

Comparison Of Giving Three Types Of Honey On Exudate Weight In The Healing Process Of Acute Wounds In Balb/C Mice

Eko Naning Sofyanita^{1*}

¹Applied Medical Laboratory Technology, Semarang Health Polytechnic
¹en.sofyanita@gmail.com

ABSTRACT

A wound is an injury where the skin is torn, cut or punctured, or a blunt force trauma causes a contusion. The use of honey as a wound treatment has been widely used, but the comparison of accelerated wound healing using three types of honey originating from Indonesia is not yet known. From the results of the study that on days 1 to 7 the MD-NTT group could reduce exudate weight better than the MD-JW, MD-KLM, and K-MD. The conclusion in this study is that the use of honey originating from NTT can be an alternative to healing acute wounds infected with bacteria.

Keywords: Human Rights, Policy, Narcotics

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INTRODUCTION

Wound healing is a physiological process that occurs naturally and dynamically in the body. The wound healing process consists of 4 stages; hemostasis, inflammation, proliferation (granulation, contraction, and epithelialization), and remodeling (Diegelmann et al, 2004). The hemostasis stage will begin when blood components enter the wound area. Platelets will release growth factors and cytokines such as Platelet Derived Growth Factor (PDGF) and Transforming Growth Factor Beta (TGF- β). In the inflammatory phase, neutrophils enter the wound and initiate phagocytosis to remove foreign objects, bacteria, and damaged tissue. Efforts to heal wounds are often made by providing various dressings (wound coverings) such as hydrocolloid, gel, foam and so on. This dressing is a problem in developing countries because the price is not cheap, so as an alternative, honey can be used as a substitute for topical dressings.

Honey is thought to be a good alternative in wound care because of its anti-bacterial, anti-inflammatory and immunostimulatory abilities. This ability cannot be separated from its hygroscopic power, sugar content and also hydrogen peroxide. (Simon, 2009) The activity of honey in healing wounds is also influenced by the characteristics of the honey itself. These differences in activity can be caused by the species of honey-producing bees/wasps, geographical location, surrounding vegetation, and possibly also due to the process of making and storing it (Moore, 2001). The vastness and diversity of vegetation in Indonesia is very likely to cause differences in the effectiveness of honey. This research will specifically use three types of honey originating from several regions in Indonesia, namely Central Java Forest Honey, Kalimantan Forest Honey, Flores NTT Forest Honey. Even though there may be differences in content, honey is generally composed of 40% glucose, 40% fructose, 20% water, amino acids, vitamins biotin, folic acid, pyridoxine, thiamine, diastase invertase enzyme, glucose oxidase, catalase, minerals (Sofyanita, 2019). The results of this research will find out how quickly each type of honey will help wound healing when compared with dressing treatment and without treatment.

METHOD

This research is experimental research. The research was carried out at the Sultan Agung University Laboratory, Semarang. This research. The mice used in this study were 24 mice divided into four groups. All research samples had 2 wounds made on the back skin and were treated with 20 μ l of *S. aureus* bacterial suspension. The control group was treated with bandages (K-MD), the first treatment group was treated with Central Java Forest Honey and bandages (MD-JW), the second treatment group was treated with Kalimantan Forest Honey (MD-KLM) and bandages, and the third treatment group received wound care by administering Flores NTT Forest Honey and bandages (MD-NTT). All samples in the research group underwent daily wound care and the weight of the exudate was weighed.

RESULT AND DISCUSSION

This study used 24 mice divided into 4 groups. The control group (K-MD), the first treatment group received wound care by administering Central Java Forest Honey and bandages (MD-JW), the second treatment group received wound care by administering Kalimantan Forest Honey (MD-KLM) and bandages, and the treatment group thirdly, wound care was carried out by administering Flores NTT Forest Honey and bandages (MD-NTT) every day, wound care was carried out using bandages and hydrocolloid, the weight of the exudate was weighed every day to determine the acceleration of wound healing for each group. The results of exudate weight for each group are as in Table 1.

Table 1. Exudate Weight Results

	K-MD	MD-JW	MD-KLM	MD-NTT	<i>P Value</i>
Exudate Weight	78.35 \pm 39.06	84.72 \pm 23.50	87.03 \pm 21.10	98.70 \pm 46.20	> 0.05

From Table 1 it can be seen that the highest exudate weighing results were found in the MD-NTT group, followed by the MD-KLM group, then the MD-JW group and the lowest was in the K-MD group. Based on these results, it was continued with the ANOVA test and it turned out that there was no significant difference. between groups $p < 0.05$.

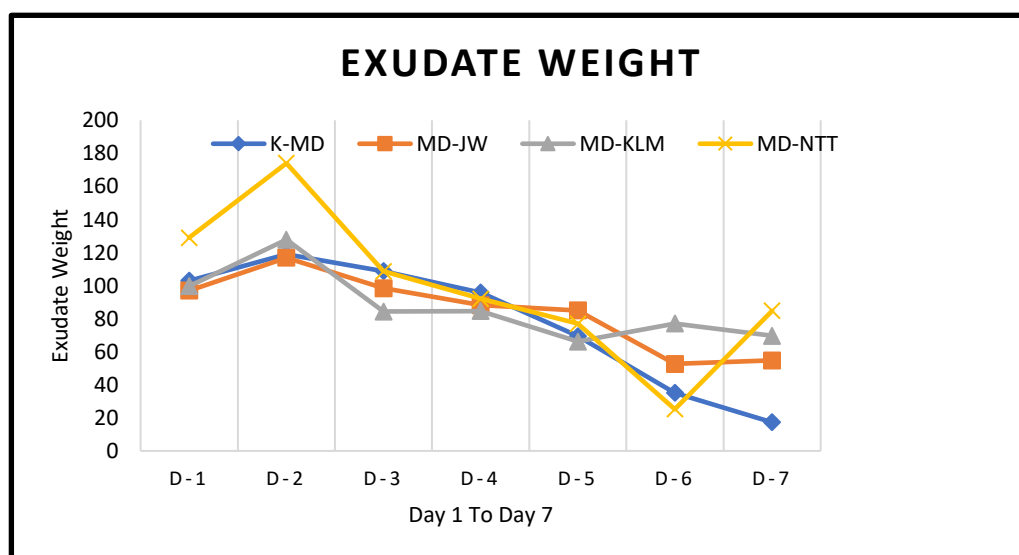


Figure 1. Exudate Weight Graph

In this study it can be seen that the weight of the exudate from the first day to the 2nd to 7th day decreased. This is due to the wound healing process. The group treated with honey showed a better reduction than the control. However, on the 7th day in the MD-NTT group there was an increase, because according to observations during the research, the presence of hydrocolloid caused the wound to experience

higher humidity and the strong adhesion of the hydrocolloid caused the new skin that was growing to be lifted when treating the wound or changing the bandage every time. day. Even though honey itself has strong debridement power, it increases the anti-inflammatory process (Molan, 2015). However, in chronic wounds there is an accumulation layer of necrotic tissue or dead blood cells. This accumulation can inhibit the wound healing process and will increase the risk of inflammation so that the number of leukocytes and the weight of the exudate increases (Jonas, 2016; Sussman, 2007). This can be seen in the MD-NTT group on day 7 and MD-KLM on day 6 which showed an increase in exudate weight.

Debridement is the basic ingredient for healing wound tissue that functions regularly (Klein, 2007). The use of honey as a dressing can help create a moist environment so that debridement can be induced (Sukur et al., 2011). This occurs due to the high osmotic pressure of honey and the activation of proteases caused by hydrogen peroxide (Manyi-Loh et al., 2011).

Based on previous research, it is known that honey has many benefits in the wound healing process. Research by Febriyenti et al, 2019 states that honey gel has a greater influence on the wound healing process. Research by Kontian et al, 2018 also states that honey is widely used for therapeutic purposes using ghee, GG, and NI honey which are known for their extracts which have the ability to heal wounds in Ayurvedic and Folk Medicine treatment methods. The results of this research in the epithelialization phase of the healing process were good in all groups, but among all groups the one that showed the best results was the combination group (Kotian et al, 2018). Meanwhile, in Ayu's research, 2012, which compared the antibacterial potential of local Indonesian honey (Madu Murni Nusantara) and manuka honey, it was concluded that local Indonesian honey was effective in treating *P. aeruginosa*, MRSA and *S.aureus* infections. The mechanism for accelerating injury is also based on an anti-inflammatory mechanism which is triggered by the activation of Reactive Oxygen Species (ROS) produced by phagocyte cells. The decrease in ROS due to honey is due to the direct inhibition process of ROS production by the activity of macrophage cells, eutrophils and monocytes, all of which are activated to become zymosan. This inhibitory effect reaches 50%. (Molan, 2011).

Molan's research results, 2011 Honey can regenerate injured tissue by lowering the pH of the wound base and providing oxygen. Wound treatment using honey requires attention to moisture. The increasingly moist wound causes cell death and epithelial and tissue movement cannot occur. There are several types of dressing choices for chronic wounds that can be used, namely: Wound dressing materials can be hydrogel, film dressing, hydrocolloid, calcium alginate, foam/absorbant dressing, antimicrobial dressing, antimicrobial hydrophobic (Kartika, 2015). Supported by research by Kefani et al., 2018, in this study the use of honey on previously swollen wounds and irregular wounds experienced improvement after 2 weeks of treatment with honey with the result that the size of the wound decreased, the exudate decreased, granulation and re-epithelialization were visible. Honey's ability to stimulate granulation and epithelialization in the treatment of chronic wounds is due to its nutritional composition such as carbohydrates, amino acids, vitamins and minerals which are easily metabolized. In the epithelialization process, cells need carbohydrates to move to the wound surface, so that they can close the wound (Kefani et al., 2018). Honey can help speed up healing because honey has acidic properties and has a pH of 3.2 – 4.5 so that bacteria will not be able to survive and is considered useful in speeding up wound healing (Molan & Rhodes, 2015). This shows that using honey as a treatment for wounds infected with bacteria can speed up wound healing, one of which is reducing the weight of exudate in wounds on the skin.

CONCLUSION

The conclusion of this research is that the use of honey from NTT can be an alternative for healing acute wounds infected with bacteria.

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