

Hydrotherapy in burn care: Pros, cons and suggestions

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ABSTRACT

Hydrotherapy represents the use of water for medical purpose, being involved in burn wound care since the 17th century. Burn wound cleansing, performed daily, twice a day, or as needed, as part of standard care, should be scheduled by a burn surgeon and supervised by proper specialists. It can be performed by various methods, like shower, immersion, bedside irrigation or wiping. Due to the high risk of cross-contamination, immersion is no longer recommended. Tap water seems to be superior to saline solution in burn wound care, and adjuvants can be added, especially chlorhexidine, povidone-iodine, or special detergents. Disposable plastic sheets use during showering and the following of cleaning protocols for washing areas have decreased the risk of infection. Apart from the wound-cleansing role, hydrotherapy reduces itching and pain, improves wound healing, favours early mobilization and increases patients' comfort. Controversy persists around the optimal method and appropriate solutions for cleaning burn injuries and clinical studies are further required to solve this matter. In the absence of standardized recommendations, most burn centers are guided by experience.

Keywords: hydrotherapy, burn care, burn wound, cross-contamination, wound healing

BACKGROUND

Despite advances in burn care that have been made in the last fifty years, infections continue to be the main complication and leading cause of death in these patients and retractile scars impair the life quality, being associated with persistent pain [1, 2]. In addition to the fact that infected post-burn wounds are very difficult to heal, they can also cause systemic infections, which have a negative impact on the outcome of patients with severe burns [3,4]. In order to limit these impediments, over the years, hydrotherapy has been proposed for the management of burn patients. There are various opinions for and against this practice, which will be discussed in the present article.

Hydrotherapy represents the use of water for medical purpose, being involved in burn wound

care since the 17th century [5,6]. In Burn Units, there are designated rooms for this procedure. Every burn center has its own routine regarding wound cleansing, which can be performed daily, twice a day or, as needed, depending on the association with other topical treatments [7,8].

Burn wound cleansing is part of standard care and can be performed using various methods, like shower, immersion in bathtubs, immersion followed by a shower, bedside irrigation or bedside wiping [9]. It is mainly realized using tap or sterile water, in association with cleaning solutions like regular soap, special detergents, chlorhexidine or povidone-iodine [10]. These solutions can be harmful to the healing process and should be carefully chosen depending on the type, grade and localization of burns [7].

Fernandez et al. emphasized in a systematic review that tap water is more effective than a saline solution in reducing the infection rate in adult patients with burns. At the same time, if potable tap water is unavailable, boiled and cooled water or distilled water can be safely used to clean burn wounds [11]. Regarding the use of Chlorhexidine, Abdel-Sayed et al. showed its role in the topical management of infections with resistant organisms due to a large spectrum of action, such as preventing or treating infected burn wounds. The effects on burn injury healing and reepithelization promotion are still controversial and need further studies [12].

Pros – The purpose of hydrotherapy

As we emphasized before, the first role of hydrotherapy is burn wound cleansing, through lesions decontamination (reduces microbial burden), especially as showers (specialized shower systems) during normal patient care [9, 13]. It improves the burn wound surface through cleaning, pus drainage and separation of healthy skin from eschars [14].

Over time, hydrotherapy was associated with wound healing promotion, softening of the burn wound and new tissue formation through removing dead cells. It can minimize scar development and create a proper moist environment for wound healing [15, 16]. As adjuvant therapy, it promotes early mobilization and increases patients' comfort and quality of life [14].

Recent guidelines showed the important role of hydrotherapy in standard burn care. It can relieve itching, ameliorate persistent pain, and appears to improve patients' cardiopulmonary function and range of motion, favouring rehabilitation [17].

Apart from the cleansing role of hydrotherapy, it can be used in the rehabilitation phase after important burns, leading to the improvement of retractile scars by obtaining a uniform wound structure, skin color, viscoelastic properties, decreasing the pruritus and pains intensity [18].

Cons – The risks associated with hydrotherapy

Hydrotherapy through immersion is responsible for cross-contamination and bacterial resistance development, due to equipment contamination [19, 20]. Therefore, this practice has been replaced by showering and bedside irrigation or wiping. At the same time, the use of disposable plastic sheets and the establishment of cleaning protocols for washing areas have resulted in a decreased risk of infection [21]. The movement of patients up to the hydrotherapy room can be associated with cross-contamination [22].

A recent study published by Ziwa et al. showed that the use of hydrotherapy (traditional bathtubs,

without shower trolley or disposable materials) increases the wound bacterial load, promotes infection (and cross-infection), and sepsis development, which leads to the development of resistant microorganisms (mainly *Staphylococcus aureus* and *Klebsiella pneumoniae*). It confirms previous findings that only decontamination of regular bathtubs is not enough [16].

Hydrotherapy may be associated with other risks, apart from an infection, such as plasma electrolyte disturbances, especially hyponatremia [6]. Due to the lack of skin barrier, reports show that burn patients may absorb water and can further develop tissue edema [23, 24].

Suggestions – Current recommendations

There is no current standard recommendation regarding the use of daily hydrotherapy in burn patients. Due to the previously mentioned risks, namely infection transmission, there are authors that do not consider it as part of normal routine care [25].

The use of disposable plastic sheets for the shower trolley decreases the potential risk of bacterial transmission through surfaces, as shown in a study by Akin S. and Özcan M. [21]. Immersion hydrotherapy in bathtubs is no further considered a proper option [9]. The use of simple equipment, easy to clean, with removable stretchers, plastic-covered chairs and shower nozzle for water delivery are of vital importance in infection prevention. The bathtub has only the role of water drainage [23].

In a recent report, McKew et al. showed the efficacy of using aerosolized hydrogen peroxide in cleaning high-risk devices and rooms (bathrooms, shower trolleys, shower chairs etc.) in Burn Units, after normal detergent cleaning, reduces, but do not neutralizes, the contaminated surfaces [26].

According to a guideline for burn rehabilitation, hydrotherapy must follow some specific steps as presented in Figure 1, in order to avoid the risk of complications [17].

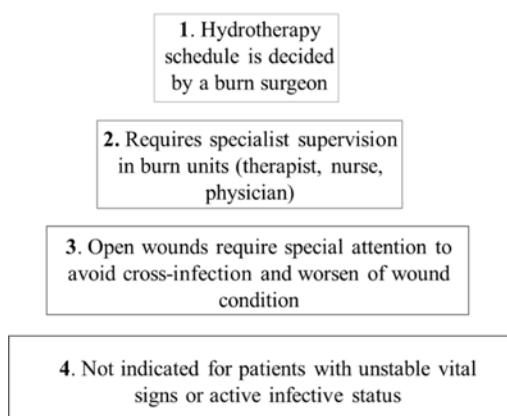


FIGURE 1. Guideline recommendation for proper hydrotherapy use

As presented by Langschmidt et al. in a survey regarding hydrotherapy practice among specialists in UK and Ireland, although it is used nationwide and plays an important role in burn patients' management, there is variation among practices due to the lack of structured guidelines [27].

CONCLUSION

Controversy persists around the optimal method and appropriate solutions for cleaning burn injuries, and clinical studies are further required to

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