

Application of Moist Wound Healing Technique in Post-Cesarean Section Patients: A Case Study

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Abstract: Cesarean section is a surgical procedure involving an incision through the abdominal wall and uterus to deliver the baby. Although it is widely performed to ensure the safety of both mother and infant, this procedure often results in wounds that require specific care for optimal healing. This study aimed to explore the application of the Moist Wound Healing (MWH) technique in post-cesarean section wound management. A case study design was employed, focusing on a patient (Mrs. D) who underwent post-cesarean wound care using the MWH technique at Griya Afiat Gowa independent practice clinic. Following diagnosis, the planned nursing intervention involved wound care using the MWH approach. After three sessions of wound care, notable improvements were observed: during the first and second visits, the wound exhibited >25% serous exudate, 80% granulation tissue, and 20% slough. By the third visit, the wound showed 80% granulation, a reduction of slough to 15%, and the presence of 5% epithelial tissue. These findings indicate that the Moist Wound Healing technique is effective in promoting wound healing following cesarean section.

Keywords: Post-Cesarean Section, Wound Care, Moist Wound Healing

INTRODUCTION

Cesarean section (CS) is a surgical procedure performed to deliver a baby through incisions in the abdominal wall and uterus. Although this procedure is commonly carried out to ensure the safety of both the mother and the infant, like other surgical interventions, CS leaves wounds on the mother's body that require specialized care to achieve optimal healing outcome (1). Cesarean delivery has increasingly been chosen as an alternative birthing method, as it is perceived to be more practical and convenient compared to vaginal delivery, both in emergency and elective situations. In Indonesia and globally, CS has become one of the most frequently performed surgical procedures, with the CS rate in Indonesia reaching 25.9%. This figure exceeds the World Health Organization (WHO) standard, which indicated that more than 21% of births in 2021 were delivered via CS, and it is projected to increase to nearly 29% by 2030 (2). The wound healing process can be classified according to duration into acute and chronic wounds. Acute wounds, usually caused by trauma, often receive prompt treatment and heal well if no complications occur, whereas chronic wounds persist over a prolonged period and fail to heal according to the normal physiological timeframe (3). Wound care techniques play an important role in wound healing. Various techniques are widely discussed, particularly modern wound dressings, which are recognized to accelerate wound healing. Certain modern dressings also contain antimicrobial properties capable of inhibiting the growth of both Gram-positive and Gram-negative bacteria. From clinical, economic, and infection-prevention perspectives, modern dressings are considered highly effective and efficient in supporting optimal healing (4). Post-cesarean wound care plays a crucial role in the mother's recovery process. Without appropriate management, these wounds may develop infections, delayed healing, or other complications. Therefore, it is essential to identify effective wound care methods that support optimal healing. One such

method is the Moist Wound Healing (MWH) technique (5). MWH emphasizes maintaining wound moisture as a critical factor in accelerating the healing process while reducing pain. This technique focuses on creating a protective layer over the wound, which maintains a moist environment, prevents desiccation, and reduces crust formation that may delay recovery. A study by Herman (6) reported that 50.8% of wounds treated with moist wound care achieved complete healing without the need for further therapy. Modern wound dressing represents one of the latest wound management methods, which emphasizes a closed system of wound care that maintains moisture to enhance the healing process. Modern dressings have been shown to accelerate wound healing by sustaining a balanced moist environment at the wound surface. This technique has been proven to promote faster wound closure, reduce infection, and minimize patient discomfort. Consequently, the implementation of Moist Wound Healing in post-cesarean wound care represents an appropriate choice for facilitating faster and more efficient recovery (7). Inappropriate wound care practices in post-surgical patients often hinder the healing process. For example, the use of gauze compresses with normal saline (NaCl) to maintain moisture is less effective because it dries out quickly, requiring frequent dressing changes. This phenomenon can cause repeated trauma to the wound bed, stimulating recurrent inflammation and delaying healing. Contemporary wound care highlights the importance of modern dressings (7). According to Febrianti (8), modern wound dressings represent a closed method of wound management that focuses on preserving wound moisture to accelerate the healing process. Therefore, the aim of this study was to apply wound care using modern dressings through the Moist Wound Healing technique in post-cesarean section patients.

Case Presentation

Mrs. D presented with the chief complaint of a post-cesarean section wound located in the lower abdominal region. The patient reported undergoing a cesarean section on July 11, 2024. Two weeks after the surgery, the wound initially healed, and the patient subsequently applied Dermatix gel to minimize the surgical scar. However, following the application of Dermatix, the post-cesarean wound reopened. Due to this complication, the patient decided to undergo wound care at the independent practice clinic *Griya Afiat*, specifically for wound management, starting with home service visits on October 9, 2024, for two treatment sessions, and later continuing directly at the clinic on October 14, 2024. On physical examination, the patient's vital signs were within normal limits: blood pressure 120/80 mmHg, pulse rate 90 beats/minute, respiratory rate 20 breaths/minute, and body temperature 36.5°C. The patient's level of consciousness was assessed as *compos mentis* (E4M6V5), indicating full awareness and orientation.

METHODS

This study employed a case study design, conducted at the *Griya Afiat* independent nursing practice in Gowa during October 2024. The subject of this case study was Mrs. D, a 25-year-old patient in the postoperative period following a cesarean section. Nursing care was provided for a single case using the nursing process approach, and the interventions delivered were described in detail to illustrate the wound care management for the post-cesarean section patient. Data were obtained through direct observation and documentation of wound progression. Photographic documentation was performed using an Android-based camera to compare the condition of the wound from the first to the third visit. To quantitatively evaluate healing, the reduction in Bates-Jensen Wound Assessment Tool (BWAT) scores was used as an indicator of wound healing progress.

RESULT AND DISCUSSION

Result

Based on Table 1, the BWAT (Bates-Jensen Wound Assessment Tool) score of the patient showed a progressive decrease across the three wound care sessions. At the first treatment, the score was 36, indicating a moderate level of wound severity. By the third treatment, the score had decreased to 34, reflecting an improvement in wound healing status. This reduction demonstrates positive wound healing progress following the implementation of the Moist Wound Healing technique in post-cesarean wound management.

Tabel 1. Skor penurunan BWAT

Day Visit		Score
Case	Visit 1	36
	Visit 2	35
	Visit 3	34

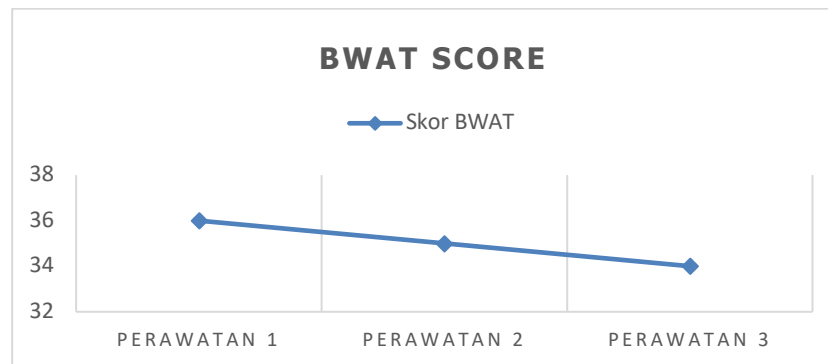


Figure 1. BWAT Score Graph

In addition to the quantitative findings, visual documentation of the wound also revealed significant changes in the wound bed of Mrs. D. At the initial assessment, the wound consisted of approximately 80% granulation tissue and 20% slough. By the third treatment session, the wound composition had improved, with 80% granulation tissue, a reduction of slough to 15%, and the emergence of 5% epithelial tissue. These visual changes further supported the clinical evidence of wound healing progression achieved through the application of the Moist Wound Healing technique in post-cesarean section care.

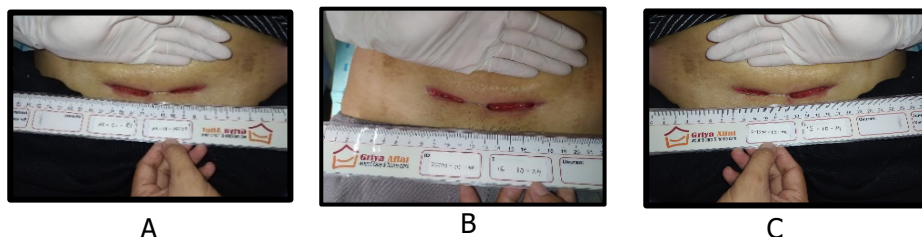


Figure 2,3 and 4 : wound healing process

On the first day (October 14, 2024), Mrs. D presented at the *Griya Afiat* independent clinic with a post-cesarean section wound. Initial assessment revealed an open wound with reddish-yellow discoloration and a considerable amount of exudate. The wound depth extended from the epidermis to the dermis, with clearly visible margins attached to the wound bed. A small sinus tract measuring less than 2 cm was also observed. The wound exhibited serous exudate covering approximately 50% of the dressing, with thickened serous discharge, 80% granulation tissue, and 20% slough. No epithelialization or necrotic tissue was present. The wound size was recorded as 10.8 cm in length and 0.8 cm in width. The wound care intervention began with monitoring the wound characteristics, which displayed a combination of black, yellow, red, and pink tissue, accompanied by copious malodorous exudate. The old dressing was carefully removed, revealing abundant serous exudate (50%) on the dressing.

The wound was irrigated with 0.9% NaCl solution and antibacterial soap, performed from outward to inward to minimize the risk of recontamination. The wound was then dried, and necrotic tissue was debrided using both sharp and mechanical debridement techniques. Documentation of the wound was conducted through photographic records for subsequent evaluation. Primary dressing included cadexomer iodine powder (Iodosorb) and hydrofiber, combined with Calmoseptine cream applied to the wound edges. Secondary dressing consisted of gauze, secured with adhesive tape as tertiary dressing. Sterile technique was maintained throughout the procedure, and the patient's family received education regarding wound self-care and early signs of infection. Evaluation following the first day of wound care using the Moist Wound Healing technique indicated positive outcomes. Subjectively, the patient reported that the wound was moist but not malodorous, with only mild pain. She denied any burning or stinging sensations around the wound. Objective observations showed the wound consisting of granulation tissue and slough, with yellowish exudate that was slightly odorous upon removal of the dressing. The wound bed contained 80% granulation tissue and 20% slough, with dimensions of 10.5 cm in length and 0.8 cm in width. Interventions were continued, including necrotic tissue debridement (sharp and mechanical), application of secondary dressing, and reinforcement with tertiary dressing. The family was further educated. Although the amount of exudate remained relatively high, modern wound care with the Moist Wound Healing technique demonstrated effectiveness in reducing wound size and supporting healing progress.

On the second day of wound care (October 16, 2024), the implementation was continued by monitoring the wound characteristics. The wound still exhibited reddish and yellowish tissue with a considerable amount of exudate and a slight odor. The old dressing was carefully removed, and the wound was irrigated with 0.9% NaCl solution and antibacterial soap, performed from outward to inward to prevent recontamination. The wound was then dried, and necrotic tissue was removed using both sharp and mechanical debridement techniques. Photographic documentation was taken to support evaluation of wound progression. The primary dressing consisted of cadexomer iodine powder (Iodosorb) and hydrofiber, with Calmoseptine cream applied to the wound edges. The secondary dressing was gauze, secured with adhesive tape as tertiary dressing. Sterile technique was maintained throughout the procedure, and the patient's family was educated about wound self-care and early signs of infection that should be monitored.

Evaluation following the second wound care session with the Moist Wound Healing technique indicated further improvement. Subjectively, the patient reported that the abdominal wound remained moist but was no longer malodorous, with only mild pain. She denied any burning sensation around the wound. Objectively, observations revealed wound tissue consisting of granulation, slough, and early epithelialization, accompanied by yellowish exudate with slight odor. Approximately 50% of the dressing

was saturated with exudate. The wound composition consisted of 80% granulation tissue, 15% slough, and 5% epithelial tissue, with dimensions of 10.0 cm in length and 0.6 cm in width.

Analysis still indicated impaired tissue integrity with localized risk of infection that required ongoing monitoring. The treatment plan on the second day remained consistent with the first day, including wound cleansing, necrotic tissue debridement, and appropriate dressing application. The evaluation of the second day demonstrated the emergence of 5% epithelial tissue and a reduction in slough, indicating progressive tissue regeneration and wound healing.

On the third day of wound care (October 18, 2024), the intervention was continued by cleansing the wound with 0.9% NaCl solution and antibacterial soap, performed from outward to inward to minimize the risk of recontamination. The wound was then dried, and necrotic tissue was removed using sharp and mechanical debridement techniques. Wound condition was documented photographically for progression evaluation. The primary dressing consisted of cadexomer iodine powder (Iodosorb), with Calmoseptine cream applied to the wound edges. Secondary dressing was gauze, secured with adhesive tape as tertiary dressing. Sterile technique was consistently maintained throughout the procedure. Evaluation after the third session of wound care using the Moist Wound Healing technique revealed further improvements. Subjectively, the patient reported that the lower abdominal wound remained moist, was free from odor, and caused only mild pain. She denied any burning or stinging sensation in the wound area. Objectively, observations indicated a wound bed consisting of granulation, slough, and epithelial tissue, accompanied by yellowish exudate with slight odor. Approximately 45% of the dressing was saturated with exudate. The wound composition was 80% granulation tissue, 15% slough, and 5% epithelial tissue, with dimensions of 9.5 cm in length and 0.6 cm in width. The analysis continued to indicate impaired tissue integrity with localized risk of infection, requiring close monitoring. The wound care plan on the third day remained consistent with previous sessions, including cleansing, necrotic tissue debridement, and appropriate dressing application. The third-day evaluation demonstrated a reduction in exudate volume and a measurable decrease in wound size, indicating significant progress in the healing process.

Discussion

The case study was conducted on Mrs. D, who presented with a post-cesarean section wound at the *Griya Afiat* Independent Wound Care Practice in Gowa. The patient underwent three wound care sessions within one week using modern wound management with the Moist Wound Healing (MWH) technique. The primary nursing problem identified was impaired tissue integrity related to tissue damage resulting from the surgical incision. In this case, dressing changes were performed every two days, or approximately three times per week. According to previous research (9), in postpartum cesarean patients, dressing replacement using modern dressings with the MWH technique does not need to be performed daily; instead, dressings may be changed every two to three days, which supports more effective wound healing. Immediate dressing replacement is indicated only when signs of infection are observed in the surgical wound. Similarly, other authors (10) reported that modern dressings may remain in place for 3–5 days, thereby minimizing tissue trauma during the healing process and reducing pain associated with frequent dressing changes. In this study, the author selected the Moist Wound Healing technique as an effective intervention.

The MWH technique functions by maintaining wound moisture through dressings that retain hydration, thus supporting the natural growth of new tissue. This finding is consistent with previous studies (7,8), which reported that moist and occlusive wound care promotes optimal healing and supports tissue regeneration. Herma (6) also emphasized that a moist wound environment accelerates healing by

facilitating the removal of fibrin in chronic wounds through the action of endothelial cells and neutrophils in hydrated conditions. Following three wound care sessions, Mrs. D's post-cesarean wound showed significant improvement: the wound measured 9.5 cm in length and 0.6 cm in width, exudate volume decreased from the first to the third session, granulation tissue remained at 80%, slough was reduced to 15%, and 5% epithelial tissue emerged. These findings demonstrate that the Moist Wound Healing technique effectively supported wound healing.

This aligns with earlier studies (7,11) showing that MWH maintains wound hydration, accelerates epithelialization and tissue regeneration, reduces infection, and minimizes pain, particularly during dressing changes. Other research (12) also supports this, indicating that a lower epithelialization score (as observed with zinc cream) reflects improved wound epithelialization. The success of this intervention was further supported by the appropriate selection of dressings, such as cadexomer iodine and hydrofiber, both of which possess antibacterial properties and support a moist wound environment. Previous studies highlighted that cadexomer iodine, with its antibacterial and desloughing properties, removes healing barriers and provides prolonged iodine release for effective antimicrobial action. Similarly, another study (13,14) reported that cadexomer iodine powder and zinc cream contribute to reducing biofilm, acting as antimicrobial and autolytic agents that minimize necrotic tissue and prevent recurrence, thereby promoting wound healing. In line with previous research, modern wound care using the Moist Wound Healing technique is not only effective in accelerating wound healing but also more economical compared to conventional methods. The reduced frequency of dressing changes and lower pain intensity during wound care represent additional advantages of this technique. Given the significant outcomes observed, modern wound care using the Moist Wound Healing technique is recommended for wider implementation, particularly in managing post-cesarean section wounds in healthcare facilities and independent wound care practices.

CONCLUSION

From the nursing assessment conducted on Mrs. D (25 years old), the primary nursing diagnosis identified was impaired skin integrity related to tissue damage, as evidenced by the presence of a post-cesarean section wound. The main nursing interventions included wound cleansing with 0.9% NaCl solution and antiseptic soap, application of cadexomer iodine powder to the wound bed, and epithelial cream to the wound edges as part of modern wound dressing using the Moist Wound Healing technique. Wound monitoring was carried out every two days, or three times per week, using the Bates-Jensen Wound Assessment Tool (BWAT). After three sessions of wound care within one week, significant changes were observed in the wound condition. The progression from the first to the third visit demonstrated visible improvements, including reduced wound size, decreased exudate, reduction of slough tissue, and the appearance of new epithelial tissue. These findings confirm that the Moist Wound Healing technique is effective in supporting post-cesarean section wound healing.

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