International Journal of Research in Medical Sciences
Rohmayanti et al. Int J Res Med Sci. 2017 Feb;5(2):702-706
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012

DOI: http://dx.doi.org/10.18203/2320-6012.ijrms20170178

Case Report

Modern wound care application in diabetic wound management

Rohmayanti*, Estrin Handayani

Department of Nursing, Faculty of Health Sciences, University of Muhammadiyah Magelang, Indonesia

Received: 06 December 2016
Revised: 17 December 2016
Accepted: 07 January 2017

***Correspondence:**
Rohmayanti,
E-mail: rohmayanti80@gmail.com

ABSTRACT

Diabetes mellitus is a group of metabolic disease which facilitates diabetic wound foot. To prevent long diabetic wound complication and worse condition it is needed wound care for diabetic patient. Modern bandage has been used for recent wound care technique. The principles of modern wound care product are maintaining and watching over the humid environment of the wound to facilitate the wound healing process, maintaining liquid tissue deprivation and cell decease. This research was aimed to find out how modern wound bandage is applied to the diabetic patient and to find out the influence in healing wound phase. This research is qualitative research using phenomenology approach, 4 wound diabetic patients who were hospitalized for 2 weeks using modern wound care method in Magelang regency were participated. The participants were elected using purposive sampling method. Observation and interview were used to obtain data, data was analyzed using explanation building method. The results of this research have 4 topics which are wound examination, type of modern bandage, the way of wound care, and the influence toward the wound. Bates-Jensen Wound was used for the wound examination, the type of bandage used were hydrogel and wound ointment, TIME management approach was used in wound care, and the wound care influences the decreasing of wound size, wound proliferation and granulation. Modern bandage application of diabetic wound influences the decreasing of wound size, wound proliferation and granulation. Paramedic is suggested to use modern wound care method in diabetic wound management.

Keywords: Application, Diabetic wound, Modern wound care

INTRODUCTION

Diabetes mellitus or generally called as diabetes is a group of metabolic disease which has hyperglycaemia characteristic. A long hyperglycaemia condition in a diabetes mellitus patient causes arthrosclerosis facilitating the diabetic wound foot.[1,2]

In 2030, epidemiologically it is predicted that diabetes mellitus prevalence in Indonesia will reach 21.[3-5] million people. From Hasil Riset Kesehatan Dasar (Riskesdas) in 2013 it is obtained that the proportion of death cause becasue of diabetes mellitus in age group of 45 until 54 years old in urban occupies second rank which is 14.7% and in rural area occupies sixth rank which is 5.8%.[7-11]

To prevent the diabetic wound complication which occurs in a long time and to prevent the worse condition it is important to give attention in how the wound care is in the patient in which there are four principles of diabetic wound management to optimize the healing process.[12-16] The principles are basic wound preparation, wound protection, wound bandage, and wound oxygenation.[17] By using these principles it is expected that 80% of diabetic wound foot problems can be cured, so it can avoid amputation.[18]

Nowadays, wound care technique has greatly developed in which the wound care has used modern bandage. The principle of modern wound care product is to maintain tissue liquid deprivation and cell demise.[19] The management of wound care modern sets the issue out. It is supported by the increasing innovation of latest wound care products. Basically, a precise product selection must be based on some considerations which are cost, comfort, and safety.[8,20] Modern dressing wound care method has developed in Indonesia. Modern dressing is able to maintain humid environment balanced with wound surface, the dressing selectionswhich are films, hydrogels, hydrocolloids, foams, alginates, and hydrofibers.[5,21-25] This research is going to examine the modern bandage application as a whole in healing process of diabetic wound in phase stages of diabetes wound healing.

The used research plan was single instrument case study in which the participants were selected by purposive sampling.[1] The participants were taken from new wound which has not yet been applied wound care modern with diabetic foot ulcer in grade minimal.[2] The used analysis in this research was explanation building.[32]

CASE REPORT

The following passage is the portrait of discussed case in each case:

Case 1

Mrs. S, 48 years old, has DM history for 13 years, diabetic wound was suffered for last 3 months, there was wound in both sole, in the right sole the wound had already desiccated, while the wound in left sole still has cave in stage 2 depth, and there was callus, the condition of wound is stink. Bates Jensen examination wound: wound size: 2, wound depth: 2, wound edge : 4, Cave: 2, necrosis tissue type 5, total necrosis tissue : 4, exsudat type : 1, total exudate : 4, skin colour around the wound : 5, ossification of edge tissue: 2, granulation tissue : 5, epitalisation : 5. Total score : 41. Wound care: washing the wound using wound soap and NaCL, then giving antiseptic to the wound, and mechanical debridement to decompress callus and necrotic tissue, next giving the antiseptic and dried by sterile dry gauze, used dressing is topical therapy in the form of wound ointment containing zinc, metronidazole, used absorbent as well as occlusive covering of the wound.

The wound care has been done for two weeks, the result showed changes which appropriate with wound examination which are : wound size:1, wound depth : 2, wound edge : 2, Cave : 1, necrosis tissue type 4, total necrosis tissue : 4,exsudat type : 1, total exudate : 3, skin colour around the wound : 3, ossification of edge tissue:1, granulation tissue : 4, epitalisation : 5. Total score : 31. The description above shows that wound has changed in wound size, wound depth, cave size, the decreasing in necrosis tissue and the total of exudate in the wound, skin colour around the wound by the decreasing in callus as well as the increasing of granulation tissue, however epitalisation did not increase.

Figure 1: 1st patient wound (1st day-12 day).

Case 2

Mr. S, 76 years old, has suffered diabetes mellitus since 7 years ago and he experienced diabetic ulcers on left foot. Wound examination are : Stadium wound 2, wounds size : 1st wound (2,5 cm x 1 cm), 2nd wound : (1 cm x 1 cm), 3rd wound : 2 cm x 2cm), there was no cave founded, there was no exudate, it was not sting, there is necrotic tissue, wound basic colour : granulation (50%), epitelisation (40%), slaf (10%), wound base was being onewith the wound, thin-and-soft wound edge, scaly skin around the wound, there was no infection, there was not painful. The result obtained in second week of wound care : Stadium wound 2, wounds size : 1st wound : Length : 1.2 cm Width : 0.5 cm, 2nd wound : Length 0.8 cm Width : 0.4 cm, 3rd wound : has already dried, there is no cave, no exudate, it was not sting, there is necrotic tissue, wound basic colour : granulation (60%), epitelisation (40%), slaf (10%), wound base was being one with the wound, thin-and-soft wound edge, there was no infection, there was not painful.

Figure 2: 2nd patient wound (1st day-12 day).

Case 3

A client named as Mrs. M has had DM history since 10 years ago, fluctuated blood sugar was controlled.

Figure 3: 3rd patient wound (1st day-12 day).

This is example of result assessment with Bates Jansen Assessment Tool for 3rd study case. The condition at the beginning is there was post-amputation wound digiti 1 until 5 wounds, wound I: 1507mm^2 (poin:2), there was hypergranulation tissue growth, wound II had width 10542 mm^2 (point : 5), permeating wound, in depth level 2, wound edge was looked like being one with wound base, there was no cave, there was no necrosis tissue, no exudate, dried exudate. The skin around the wound was hyperpigmentation. There was edema which was less than 4 mm around the wound, there is no wound edge ossification, granulation 100%, epitalisation was less than 25%.

Table 1: Assessment tool 3rd study case.

Items	Assessment results			
	Day-1		Day-12	
	1 st wound	2nd wound	1st wound	2nd wound
Wound size	2	5	2	5
Depth	2	2	2	2
Wound edges	2	2	2	2
Undermining	1	1	1	1
Necrotic tissue type	1	1	1	1
Necrotic tissue amount	1	1	1	1
Exudate type	1	3	1	1
Exudate amount	1	3	1	1
Skin color surrounding wound	5	5	5	5
Peripheral tissue edema	2	2	2	2
Peripheral tissue induration	1	1	1	1
Granulation tissue	2	2	2	2
Epithelialization	5	5	5	5
Total	26	33	26	29

The result of wound care in second week is: GDS 250g/dl, wound size pf wound I 930 mm^2 (point:1), hypergranulation tissue decreased, wound II was 8897mm^2 (point : 4), the wound has being clean, the depth is in stage 2, the wound edge looked like being one with wound base, there was no cave, no necrosis tissue, no exudate, dry exudate, skin around the wound was hyperpigmentation. There was edema which is less than 4 mm around the wound, there was no edge tissue ossification, granulation 100%, epitalisation was less than 25%.

DISCUSSION

Wound care is done with modern dressings using principles of moist show the results that the presence of tissue changes that occur in some components of assessment of the wound by betes Jensen include a reduction in the size of the wound, the depth of the wound, the percentage of granulation, epithelialization, reduced the amount of tissue necrosis as well as the amount of liquid that appears. This is consistent with the results of Frank who said that of several studies prove that the more modern bandage gauze bandage efekif

compared, the results of these studies are also influenced by the condition of the wound (breadth, depth of the wound, and the wound treatment duration).[12] Stages of the action taken is to wash the wound, debrided, the provision of disinfectants, installation of proper dressings namely wound ointments and closes occlusive done within 2 weeks. In the study Sheehan, reported treatment of patients with diabetic foot wounds will show the area of wound closure in the first 4 weeks and recovered a total of 12 weeks.[27]

The purpose of washing the wound area is to reduce the number of bacteria in a wound and an imbalance of proinflammatory cytokines in the wound. The liquid used in wound care are drinking water, because according to Fernandez and Griffith there is no significant difference between the use of potable water with normal saline on the incidence of infection in chronic wounds, where the use of potable water is more easily available and more cheap.[11] Debridement is a process of eliminating the necrotic tissue or non-vital tissue and highly contaminated tissue from the wound area with maximal maintaining important anatomical structures such as nerves, blood vessels, tendons and bones. Wound debridement performed on acute and in chronic wounds. After the wound was cleaned of necrotic tissue is expected to improve and simplify the process of wound healing.

The basic goal of debridement is to reduce contamination on the wound to control and prevent infections. If the necrotic tissue is not removed will result not only hinder the healing of wounds but it can also happen to lose potein, osteomyelitis, systemic infections and possible sepsis, limb amputations or death. Heaps of necrotic tissue usually occurs due to poor blood supply to the wound or from an increase in interstitial pressure. After debridement of necrotic tissue wasting will occur improved circulation and met adequate oxygen delivery to the wound. From the results of studies ever conducted found that there is an increase in wound healing after debridement compared with no cases of debridement in chronic wounds.[23]

The materials used are iodine and normal saline. Once the wound compress cleared wound with iodine for 3 minutes, rinsed with normal saline. Disinfectants should not be on the wound during bandaged because it would interfere with the growth of the network. The principle is to replace temporary bandage function of the skin, should be able to retain moisture, avoid contaminants. Is done by using several layers of gauze and the top layer are given a plastic perforated. The goal is to create a semi occlusive dressing so that optimal tissue growth. The use of a standard gauze dressings in wound care and is still widely used in the treatment of wounds.[16] Wound care products with a gauze bandage many benefits such as cheaper, easier to use and can be used in areas that are difficult. Gauze bandage including passive material with its main function as a protector, keep warm and cover the wound unpleasant appearance. Besides, the gauze bandage is also used to protect the wound from trauma, maintain the wound area, and to prevent bacterial contamination.

In modern wound care techniques, injuries sustained in humid conditions.[20] In this case using a topical ointment therapy wounds. Topical therapy of this kind in the form of ointment and powder material consisting essentially of zinc oxide. This material serves to protect the skin around the wound of maceration. Its use can be combined with metronidazole powder on wounds which emit a bad odor.[17,26-29] This condition is a theory among others: 1) accelerate the fibrinolysis fibrin formed on chronic wounds, which can be eliminated more quickly by neutrophils and endothelial cells in a humid atmosphere; 2) accelerating angiogenesis, since hypoxia in a closed wound treatment stimulates formation of blood vessels more quickly; 3) reducing the risk of infection; 4) The incidence of infection is relatively lower than the dry type of care; 5) accelerate the formation of growth factors that contribute to form the stratum corneum and angiogenesis, whose production will be faster.[30-32]

CONCLUSION

Wound care done by modern dressing using the humid principle shows that there is tissue change occurred in some examination wound components according to Betes Jensen which are the decreasing of wound size, the wound depth, granulation percentage, the declining of the number of necrosis tissue as well as the amount of the liquid appearing. Treatment stages are washing the wound, doing debridement, giving the disinfectant, setting the dressing precisely which is wound ointment and occlusive covering.

ACKNOWLEDGEMENTS

Authors would like to thank all those who contributed in the preparation and completion of this study. Thanks to Wound Care Clinic Department (Klinik Sembuh Lukaku) on its permission to do research in the region. Thanks to patient for its willingness to participate in this study.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. Afiyati A. Qualitative Research Methodology in Nursing Research. Rajawali Pers. Jakarta. 2014
2. Agustina H. Care Luka Modern. J Nursing Unpad. 2009:2-3.
3. Black JM, Hawks JH. Medical Surgical and clinical Management for positive outcome. Eight editions. Singapore: Saunders Elsevier. 2009.
4. Brand PW, Coleman WC. The Diabetic Foot In Diabetes Mellitus-Therapy and Practice. 4th edition, D. Elsevier Science Publishing Co. 1990:792.

5. Broussard KC, Powers JG. Wound Dressings: Selecting the Most Appropriate Type. Vanderbilt Division of Dermatology. 2013:451-6.
6. Byrd CA, Bornmann W, Erdjument BH, Tempst P, Pavletich N, Nathan CF, et al. Heat shock Protein 90 Mediates Macrophage Activation by taxol and bacterial lipopolysacharide. Prot Natl Acad Sci. 1999:11;96(10):5645.
7. Carville K. Wound care: manual. 5th ed. Osborne Park:Silver Chain Foundation; 2007:20-9
8. Casey. G. Modern wound dressings. Nurs Stand. 2000;15(5):47-51.
9. Clayton W, Elasy TA. A Review of the Pathophysiology, Classification, and Treatment of Foot Ulcers in Diabetic Patients. Clinical Daibetes. 2009;27:2:52-8.
10. Cresswell JW. Qualitative enquiry and research design: choosing among five approaches. Thousand Oaks: sage Publicatuon Ltd. 2013.
11. Fernandez R, Griffiths R. Water for wound cleansing, Cochrane Database of Systematic Reviews, Issue 2. Art. No. CD003861.
12. Fernandez R, Griffiths R, Ussia C. The effectiveness of solutions, techniques and pressure in woundcleansing. JBI Reports. 2004:2(7):231-70.
13. Gitaraja SW. Series Integrated Wound Care - Care Diabetic foot ulcer, Bogor: WOCARE Publishing. 2008.
14. Grace PA, Neil RB. Surgery at a Glance. Erland. 2006.
15. Haimowitz JE, Margolis DM. Moist wound healing, In: Krasner D, Kane, D. chronic wound care, second edition. Wayne, PA: Health Management Publications, Inc. 1997.
16. Hartmann Compedium. Wounds and Wound Management, First Hartmann Medical Edition. 1999.
17. Hutchinson J. Phase of wound healings. [Online]. 1992 [Cited 2010 april 20]. Availabel from; URL http://www.clinimed.co.uk/ wound-care/ education/ wound-essentials/ phases-of-wound-healing.aspx.
18. Kartika RW. Perwatan Chronic Wound Dressing with Modern. CDK-2015;42(7):230.
19. Levin MEC. Pathogenesis and Management of Diabetic Foot lesions. In the Diabetic Foot. Eds: Levin ME, O'Neal MW. And Bowker JF. Figh ed.st. louis, Mosby Book. 1993.
20. Miguel SL, Bou Torra I, Soriano, Verdu J. Economics of pressure-ulcer care: review of the literature on modern versus traditional dressings. J wound care. 2007:16.
21. Naude SL. Diabetes Diagnosis and Management of Diabetic Foot Ulcer. Professsional Nursing Today. 2005;9(6).
22. Ovington LG. Hanging Wet-to-Dry Dressings Out to Dry. J Adv Skin Wound Care. 2002;15:79-84.
23. Perdanakusuma DS. The Role of Surgery in Debridement, Department / SMF Plastic Surgery, Faculty of Medicine, University of Airlangga / Dr Soetomo Hospital, Surabaya. 2007.
24. Price. Pathophysiology, concept of diseases. EGC. Jakarta. 2005.
25. Basic Health Research (Riskesdas) Jakarta. Agency for Health Research and Development Ministry of Health. 2013.
26. Ropper R. Principles of wound assessment and management. Practice Nurse. 2006:31:4
27. Sheehan, Peter. Percent Change in Wound Area of Diabetic Foot Ulcer Over a 4-week Period is a Robust Predictor of Complete Healing in a 12- week Prospective Trial. (http://www.medscape.com/, diakses tanggal 17 Januari 2003.
28. Semer NB. Free HELP To Basics Wound care. Global HELP Organization. UCLA. 2013.
29. Theoret CL. Clinical technique sinequine practice. 3rd ed. 2004. Chapter 2: 110-22.
30. Walton, Robert L. (Wound Care and People with Multiple Sores, Translations: Sonny Samsudin, Moulds I. Jakarta: EGC. 1990.
31. Wayne PA, Flanagan. Managing chronic wound pain in primary care. Practice Nursing. 2006;31:12.
32. Yin RK. Case Study Research: Design and Mothods, 3rd edn. Thousand Oaks: Sage. 2009.

Cite this article as: Rohmayanti, Handayani E. Modern wound care application in diabetic wound management. Int J Res Med Sci 2017;5:702-6.