Original Research Article

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The effect of *Aloe vera* compress on the plebitis degrees due to intravena therapy in children

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ABSTRACT

Background: Intravenous therapy is a kind of therapy which is often given to children patients. The use of intravenous in a long time will cause phlebitis. Non pharmacology action to cure phlebitis is by applying Aloe vera compress on it. Aloe vera is useful because it has low electrolyte concentrate, so it will not cause extravation. This research aims to learn the effect of giving *Aloe vera* to phlebitis children.

Methods: The research method is using Quasi experiment with randomized control group pre-test and post-test design. The sample of the research is 30 phlebitis children who are taken randomly. The sample is divided into two groups; 15 phlebitis children are cured with Aloe vera compress, and the other 15 are cured by using pure aloe vera. The treatment is done 3 times a day for two days. Phlebitis degree is measured by using phlebitis scale infusion nurse society (INS) before and after interruption.

Results: his research finds that the average degree before the act is 3 with minimum-maximum score 1-4. The degree of phlebitis after the act becomes 2 with minimum-maximum score 1-3. Aloe vera is effective for lowering the degree of children phlebitis with p=0.0000. The test used Mann-Whitney.

Conclusions: *Aloe vera* compress is effective in reducing the degree of phlebitis.

Keywords: Aloe vera, Intravena, Plebitis

INTRODUCTION

Intravenous therapy is a type of therapy that is widely given to children when treated, especially in intensive care rooms. Approximately 80% of pediatric patients receive infusion therapy in the hospital. Therapy aims to replace lost fluids, electrolyte correction, blood transfusion, or for medication.² Giving intravenous therapy especially in the long term can cause complications. One of the most common complications is phlebitis. Phlebitis is inflammation of the tunica intima vein caused by chemical, mechanical, bacterial, and post infusion factors that cause the effects of pain, erythema, swelling and warmth in the puncture, formation of layers, and hardening along the vein.^{3,4} Children are an age group that is susceptible to phlebitis. Data on children's hospitals in Afghanistan shows that 69.9% of children treated have phlebitis. The risk of phlebitis increases after 24 hours of installation and the risk is reportedly increased in the intensive care unit.4

Phlebitis rating scales that are widely used for research include visual infusion phlebitis (VIP), infusion nurses society (INS), Maddox, Baxter, Lipman or Dinley. In general, the evaluation of phlebitis on that scale is based on observations. VIP and INS scale is a scale that is widely used but until now there is no phlebitis rating scale that has a very good validity and reliability value.⁵

Phlebitis assessment using a scale of 0-4. Observations made include aspects of pain, skin color, vein condition and the type of fluid that comes out of phlebitis. The Royal College of Nursing (RCN) has classified the visual degree of phlebitis, which is degree 0 (apparently where the insertion is still healthy), grade 1 (pain or erythema at the insertion site), grade 2 (there are two of the clinical criteria, namely pain, erythema, swelling), grade 3 (all of the clinical criteria are evident i.e. pain along the cannula, erythema, induration), grade 4 (pain along the cannula, erythema, induration, venous cord palpated), and grade 5 (pain along the cannula, erythema, induration, venous cord palpated, fever).

Nursing management to overcome this phlebitis has been widely sought such as using 75% alcohol compresses, 33-50% MgSO₄, and 0.9% salt solution, but none have been effective. Several studies have shown that treating phlebitis using warm water and topical antibiotics can reduce the incidence of phlebitis in children. Topical or external application in the form of *Aloe vera* oil, fresh *Aloe vera* leaves / stems, and *Aloe vera* juice are adjuvant treatments for skin disorders. Research conducted in China by Zhang et al, proved Aloe is useful for the prevention and management of phlebitis. Other studies report that compressing *Aloe vera* and a mixture of glycerin and magnesium sulfate can reduce the degree of phlebitis. §

The use of *Aloe vera* has advantages, among others, is easy to obtain and does not cause extravasation because it does not have electrolytes in high concentrations. *Aloe vera* contains 20 types of amino acids and salicylic acid which are anti-inflammatory and anti-bacterial. The lignin content in *Aloe vera* facilitates the penetration of these substances into the skin. In addition, the content of *Aloe vera* is less allergic effect on the skin of children who are still sensitive. Provision of *Aloe vera* is considered safer given to children because *Aloe vera* does not contain electrolytes which can cause extravasation of blood vessels. This initial research aims to identify the effect administration of *Aloe vera* to the degree of phlebitis.

METHODS

This research is a quantitative study using a Quasy experiment design with a two group pretest and posttest design approach involving 15 children as an intervention group and 15 children as a control group. This research was conducted on study by Padang City Hospital on May 5th - July 5th, 2019. With the inclusion criteria of children aged 7-12 years and those who were infused after 24 hours. Data collection procedures used were observation sheets containing phlebitis levels using the INS scale, which were assessed before and after treatment. Pre-test is done on the first day before the intervention, while post-test is done on the third day after the intervention. *Aloe vera* used is pure *Aloe vera* with 100% *Aloe vera* stored in the refrigerator. All respondents were given *Aloe vera* compresses which were installed every 3 (three)

hours every day for 2 (two) days using gauze. Presented in the form of tables and narrative texts using the T-Independent statistical test.

RESULTS

Table 1 characteristics of respondents include gender and age. Respondents were mostly male (71.8%) and most were in the range of infant children (93.7%).

Table 1: Characteristics of respondents (n=32).

Characteristics of respondents	N	%
Gender		
Male	23	71.8
Girl	9	28.2
Age		
Infant	30	93.7
Toddler	2	6.3
Preschool	-	-
School	-	-

Table 2: Frequency distribution of phlebitis degrees before and after treatment.

The degree of phlebitis				
The degree of phlebitis	Before confession		After treatment	
	N	%	N	%
Degree 0	-	-		
1 st degree	-	-	5	15.6
2 nd degree	-	-	14	43.7
3 rd degree	19	59.3	12	37.5
4 th degree	13	40.6	1	3.2
5 th degree	-	-	-	-

Table 2, distribution of frequency of phlebitis degrees before and after treatment before the treatment of aloe vera, most of the phlebitis degree of the respondents were at degree 3 (59.3%). After receiving *Aloe vera* compresses, most of the respondents with phlebitis were in degree 2 (43.7%).

Table 3: Comparison of the degree of phlebitis before and after treatment.

The degree of phlebitis	N	Average	Min-max
Before confession	32	3.2	3-4
After treatment	32	2.3	1-4

Table 3, comparison of phlebitis degrees before and after treatment of the average degree of phlebitis before *Aloe vera* treatment that is equal to (3.2) with a minimum score of-maximum (3-5), there was a decrease in the average degree of phlebitis after treatment with a mean of 2.3 with a minimum-maximum score of 1-4 (Table 4). Mann-Whitney test results obtained p=0.000 (p< α =0.05) and it

can be concluded that *Aloe vera* is effective in reducing the degree of phlebitis in children.

Table 4: Mann-Whitney test results.

Test statistics ^b	Postest
Mann-Whitney U	5.500
Wilcoxon W	141.500
Z	-4.977
Asymp. Sig. (2-tailed)	.000
Exact Sig. [2*(1-tailed Sig.)]	$.000^{a}$

a. Not corrected for ties; b. Grouping Variable: Perlakuan.

DISCUSSION

Children who are treated in hospitals will mostly get medical procedures, both for diagnostic and therapeutic purposes, including intravenous therapy to find high cortisol levels in children who will be placed intravenous tubes. This means the child is distressed. Distress experienced by children include various levels of anxiety, fear, and pain, as well as a range of children's behavior from calm and controlled to panic and banging. This condition is influenced by several factors, namely the child's age, gender, experience, temperament, anxiety, coping style, pain sensitivity, and genotype, as well as preparation before the procedure. Younger children exhibit higher distress behavior and experience more severe pain due to medical procedures.¹⁷ This study did not analyze the relationship between intravenous therapy and respondent characteristics. Pediatric patients treated with intravenous therapy are at risk of developing phlebitis found that of 338 children, 2.7% had phlebitis. There is no relationship between demographic characteristics and the incidence of phlebitis. Installation for more than five days, intermittent care and permanent therapy are risks of phlebitis. In addition, the child's active movements and improper fixation can also cause a mechanical effect, namely friction of the cannula to the blood vessels and eventually cause inflammation in the tunic intima vein.19

In this study, it was found that most children had phlebitis grade 3 (59.3%) before treatment. After receiving *Aloe vera* compresses, most of the respondents with a degree of phlebitis were in degree 2 (43.7%). Degree 2 means that there are two of the clinical criteria, namely pain, erythema, and swelling (Higginson, 2011). These results support the results of previous studies conducted.²⁰ They reported that in adult patients undergoing intravenous therapy who developed phlebitis grade 1 were 46.2%, then grade 2 (40%), grade 3 (18.3%) and there were no patients with advanced phlebitis.⁴ In pediatric patients in hospitals in India found incidents of phlebitis as much as 71.25% and the majority were phlebitis grade 2 (46.25%).²¹

Management of phlebitis that has been used in the form of warm water compresses, MgSO₄, salt solution (NaCl) 0.9%, and 75% alcohol. The use of some of these

ingredients has not had a significant effect on reducing the symptoms of phlebitis. Aloe vera compress is an alternative management of phlebitis that has been applied to adult patients in China and is proven to be more effective.²² This study also applied *Aloe vera* compresses, but in infants to school-age children who have phlebitis in the treatment room. Based on statistical tests giving pure Aloe vera compress in this study produced a significant improvement in the form of a decrease in the degree of phlebitis with a minimum degree of 1 and a maximum of 4. The value of p=0.000 is interpreted as having the effect of Aloe vera on the reduction in the degree of phlebitis in children. This is in line with research that explains that Aloe vera can reduce the degree of phlebitis and when compared with MgSO₄ 33% or 50%, Aloe vera is 1.24 times more effective in treating phlebitis. Phlebitis can be caused by injury to the vein during insertion of the cannula, infection, and irritation from chemicals / medications.3

This study is also in line with research by Oswati, et al which explains the effect of giving Aloe vera with phlebitis with p=0.00022. Venous irritation from medications and intravenous fluids is influenced by the pH and osmolarity of the fluid which has a significant effect on the incidence of phlebitis.²³ The normal blood potential pH is in the range of 7.35-7.45 and tends to be a temporary base of fluid needed in administration of therapy is. Antibiotics have a low pH so that it influences the increase in phlebitis. Parenteral nutrient solutions such as glucose, amino acids, and lipids are also able to cause the same thing.²⁷ High osmolarity (hypertonic) fluids are also proven to cause phlebitis more frequently than isotonic fluids. However, isotonic fluids can become hypertonic when added with drugs, electrolytes, or nutritional fluids. Intimate tunica in vein will experience trauma if you get fluid with high osmolarity.²⁵

Aloe vera contains 75 active ingredients such as vitamins, enzymes, lignin, sugars, saponins, salicylic acid, amino acids, some of which have pharmacological reactions1, and contain secondary metabolites namely aloe emodin and chrysophanol.²⁶ These substances act as immune system effects, moisturizing, anti-aging, and anti-septic. In addition, Aloe vera contains carboxypeptidase which inhibits the activation of bradykinin, salicylate which also inhibits the vasoconstriction process. 1 C-glucosyl chromone, one of the ingredients of aloe vera, is antiinflammatory. The content of this substance can reduce the inflammatory process that occurs by inhibiting the release of cyclooxygenase and suppressing prostaglandin E227 production. Decreased inflammatory process that occurs is evidenced by the reduction in the average degree of phlebitis before treatment ie. grade 3 which is characterized by pain along the cannula, erythema, and induration to grade 2 which is marked by not finding induration and pain or erythema.

Aloe vera has proven to be effective and beneficial in treating phlebitis in children. Making pure Aloe vera is

relatively easy to do, made using a simple method, but also minimal side effects. From an economic point of view, these interventions are cost effective and cost efficient to be implemented in hospitals. However, methodologically this study has limitations in terms of sample size. The limited number of samples makes it difficult for these results to be generalized.

CONCLUSION

There is an effect of *Aloe vera* administration on the degree of phlebitis due to intravenous therapy in children.

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