

TURMERIC EXTRACT AND SALT FOR WOUND HEALING PROCESS

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Abstract

Turmeric is an herbal plant that is believed to accelerate the wound healing process. Scientifically, turmeric has been proven to have anti-inflammatory and antibacterial effects. This study aimed to determine the effectiveness of turmeric extract and salt on wound healing. This was experimental study. Experimental animals were divided into two groups, each group consisted of five white rats, each group was given treatment using (turmeric extract with salt and Normal Saline solution). The data were analyzed by using the Statistical Product and Service Solution Program (analysis of variance, Wilcoxon). This study showed that there were significant differences in the intervention group and the control group ($P < 0.05$). However, The Mann withney test showed that there are the same results between the treatment group by Turmeric and Salt Extract (TSE) with the control group by Normal Saline Solution (NSS) and also showed that both treatments has the same function in accelerating wound healing process. There is a strong effect of using TSE treatment in wound care for wound healing process on white rats.

Key word: Turmeric and salt extract, Normal Saline Solution, wound healing process

Introduction

Wound is the loss or destruction of part of the body's tissues. This situation can be caused by sharp or blunt trauma, temperature changes, chemicals, explosions, electric shocks or animal bites [1] Wound can be distinguished based on the etiology, such as abrasion, cut, laceration, stab wound, bite wound, and burn. Meanwhile, based on contamination, there are clean wound, clean

contaminated wound, contaminated wound, and dirty or infected wound [2]

The incidence of injuries is increasing year by year, both acute and chronic wounds. A study conducted in America showed the prevalence of patients with wound as much as 48% surgical or traumatic wound, 28% foot ulcer, and 21% pressure sore [3]. In 2009, a Wound Association in America conducted a study on the incidence of wound in the world. Data obtained 110.30 million

cases of surgical wound, 1.60 million cases of trauma wound, 20.40 million cases of abrasion, 10 million cases of burn, 13.50 million cases of diabetic ulcer, 0.20 million cases of amputation per year, 0.60 million cases of carcinoma per year, 0.10 million cases of melanoma, and 0.10 million cases of skin cancer complications [4]

The prevalence of injured patients in Indonesia according to the Ministry of Health of the Republic of Indonesia in 2013 was 8.2% with the highest number found in the province of South Sulawesi, namely 12.8% and the highest type of wound experienced by the Indonesian population was abrasions at 70.9%. The most common etiology of injuries is falling as much as 40.9%, then followed by motorcycle accidents as much as 40.6% [5]

The body has a physiological function in the wound healing process. The wound healing process that occurs in damaged tissue can be divided into three phases, namely the inflammatory phase, the proliferative phase and the maturation phase which is tissue remodeling [6]. Appropriate wound care can help the wound healing process. Washing the wound is the first step in wound care. Wound cleaning is done to reduce contamination of the wound and prevent infection. Scratches and scars can be cleaned with running water, warm water and antiseptic liquid. Meanwhile, stab and bite wound need to be cleaned more optimally to remove toxin or microbe that may be present in the wound [7].

Furthermore, the cleaned wound is debrided to remove dead or necrotic tissue. After that, the wound is covered with gauze in this process, better known as the dressing process. Wound dressing is also one of the things that can affect the wound healing process. The model or type of dressing is divided into modern dressings and traditional dressings.

A Modern dressing is a method of wound care in a closed and moist way that is focused on keeping the wound from dehydration and improving the wound

healing process [8]. The Modern dressing that have been developed are made of synthetic polymers and are classified as passive, interactive and bioactive products), in the form of hydrocolloids, alginates, hydrogels, films, and foams [8]. A Modern dressing containing antimicrobial have been developed since the last twenty years, which effectively kill bacteria and fungi in wound, and also prevent recurrent infections during healing process [9].

While traditional dressing is one way of treating wounds by using natural ingredients such as medicinal plants and honey in the wound healing process. Some of people in Indonesia are using turmeric and salt in covering their wound. People believe that turmeric and salt water can improve the wound healing process. Previous study showed that turmeric extract can accelerate the wound healing process [10]. However, there are no studies that explain the effectiveness of turmeric and salt extract to accelerate wound healing process. This study aimed to analyse the effect Turmeric and Salt Extract in wound healing process.

METHOD

This is experimental study with post test only control group design. This study used white rats which divided into two groups, namely the TSE as the treatment group, and NSS as the control group.

The materials used in this study were turmeric rhizome, salt water and 96% ethanol. Turmeric rhizome as much as 3000 grams, washed and cleaned by running water to remove impurities in the turmeric. The clean turmeric rhizome is sliced or chopped and dried for three days. The dried simplicia was then blended into powder. Turmeric powder as much as 200-300gr, then macerated using 96% ethanol solvent and two liters of salt water for 3-5 days and stirred periodically. Then the filtering process was carried out after the dregs obtained in the filtering process were soaked again using 96% ethanol and a liter of salt water. After the filtrate was obtained, an evaporation process

was carried out to obtain an ethanol extract of turmeric and salt.

RESULTS

Table 2.1 Wilcoxon Test Results for Healing Cuts in the Treatment Group (TSE)

Group	N	Mean	SD	P value
Treatment	5	3	.548	.038

The Wilcoxon test for wound healing in the treatment group showed a significant P-Value of 0.038 less than 0.05. It can be concluded that there is an effect on wound healing in the treatment group before and after intervention.

Table 2.2 Wilcoxon Test Results for Healing Cuts in the Control Group (NSS)

Group	n	Mean	SD	P value
Control	5	3	.548	.038

The Wilcoxon test for wound healing in the control group showed a significant P-Value of 0.038 less than 0.05. It can be concluded that there is an effect on the wound healing in the control group before and after intervention.

Table. 2.3 Comparative Results of the Mann Whitney Test of Cut Wound Healing in the Treatment Group and the Control Group.

Group	n	mean	SD	P value
Treatment	5	4,40	.516	1.000
Control	5	4,40	.516	1.000

The Wilcoxon test for wound healing in the Treatment and Control groups showed a significant P-Value 1,000 greater than 0.05, so it can be concluded that there was no difference in the results of wound healing in

the Treatment and Control groups after being given treatment.

Table 2.4. The results of the measurement of the average change in wound length (cm)

Day	TSE	NSS
1	2 cm	2 cm
3	2 cm	2 cm
5	1,32 cm	1,32 cm
7	0,82 cm	0,84 cm
9	0,3 cm	0,38 cm
11	0 cm	0 cm

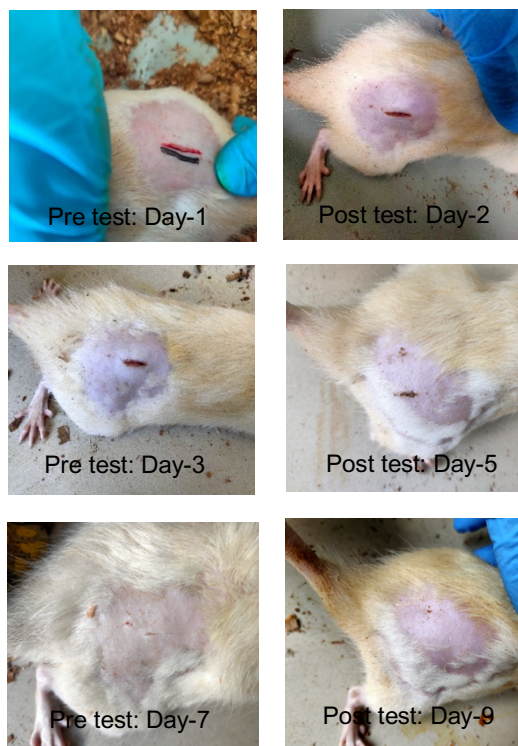


Figure 1. Wound healing process on intervention group (TSE)

It can be seen that the time (days) needed for both groups of white rats to close their wounds completely. In the table, it can be seen that all rats for the treatment group and control group experienced complete wound closure on day 11th.

DISCUSSION

TSE Intervention Group

The results of this study stated that the healing of cuts at the beginning and at the end of using TSE was significant. Because turmeric contains curcumin which can accelerate wound healing, curcumin can increase re-epithelialization, suppress inflammation, increase tissue collagen density and increase the proliferation of fibroblasts (Partomuan, 2009). in combination with salt containing elements of sodium and chlor NSS, the benefits of salt for wounds

when this saline solution is given to the wound, these ions will regulate the pressure of the cells around the wound. The pressure is set in such a way that the liquid will not escape from the cell. This causes the wound to dry quickly. In addition to drying the wound, salt can also kill bacteria that attack the wound especially staphylococcus and streptococcus bacteria [11]

The ingredients in turmeric and salt have a role in the wound healing process as well as antibacterial, including curcumin which can increase re-epithelialization, suppress inflammation, increase tissue collagen density and increase the proliferation of fibroblasts [12]. So that TSE are effective for wound healing in rats. It can be related to the results of research that this treatment has a significant effect. This is also supported by previous study showed that turmeric extract can accelerate the wound healing process [13], and another study aslo showed that turmeric extract in the form of an effective ointment for wound healing [14].

NSS Control Group

The results also showed that the wound healing at the beginning and at the end of using NSS was significant. It caused that NSS as a control group is also effective in healing acute wound. NSS is an effective physiological fluid for wound care by maintaining moisture, keeping granulation

dry so that the wound remains in a balanced state, which is neither dry nor wet [15].

The content and benefits of NSS can accelerate the wound healing process. So that NSS is effective in healing cuts in rats, this can be related to the results of research that this treatment has a significant effect.

Comparison of TSE and NSS

This study showed that the comparison of wound healing at the beginning and end of using TSE with the control group (NSS) was not significant. This is because there was an error in determining the type of wound. Actually, type of wound chosen should be an infectious incision in order to the difference between the two treatments can be seen. Although the results are not significant, it does not mean that TSE not effective in wound healing. Clinically, the use of TSE is effective in wound healing because of same or equivalent with NSS which has been proven to be effective for wound healing.

NSS as a control group is also effective in acute wound healing. According to previous study state that NSS 0.9% is an effective solution to protect skin tear from bacteria [16]. While turmeric extract and salt water contain (curcumin and essential oils) have a role as an antioxidant, antitumor and anticancer, reduce fat and cholesterol levels in the blood and liver, antimicrobial, antiseptic and anti-inflammatory [17]

This study result is not in line with previous study where there was a significant effect of turmeric extract in the wound healing process compared to the control group [18]. the study stated that the number of samples used were 24 male mice which were divided into 4 treatment groups with 5 replications where this study was carried out for 10 treatment days. This is different from research conducted by researchers starting from the type of research sample, the number of samples and the time of observation in the wound healing process until it heals.

In general, the wound healing process is divided into three main phases, namely: the

inflammatory phase, the proliferative phase and the maturation or remodeling phase. The inflammatory phase of this phase occurs after 24-48 hours and in certain circumstances and can increase for 2 weeks [19]. The proliferative phase in this phase is the proliferation of several cells during the recovery process, including the remnants of injured tissue that are trying to restore to normal tissue. The remodeling phase is the final process of the wound healing process. In this phase, collagen synthesis occurs which has already begun in the proliferative phase. Healing or epithelialization occurs without fibroplasia and granulation tissue formation, but in certain circumstances, such as incisional wounds, revitalization can occur in less than 48 hours, while deep wounds are larger so the healing process takes a long time [20]

This study observed until the wound healed, the average cut in rats treated with turmeric extract and salt water with NaCl control were observed every 2 (two) days until the wound healed. Previous researchers described the wound healing process in experimental animals by observing the wound healing process until it healed. The results of this study mean that there is an effect on the 2 (two) treatments.

CONCLUSION

This study prove that TSE can be used for wound care to improve wound healing process. This was preliminary research that only used rats as experiment object. The next study will apply TSE on human as the object study.

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