there is more to consider than simply whether povidone iodine or antiseptics in general are safe to use. Effective use of povidone iodine relies on frequent dressing changes. In the community, this is not cost effective and adds to client pain, discomfort and inconvenience. In addition, as stated earlier, the way practitioners perform wound management has changed and frequent dressing changes are not generally regarded as being part of evidence based wound management.

There are other more effective cleansing agents and dressings available. Warmed normal saline is reported to be one of the safest cleansers. Research has found that both tap water and saline are effective cleansing agents, but that the incidence of sepsis was higher in the saline cleansing group²³.

Unfortunately, this study had a methodological flaw because it used warmed tap water and cold saline. It was thought that the incidence of sepsis was higher when the solution was cold because this caused local vasoconstriction and impaired the wound's resistance. The drop in temperature that occurs when a cold solution is poured onto the wound is thought to hinder the ability of macrophages to work effectively¹². This implies that, in cleansing a wound, the most important consideration is to have the solution warmed.

Povidone iodine should only be used for the short term and as an adjunct to systemic antibiotic therapy and its use should be reviewed regularly². In the community, it may be beneficial to use one of the slow release cadexomer iodine dressings. Cadexomer iodine dressings are a polysaccharide, three dimensional starch lattice that contains 0.9 per cent povidone iodine that is released slowly to assist in reducing bacterial loads of wounds. But, as with any dressing containing an antiseptic, it should not be used for prolonged periods.

Removal of slough from wounds can be undertaken by debridement, which can be mechanical, autolytic or as a result of myiasis (fly larvae infestation). All of these methods have been found to be effective. Research undertaken by Mertz showed that autolytic debridement may take place in chronic wounds between 7-10 days²⁴. Unlike antiseptics, autolytic debridement does not damage new cells and therefore should not hinder the healing process.

Conclusion

There is still considerable debate regarding the effectiveness and safety of antiseptics. Current evidence and consensus of opinion would suggest that overall they are unnecessary in the day to day management of clean wounds. Showering and irrigating with normal saline or tap water are the most commonly accepted methods used to cleanse wounds to assist healing. In particular, chlorhexidine is considered to be damaging to the wound and in fact impairs wound healing.

There is still much controversy surrounding povidone iodine usage in wound healing. Long-term use of antiseptics should be avoided and consideration should be given to their use in conjunction with an antibiotic. Cadexomer iodine dressings are slow release and although more research is needed in this area, it seems that they are effective in reducing the bacterial load of a wound.

When prescribing povidone iodine dressings, the practitioner needs to ensure that it is the most effective and economical dressing available for the particular wound and client lifestyle. Most importantly, one needs to remember that no one solution or dressing material will be applied to a wound throughout its life. As the status of the wound changes, the management approach must also be changed.

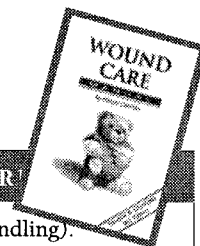
References

1. Winter G. Formation of the scab and the rate of epithelialisation of superficial wounds in the skin of the young domestic pig. *Nature* 1962; **193**:293-294.
2. Flanagan M, Marks-Maran D, editors. *Wound Management*. New York: Churchill Livingstone, 1997; 52-65.
3. Brennan SS, Leaper DJ. The effect of antiseptics on the healing wound: a study using the rabbit ear chamber. *Br J Surg* 1985; **72**:780-2.
4. Carville K, Smith R. Silver Chain WA Wound Survey: Valuable Findings. *Health Link*, 1996; 2-3.
5. Morison M, Moffatt C, Bridel-Nixon J, Bale S. *Nursing management of chronic wounds*, 2nd ed. London: Mosby, 1997.
6. Lawrence JC. The use of iodine as an antiseptic agent. *J Wound Care* 1998; **7**(8):421-5.
7. Gogia PP, editor. *Clinical Wound Management*. Thorofare, NJ: SLACK Inc., 1995.
8. Oshlack B, Grundy RP, Chelle C, Ast TM, Goldenheim PD. Povidone iodine cream or topical antiseptics. *Prog First Asian/Pacific Conf Antisepsis*. Royal Society of Medicine Services International Congress and Symposium. Series No 129; 73-81.
9. Findlay D. Modern dressings: what to use. *Australian Family Physician* 1994; **23**(5):824-39.
10. Lawrence JC. Wound irrigation. *J Wound Care* 1997 Jan; **6**(1):23-6.
11. Pudner R. Wound cleansing. *Journal of Community Nursing* 1997 July; **11**(7):30-36.
12. Young T. Common problems in wound care: wound cleansing. *British Journal of Nursing* 1995; **4**(5):286,288-9.
13. Rodeheaver G. Topical wound management. *Ostomy/Wound Management* 1988; **4**:59-68.
14. Morgan D. Is there still a role for antiseptics? *Journal of Tissue Viability* 1993; **3**(3):80-4.
15. Kucan JO, Robson MC, Hegggers JP, Ko F. Comparison of silversulfadiazine, povidone iodine and physiologic saline in the treatment of chronic pressure ulcers. *J Am Geriatr Soc* 1981; **29**:232-5.
16. Robson MC, Schaerf RH, Krizek TJ. Evaluation of topical povidone iodine ointment in experimental burn wound sepsis. *Plast Reconstr Surg* 1974; **54**:328-34.
17. Tommey RC, Norberg HP, Guernsey JM. The use of povidone iodine in the treatment of burns: a literature review. *J Oakla State Med Assoc* 1980; **73**:406-8.
18. Thomas S. *Wound Management and Dressings*. London: The Pharmaceutical Press, 1990.
19. Gilchrist B. Should iodine be reconsidered in wound management? *J Wound Care* 1997; **6**(3):148-50.
20. Lineaweaver W, Richard H, Soucy D. Topical antimicrobial toxicity. *Arch Surg* 1985; **120**:267-70.
21. Aronoff TG, Friedman S, Doedens D, Lavelle K. Increased serum iodine concentration from iodine absorption through wounds treated topically with povidone iodine. *Am J Med Sci* 1980; **279**:173-6.
22. Bajaja AK, Gupta SC. Contact hypersensitivity to topical antibacterial agents. *Inter J Derm* 1986; **25**:103-5.
23. Hall Angeras MH, Brandberg A, Falk A, Seeman T. Comparison between sterile saline and tap water for the cleansing of acute traumatic soft tissue wounds. *Eur J Surg* 1992; **158**:347-50.
24. Mertz PM. Intervention: dressing effects on wound healing. In: Eaglstein WH, editor. *New directions in wound healing: wound care manual*. Princeton, NJ: ER Squibb and sons, 1990. ■

New Revised & Expanded 1998 Edition

WOUND CARE MANUAL ONLY \$35.00

To Order please photocopy this form and post or fax your order to CarePlus



ORDER FORM

ORDER FORM

OR

Please send me copies of the Wound Care Manual at \$35.00 each (which includes postage and handling).

Name Telephone No. ()

Delivery Address

..... Postcode

Cheque enclosed (payable to CarePlus)

Credit Card payment: Bankcard Mastercard Visa

Card No.

Name on Credit Card

Signature

Expiry Date ____ / ____ / ____

Post to: Silver Chain CarePlus
6 Hutton Street, Osborne Park WA 6017 or
PI Fax to (08) 9444 4145 or Tel (08) 9441 4644.

MONEY BACK GUARANTEE:
If not completely satisfied,
return within 30 days in
saleable condition and receive
a refund.



SILVER CHAIN
CAREPLUS