Considerations in the Use of Antiseptic Agents In Wound Healing

The use of antiseptics such as acetic acid, Dakin’s solution and povidone-iodine has long been a controversial subject. It was originally thought that these products would reduce the rate of infection and speed the repair of the wound, so their use was prolific. It was later proven that long term use of these products caused cytotoxicity to fibroblasts, keratinocytes and neutrophils (all cells necessary to aid in the healing process) as well as retard wound contraction and epithelialization. As a result, the use of these products was drastically reduced. In the age of antibiotic resistance as a result of overuse, antiseptics are now being looked at again for their antimicrobial properties. Below are some of the findings and indications for use that may help in the treatment and prevention of wound infections when used appropriately.

**Acetic acid** is effective when used for 2 weeks against:
- Gram-positive and gram-negative bacteria
- Particularly effective against *Pseudomonas aeruginosa*; when *Pseudomonas* infections are suspected on physical examination there is a greenish or blackish, fruity-smelling discharge
- If infection persists after 2 weeks, use should be reassessed

*Adverse reactions*: Cytotoxic to human cells and when diluted to a level that is noncytotoxic, solution is no longer bacteriostatic. May cause acidosis when used on large surface area wounds.

**Dakin’s solution** was first introduced in World War I to treat infections on the front line. The treatment appeared to be effective although the efficacy was truly not studied until the late 19th century and continues to be researched. This product is effective when used on wounds with signs and symptoms of infection (increased exudate, odor, pain) for short-term use of 12-14 days:
- To treat all human bacterial, viral, and fungal pathogens on a short-term basis; reassess if symptoms persist
- Destroys biofilm and is inexpensive
- Dakin’s is diluted in 3 strengths: quarter strength is 0.125%, half strength is 0.25%, full strength is 0.5%
- Strength is determined by doctor orders. The only strength non-cytotoxic is 1/50 which is ineffective as an anti-septic.

*Adverse reactions*: Can be irritating to intact skin causing pain, redness, and edema. Full, quarter, and one-eighth strength is cytotoxic to keratinocytes and fibroblasts.

**Povidone-iodine** is acceptable to use and is effective in wounds that are infected or at risk of becoming infected and for stagnant wounds with biofilms. Povidone-iodine:
- Is able to penetrate biofilms and is very effective in treating MRSA
- Has anti-inflammatory properties, low cytotoxicity, and a broad antimicrobial spectrum
- Has high tolerability

*Not recommended for*: Patients with thyroid disease and known or suspected iodine sensitivity. Not recommended for long term use; discontinue when infection clears or risk of infection is no longer an issue.

**SOURCES:**
- Wound Management Principles and Practice, Second Edition - Chapter 6, Betsy A. Meyers