VIVA MEDIKA
Jurnal Kesehatan, Kebidanan, dan Keperawatan

Homepage: http://ejournal.uhb.ac.id/index.php/vm
P-ISSN: 1979-2026 E-ISSN: 2656-1034
DOI: 10.35960/vm.v15i2.858

A Case Study: Application of Kersen Leaf Extract (*Muntingia Calabura L.*) and Manuka Honey Ointment Combination On Second Degree Superficial Burns

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ABSTRACT

Background: Burns are a significant cause of morbidity and mortality globally. Intensive treatment is necessary to prevent infection and manage erythema in burn wounds. This case study aims to evaluate the effectiveness of a combination ointment containing Kersen (Muntingia calabura L.) leaf extract and Manuka honey in treating second degree superficial burns. Methods: A case study design employing evidence-based practice was used. Data were collected through interviews, observations, and physical examination. The study was conducted from October 14-28, 2023 in Mirikerep Hamlet, Pringsurat Village, Temanggung Regency, Indonesia. A comprehensive nursing care approach was implemented, including assessment, diagnosis, intervention, implementation, and evaluation. Results: Macroscopic examination revealed a significant reduction in wound area from 5.5x3 cm to 0.5x0.3 cm after treatment with the combination ointment. The ointment effectively promoted epithelialization and tissue regeneration in the healing process of second-degree superficial burns. Conclusions: The combination ointment containing Kersen leaf extract and Manuka honey demonstrates potential as an effective treatment for second degree superficial burns. Further research is warranted to elucidate the mechanisms underlying its therapeutic effects.

Keywords: burns, wound care, Kersen leaf extract, Manuka honey, combination ointment

1. INTRODUCTION

Burns are a form of skin and tissue damage caused by exposure to heat (Zwierełło et al., 2023). The World Health Organization reported 180,000 deaths due to burns globally in 2018. In Indonesia, burns account for a 0.7% mortality rate according to Basic Health Research data from 2013, with a higher prevalence in males (1.04%) compared to females (1.02%) (Herlianita et al., 2020).

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The rule of nines is a method used to assess the total body surface area (TBSA) affected by burns. Measuring TBSA is important for determining fluid resuscitation needs in moderate burns with fluid loss (Dini & Widada, 2023). Factors influencing burn wound healing include the healing phase, patient age, burn severity, infection, and comorbid chronic diseases (Wang et al., 2018).

Burn wound management can involve both modern and complementary approaches. For second degree superficial burns, a combination ointment containing Kersen (Muntingia calabura L.) leaf extract and Manuka honey can be applied topically. Kersen is a plant commonly found in tropical regions. The bioactive compounds in Kersen leaves, such as flavonoids and tannins, have the potential to promote burn wound healing by increasing collagen formation, reducing macrophages and tissue edema, and stimulating fibroblast proliferation (Ambiga et al., 2007).

Empirically, Manuka honey has demonstrated antibacterial activity against Staphylococcus aureus (Arumsari et al., 2012). Derived from the Manuka tree (Leptospermum scoparium), this honey possesses unique therapeutic properties for wound healing (Nadhilla, 2014). Manuka honey contains phenolic and flavonoid compounds, peroxides, and 1,2-dicarbonyl glyoxal (GO), 3-deoxyglucosulose (3-DG), and methylglyoxal (MGO), which stimulate macrophage migration and accelerate proliferation and granulation at the wound surface (Iacopetti et al., 2020).Based on this background, the researchers provided nursing care to Mr. J by applying a combination ointment of Kersen leaf extract and Manuka honey to evaluate its effectiveness in healing a second-degree superficial burn wound.

2. RESEARCH METHOD

This case study employed an evidence-based practice approach to observe a patient with a second-degree superficial burn wound treated with a topical combination ointment containing Kersen (Muntingia calabura L.) leaf extract and Manuka honey. The ointment was formulated using an experimental laboratory quality trial-and-error method. The composition included 65% ointment base (span 80, cetyl stearyl alcohol, beeswax, vaseline, tween 20, nipagin, nipasol), 5% Kersen leaf extract, and 30% Manuka honey.

Nursing care was provided in a home setting over 14 days with 7 visits. The combination ointment was applied thinly to the wound area twice daily. Indicators of successful treatment included epithelialization, tissue regeneration, and reduction in wound size.

Ethical principles were applied throughout the study to respect human dignity, beneficence, and justice (Handayani, 2018). Ethical approval was obtained from the Research Ethics Committee of the Faculty of Health Sciences, Universitas Muhammadiyah Magelang (No. 0119/KEPK-FIKES/II.3.AU/F/2023).

Data were collected through interviews, observations, and physical examination to establish a nursing diagnosis of impaired skin and tissue integrity. The instruments used included the NANDA 13 domain assessment format, sphygmomanometer, thermogun, informed consent form, wound measuring guide, and standard operating procedures for burn wound care.

The study was conducted from October 14-28, 2023 on a subject with a second-degree superficial burn wound in Mirikerep Hamlet, Pringsurat Village, Temanggung Regency, Indonesia. Data analysis revealed that Mr. J reported accidentally touching a hot motorcycle muffler 3 days prior, resulting in a burn wound. As first aid, the patient applied aloe vera to the wound area. Observation showed a dry, reddened wound with edema, warmth around the wound, and a size of 5.5x3 cm.

3. RESULTS AND DISCUSSION

This case study focuses on nursing care for the priority problem of impaired skin and tissue integrity, using a combination ointment of Kersen leaf extract and Manuka honey for burn wound management over 14 days with 7 visits.

Assessment techniques included interviews, observations, and physical examination. Mr. J, a 61-year-old male, complained of a burn wound on his leg from contact with a motorcycle muffler. The wound appeared dry and reddened, with edema and a size of 5.5x3 cm, indicating a second-degree superficial burn. Hemodynamic parameters

were BP 135/90 mmHg, HR 84/min, RR 23/min, and temperature 36°C.

Burn severity is determined by the degree of heat, intensity of tissue exposure, and skin thickness. Tissue damage is divided into three zones: coagulation, stasis, and hyperemia. The coagulation zone consists of necrotic tissue forming a scar at the wound center exposed to heat. This tissue is irreversibly damaged. The stasis zone has microvasculature damage requiring prevention of excessive edema and infection. Decreased perfusion can lead to progression towards the coagulation zone. The hyperemia zone has minimal tissue damage and can fully recover with increased microcellular perfusion, unless hypoperfusion worsens the wound (Kurniawan & Susianti, 2017).

The actual diagnosis reflects the patient's identified health problem based on major and minor data from the assessment. In Mr. J's case, the priority diagnosis was impaired skin and tissue integrity. The main expected outcome was wound healing (L.14130), with criteria of increased wound edge approximation, granulation tissue, and scar formation, along with decreased erythema, malodor, necrosis, and infection. The nursing intervention for second degree superficial burns was burn wound care (I.14565).

Wound care involves measures to prevent infection in damaged skin surfaces and promote healing (Purba & Suherni, 2021). Care is tailored to the wound condition for optimal healing. According to Arif (2017), wound healing progresses through three phases: inflammation, proliferation, and remodeling. In this case, the wound care technique involved applying a topical combination ointment of Kersen leaf extract and Manuka honey.

Natural plant-based substances and nectar offer various wound healing benefits. Kersen leaves contain active compounds like flavonoids, saponins, and tannins with antioxidant and antibacterial properties (Handayani & Sentat, 2016). The tannins act as antioxidants, increasing collagen, epithelium, and capillary formation while stimulating fibroblasts (Hertian et al., 2021). Saponins are antibacterial growth factors that stimulate fibroblast synthesis and have precipitating-coagulating effects on erythrocytes in wound healing. Overall, Kersen leaf extract has proangiogenic activity that supports angiogenesis by upregulating vascular endothelial growth factor (VEGF) transcription and translation, accelerating the inflammatory phase and wound healing process (Pastar et al., 2014).

Manuka honey, derived from Manuka tree nectar, contains methylglyoxal (MGO), polyphenols, and complex carbohydrates. Its biological effects on wounds include stimulating macrophage migration and accelerating proliferation and granulation (Iacopetti et al., 2020).

Nursing implementation aimed to address impaired skin and tissue integrity through comprehensive burn wound management interventions. The process began by identifying the cause of the burn and assessing factors such as burn duration, previous wound management, and current wound characteristics, including size, degree, base color, exudate, infection, odor, and edge condition. Aseptic technique was strictly adhered to throughout wound care procedures to minimize the risk of introducing contaminants. Cleansing the wound with sterile 0.9% NaCl solution, a physiologic solution known to promote granulation tissue formation (Anita, 2021), was a crucial step in the wound care regimen. The frequency of wound care using the combination ointment was carefully scheduled to optimize healing. Modern dressings, such as hydrocolloids, were selected based on their suitability for the specific wound condition. Patient education formed an integral part of the care plan, with the patient being informed about signs and symptoms of infection to enable early detection and prompt intervention. Collaborative efforts with the healthcare team facilitated mechanical debridement procedures when necessary. Timely and effective wound care is essential, as untreated impaired skin integrity can lead to the formation of scar tissue, which may have functional and aesthetic consequences. By implementing this systematic approach to burn wound management, the nursing team aimed to accelerate the healing process and minimize complications.

The combination ointment of Kersen leaf extract and Manuka honey has potential as a vascular endothelial growth factor (VEGF) to accelerate wound healing. A study by Lien et al.

(2015) found that active compounds like flavonoids, saponins, and tannins inhibit lipid oxidation, induce fibroblast proliferation, and can be used as an alternative treatment for skin surface wounds. Wahyuningtyas et al. (2017) showed that Manuka honey is highly effective for wound healing, especially in reducing wound size and promoting tissue formation, supported by its antibacterial and antioxidant properties (Iacopetti et al., 2020). Evaluation of wound care over 14 days showed resolution of impaired skin and tissue integrity, with the wound size reduced to 0.5x0.3 cm, a pink wound base, increased scar and granulation tissue, and absence of edema and erythema.

CONCLUSION

This case study on the application of a combination ointment containing Kersen (Muntingia calabura L.) leaf extract and Manuka honey for treating a second-degree superficial burn wound in Mr. J concluded that the patient had impaired skin and tissue integrity affecting part of the dermal tissue. The implemented nursing care involved continuous burn wound management in collaboration with the patient and family to accelerate healing. After 14 days of treatment, the wound condition improved with a size of 0.5x0.3 cm.

RECOMMENDATIONS

Wound care using the combination ointment of Kersen leaf extract and Manuka honey demonstrated good proliferation for burn wounds. However, further research is needed until the wound healing phase reaches maturation.

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