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Clinical Efficacy of the Use of Honey as Wound Treatment in Surgical Site Infection due to Hysterectomy Patient with Type 2 Diabetes Mellitus

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ABSTRACT

Background: Honey is believed to be used in the topical treatment of wounds and burns due to its anti-bacterial and wound healing promotion activities. The sugar content in honey is high enough to inhibit microbial growth. This case report reports the clinical efficacy of using honey as a postoperative hysterectomy wound dressing with type 2 diabetes mellitus complications. **Case Presentation:** A woman, 40 years old, lived in Palembang, housewife, came with complaints of open surgical scars and smelling pus. The patient is a postoperative patient with cesarean section with indications of a prolonged latent phase and macrosomia. The patient also had a history of uncontrolled diabetes mellitus since 8 years ago. Intraoperatively, a wound dehiscence is obtained in the lower uterine segment and adhesions between the anterior uterine body and the omentum and transverse colon. The patient finally underwent a supracervical hysterectomy and the surgical secretions were examined for bacterial culture and antibiotic resistance. During wound care, the patient's surgical wound was treated using honey dressings. Patient experienced improvement after treatment for 12 days post-operation. **Conclusion:** Honey has antibacterial and tissue regeneration ability which is high enough to heal surgical wounds. Further studies are needed for the application of honey to postoperative wounds more widely

1. Introduction

Honey in principle has been used for its antibacterial effect since ancient times.¹ Honey is believed to be used in the topical treatment of wounds and burns because of its anti-bacterial and wound healing promotion activities. The sugar content in honey is high enough to inhibit microbial growth.^{2,3} This is believed to be a result of its osmotic effect, which

prevents bacterial growth and hence promotes healing. Honey's high sugar content is not the only reason for this antibacterial effect. If honey is diluted with water to reduce sugar content and its osmotic effect, it is still able to inhibit the growth of many bacteria that cause wound infections. The antibacterial activity may be due to the activity of hydrogen peroxide, which the enzymes

continue to produce even when the honey is diluted and remains well below the level causing the inflammatory effect.^{4,5} For medical use, honey needs to be sterilized by gamma ray irradiation, which will not have an impact on antibacterial activity. This case report reports the clinical efficacy of using honey as a postoperative hysterectomy wound dressing with type 2 diabetes mellitus complications.

2. Case presentation

A woman, 40 years old, lived in Palembang, housewife, came with complaints of open surgical scars and smelling pus. The patient was a postoperative patient with cesarean section on February 3, 2021 with indications for a prolonged latent phase and macrosomia. The patient also had a history of uncontrolled diabetes mellitus since 8 years ago. The patient underwent surgery on February 3, 2021 and was hospitalized until February 8, 2021. Then after being home, he began to complain that the surgical wound was swollen and reddish and had a thick and smelly yellowish discharge, accompanied by pain.

On physical examination, he found a body weight of 72 kg and a height of 160 cm. From the general condition of the patient looks good, awareness compos mentis, state of malnutrition, from the heart murmur (-), gallop (-), and lungs ronkhi (-), wheezing (-). On examination of blood pressure, it was found 140/90 mmHg, pulse 84x/minute, respiration 20 x/minute, body temperature 37.2°C.

On physical examination of the abdomen, there were median surgery scars (+) 2 fingers above the symphysis to 2 fingers below the umbilicus, with an open scar size of 7 x 1 cm; 1.5 cm deep; the scar border is regular, the pus (+) is greenish yellow, thick and smells bad. On supporting examination, it was found Hb 9.7 g / dL, leukocytes $24.71 \times 10^3/\text{mm}^3$, platelets 614.000, Albumin 2.3 g/dL, GDS 244 mg/dL, and HbA1C 10.5.

During the treatment, the wound was treated 3 times a day, in collaboration with the internal medicine department for the management of diabetes mellitus. Then the patient is consulted to plastic surgery and also clinical nutrition for the management of patient

nutrition.

The patient was scheduled for re-hecting surgery on February 22, 2021. Intraoperatively, there was a wound dehiscence measuring 10x15 cm, wound depth 3 cm, base of pus tissue (-), granulation tissue (+). There is a fascial defect proximal to the wound, and 200 mL of pus is obtained. There is also adhesion between the anterior corpus of the uterus with the omentum and transverse colon.

Based on the results of the intraoperative consultation with the digestive department, the operator performed adhesiolysis and there were multiple lacerations in the sigmoid colon so it was decided to perform anastomotic resection. After further exploration, a wound dehiscence was found in the lower uterine segment down to the posterior body, with active pus production. It was decided to perform a supracervical hysterectomy. After the abdominal wall was closed, subcutaneous irrigation was performed and subcutaneous drain was applied. Examination of culture results and antibiotic resistance showed *E. Coli* bacteria and sensitive to ampicillin, gentamicin, tigecycline, amikacin and meropenem.

During wound care in collaboration with the plastic surgery department, the patient's surgical wound was treated with honey. The wound care steps we use are; cleaning prior to wound dressing with honey; after cleaning, the wound is irrigated with an antiseptic and saline solution; apply pressure from the edges of the wound to remove secretions; after the secretions are clean, do the wound irrigation again; Honey is smeared all over the wound surface to the outside of the wound; then, the wound is covered with foam dressing, sterile gauze and plaster. This action of rubbing the wound with honey is performed 2-3 times a day. After 12 days post operation, the patient is allowed to go on an outpatient basis with the wound improving and closing and there is no longer any secretion or blood production from the scar.

3. Discussion

Surgical wound dehiscence is a complication of surgical wound healing that often occurs together with infection. This will cause the wound healing process to

be interrupted. Surgical wound dehiscence is the separation of all sutures of the lining of the abdominal wall covering the skin, subcutaneous tissue, fascia to the peritoneum. Various factors can influence the occurrence of dehiscence which is often encountered. In general, surgical wound dehiscence is caused by various factors, both local and systemic factors accompanied by predisposing factors: age, obesity, perioperative infections, use of corticosteroids, diabetes mellitus, malnutrition, dehydration, hematoma, anemia, liver disorders, massive bleeding, surgical techniques used, postoperative cough, malignant processes, scarring, and radiation.^{5,6}

Complications of surgical wounds vary, including wound infection if the surgical wound is contaminated with germs with signs of redness, swelling and pus. Abdominal wound dehiscence if all the suture layers of the abdominal wall are separated, covering the skin, subcutaneous, fascia to the peritoneum.⁷

In this patient, the diagnosis of surgical wound dehiscence is made based on the finding that all the suture layers of the abdominal wall are opened or separated, which is indicated by the discharge of granulation tissue through the opening of the suture. Surgical wound dehiscence in this patient is classified as late surgical wound dehiscence, which occurs on the ninth day. The factors that exist in this patient which allow the dehiscence of surgical wounds are age, and other factors such as nutritional factors, and coughing. Besides that, technical factors such as suturing techniques and choosing the type of suture play a very important role.^{8,9}

Metabolic factors that play a role in the dehiscence of surgical wounds are hypoproteinemia, anemia and electrolyte imbalance disorders and vitamin deficiency. Hypoproteinemia will cause inhibition of the wound healing process. Hypoalbuminemia and hypoglobulinemia, which are components of mucopolysaccharide sulfation, are the basic ingredients for wound healing, where the lack of albumin and globulin in the blood will affect the fibroplasia process and the strength of the tissue will decrease so that the healing process of the surgical wound will be delayed. Vitamin deficiency will inhibit

the collagen synthesis process, which is the basic substance of the wound healing process.^{10,11}

The use of honey in in vitro wound healing in experimental animals shows that honey has a beneficial effect on wound healing. A retrospective study of 156 burn patients who were admitted to hospital within 5 years, found 13 cases treated with honey and obtained the same results as if treated with silver sulfadiazine. Literature studies show honey can reduce water content in wounds when applied to wounds. However, dehydration in wounds can be reduced by using a saline solution as a wound irrigation solution.¹⁰

Honey is also believed to accelerate tissue regeneration and decrease inflammatory processes, edema and exudate in wounds based on clinical observations and results from animal studies and clinical trials. The antibacterial ingredients in honey clear the infection by preventing the metabolic production of bacteria. The high osmolality in honey causes the production of lymphocytes which provide nutrients for regenerating tissues that grow along the granulation point.^{8,10}

4. Conclusion

In conclusion, honey has antibacterial and tissue regeneration abilities that are high enough for surgical wound healing. Further studies are needed for the application of honey to postoperative wounds more widely.

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