

Support Granulation using Acupuncture Method: Diabetic Foot Ulcer Case Study

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Abstract:-

Introduction: Indonesia is the country with the fourth most diabetes mellitus patient in the world after India, China, and the United States, 12 million patient and is expected to increase to 21.3 million in 2030. Diabetic foot ulcers (DFU) is a complication of diabetes that is hard to heal and can even end in amputation due to infection cause of not handled properly. The incidence of diabetic foot ulcers reaches 25% and the overall prevalence reaches 6.3% of all diabetes mellitus patients in each country (JWC Int, 2018). The UK reports the effect of diabetes mellitus 20% on diabetic foot ulcers (National Health Service Diabetes Care, 2013). The incidence of diabetic foot ulcers in the United States is 15% - 20%, with the risk of amputation 15-46 times higher than non-diabetic. The concept of moist wound healing with modern dressings has become the main foundation in wound care and then acupuncture support therapy can be used as additional therapy to supporting granulation in wound healing process. Acupuncture is a traditional Chinese medicine therapy using needles that are inserted into the acupoint.

Methods: A case study of a 61-year-old man who had a diabetic foot ulcers on the left leg of M. Gastronemius lateral after surgery who had sloughy, with the concept of modern wound care dressings, he found regrowth of granulation tissue and used acupuncture method to support granulation cells to grow faster. Proliferation spreads towards epithelialization which is effective enough to be used as additional therapy in cases of diabetic foot ulcers.

Results: The effectiveness was quite visible in the repair of fast-growing granulation cells, good revascularization to distal wound using acupuncture methods for diabetic foot ulcers after 2 weeks wound care in every 3 days.

Conclusion: Acupuncture therapy as an additional therapy in the treatment of diabetic foot ulcers is quite effective in increasing the amount of granulation cells towards epithelialization in the proliferative phase.

Keywords:- Granulation, DFU Treatment, Acupuncture.

I. INTRODUCTION

Diabetes mellitus is not a taboo subject in society, almost everyone knows diabetes mellitus or diabetes, which is considered the cause of all health problems whose complications are very large, so that they will experience a worse condition when a person with this disease pays less attention to his physical condition related to lifestyle and bad diet. Changes in people's lifestyles now because they tend to think it's easy to get food so that it will trigger an increase in the prevalence of diabetes mellitus. The organization that concentrates on the diabetes mellitus forum, The American Diabetes Association (ADA, 2017) explains that Diabetes mellitus is a group of metabolic diseases with characteristics of increased blood glucose levels (hyperglycemia) exceeding the value of blood sugar levels above 180 mg/dl caused by abnormal insulin secretions, impaired insulin action or both. Data from the World Health Organization (WHO) shows that Indonesia is the country with the fourth most Diabetes Mellitus (DM) patient in the world after India, China and the United States, with a total of 12 million patient and is expected to increase to 21.3 million in 2030 (Sonta Imelda, 2018). The 7th edition of the Diabetes Atlas 2015 from the IDF states that from a record 220 countries around the world, the number of people with diabetes is expected to increase from 415 million people in 2015 to 642 million in 2040. Almost half of this figure is in Asia, mainly in Asia. India, China, Pakistan and Indonesia. The terrifying fact is that 1 person per 6 seconds or 10 people per minute dies from diabetes, and diabetes claimed the lives of 5 million adults in 2015.

Countries in the Asian region, more than 5% (some even reach 85%) of diabetics have the same experience. Singapore, which has developed health services, has a prevalence rate of 20%. This ignorance is caused most diabetes diseases continue without complaints for several years, after complications arise, see a doctor (Hans Tandra, 2018) in other words that early examinations are rarely carried out by the community to identify health problems that occur. In Indonesia, based on a doctor's diagnosis at Riskesdas in 2018, the province that suffered the most DM was Jakarta as many as 2.6% of the population. So many health problems related to diabetes mellitus are found, there is a risk of complications becoming wounds that are hard to heal.

Along with the increase in the number of cases, it is easy for complications to occur, that are hard to heal wounds (WOCN, 2016). Diabetic Foot Ulcers (DFU) are reported have 25% incidence and an overall prevalence 6.3% of patients with diabetes mellitus in each country (JWC Int, 2018). The UK is a developed country in the European region reporting 20% of the effects of diabetes mellitus 20%

to diabetic foot ulcers (National Health Service Diabetes care, 2013). Diabetic foot ulcers are a condition of lower leg wounds with complications due to diabetes (Wounds Int, 2013).

The problem of diabetes is the main concentration of countries in the world because of its worsening effect of lower leg injuries, which occurs due to neuropathy problems or loss of sense, it will cause callus on the foot skin and changes in bone shape so that it will cause thin skin and blisters without realizing it. The condition continues, it will get worse because the wound becomes infected and wrong handling or incorrect of wound care, even worse, it over become to limb amputation.

It is reported that the incidence of diabetic foot ulcers reaches 25% and the overall prevalence reaches 6.3% of all diabetes mellitus patients in each country (JWC Int, 2018). The UK reports the effect of diabetes mellitus 20% on diabetic foot ulcers (National Health Service Diabetes Care, 2013). Incidence DFU in USA 15% - 20% risk of leg amputation 15 - 46 times higher than not a diabetic patient. According to data from the Indonesian Ministry of Health, 2018 that diabetes which will cause leg ulcers and accompanied by gangrene reaches 17% - 23% while the 1-year mortality rate after amputation is 14.8% and increases to 37%. According to Sulistyowati (2015) the number of patients with diabetic foot ulcers is around 15%, patients at risk of amputation are 30% with a mortality rate of 32%.

Wound is a condition where tissue damage occurs due to several causes including trauma, surgery, pressure, malignancy and vascular problems, then the body will protect itself by carrying out the wound healing process (Patrakusuma. D, 2018). Wounds are abnormalities in the normal structure and function of the skin and underlying soft tissue that occur due to pressure, infection, trauma and the surgical process (WOCN, 2016). Therefore, we cannot predict when an injury will occur, for example accidents that are classified as acute injuries and wounds due to complications that fail in the healing process are called chronic wounds. Wounds must receive appropriate wound care, both in the cleansing process and in choosing the right dressing according to the condition of the wound.

The normal stages in the wound healing process are hemostasis or the coagulation process, inflammation, proliferation or regeneration and maturation or remodeling. Wound care will follow the phases and the healing process so it must be done in the right way. The concept that is believed and recognized to follow the process in wound care that is known today is a closed concept with modern dressing. This concept was put forward by experts in wound care known as moist wound healing (Schultz, 1993; WOCN, 2014, 2016) or the wound healing process with the concept of moisture balance. The theory first introduced by George D. Winter in 1962. This concept was first published in the journal Nature as follows "When the wound condition is closed, the healing rate is twice faster than the open condition".

A guide in helping to solve the problem of foot ulcers due to diabetes mellitus, of course, there are many multidisciplinary professional team involved, such as internists or endocrinology, vascular surgeons, orthopedic surgeons, diabetes nurses, wound care nurses, psychologists, nutritionists, physiotherapists, pharmacists, podiatrists (EWMA, 2014). Each discipline brings guidance in the patient's healing process that is focused on all lines of promotion, prevention, curative, rehabilitative. Treatment program efforts after a problem occurs, for example a wound complication that infection occurs, it is necessary to involve the treatment of infection with antibiotics, fluid rehydration, proper nutrition, appropriate wound care, antidiabetic drugs that are in accordance with the body's tolerance and do not rule out the possibility of supporting treatment actions as adjuvant therapy for diabetic foot ulcers by acupuncture treatment.

Non-pharmacological treatment model of acupuncture is quite reliable in helping with problems in diabetic foot ulcers to stimulate the process of cell granulation in the proliferative phase towards epithelialization which is quite effective. Acupuncture is a critical component in traditional Chinese medicine that has been used since thousands of years ago by using needles for the treatment of several diseases including vascular problems by inserting needles into the acupoints of the body to correct diabetic neuropathy problems (Lee Maosheng, 2020). The journal published by Lee et al, that acupuncture therapy is very effective for diabetic foot ulcers because in addition to stimulating the vascular system to affect the distal circulation and wound area, it can also stimulate the growth of new tissue. Another study related to acupuncture was carried out by Irma N, 2017 by modifying the acupuncture technique at the acupoint point using laser puncture which is quite effective in helping the healing process of diabetic foot ulcers as evidenced by the wound area of 4 cm in 2 weeks using therapy the size is reduced to 2 cm.

II. METHOD

Case study: A 60-year-old man, ulcers on his left leg lateral to the lateral Gastrocnemius, size 15cm x 4.5cm After 10 days of surgery, the wound started with a carbuncle after surgical incision was made at the hospital to open the area of infection. Problems occur when the wound after surgery is sloughy (necrotic yellow tissue) because the wound is covered with gauze.

Wound assessment; Wound area M. Lateral Gastrocnemius sinistra unstageable stage 15cm x 4.5cm sloughy 100%, dry, no odor, dry and inflamed skin around the wound, positive neuropathy test on left and right feet.

Wound care management; for 1 week (3 times wound care) using hydrogel dressing sloughy can be evacuated and stage 4, 100% granulation tissue, moist conditions (sufficiently rehydrated). The 4th meeting of the proliferative phase of wound care, after cleansing the wound, electric stimulator acupuncture therapy was added for 20 minutes in the area around the wound to stimulate the gastrocnemius muscle to contract so as to increase

vascularization to the wound area, maximize in epithelial contraction wound edge more visible.

After the acupuncture procedure, the wound was closed with a modern moist concept of iodisorb dressing as antimicrobial topical dressing, hydrofoam and cohesive bandage compression. The acupuncture technique was carried out at every wound care meeting, every 3 days after cleansing the wound.



Fig. 1: Pre acupuncture procedures



Fig. 2: Acupuncture treatment

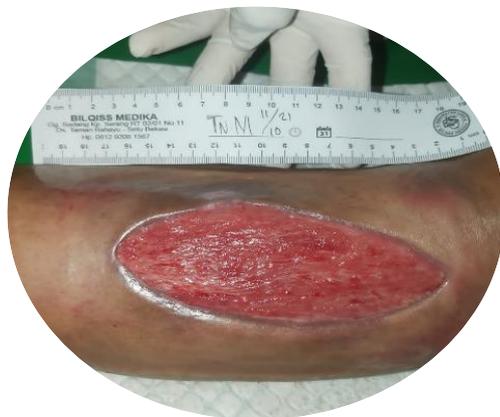


Fig. 3: Post acupuncture application

III. RESULTS

Acupuncture technique with electrical stimulator in assisting the process of treating diabetic foot ulcers is quite effective in increasing the growth of granulation tissue in the proliferative phase and supporting neo-angiogenesis process. The process of improvement is evidenced by an increase in the amount of granulation cells at the base of the wound and an increasing amount of epithelialization at the edges of the wound more visible and the growing vascularity is stimulated by contraction of the gastronemius muscle using an electrical stimulator so that with three times of modern wound care dressings added acupuncture therapy is better condition.

IV. CONCLUSION

Diabetic foot ulcers (DFUs) are a worsening complication of health problems caused by diabetes mellitus. Diabetic foot ulcers must of course get more attention in the handling or management of wound care and multidisciplinary professionals team to help the wound healing process properly and appropriately. Management is related to pharmacology for proper antidiabetic, good nutrition and adequate supplements, correct wound care techniques and selection of appropriate dressings with closed concept as well as supportive therapy or adjuvant wound healing and one that can be used is therapeutic acupuncture.

Acupuncture therapy using an effective electrical stimulator to help the healing process of diabetic foot ulcers as an additional option to increase granulation cells growth in the proliferation phase and increase vascularization to the distal wound area and successfully lead to the epithelialization process. The case study above shows that by doing three times acupuncture therapy in the wound care process there is an improvement in diabetic foot ulcers.

REFERENCES

- [1.] Atkin L, Cutting FK, Romanelli M. *Implementing TIMERS: The race against hard – to – heal wounds*. UK: JWC International Consensus Document; 2019.
- [2.] Bilqiss Medika dokumen; 2021.
- [3.] Bryant RA. *Acute and Chronic Wound currant Management concepts*. Fifth Edition. Washington (USA): Elsevier; 2012.
- [4.] Carville K. *Woundcare Manual Book*. Australia: Silver Chain Foundation 6th Edition; 2014.
- [5.] Cameron DH, Mailbach. *Effect of air exposure and occlusion on experimental human skin wounds*. Nature 200; 1963.p.377-378.
- [6.] Dowsett, Gronemann, Harding. *Taking wound assessment beyond the edge*. Wounds International; 2015. vol. 6 issue 1.
- [7.] International Wound Infection Institute. *Wound infection in clinical practice*. London (UK): International consencus update Med Ltd. 2016.
- [8.] Lee maoseng et al (2020) Acupuncture as adjuvant therapy for diabetic foot a protocol for systematic review. Medicine 2020; 99: 12 (e19502).

- [9.] MC Nichole L. *Wound Management: Wound Ostomy & Continence Nurse Society*. Philadelphia (USA): Wolter Klower; 2016.
- [10.] Nair H. *Study evaluating the efficacy of modified collagen with glycerin in periwound skin management*. Malaysia: Kuala Lumpur Hospital; 2015.
- [11.] Nareswari Irma, SrilestariAdiningsih, Simadibrata Christiana, Tarigan Tri J.E. Effectiveness of Combined Laser- puncture and Conventional Wound Care to Accelerate Diabetic Foot Ulcers Healing. *Medical Journal of Indonesia*. Vol 26 No.1 (2017).
- [12.] NICE Clinical GuideLines CG168. *Vericose Veins In The Legs: The Diagnosis And Management Of Vericose Veins*. UK: National Clinical GuideLines Centre; 2013.
- [13.] Notoatmodjo S. *Metodologi penelitian kesehatan*. Edisi revisi cetakan kedua. Jakarta: Penerbit Rineka cipta; 2012.
- [14.] Ousey Karen. *Identifying and Treating Foot Ulcers In Patient With Diabetes: Saving Feet, Leg and Lives*. UK: Journal Wound Care International Consensus Documen; 2018. P. 27(5 Suppl 5b)
- [15.] Palmieri B, Vadala M, *Nutrition In Wound Healing: Investigation Of The Molecular Mechanisms a Narative Review*. *Journal Wound Care*; 2019.Vol. 28.No 10. p. 683-684.
- [16.] Patel G. *The Importance of the skin barrier in managing periwound areas*. *Wounds International Journal*; 2011.vol.2.
- [17.] Prasetyono TOH. *Clinical Guide For Wound Care*. Jakarta: Penerbit Buku Kedokteran (EGC); 2018.
- [18.] Scemons D, Elston D. *Nurse To Nurse Wound Care*. Expert Intervention. USA: Mc Graw Hill; 2009.
- [19.] Zang You-jie, Liu Fang-rong. Effectiveness of Acupuncture for Treatment of Diabetic Peripheral Neuropathy. *Medicine*. 98(39):e17282. DOI:10.1097/MD.0000000000017282.
- [20.] Winter GD (1962). *Formation of the scab and The rate of epithelization of superficial wounds in the skin of the young domestic*. *Pig Nature*; 1962. p.193, p.293-294.