Journal Club Summary

# Background and Overview

Article Title/Citation:

Weiss EA, Oldham G, Lin M, Foster T, Quinn JV. Water is a safe and effective alternative to sterile normal saline for wound irrigation prior to suturing: a prospective, double-blind, randomized, controlled clinical trial. BMJ Open. 2013 Jan 16;3(1). [PMID: 23325896](https://www.ncbi.nlm.nih.gov/pubmed/23325896)

Study Objectives/ Purpose/Hypothesis:

Objective: To determine if there is a significant difference in the infection rates of wounds irrigated with sterile normal saline (SS) versus tap water (TW), before primary wound closure.

Hypothesis: That water is both a safe and effective wound irrigant.

Brief Background/Why Chosen for Journal Club:

Traumatic wounds are the second most common reason individuals seek medical care, with emergency departments (EDs) treating an estimated 11 million traumatic wounds each year in the USA. The most common and serious complication of a traumatic wound is infection. Wound irrigation is the most important step in reducing the risk of infection. The function of irrigation is to remove loose, devitalized tissue; particulate matter and bacteria from within the wound. Most EDs currently use sterile normal saline (SS) to irrigate wounds prior to closure, even though there is a paucity of scientific evidence to support its use as an irrigation fluid. Further, other studies have demonstrated that more expensive solutions such as antiseptics (1% povidone-iodine, hexaclorophen, isopropyl alcohol and cefazolin) and non-ionic detergents (pluronic F-68 and polaremer 188) provide no advantage over SS. Tap water (TW) may be the ideal irrigation fluid because it is readily available and it is less expensive than SS.

# Methods

Study Design & Methodology:

(type of study [eg case control, randomized], blinding, controls, study length, etc.)

Design: Single centre, prospective, randomized, double-blind controlled trial. Wound irrigation solution type was computer randomized and allocation was done on a sequential basis.

Patient Selection & Enrollment:

(inclusion & exclusion criteria, sample size, etc.)

Participants: Patients older than 1 year of age, who presented to the emergency department with a soft tissue laceration requiring repair, were entered into the study under informed consent. Exclusion criteria included any underlying immunocompromising illness, current use of antibiotics, puncture or bite wounds, underlying tendon or bone involvement, or wounds more than 9 hold.

Interventions:

(if applicable)

Interventions: Non-caregivers used a computer generated randomization code to prepare irrigation basins prior to treatment. Patients had their wounds irrigated either with TW or SS prior to closure, controlling for the volume and irrigation method used. The patient, the treating physician and the physician checking the wound for infection were all blind regarding solution type. Structured follow-up was completed at 48 h and 30 days to determine the presence of infection.

Outcome Measures/Endpoints:

Main outcome measures: The primary outcome measured was the difference in wound infection rates between the two randomized groups.

Statistical Analysis:

Categorical variables were compared using a χ2 test and continuous variables were compared with an independent samples t test, with reporting of 95% CI.

# Results

Enrollment & Baseline Characteristics:

The study population consisted of consecutive patients older than 1 year of age, who presented to the ED with an uncomplicated soft tissue laceration requiring repair. Patients had to provide a telephone number for follow-up in order to be enrolled in the study. Exclusion criteria included any underlying immunocompromising illness (eg, diabetes mellitus, chronic alcoholism, asplenism, primary immune disorder, steroid use or chemotherapy), current use of antibiotics, puncture or bite wounds, underlying tendon or bone involvement, or wounds more than 9 h old.

Summary of Primary & Secondary Outcomes:

(primary versus secondary analyses)

The primary outcome for this study was the difference in wound infection rates between the two randomized groups. Wound evaluation was based on the following criteria: (0) no evidence of infection, (1) simple stitch abscess, (2) surrounding erythema less than 1 cm, (3) surrounding erythema greater than 1 cm or lymphangitis, (4) gross exudate, (5) fever greater than or equal to 38°C and (6) others. A wound was classified as infected if it received a rating of 1 or higher.

Review of Figures & Tables:

CONSORT flow diagram was created for the trial.

# Author’s Discussion and Conclusions

Brief Summary of Main Discussion Points:

This is the largest single-centre trial to validate TW as a safe and effective wound irrigant. It is the only study that was double-blinded and controlled for irrigation technique, pressures and solution volumes.

Conclusions:

There is no difference in the infection rate of wounds irrigated with either TW or SS solution, with a clinical trend towards fewer wound infections in the TW group, making it a safe and cost-effective alternative to SS for wound irrigation.

# Your Discussion and Conclusions

Accept/Decline Author’s Conclusions:

Accept

Study Strengths:

The strengths of the study are its randomized design, control for technique of irrigation and volume of irrigant, successful blinding, relatively large number of subjects and the fact that very few were lost to follow-up.

Study Limits:

(eg bias)

A limitation of the study is that the primary measured outcome of wound infection was determined by subjective indicators of infection, such as erythema or gross exudate. Given the nature of the study, more objective measures such as bacteria counts, wound cultures or wound biopsy were not practical.

Generalizability/

Implications:

(healthcare providers and specifically at Vanderbilt)

TW has both economic and environmental advantages over SS as a wound irrigant. TW is much less expensive than SS and is more readily available. At our institution, the cost of a 500 ml bottle of SS is $0.75; the patient charge is in excess of $10. With the number of lacerations treated each year, the use of TW could generate annual savings of $7.5 million for the hospitals and $100 million for patients. Irrigating accessible wounds directly under a faucet could result in additional cost savings by eliminating the need for sterile bowls, syringes and catheters. Others have investigated this technique and found equivalent rates of wound infections using TW as compared with SS for irrigation.

Next Thoughts/New Questions:

(brought up by this study)

None.

Q&A/Discussion

None.