The Effect of Ozone Therapy on The Phase of Diabetic Wound Healing in Patient With Diabetes Mellitus at Alhuda Wound Care Clinic in Lhokseumawe

Alhuda[1], L Lumban Gaol[1], T Parlindungan[1], Rosmalina[1], C Dara Phonna[1], T Sari[1] and Wahyu Lestari[2]
{alhuda_ahonk@yahoo.com}

[1]Department of Health Nursing, Akademi Keperawatan Kesdam Iskandar Muda, Lhokseumawe, Indonesia
[2]Department of Skin and Sex Sciences, Universitas Syiah Kuala, Aceh, Indonesia

Abstract. This study aims to see whether there is an effect of ozone therapy on the wound healing phase of diabetic ulcers in patients with diabetes mellitus at Al Huda Woundcare Clinic Lhokseumawe City in 2016. This research is quassy experiment with samples in this study amounted to 20 patients diabetes mellitus at Al Huda Woundcare Clinic Lhokseumawe City. This research was conducted from 04 until 18 October 2016. Sampling by total sampling method. The analysis used paired t-test (dependent). The result of this research is the age of patient of diabetes mellitus patient at Al Huda Woundcare Clinic of Lhokseumawe city most of the aged between 56-65 years as many as 12 respondents (60,0%) and gender of patient of diabetes mellitus mostly female are 11 respondent (55,0%) . The result of paired t test is obtained p-value 0.000 $<\alpha = 0,05$. This shows that there is influence of ozone therapy to phase wound healing diabetic ulcer in patient of diabetes mellitus at Al Huda Woundcare Clinic of Lhokseumawe City 2016. The results of this study can provide benefits for the community, especially reponden that as an input that ozone therapy can serve as a new treatment alternative in addressing the problems of diabetic wounds with modern wound care so convincing to the public that diabetic wounds can be cured.

Keywords: Ozone Therapy, Injuries, Diabetic Injuries

1 INTRODUCTION

Diabetes melitus isknown diseases caused by chronic disorders, especially in the system of metabolism carbohidrate, fat and also protein in the body.

Metabolic disorders are caused by a lack of production of insulin hormone, which is needed in the process of converting sugar into energy and fat synthesis. Such condition result in the occurence of hyperglycemia, namely the increasenin blood sugar levels or the presence of sugar content in urine and ketone subtences and excessive acids.

Diabetes melitus (DM) is health problem that needs to be handled thoroughly DM prevalence increases annually, especially in high risk groups. Uncontrolled DM can lead to

WMA-1 2018, January 20-21, Indonesia

DOI 10.4108/eai.20-1-2018.2282083

metabolic complication or long term vascular complications, namely microangiopathy and microangiopathy. Diabetics are also susceptible to wound foot infection which can then develop into gangrene, thus increasing cases of amputation. According to World Health Organization (WHO) reports the patient's average adherence to long term theraphy against chronic diseases in developed countries is only 50% and in developing countries the number is even lower.In 2015 the number of diabetes sufferers is the world reaches 415 million people. Of which 50% counscius sufferers and about 30% of them regularly treated [1].

The process of accurrence of diabetic foot begins with angiopathy and neuropathy infection. Neuropathy caused a sensory disorder that eliminates or decreases the sensation of foot pain, so that ulcers can occur unnoticed. Motor disorders cause leg atrophy thus altering the fulcrum leading to foot ulceration. Angiopathy will interfere with blood flow to the leg, the patient may feel leg pain after walking with in a certain distance. Infection is often a complication due tro reduced blood flow or neuropathy.

Diabetic ulcers can become diabetic foot gangrene. Diabetic feet require long healing time and conprehensive multidisciplinary handling, ranging, and revascularization surgery, but to date none have satisfactory. This encourages the search for methods that stimulate the acceleration of wound healing, one with the method of ozone theraphy. The use of ozone as a complementary/alternative theraphy is now popular in indonesia and has been used since 1992 as a molecule that has enourmous energy. Ozone can meninaktifikasi bacteria, viruses, fungi and some tipes of protozoa, this can happen because of the ion, ion radical ozone degradation results in water in the form of hidrogen peroxide (HO2) and hydroxyl (HO) [2].

The infection of ozone in healding diabetic wounds is antimicrobial, it is generally belived that bacteria are destroyed by the protoplasm oxidation process. The oxidation of protoplasm will damaged the capsid or outer skin of the microorganism, which comprises an unsaturated bond of phostolipid or lipoprotein, then penetrates into the cell membrane acts with cytoplasmic substances and converting a closed DNA plasmid cycles into an open DNA crystal, which can reduce the efficiency of bacterial politation, directly effect cytoplasmatic integrity and impair some degree of metabolic complexity.

Based on research conducted by Anichini et.al.; on the effects of local ozone therapy on diabetic foot ulcers treated on 34 clients, reported 53% clientsoutcomes were cured in 20 weeks, 34% clients experienced a reduction in surface area of more then 50% [3].

Another study was conducted by Megawati et.al., on the effectiveness of modern modification dressing and ozone therapy wound healing in patients with pressure ulcer in wocare clinic bogor conducted on 16 clients, devided into two groups . It's treatment groups and groups control [4].

The result of the study in the use of modern modification of dressing and ozone therapy more effectively to wound healing compared to use modern dressing alone in patients with pressure ulcers. Bassed on a preliminary survey that researchers conducted with two nurses at the Alhuda

Wound Care Clinic in Lhokseumawe. The nurse said every patients who is treated is advised to take ozone therapy and treat wound at least 5-8 times.

Some patients who do therapy, when they feel the condition of the wound is better, the patient doesn't come or break the therapy and sometimes they come back when the wound conditions worsen. After that, the patient rountinely to follow oxyen ozone therapy, until the the wound healed.

Early interviews that researchs did with three patients said they choose ozone therapy because it was suggested by family members and health workers and the patient said wound

healing was faster with ozone therapy. The nember of visits of patients who come to therapy is amounted to 8 to 10 peolpe/day.

Based on this background, research is conducted to determine the effect of ozone therapy on diabetic wound healing face in patients with diabetes mellitus at AL Huda Wound Care Clinic of Lhokseumawe city in 2016.

2 METHODS

The research design used was quassy experiment. The study was conducted at AL Huda Wound Care Clinic In Lhokseumawe. The population in this study were all patients with diabetes mellitus with diabetic wounds from january to august 2016 as many as 101 people. According to Dempsey for studying was done univariate [5].

3 Results

The result of research of respondents characteristic is found that most of respondent age between 56-65 years old is 12 respondents (60,0%) and female is 11 respondents (55,0%), it can see on the first table.

Table 1. Distribution of Frequency Characteristics of Respondents.

No.	Characteristics	f	%
1.	Age		
	46-55 years	8	40,0
	56-65 years	12	60,0
	Genders		
2.	Man	9	45,0
	Women	11	55,o
	Total	20	100

Pre and post ozone therapy can known that phase wound healling diabetics before (pre-test) given ozone theraphy mostly in the inflammatory phase as much as 13 respondents (65,0%) and after given partial ozone therapy big on phase as much poliferation 8 respondents (40,0%) can be seen on table 2.

Table 2. Pre Post Ozone Therapy (n=20)

No	Fase	Pre-	test	Post-	Test
		N	%	N	%
1.	Inflammation	13	65,0	7	35,0
2.	Poliferation	15	25,0	8	40,0
3	Remodelling	2	100	5	25,0
	Totality	20	100	20	100

Simple with a regorous experiment, can use a minimun sample size of 10 to 20 subject. Samples in this study were 20 patients with diabetes mellitus with diabetic wounds.

The influence of ozone therapy taking the healing phase of diabetik wounds in patients with diabetes mellitus.

The result of statistical test shows that the value of p value 0,000 ($p<0,05$) so that it can concluded that there is a difference between diabetic injury before ozone therapy is given with diabetic wound after given ozone therapy with t value = 12, 073 > t table = 1,724 with q= 0,05 then ho rejected, thus ha accepted.

It can be concluded that there is an effect of ozone therapy on the phase of diabetic wound healing in patient with diabetes mellitus at Al Huda Woundcare clinic in Lhokseumawe city 2017 (Ha accept).

Table 3. Pre Post Ozone Therapy (n=20)

No	Variable	Mean	Standart Deviation	Standart Error	P value	N	t
1	The wound Diabetic before azone therapy is given	48,65	8,00	1,811			
2	The Wound diabetic after ozone therpy	37,05	9,960	2,227	0,000	20	12,07

4 DISCUSSIONS

The effect of ozone therapy on healing phaseof diabetic healing on diabetes mellittus patient.

The result showed that there was an effect of ozone therapy on diabetic wound healing phase in diabetes mellitus patient Al Huda Woundcare Clinic In Lhokseumawe city before and after ozone therapy, with data analysis (Pairred T Test), obtained P-Value 0,000 shows a value less than α =0,005.

Diabetic feet requiry long healing time and comprehensive multidiciplinary handling, ranging from blood glucose control, daily local wound care, antibiotic therapy, and revascularization surgery, but to date none have been satisfactory.

This encourages the search for methods that stimulate the accaleration of wound healing, one with the methode of ozone therapy.ozone therapy in addition to being used as an atiseptic, ozone is also said to have antiviral, anty fungal, and antiprotozoa effects. Ozone is able to oxidize various type of bacteria, spores,fungi, yeasts, and other organic matter. The ozone effect on bacteria is to integration of bacteria cell capsules by oxidation of phospolipids and lipoproteins, then penetrate into cell membranes, react with cytoplassmic substances and convert circulates of closed DNA, plasmic into opened DA circulate which can reduce the effecincy of bacterial prolifaration, directly effect cytoplasmic integrity and distupts some degree of netabolic complexity. In addition, ozone can also improve the distribution of oxygen and the release of growth factors are usefull in accelerating wound healing [6].

Based on research result, it is known that 55% patient are diabetic wounded female. This is accordance with research by Ferawati which show s hormoral changes in women entering of menopouse [7]. According to researchers, gender is one of the risk factors for the occurence of wound diabetic especiallly for the women.

The results of this study indicate that patients with diabetic injuries are most prevalent in the age group of 56 to 65 years as many as 60% . According Lipsky, on of the risk factors are

diabetic ulcers is age, where age is a factors taht cannot be changed [8]. The older the age, the physicological function of the body decreased. According to researhers, age is closely related to the increase in blood sugar levels, so the more age increases the higher the prevalence of diabetes.

Research conducted by Megawati et.al. [4] on the effectiveness of modern modification dressing and ozone therapy on wound healing in patients with pressure ulcers in Wocare Clinic Bogor conducted on 16 clients, devided into two group namely the treatment group and the control group. The result of this study is the use of modern modification dressing and ozone therapy more effective againts wound healing compared with the use of modern dressing alone in patient with pressure ulcers.

Another research conducted by Restuningtyas [9], there is the effect of combination of modern wound care with ozone bagging on diabetic ulcer healing process in client diabetes mellitus at Nurmalam Jember Hospital with P value 0.000 < 0,05.

Based on the result of the study, it can be concluded that the effect of ozone therapy on diabetic wound healing process in patients with diabetes mellitus in accelerating wound healing not only required primary therapy but also required additional therapy or referred to as complementary therapy, one of which is ozone therapy.

5 Conclusions

Based on the result of tthis research, the result of this research can be concluded the phase of diabetic wound healing before (pre-test) was given as many as 13 respondents (65,0%) ozone therapy on inflamatory phase. Phase of diabetic wound healing after (post-test) was given ozone therapy as many as 12 respondents (60,0 %) in the remodeling phase. There is an effect of ozone therapy on the healing phase of diabetic ulcer wounds in patients with diabetes mellitus at Alhuda Woundcare Clinic in Lhokseumawe city 2016 with data analysis (Paired T Test) obtained value P-Value 0,000 < $\alpha = 0,05$.

References

[1] WHO, “Diabetes; fact sheet, department of sustainable development and healthy environments, regional office for sputh-east asia,” 2016. [Online]. Available: https://www.who.int/. [Accessed: 01-Oct-2017].

[2] N. A. Zafhira, “Pengaruh waktu inkubasi dan dosis ozon pada disinfeksi hama bakteri xanthomona oryzae pv oryzae dengan kombinasi proses ozonisasi dan adsorpsi dengan zeolit alam,” Universitas Indonesia, 2012.

[3] R. Anichini *et al.*, “ozone-therapy in treatment of diabetic foot ulcers: a suggestive approach in wound bed preparation: 199,” *Eur. J. Clin. Investig. Suppl.*, vol. 33, pp. 46–47, 2003.

[4] V. N. Megawati, H. M. Hakimi, and S. Sumaryani, “Efektifitas modifikasi modern dressing dan terapi ozon terhadap penyembuhan luka pada pasien dengan pressure ulcer di Wocare Clinic Bogor.” 2015.

[5] P. A. Dempsey, *Riset Keperawatan: Buku Ajar dan Latihan/Penulis*. Jakarta: EGC, 2007.

[6] A. Dewiyanti, H. Ratnawati, and S. Puradisastra, “Perbandingan Pengaruh Ozon, Getah Jarak Cina (Jatropha Multifida L.) dan Povidone Iodine 10% terhadap Waktu Penyembuhan Luka

pada Mencit Betina Galur Swiss Webster," *Maranatha J. Med. Heal.*, vol. 8, no. 2, 2009.
[7] I. Ferawati, "Faktor-Faktor Yang Mempengaruhi Terjadinya Ulkus Diabetikum Pada Pasien Diabetes Melitus Tipe 2 Di Rsud Prof. Dr. Margono Soekarjo Purwokerto." Skripsi. Purwokerto. Kementerian Pendidikan Dan Kebudayaan Universitas …, 2014.
[8] B. A. Lipsky *et al.*, "2012 Infectious Diseases Society of America clinical practice guideline for the diagnosis and treatment of diabetic foot infections," *Clin. Infect. Dis.*, vol. 54, no. 12, pp. e132–e173, 2012.
[9] A. Restuningtyas, "Pengaruh kombinasi perawatan luka modern dengan ozon bagging terhadap proses penyembuhan ulkus kaki daibetik pada klien diabetes mellitus di Rumah Rawat Luka Nirmala Jember," Universitas Jember, 2016.