



COMPARISON OF THE EFFECTIVENESS OF TRADITIONAL SALINE DRESSINGS AND ACETIC ACID DRESSINGS ON CHRONIC WOUNDS INFECTED WITH PSEUDOMONAS AERUGINOSA

Surgery

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KEYWORDS

Pseudomonas, Chronic wound, Acetic acid

INTRODUCTION:

Chronic wounds are wounds that persist and do not respond to treatment. One of the most common bacteria in chronic wounds is *Pseudomonas aeruginosa*, which is a serious bacterial problem because it is resistant to many antibiotics. *Pseudomonas aeruginosa* is a common hospital acquired pathogen and can cause local complications during treatment due to its many characteristics such as biofilm formation, increased virulence, and multidrug resistance. Unfortunately, we rely on first-generation antibiotics and third generation cephalosporins, aminoglycosides, etc. Due to increasing resistance to the disease, other methods are needed.

This study will compare the effectiveness of acetic acid dressings and conventional dressings in chronic wounds infected with *Pseudomonas aeruginosa*.

The mechanism of resistance in *Pseudomonas aeruginosa* can be attributed to the following processes: impermeability, active efflux, target modification, Non-enzymatic methods. These bacteria also acquire additional resistance mechanisms through metallo-beta-lactamase (MBL)-mediated resistance, exhibiting carbapenem resistance. In wounds infected with *Pseudomonas aeruginosa*, these bacteria form biofilms that release many toxins when neutrophils are attracted to them. These toxins prevent phagocytosis and cause oxidative stress, which delays the physiological process of wound healing and inhibits wound healing by activating the inflammatory response.

Acetic acid has a bactericidal effect on many bacteria, especially *Pseudomonas aeruginosa*. It can be used topically against *Pseudomonas aeruginosa* at a concentration of 0.5 - 5% and has been shown to be effective in eradicating *Pseudomonas aeruginosa*. Its acidic nature will neutralize the electrochemical potential and reduce the pH value of the wound.

It can also increase microcirculation of the wound, thereby improving wound healing by creating healthy granulation tissue.

All patients experienced improvement within 7 to 14 days after treatment.

The use of acetic acid at the points mentioned above may provide another alternate to conventional antibiotics in elimination of organism. Thus, it helps heal wounds, reduce pain and provide local control.

AIMS AND OBJECTIVES:

The purpose of this study was to compare the effectiveness of saline dressing and acetic acid dressing on chronic wounds infected with *Pseudomonas aeruginosa*.

MATERIALS AND METHODS:

This is an open-label, prospective, randomized controlled study.

Inclusion criteria:

All patients with chronic wounds infected with *Pseudomonas aeruginosa*

Exclusion criteria:

- Massive burns

- Patients with weakened immune systems
- Patients who did not give consent

This study was conducted in department of general surgery (inpatient and outpatient).

The research period is between September 6, 2022 to September 10, 2023.

20 people with chronic wounds infected with *Pseudomonas aeruginosa* (culture proven) participated.

Written informed consent was obtained from the patients

All patients were given routine antibiotics orally and/or parenterally according to culture sensitivity.

Wound culture sensitivity was measured on days 0 and 10. All patients were followed for 10 days and culture data were examined.

According to simple randomization, patients were divided into two groups: experimental group and control group.

Test group: 10 people

Control group: 10 people

Test group : (3% AA)

This group received 3% acetic acid dressing. 3% acetic acid was taken in a sterile container and sterile gauze was soaked in it. After thorough cleansing of the wound with saline, 3% acetic acid is placed over the wound and gamgee pad was placed over it and wound dressed. This was done twice daily for 10 days and wound culture sensitivity was sent on 10th day.

Acetic acid preparation: 3% acetic acid was prepared by titrating 100% Glacial acetic acid with distilled water

Control group : (SD)

Normal saline dressing is applied to this group as a sterile precaution; flush the patient's wound thoroughly with normal saline and place a sterile gauze over the raw area following which gamgee pad was placed and wound dressed and wound culture sensitivity was sent on 10th day

The effectiveness of 3% acetic acid in eradicating *Pseudomonas aeruginosa* - infected chronic wounds was evaluated by examining day 10 wound culture reports for all patients in both groups.

RESULTS:

- Complete elimination of *Pseudomonas aeruginosa* was observed in 14 individuals in the 3% acetic acid-treated group compared to 6 individuals in the control group (treated with normal saline).
- 70% of individuals were male; prevalence in the experimental group compared with 65% in the control group. The most affected people are people aged 40-70 years
- In 88% of the people in the test group, the infection was completely eliminated by using acetic acid dressing
- 63% of individuals in the control group achieved microbial eradication using saline products
- The acetic acid group required an average of 7 days less healing

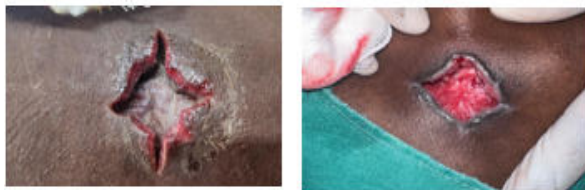
time than the control group to remove *Pseudomonas* from the wound.



Images of S/p Ray's amputation ulcer- with 3 % acetic acid dressing



Images of circumferential ulcer S/p wound debridement for Necrotizing Fasciitis- with 3% acetic acid dressing



Images of S/p Incision and Drainage for carbuncle over upper back- with 3% acetic acid dressing.

CONCLUSION:

3% acetic acid is a simple, safe and effective topical antiseptic that can be used to destroy *Pseudomonas aeruginosa* in chronic wounds. The main advantage is that acetic acid is easily available and is a good disinfectant. Provides a commercial alternative for loco regional control of wound infections caused by multidrug-resistant *Pseudomonas*.

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