

WHAM evidence summary: Octenidine for chronic wounds

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CLINICAL QUESTION

What is the best available evidence using octenidine (OCT) products to reduce infection and promote healing in chronic wounds in all populations?

SUMMARY

Octenidine dihydrochloride (OCT) is an antiseptic that has been used as a wound treatment for over 20 years.¹ *Level 5* bench research^{2, 3} indicates that OCT products have broad-spectrum antimicrobial activity against gram positive and negative bacteria, fungus and methicillin-resistant *Staphylococcus aureus* [MRSA]. *Level 14* and *Level 25, 6* clinical trials demonstrate antimicrobial efficacy of OCT when used to treat chronic wounds, particularly venous leg ulcers (VLUs). Efficacy of OCT in promoting complete wound closure or reduction in wound surface are over 4 to 12 weeks for VLUs was demonstrated in four small *Level 17, 8* and *Level 25, 6* studies. Evidence from four *Level 4* studies⁹⁻¹² conducted in other chronic wound types also established that OCT is associated with positive wound healing outcomes. This evidence supported a *Grade B* recommendation (a weak recommendation).¹³

CLINICAL PRACTICE RECOMMENDATIONS

All recommendations should be applied with consideration to the wound, the person, the health professional and the clinical context.

Octenidine-based products could be used to reduce local infection and promote healing in chronic wounds. (Grade B).

SOURCES OF EVIDENCE

This summary was conducted using methods published by the Joanna Briggs Institute.¹³⁻¹⁵ The summary is based on a literature search combining search terms related to OCT and chronic wound types. Searches were conducted in CINAHL, Medline, the Cochrane Library and Google Scholar for evidence published up to December 2019 in English. Studies were assigned a level of evidence (see Table 1) based on JBI's hierarchy.¹³⁻¹⁵

BACKGROUND

Octenidine dihydrochloride is a surfactant solution. When used in wound care, surfactants reduce the surface tension between the liquid and the skin surface, which increases the ability of the solution to wet the wound bed by spreading further and accessing wound pockets.^{9, 18, 19} Octenidine is available as an irrigation solution or as a gel designed to promote autolytic debridement.^{9, 18} Laboratory studies have demonstrated efficacy of OCT in reducing bacteria and fungus,^{2, 3} eradicating bacterial biofilm¹⁹ and controlling newly forming biofilm for up to 72 hours.¹⁹

Table 1: Sources of evidence and the level

Level 1 Evidence	Level 2 Evidence	Level 3 Evidence	Level 4 Evidence	Level 5 Evidence
Experimental Designs	Quasi-experimental Designs	Observational – Analytic Designs	Observational –Descriptive Studies	Expert Opinion/ Bench Research
1.c RCT ^{4, 7, 8, 16}	2.c Quasi-experimental prospectively controlled study ⁵ 2.d Pre-test – post-test or historic/retrospective control group study ⁶	None	4.d Case study ⁹⁻¹²	5.b Expert consensus ¹⁷ 5.c Bench research ^{2, 3} and single expert opinion ^{1, 18, 19}

Onset of antimicrobial activity is reported as within 3 to 10 hours, and due to its non-antimicrobial specific effect, resistance does not develop¹⁷ (all *Level 5*). An RCT conducted in acute wounds (skin graft donor sites) demonstrated efficacy in reducing superficial bacterial contamination within 24 hours¹⁶ (*Level 1*).

CLINICAL EVIDENCE

Reduction in local infection

- In an RCT at moderate risk of bias, OCT solution used for wet-to-moist cleansing was effective in reducing bacterial burden within 20 minutes of application. Bacterial burden was reduced by a statistically significant amount (mean reduction 2.90 natural log reduction factor, $p = 0.015$) in 23 chronic wounds. This was as effective as a range of other commonly used antiseptic solutions⁴ (*Level 1*).
- In the pre-experimental washout period of a quasi-experiment at moderate risk of bias, microbiological assessment of VLUs ($n = 50$) irrigated with OCT for four weeks showed complete eradication of gram-positive and gram-negative bacteria (including MRSA) in 88% of wounds and large reductions in number of bacterial strains in the remaining wounds⁶ (*Level 2*).
- In a quasi-experiment at high risk of bias conducted in chronic venous leg ulcers (VLUs, $n = 49$), clinical signs of local infection did not significantly differ between VLUs treated with silver dressings and those treated with OCT gel either with ($p=0.0117$) or without ($p=0.213$) a wound-phase adapted modern dressing, suggesting OCT is as effective as silver in reducing bacterial bioburden⁵ (*Level 2*).

Improvement in wound healing outcomes

- In an RCT at low risk of bias, there was no significant difference in rate of complete closure within 12 weeks of chronic VLUs ($n = 99$) for those treated with OCT compared to Ringer's solution ($p = 0.882$). When analysis was limited to larger VLUs that had persisted more than six months ($n = 28$), significantly more VLUs treated with OCT achieved complete healing compared to Ringer's solution (33.3% versus 0%, $p = 0.022$)⁷ (*Level 1*).
- An RCT at moderate risk of bias conducted in non-healing VLUs ($n = 76$) demonstrated superiority in mean percent reduction in wound surface area for an OCT layered dressing compared to a silver dressing (OCT $1.58 \pm 0.77\text{cm}^2/\text{week}$ versus silver, $0.23 \pm 0.88\text{cm}^2/\text{week}$, $p = 0.0182$). This amounted to an average size reduction of 58% for OCT and 14% for silver dressings⁸ (*Level 1*).
- Chronic VLUs treated with OCT gel achieved 96.2% reduction in wound size at 42 days, compared with

64.1% reduction for VLUs treated with OCT gel in combination with a wound-phase adapted modern dressing and compared with 14.6% for VLUs treated with silver dressings⁵ (*Level 2*).

- In the four-week wash out observational period of a study comparing different dressings, all VLUs ($n = 50$) were irrigated with OCT and received a basic dressing. Over time, there was a significant improvement in VLUs with respect to necrotic tissue ($p < 0.0001$), granulation tissue ($p = 0.0003$) and epithelialisation ($p < 0.0001$)⁶ (*Level 2*).
- In a small number of case studies at high risk of bias, OCT irrigation (often used in combination with an OCT gel) was associated with a reduction in slough and an increase in granulating tissue and epithelialisation for chronic wounds of different aetiologies⁹⁻¹² (*Level 4*).

CONSIDERATIONS FOR USE

The following points could be considered when using OCT products in wound management:

- Octenidine might assist in managing comfort and wound pain. In one RCT an OCT layered dressing was associated with superior pain management compared to silver dressings⁸ (*Level 1*) and in a small number of case reports, OCT-soaked gauze was associated with reduced pain after two weeks of treatment⁹ (*Level 4*). In another study ($n = 50$), there was a statistically significant reduction in VLU pain after four weeks' of irrigation with OCT (*Level 2*). In a quasi-experiment, individuals with VLUs receiving an OCT gel dressing described the treatment as pleasantly cooling, but satisfaction was not significantly greater than for a silver dressing⁵ (*Level 2*).
- Octenidine appears to have a good safety profile. No significant side effects were reported in the studies included in this evidence summary. In one RCT, OCT was associated with fewer adverse events than Ringer solution (16.7% versus 18.8%) and no participants receiving OCT experienced a serious side-effect⁷ (*Level 1*).
- Octenidine products might be more cost-effective than other wound treatment options. A quasi-experiment conducted in 49 VLUs indicated that OCT gel was a cost-effective treatment compared to using silver dressings⁵ (*Level 2*).
- Follow the manufacturer's direction when selecting OCT products for wound irrigation or wound dressings.

CONFLICTS OF INTEREST

The author declares no conflicts of interest in accordance with International Committee of Medical Journal Editors (ICMJE) standards.

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ABOUT WHAM EVIDENCE SUMMARIES

WHAM evidence summaries are consistent with methodology published in

Munn Z, Lockwood C, Moola S. The development and use of evidence summaries for point of care information systems: A streamlined rapid review approach, *Worldviews Evid Based Nurs*. 2015;12(3):131-8.

Methods are provided in detail in resources published by the Joanna Briggs Institute as cited in this evidence summary. WHAM evidence summaries undergo peer-review by an international review panel. More information on the website: <http://WHAMwounds.com> WHAM evidence summaries provide a summary of the best available evidence on specific topics and make suggestions that can be used to inform clinical practice. Evidence contained within this summary should be evaluated by appropriately trained professionals with expertise in wound prevention and management, and the evidence should be considered in the context of the individual, the professional, the clinical setting and other relevant clinical information.

PUBLICATION

This evidence summary has been published in:

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