Cleansing chronic wounds with tap water or saline: a review

Wound cleansing has been a controversial topic for many years. Various solutions such as tap water, boiled water, distilled water, sterile saline and Povidone-iodine have been recommended for cleansing wounds, although normal saline is favoured as it is an isotonic solution and does not interfere with the normal healing process. On the other hand, tap water is also an effective wound cleansing solution and has advantages of being cost effective and easily accessible. Wound cleansing in many areas of nursing is often carried out ritualistically rather than by adopting an evidence-based approach and nurses do not always think about why a certain fluid is used. In Slovenia it has become common practice to clean wounds with tap water but is this the best practice? Some practitioners advocate that cleansing with tap water is better than with saline for healing and has economic benefits, others say that there is no difference in infection rates or healing with either solution. The purpose of this review is to establish if there is any difference in healing and infection rates when wounds are cleaned with tap water instead of sterile saline.

Method
An electronic literature search using the key words chronic wounds, wound cleansing, tap water and saline was undertaken.

Results: Results showed that there was no increase in infection or in wound healing rates between patients whose wounds were cleaned with tap water or sterile saline. Tap water may be as safe and effective as sterile saline but only when the water comes from the properly treated supply and used at body temperature.

Conclusion: Some evidence suggests that the use of tap water of drinkable quality appears to be a safe alternative to sterile saline, and that there are numerous benefits in its use.

Key words:
Tap water versus saline
Wound infection
Community wound care

Wound cleansing with tap water or saline
Wound cleansing is technically defined as the use of fluids to remove loosely adherent debris and necrotic tissue from the wound surface and its purpose is to create optimum conditions at the wound site for uncomplicated healing. Cleansing methods often differ among individual health care providers, institutions, and facilities, and are often based on individual experiences and personal preferences. The literature suggests that the use of aseptic technique in wound management is an out-dated and ritualised practice. The use of tap water for wound cleansing is described as using the clean technique. In community practice, nurses often use tap water as a wound cleanser because it is easily accessible, inexpensive, is chlorinated and has been used throughout the years for minor injuries in homes around the world.

Main results
A summary of the studies reviewed is presented in Table 1. The systematic review by Fernandez, Griffiths and Ussia included 11 RCT’s and quasi RCT’s that assessed wound healing outcomes and infection rates in acute and chronic wounds after cleaning with tap water compared to sterile saline in healthcare settings (hospital, community, nursing homes, general practice, wound clinics). The studies included adults and children. Results showed that there was no increase in infection rate or in wound healing in patients who had wounds cleaned with tap water. In three trials in adult patients, the infection rate was reduced with tap water. In all studies, the tap water was at body temperature and the normal saline at room temperature.

The authors concluded that tap water may be as safe and effective as sterile saline but with certain conditions, namely that practitioners should take into account:
- the quality of water
- the nature of wounds
Table 1: Reviewed literature

<table>
<thead>
<tr>
<th>Title of study</th>
<th>Types of study</th>
<th>No of patients included</th>
<th>Types of wounds</th>
<th>Main findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water for wound cleansing</td>
<td>Systematic review</td>
<td>Ranged between 35 - 770</td>
<td>Lacerations, open fractures, chronic wounds, surgical wounds</td>
<td>There is no evidence that tap water increases infection rates as compared to sterile saline. The use of tap water is not recommended in a country where potable drinking water is not available. Tap water is cost-effective.</td>
</tr>
<tr>
<td>Effectiveness of solutions, techniques and pressure in wound cleansing</td>
<td>Systematic review</td>
<td>Ranged between 35 - 617</td>
<td>Lacerations, postoperative wounds, chronic wounds</td>
<td>There is no difference in the infection and healing rates in acute and chronic wounds cleansed with tap water or normal saline.</td>
</tr>
<tr>
<td>Is tap water safe alternative to normal saline wound irrigation in the community setting?</td>
<td>Double-blind randomised controlled trial</td>
<td>49</td>
<td>Acute and chronic wounds</td>
<td>Drinkable tap water appears to provide a safe alternative and there was no significant difference between the infection and healing rates.</td>
</tr>
<tr>
<td>Wound cleansing: water or saline?</td>
<td>Meta-analysis</td>
<td>Ranged between 35 - 770</td>
<td>Surgical wounds, lacerations, open fractures, chronic wounds</td>
<td>Potable tap water may be as safe and effective as sterile saline.</td>
</tr>
<tr>
<td>Tap water cleansing of leg ulcer in the community</td>
<td>Evidence-based practice</td>
<td>388</td>
<td>Leg ulcers</td>
<td>From own clinical practice, authors concluded that both tap water and saline are acceptable cleansing solutions with the proviso that they have been warmed.</td>
</tr>
<tr>
<td>Is tap water a safe alternative to normal saline for wound cleansing?</td>
<td>Literature review</td>
<td>Ranged between 46 - 705</td>
<td>Lacerations, acute wounds, chronic wounds</td>
<td>The literature analysis does not provide any definitive answers and there is a need for further studies to examine whether tap water is safe for cleansing wounds.</td>
</tr>
<tr>
<td>Examining the literature on using tap water in wound cleansing</td>
<td>Literature review</td>
<td>Ranged between 35 - 817</td>
<td>Acute wounds, lacerations, surgical wounds, chronic wounds</td>
<td>The use of tap water is a viable option for cleansing traumatic and chronic wounds.</td>
</tr>
</tbody>
</table>

- the patient’s general condition, including the presence of comorbidities that compromise immune function.

The same conclusion was reached by the same authors in an earlier systematic review about effectiveness of wound cleansing solutions, techniques and pressure used in the prevention of infection and promoting wound healing. Four studies of 14 RCTs comparing the infection rates in wound cleansing with tap water and normal saline in adults and children were identified. The studies evaluated patients in hospital emergency departments, wards and community settings. The trial undertaken in the community setting was a comparison of the effects of tap water and normal saline on the healing and infection rates of acute and chronic wounds in community. The small sample and study limitation of this trial precludes the generalisability of the findings to other community settings. However, the researchers conclude that there was no significant difference between the infection and healing rates in wounds cleansing with normal saline and tap water and that tap water appears to provide a safe alternative.

To establish wound management practice based on evidence, the Australian Community Nursing Organisation undertook a pilot research project on cleansing chronic leg ulcers with tap.
water in the community. They compared two groups in three regions, the only difference in treatment between them being the solution used for cleansing (tap water or saline); the main identifier for noting difference was the presence of infection. The researchers noted that washing with tap water, either showering or pouring water on the leg, assisted with the removal of dry skin and that the patients felt better after washing their whole leg, not only the wound bed. They also found that it is almost impossible to find a homogeneous group of patients with leg ulcers because of variations in age, gender, aetiology of ulcer and comorbidities. Problems arose also in documenting, as some information about interventions was not recorded. In addition, in some instances, nurses used a different solution from that agreed. They concluded that project did not generate any findings related to whether one cleansing solution was preferred for wound management of leg ulcers in the community. From their literature review and their own clinical practice, they also concluded that both tap water and saline are acceptable cleansing solutions with the proviso that they have been warmed.

In a literature review of randomised and quasi-randomised controlled trials Magson-Roberts tried to determine if tap water is safe alternative to normal saline for wound cleansing in the community setting. The author concluded that the review of the literature does not provide any definitive answers and there is a need for further controlled and comparative studies to examine whether tap water is safe for cleansing wounds.

Patel cites Flanagan who argues that prior to the use of saline, tap water had been used for centuries in the cleansing of wounds and that as long as the water comes from a properly treated supply and the tap is run for a few minutes prior to use, fears of bacterial contamination appear to be unfounded. The same author also concluded that patients can cleanse wounds with water as a part of a normal hygiene routine, as long as wounds are not soaked for long periods.

Limitations

The limitation of this review is that sparse evidence is available to support the practice of using tap water as a viable option for wound cleansing. Much of the evidence on wound cleansing appears to be based on expert opinion rather than scientific study, and published studies are not always of good quality.

Conclusion

Despite significant progress in wound care technology in recent years, little attention has been directed to the use of cleansing solutions. There is limited research available on the use of tap water as option for wound cleansing.

The evidence showed that there is insufficient evidence to either support or refute the claim that tap water is comparable or superior to normal saline. On the other hand, some evidence suggests that the use of tap water of drinkable quality appeared to be an acceptable, especially in the community, for the cleansing of chronic wounds and that there are numerous benefits in its use, including that it is readily available and can have psychological effects on patient’s well-being and heal associated with cleanliness. Water irrigation may cause damage to delicate granulation and epithelialising tissue and patients may experience greater pain and discomfort.

My conclusion after reviewing this literature is that the use of tap water is as effective and as normal saline for cleansing acute or chronic wounds because no differences were noted in the rates of infection and healing between these two solutions. Tap water is cheaper than normal saline.

Recommendation for practice

Tap water is a commonly used wound cleansing agent not only in the community but also within hospital settings; however, published guidelines give few details about the use of tap water.

If water or saline is used it should be at body temperature as it can take 40 minutes for a wound to return to normal temperature after cooling. In practice nurses, should warm a cleansing solution to between 37°C and 42°C to help minimise loss of wound temperature and to maintain an optimum wound healing environment. Nurses must be able to identify the most appropriate solution to use, as this is part of their accountability.

However, the decision to use tap water for cleansing wounds should take into consideration the quality of tap water, comorbidities that compromise immune function of the patient, and the extent and nature of the wound. All the studies reviewed were conducted in countries with developed water systems. Water quality may influence outcomes, meaning that population living in places where the quality of tap water is poorer may have different outcomes. In these it would be necessary to use boiled or distilled water for wound cleansing.

Further research is needed to truly draw any conclusions, and randomised controlled trials are needed to determine the effectiveness of different solutions used for wound cleansing among various populations and settings to compare the cost-effectiveness. Clinical guidelines and protocols need to be developed or updated to ensure that they are based on expert opinion and available research.

References


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