

Editorial

Boric acid- could it be a potential topical antiseptic agent?

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An acidic environment created by use of acid promotes wound healing by controlling wound infections, increasing antimicrobial activity, altering protease activity, releasing oxygen, reducing toxicity of bacterial end products, enhancing epithelization and angiogenesis, etc. [1]. Various acids such as citric acid, acetic acid, alginic acids have been used as non-toxic, inexpensive and highly effective topical antiseptic agents in the management of a variety of acute and chronic wound infections caused by bacterial pathogens including those caused by multiple antibiotic resistant strains not responding to conventional therapies with oral or injectable antibiotics and local wound care using hydrogen peroxide and povidone-iodine (betadine) [2-6]. The efficacy of citric acid in the management of wound infections caused by a variety of bacterial pathogens [2-3] and the efficacy of acetic acid in the management of wound infections caused by Gram negative bacteria and *Pseudomonas aeruginosa* in particular have been proved beyond doubt [4]. As compared to citric acid and acetic acid, boric acid has not been extensively investigated as a topical antiseptic agent in the management of wound infections. Although boric acid has potential to be a good topical antiseptic agent, it has been mostly overlooked, rarely investigated for its potential as topical agent and rarely reported.

Use of boric acid in a concentration of three percent as a topical antiseptic agent to treat local Pseudomonal wound infection has been first reported by Kujath and Hugschaffner in 1987 [7]. Their study reported that three percent boric acid has a potential to treat local Pseudomonal wound infections effectively without any toxic side effects. Adarchenko et al. [8] has also reported boric acid to be better antiseptic agent as compared to other agents, against clinical isolates of *P. aeruginosa*. In other studies, three percent boric acid has been reported to be efficient alternative in the treatment of deep wounds with loss of substance, but it has been reported to be delicate to handle because of its toxicity [9,10].

The results of various earlier studies show that boric acid is not readily absorbed through the intact skin. However, it is rapidly absorbed through damaged skin and wounds especially through granulation tissue. It has been reported to cause moderate irritation of skin and mucous membranes. The effects of boric acid intoxication are manifested most frequently at the site of application and in the brain, kidneys and liver [11].

In a recent systematic review on efficacy of boric acid in the treatment of chronic suppurative otitis media (CSOM), boric acid was found relatively effective in the treatment of CSOM, especially at the higher concentration [12]. However, some animal studies show that boric acid has ototoxic potential [13], especially four percent boric acid solution prepared in 70% alcohol was found to have toxic effects [14]. Although four percent boric acid solution prepared in saline or distilled water was found safe in comparison of four percent boric acid prepared in 70% alcohol, the review results conclude that the ototoxicity of boric acid solution in a concentration higher than four percent needs further evaluation [12].

In view of controversial results of earlier studies on local application of boric acid, especially in view of its toxicity, it is difficult to confirm the boric acid as a potential alternative as a topical antiseptic agent in the treatment of wounds, burns, and other skin and soft tissue infections. The results of earlier studies are not in favor of boric acid as an effective topical antiseptic agent and suggest for further systematic studies on antimicrobial effects of boric acid in vitro and in vivo, studies on its side effects /adverse reactions on skin and granulation tissue, cells involved in the process of wound healing and the process of wound healing in general.

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