

# Urgo Medical Sponsored Learning: Pressure Injury: With Focus on Prevention, Is Quality Treatment Overlooked?



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## PIs and the Importance of Wound Cleansing Choice

Pressure injuries (PIs) are very common in the hospital setting and are a challenge to manage. There are various treatments for the management of PIs and guidelines regarding the use of certain wound cleansing products.<sup>1</sup> Hypochlorous acid preserved wound cleansers are recommended (Level 1 evidence).

## Safety vs. Efficacy

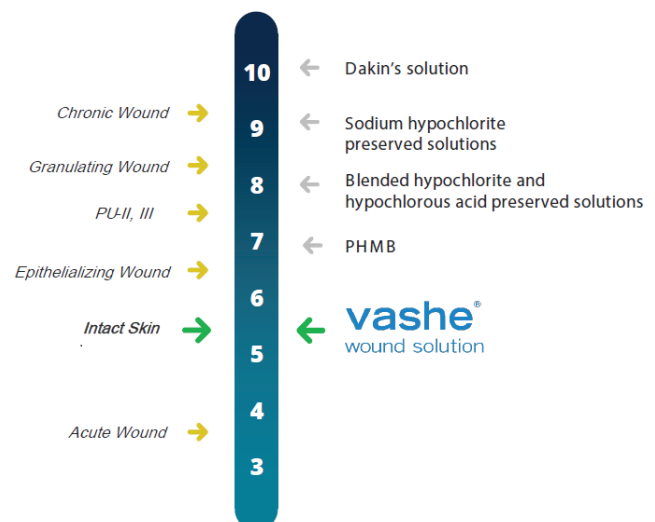
When choosing wound cleansing products, clinicians are often faced with the dilemma of choosing between safety and efficacy, and it can be difficult to find the right balance between the two. Normal saline, for example, is very safe; however, the efficacy of saline on wound cleansing and healing is questionable. On the other end of the spectrum, Dakin's solution and other blended synthetic solutions may be able to remove germs better than saline but are also cytotoxic to key cells involved in the wound healing process.

## Hypochlorous Acid (HOCl) and Innate Immunity<sup>2</sup>

The human body's ability to fend off pathogens naturally (i.e., innate immunity) provides valuable insight into the development of wound care products such as Vashe® Wound Solution. Once neutrophils encounter pathogens in the body, they engulf the pathogens via phagocytosis. Subsequently, hypochlorous acid (HOCl) is released to kill the pathogens.

## Why pH Matters in Wound Healing

Wound pH is closely associated with the wound healing process. When a wound is healing, the pH level decreases (see Figure 1). The decreasing pH causes an increase in protease activity and oxygen release, a reduction in toxicity of bacterial end products, an enhancement of destruction of abnormal collagen, a stimulation of angiogenesis and increased macrophage and fibroblast activity and control of enzyme activity.<sup>3</sup> pH also has the greatest impact on antimicrobial preservative activity of chlorine in solution:<sup>4</sup> an increase of pH decreases antimicrobial preservative activity; a decrease of pH increases antimicrobial activity. Controlling pH in the wound can encourage healing,



**Figure 1.** pH levels during wound healing and of commonly used cleansing solutions.

protect cells and aid in the removal of pathogens from wounds.

## Best of Both Worlds:

### Vashe® Wound Solution

Vashe® Wound Solution contains 0.033% HOCl as an antimicrobial preservative and is produced at a pH of 5.5. Because HOCl is naturally occurring—and thus it is not foreign to human tissue and cells at the level present in Vashe®—the Vashe® Wound Solution is biocompatible and safe to use on wounds. The Vashe® Wound Solution has also been found to be tissue-friendly (e.g., to fibroblasts and keratinocytes) and has demonstrated fast *in-vitro* killing of bacteria, fungi and spores.<sup>5</sup> With the Vashe® Wound Solution, clinicians do not have to sacrifice safety for the sake of efficacy—and vice versa.

Vashe® Wound Solution can be used in conjunction with ultrasonic debridement (Figure 2) and negative pressure wound therapy with instillation (NPWT-id) (Figure 3).

### Vashe® and Wound Bed Preparation

Vashe® Wound Solution has been shown to significantly reduce costs related to wound debridement protocols when Vashe® was used instead of saline and collagenase-based debriding agents.<sup>8</sup> Vashe® Wound Solution can also be used to mechanically remove biofilms on chronic and/or hard-to-heal wounds. It has been demonstrated to penetrate and disrupt the polysaccharide/protein matrix of bacterial biofilms<sup>9</sup> and reduce wound bioburden effectively without the concern of bacterial antibiotic resistance.<sup>10,11</sup>

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### Ultrasonic Debridement with Vashe® versus Saline

Ultrasonic Debridement Solution	Initial Bacteria Count	Post-Debridement Count	7 days Post-Debridement Count	Failure Rate of Flap
NaCl .9%	>10 <sup>6</sup>	10 <sup>2</sup>	>10 <sup>5</sup>	80%
Vashe	>10 <sup>6</sup>	10 <sup>2</sup>	10 <sup>2</sup>	25%

**Figure 2.** In comparisons with saline and ultrasonic debridement, patients treated with Vashe® showed a reduction in bacterial count initially and did not have increased bacterial count for seven days post-operatively.<sup>6</sup> Vashe®-treated patients also had a reduction of post-operative complications, such as flap failure, 55%.<sup>6</sup>

### NPWT-id with Vashe® versus Saline and Dakin's

Solution Used	Mean Operating Room Visits	Length of Stay	Days to Closure
NaOCl/NaCl	7	25	37
Vashe	3.2	14	30

**Figure 3.** Compared with saline and Dakin's solution with NPWT-id, patients treated with Vashe® and NPWT-id had decreased operating room visits, decreased hospital length of stay and faster wound closure.<sup>7</sup>

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