

Review Article

THE EFFECT OF ALOE VERA COMPRESS ON THE INJECTION AREA OF INFUSION TO PHLEBITIS INCIDENCES IN LOCAL GOVERNMENT HOSPITAL IN INDONESIA

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Received: 10.12.2019

Revised: 12.01.2020

Accepted: 18.02.2020

Abstract

This study aims to analyze the effect of Aloe Vera compress on the injection area of infusion toward phlebitis event in RSUD Dr. Soetijono Blora. This research uses a quantitative approach with the application of descriptive methods and explanations. Data and information were collected using phlebitis event questionnaire to 60 respondents that divided into intervention and control groups. The data of them were analyzed by paired t-test of statistical program. This study concludes that Aloe Vera compress was effective to maintenance of infusion injection area so it can be applied for nursing intervention in the patient especially in the RSUD Dr. Soetijono Blora.

Keywords: Aloe Vera, infusion, phlebitis.

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PRELIMINARY

Research Background

The incidence of phlebitis is an indicator of the hospital services quality because it is one kind of nosocomial infection. The hospital or health facilities operational licenses can be stopped if their prevalence of nosocomial infection is overabundance not controlled. Actually, it can be detected after ± 72 hours hospitalization. Medical team must be caring carefully. If the accident occurs, it will give negative impact not only for hospital but also patients and their families.

The government decided the laws of nosocomial infection prevention in hospital and health facilities. Moreover the ministry of health decides maximum standard of nosocomial infection incident is ≤ 1, 5 %. But the incident of it becomes base problem because it causes 1.4 million mortalities every day in the world. WHO described the prevalence of nosocomial infection reached 8.7% from 55 hospital in 14 countries such as Europe, Middle East, Southeast Asia and The Pacific. The Southeast Asia gained it 10%. Actually at developing countries such as India gained it 27.91%, Iran 14.20%, Malaysia 12.7%, Philippine 10.10% and Indonesia 9.80%. In Indonesia, it happened 50.11% in government hospitals and 32.7% in private hospitals.¹⁴ The last research in one of central java hospital shows the phlebitis incident from January at 2.22% and become 3.41% in May. It proves those phlebitis incidents was increasing and go above of standard.¹⁵

Phlebitis can be detected as the condition of redness, edema, hot and pain sensation of skin. Factors causing phlebitis include chemical factors (drugs, infusion irritants for veins), mechanical factors (size and material of intravenous catheter, location and duration of infusion assembly), bacterial factors (techniques and materials that are inadequate for infection), internal factors of patients include age, disease status and basic conditions of the disease (diabetes mellitus and immunosuppressant). Phlebitis occur as tunica intima of capillary vein inflammation and trombositis sticking.^{1,2}

The incident of it causes more length of stay (LOS) that causes increasing of drugs uses, additional laboratory checkup, isolation needs, and diagnostic test. All of them cause increasing of health care cost. In long term, it causes infection disease spread until mortality cases.¹² Moreover, the patients suffer financial losses because the insurance refuses payment of their health care cost that caused by nosocomial infection.¹⁴

One of the efforts to prevent *phlebitis* from bacterial factors is *intravenous catheter dressing* combined by *oleo vera* in the injection area of infusion. It can blocked microorganism development which cause phlebitis incident.

Aloe Vera contains anti-inflammatory substances such as lignin, saponin, anthraquinone complex, acemannan, bradikinese enzyme, tenin, aloctin A, amino acid, vitamins and salisilat. Lignin can be used as topical therapy for because its ability for absorbing into skin. Moreover the substances such as saponin, tenin and salisilat have antiseptic function. Besides that, Aloe Vera is analgesic therapy because it blocks migration of PMN cell (neutrofil) to inflammatory vein tissues, so inflammation process is inhibit. Amino acid, glycoprotein and Aloeemodin in Aloe Vera accelerate accelerates the development of new cells in the regeneration process of blood vessel epithelium.

The benefits of Aloe Vera substance have not been utilized in the hospital or health facilities especially at RSUD Dr. Soetidjono Blora. Actually, it can be used as topical therapy for injection area of infusion treatment so it can controls of phlebitis incident. Currently, they use transparent film dressing for injection area treatment but still produced phlebitis incidents. The result of the initial survey on 2008 that conducted by researches, phlebitis incident gained 0.14% in the first quarter, increased become 0.28% in second quarter, decreased in third quarter as 0.27% , 0.26% in the last quarter. On January 2019, there were 12 phlebitis patients (0.04%) of 2910 infused patients, ; increase on February there were 8 phlebitis patients (0.28%) of 2786 infused patient, and decrease become 0.27% with prevalence 8 phlebitis patients from 2873 infused patients.

However, there are so many phlebitis incident occur in those hospital. Thus, this study was conducted to determine better treatment for decreasing phlebitis incidences using aloe vera compress in the injection area of infusion especially in RSUD Dr. Soetijono Blora.

RESEARCH METHODS

Research Design

Quantitative study approach was adopted for this study. Experimental pre-test post-test design was selected on 60 people that divided into 30 peoples was experimental and others were control group. The experimental group was a

group that used transparent intravenous dressing plus aloe vera compress while the control group was a group that used transparent intravenous dressing. Furthermore, each group will be observed (*post-test*) for 3 days to find out if there are differences in the incidence of phlebitis.

This design was chosen for referring the research objective which is to find the effect of aloe vera compress on the injection area of infusion towards the phlebitis incidence in RSUD Dr. Soetijono Blora.

Research Variables and Operational Formulations

This research involves two main variables; there are dependent and independent variables. Dependent variable is phlebitis incidence while independent variable is aloe vera compress on injection area of infusion. Besides that there is control variable in the form of transparent dressing.

To be able for measuring the variables, it is necessary to first conceptually define these variables as follows:

1. Aloe Vera compress is defined as topical gel made of Aloe Vera extract which is smeared in the injection area of infusion before being covered by transparent dressing.
2. Transparent dressing is defined as sterile bandage made of semi permeable polyurethane layer with transparent acrylate adhesive, waterproof and able to maintain oxygen circulation in the skin so as to maintain skin integrity, which is used for covering the injection area of infusion.
3. Phlebitis is defined as inflammation of the inner lining of veins in the injection area of infusion \leq 72 hours due to infusion, which is measured using an observation sheet that contains of phlebitis signs such as redness, pain, swelling, warmth, and venous hardening.

Population and Samples

The community in this study is all patient in RSUD Dr. Soetijono Blora who met the inclusion criteria within 3 months of the study period. The sample size was determined total sampling that is using all population that meet the existing inclusion criteria as research objects. The sampling method used is simple random sampling where samples are taken alternately distinguished by even and odd numbering. Odd numbers are used as a transparent dressing (control group) and even number is used as an aloe vera compress plus transparent dressing (experimental group). Samples were taken must appropriate with inclusion criteria such as their age were 16 - 50 years old, didn't suffer immunosuppressive diseases, got crystalloid fluid therapy, didn't get blood transfusion, not emergency patients and they not suffer from phlebitis.

Data Collection Techniques

The data collection process began in the Emergency room before the patients transferred to ward. Researcher followed the patient until occupied into ward for observation the result of this study (*post test*). The first procedure was submit a permit to conduct research, determine the respondent or family responsible, respondents who agree to become respondents are given an informed *consent form* to be signed by the respondent or responsible family and they became subjects of this study. They were randomly divided into experimental and control group and observed their phlebitis signs using phlebitis observation sheet. In experimental group, the subjects were given aloe vera compress before dressing transparent covered their injection area of infusion. While the control group, they were given transparent dressing for covering their injection area of infusion. Both of them were observed in 3 x 24 hour or 3 days used same tool. In the third day, their phlebitis sign were measured as phlebitis incidence in *post test* data.

Data Analysis Techniques

Data analysis techniques in this study used simple statistical analysis (univariate analysis) and bivariate analysis. Univariate analysis such as frequency table analysis (percentages) while bivariate analysis used paired t-test for

experiment and control group to determine the influence of aloe vera compress toward phlebitis incidence. The influence of it was described by *p* value on statistical program (SPSS for Windows version 18 program). If the analysis result of *p* value was $p \leq 0,05$, so the aloe vera compress give effect or influence toward phlebitis incidence.

RESULTS AND DISCUSSION

Research Results

Table 1. Socio-Demographic Characteristics of study participants

Characteristics	Experimental group (n=30)		Control group (n=30)		Total	
	n	%	n	%	n	%
Gender						
Male	11	36.6	6	20.0	17	28.3
Female	19	63.3	24	80.0	43	71.7
Age (years old)						
20 - 59	25	83.3	14	46.7	39	65.0
60 - 75	5	16.7	16	53.3	21	35.0
Education level						
Senior/Higher	11	36.7	2	6.7	13	21.7
Junior	14	46.7	12	40.0	26	43.3
Elementary	5	16.7	16	53.3	21	35.0

Based on table 1, most of study participants were women (71.7%). The age was mostly in the range 20 - 59 years old (65%). While their education level, most of them finished on junior high school (43.3%).

Table 2. The Influence of Aloe Vera Compress in the Injection Area of Infusion to Phlebitis Incidence

Variable	Experimental group (n=30)		Control group (n=30)		p
	n	%	n	%	
Phlebitis	6	20	13	43.3	0.004
No Phlebitis	24	80	17	56.7	

According to table 2, the phlebitis incidence in experimental group was 6 patients (20%) while the control group was 13(43%). The number of phlebitis incidence in control group was higher than the experimental group. The influence of the intervention was analyzed by independent t-test and the result of it was $p = 0,004$ or $p < 0.05$.

Hypothesis Testing

The results of statistical analysis of the variables studied, independent variables was Aloe Vera compress (X) and the phlebitis incidence (Y) as the dependent variable. Based on the results of independent t-test analysis it was very significant with the value of P (P-value) = 0,004 is smaller than $\alpha = 0.05$, then the hypothesis that the independent variables which is Aloe Vera compress have a significant effect the phlebitis incidence, especially in RSUD Dr. Soetijono Blora, was convincingly accepted.

DISCUSSION

Socio-Demographic Characteristics

Based on the results of univariate analysis found that almost

of phlebitis incidence occurred in female (71.7%). Phlebitis occurs more frequently in female due to smaller female blood vessels, large fat deposits and female hormones (estrogen and progesterone) that affect blood vessels integrity. While in male, their blood vessels fewer fat deposits because of their high activity so they not too risky in phlebitis incidence.¹¹

According to this study, almost of participants ages were 20 – 59 years (65%). The previous study not found the relation between age and phlebitis incidences. Theoretically, as we get older make physical and biological function changes. One of physical change is decreasing the immune system which has function of helping infection prevention that caused by fungi, bacteria, viruses and other microorganism with produce antibodies (a type of protein that called immunoglobulin).² It also occurs in people's age more than 60 years old, whereas their veins are fragile, not elastic and easy for losing (collapsed) which will affect incidence phlebitis.¹³

Most of study participants finished their education level in junior high school. There is no study was found that described the relation between education level with phlebitis incidences. But their infusion treatments need the knowledge, skill and awareness for preventing phlebitis incidences.

The Influence of Aloe Vera Compress to Phlebitis

Incidence of phlebitis was observed in this study during 3 x 24 hours which is divided into experimental and control group. The control group was given dressing transparent in the injection area of infusion, while the control group was given dressing transparent plus aloe vera compress. The result of control group was found 13 (43%) patients suffered phlebitis while experimental group was (20%) patients. Clinical manifestations of phlebitis are in the form of inflammation which generally includes typical signs of inflammation, namely dolor (pain), heat (heat), rubor (red), tumor (swelling) and function olesa. The signs of inflammation begin to appear after the first 4-6 hours after injury. It shows that Aloe vera compress which is combined with dressing transparent more effective than dressing transparent only for injection area of infusion. It was proven statistically by p value which is 0.004 or $p < 0.05$. The previous study also was proven the effectiveness of aloe vera for lowering degree phlebitis. The average degree before the act is 3 with minimum-maximum score 1-4. the degree pf phlebitis after the intervention became 2 with minimum-maximum score 1-3.¹ The other study described that fresh aloe vera compress was affective in edema and palpable venous cord with the result of p value was $p < 0.05$.²

Aloe vera substances are effective for inhibiting inflammatory process in phlebitis. Aloe Vera contains anti-inflammatory substances such as lignin, saponin, anthraquinone complex, acemannan, bradikines enzyme, tenin, aloctin A, amino acid, vitamis and salisilat. Lignin can be used as topical therapy for because its ability for absorbing into skin. Moreover the substances such as saponin, tenin and salisilat have antiseptic function. Besides that, Aloe Vera is analgesic therapy because it blocks migration of PMN cell (neutrofil) to inflammatory vein tissues, so inflammation process is inhibit. Amino acid, glycoprotein and Aloemodin in Aloe Vera accelerates the development of new cells in the regeneration process of blood vessel epithelium because acts as immune system effects, moisturizing, anti aging and anti septic.^{1,2,13} The using of Aloe vera give benefits is easy to obtain and doesn't cause extravasations because doesn't contain of electrolytes in high concentration, so it can prevent phlebitis. It is more effective than transparent dressing because the transparent dressing doesn't contain anti inflammatory substance. It is sterile bandage made of semi permeable polyurethane layer with transparent acrylate adhesive, waterproof and able to maintain oxygen circulation in the skin so as to maintain skin integrity, which is used for covering the injection area of infusion.³

CONCLUSIONS

The study shows the phlebitis incident which were applied dressing transparent plus aloe vera compress in the injection area of infusion was lowering than dressing transparent. It described that aloe vera influence on phlebitis incident and effective to apply in infusion patients.

REFERENCES

1. Irman, Veolina & Fenny Fernando. The Effect of Aloe Vera Compress on the phlebitis degrees doe to intravenous therapy in children. *International Journal of Community Medicine and Public Health*. 2019 Dec;6(12):5066-5063
2. Susanna, Junia.D, et al. Effectiveness of Fresh Aloe vera and glycerine Magensium Sulphate on Phlebitis among Children. *International Journal of Current Research Vol 6, Issue, 07, pp.7477-7479, July 2014*.
3. Ministry of Health. (2015). *Guidelines for Prevention & Management of Nosocomial Infection*. Jakarta: Director General of Yanmed
4. Notoatmodjo, S. (2012). *Health Research Methodology*. Jakarta: Rineka Cipta
5. Nursalam, (2013), *Concept and Application of Nursing Research Methodologies, Thesis Guidelines, Thesis and Nursing Research Instruments*, Jakarta, Salemba Medika
6. Sugiyono (2012). *Research Quantitative and Qualitative Methods*, Bandung: Alffeta Publisher
7. Smeltzer, Suzanne C, (2012), *Medical Nursing Textbook for Surgery* Brunner & Suddarth, Issue 8, EGC, Jakarta
8. Suzanna, Souza, & Malarvizhi, (2014). *Effectiveness of fresh aloe vera and glycerine magnesium sulphate: Application on phlebitis among children. Internationa Journal of Current Research*
9. Potter & Perry. (2011) *Nursing Fundamentals: Concepts, Processes & Practices*. Issue 4. Vol 1. Jakarta: EGC
10. Alimul H, Aziz, (2012), *Nursing Research and Scientific Writing Techniques*, Edition I, Jakarta: Salemba Medika
11. Yadav, C. et al. Effectiveness of aloe vera, glycerin, and cold application on superficial thrombophlebitis among patients. *International Journal of Bioassays* 5.9 (2016) 4858-4861
12. Zheng, Guo Hu, et al. Aloe vera for prevention and treatment of infusion phlebitis. *Cochrane Database of Systematic Reviews* 2014, Issue 6. Art No. CD009162
13. Amirullah. 2017. *Evaluasi Teknik Pemasangan Infus dan Insiden Phlebitis di RSUD H.A. Sulthan Daeng Radja Bulukumba*. Tesis. Fakultas Keperawatan; Universitas Hasanuddin Makassar
14. Fakhrur, A.A & Husnul K. Hubungan antara Lokasi Penusukan Dengan Kejadian Plebitis Pada Pasien di Ruang Flamboyan RSUD Abdul Wahab Sjahranie Samarinda. *Jurnal Ilmu Kesehatan* Vol. 6 No. 1 Juni 2018
15. Jannah, dkk. Prevalensi Phlebitis Pada Pasien Rawat Inap Dengan Infus di RSUD Tugurejo Semarang. *Jurnal Kesehatan Masyarakat* Vol. 4 No. 4, 2016.
16. Zhang, N. The role of endogenous aryl hydrocarbon receptor signaling in cardiovascular physiology (2011) *Journal of Cardiovascular Disease Research*, 2 (2), pp. 91-95. DOI: 10.4103/0975-3583.83033