Orignal Article

Indian Journal of Surgical Nursing
Volume 9, Number 2 May–August 2020
DOI: http://dx.doi.org/10.21088/ijsn.2277.467X.9220.5

Effectiveness of Ice Pack Application on Phlebitis Among Patients with Peripheral Intra-venous Cannula Induced Phlebitis

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Abstract

"A study to assess the effectiveness of ice pack application on pain and inflammation response during intravenous cannula insertion among patients admitted in Government General Hospital, At Puducherry."

Intravenous fluid therapy is an invasive procedure which may increase the risk of patient complications. One of the most common of these is phlebitis, which may cause discomfort and tissue damage. Therefore, a nursing intervention is needed to effectively treat phlebitis. The purpose of this study was to investigate the effectiveness of applying a warm compression intervention to reduce the degree of phlebitis. A quasi-experimental study with nonequivalent control group pre-test-post-test design was used for the study with objective to compare the efficacy of cold application in relieving phlebitis among patients receiving intravenous therapy. Convenient sampling technique was used for selecting 30 patients having phlebitis; phlebitis was assessed using visual infusion phlebitis scale. The findings of the present study suggest that ice pack application was effective on phlebitis.

Keyword: Intravenous therapy; Ice pack application; phlebitis.

How to cite this article:

P. Saktisvary, Effectiveness of Ice Pack Application on Phlebitis Among Patients with Peripheral Intra-venous Cannula Induced Phlebiti. Indian J Surg Nurs. 2020;9(2):81–84.

Introduction

Peripheral intravenous cannulation is a common procedure carried out in hospitals to allow rapid and accurate administration of medication. However, the placement of an intravenous cannula can have undesirable effects, the most common of which is phlebitis. Phlebitis is a complication that is frequently associated with intravenous therapy. A number of literature articles have written that phlebitis can occur in as much as 25–70% of patients. Phlebitis is defined as the acute inflammation of the internal lining of the vein. Phlebitis is characterized by pain and tenderness along the course of the vein, redness and swelling and warmth can be felt at the insertion site. Phlebitis can be classified into three categories: mechanical, chemical or infusion, and bacterial.

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Materials and Methods

A quasi-experimental study with nonequivalent control group pre-test-post-test design was used for the study. The study was conducted in IGGGH and PGI at puducherry.

Ethical clearance from institutional ethical committee and the administrative permissions from govt general hospital were taken. Anonymity and confidentiality of the subjects were maintained while carrying out the study. Informed consent was obtained from the subjects. Attribute variables of the study were; independent variable: ice cold application, dependant variable: phlebitis.

Inclusion Criteria Included

1. Patients aged between 20–55years;
2. Patients who are willing toparticipate;
3. Patients who are receiving intravenous antibiotics and intravenousfluids;
4. Patients who are not suffering from any other skin disorders.

Exclusion Criteria Included

1. Patients who are having skin disorder and abscess seen at the puncture site.
2. Patients who are not willing to participate in the study.
3. Patients receiving total parenteral nutrition (TPN).

Convenient sampling technique was used for selecting 30 patients having phlebitis, from which 15 were in experimental group and 15 were in the control group. Cold application (ice pack) in experimental group was applied for three times a day for 20 min for three days and in control group was applied for three times a day for three days. Phlebitis was assessed using visual infusion phlebitis scale.

Results

Section I

This section is divided into two parts:

(i) Findings related to demographic characteristics of the subjects in experimental and controlgroup.

(ii) Findings related to clinical profile (information related to cannulation) of the subjects in experimental and control group.

Section II

Findings related to mean pre-test and post test scores of phlebitis in the experimental group. Section III

Findings related to mean pre-test and post test scores of phlebitis in the control group.

Section IV

Findings related to mean post-test scores of phlebitis in experimental and control group.

The data presented in the Table 1(a) shows the following findings:

- Regarding the age of the subjects; data revealed that in the experimental group, majority of samples belonged to the age group of 20–29 years which is 8 (53.3%). Whereas in the control group, majority of samples belonged to the age group of 30– 39 years which is 6(40.0%).
- Regarding the gender; data revealed that in experimental group, majority of the samples 9 (60.0%) were males. Whereas in control group, majority of the samples 10 (66.7%) werefemales.
- Regarding the educational qualification; data revealed that in the experimental group, maximum number of samples 8 (53.3%) had primary education,whereas in control group, most of the subjects 9 (60.0%) had no basic education.
- It can be concluded from Table 1(a) that p values calculated using chi-square and fisher's exact test are more than 0.05, and are therefore not significant. So, both groups are homogenous

Table 1(a): Comparison of Sample Characteristics (Age, Gender, Educational Qualification) of the Subjects in Terms of Frequency and Percentage in Experimental and Control Group. $n_1+n_2=30$

S. No.	Sample Characteristics	Experimental Group (n_1=15)		Control Group (n_2=15)		df	Test Applied	p Value
		Frequency	Percentage	Frequency	Percentage			
	Age (in years)							
1.	a)20–29	8	53.3	3	20.0	2	Fisher exact	0.054
	b) 30–39	1	6.7	6	40.0		test	
	c) 40, and above	6	40.0	6	40.0			
2.	Gender							
	Male	9	60.0	5	33.3	1	Chi-sqaure	0.272
	Female	6	40.0	10	66.7			
	Educational qualification							
	a) No basic	2	13.3	9	60			
3.	Education (Illiterate)					3	Fisher exact	0.049*
	b) Primary education	8	53.3	3	20		test	
	c) Secondary education	4	26.7	3	20			
	d) Graduation	1	6.7	0	0			

.$p<0.05$, *Significant

Table 1(b): Comparison of Clinical Profile (Duration of Cannula, Size of Cannula, Site of Cannula, and Type of Fluid Infused) of the Subjects in Terms of Frequency and Percentage in Experimental and Control Group.

$n_1+n_2=30$.

S. No.	Sample Characteristics	Experimental Group (n_1=15)		Control Group (n_2=15)		df	Test Applied	p Value
		Frequency	Percentage	Frequency	Percentage			
1.	Duration of the cannula (in days) a) 1–2							
	b)3–4	1	6.7	4	26.7	2	Fisher exact test	0.239
	c)5–6	13	86.7	9	60.0			
		1	6.7	2	13.3			
2.	Size of the cannula (in gauze)							
	18	2	13.3	2	13.3	2	Fisher exact test	0.500
	20	8	53.3	5	33.3			
	22	5	33.3	8	53.3			
3	Site of cannula							
	Basilic (a	1	6.7	1	6.7	2	Fisher exact test	0.510
	Cephalic (b	7	46.7	4	26.7			
	Metacarpalveins (c	7	46.7	10	66.7			
4	Type of fluid infused							
	Crystalloids (a	10	66.7	9	60.0	2	Fisher exact test	0.591
	Blood based (b products	0	0	1	6.7			
	Othermedications (c	5	33.3	5	33.3			

.Not Significant, p>0.05

Table 2: Comparison of Pretest and Post Test VIP Scores in Experimental Group in Terms of Mean, Mean Difference ($M_{D)}$, Standard Deviation, Standard Error, 't' Value.

n_1=15

Research Group	Observation	Mean	M_D	SD	SE Mean	't' Value
Experimental group (n_1=15)	Pre-test	3.07	1.73	0.70	0.153	11.309*
	Post-test	1.33		0.49		

.$t'_{(14)=}$2.15, p<0.05, *Significant'

Table 3: Comparison of Pretest and Post Test VIP Scores in Control Group in Terms of Mean, Mean Difference ($M_{D)}$, Standard Deviation, Standard Error, 't' Value.

n_2=15.

Research Group	Observation	Mean	M_D	SD	SE Mean	't' Value
Control group ($n_{2=}$15)	Pre-test	3.07	1.80	0.59	0.145	12.435*
	Post-test	1.27		0.46		

'$t'_{(14)=}$2.15, p<0.05, *Significant.

Table 4: Comparison between the Post-Test VIP Scores in the Experimental and Control Group in Terms of Mean, Mean Difference ($M_{D)}$, Standard Deviation, Standard Error, 't' Value.

n_1+n_2=30

Research Group	Observation	Mean	MD	SD	SE	't' Value
Experimental group (n_1=15)	Post-test	1.33	0.06	0.49	0.211	0.28
Control group ($n_{2=}$15)	Post-test	1.27		0.46		

't'(28)=2.05, p>0.05.

in the above mentioned aspects except for educational qualification (p=0.049).

- The data presented in the Table 1(b) shows the followingfindings:
- Data revealed in experimental group, 13 (86.7%) were having cannula duration 3– 4 days and in control group, 9 (60.0%) of the subjects were having cannula duration 3–4 days.
- Data revealed that in experimental group; 20G cannula were used in most of the subjects i.e. 8 (53.3%). Whereas incontrol group; 22G cannula were used, i.e. 8 (53.3%).
- Data revealed that Metacarpal vein 7 (46.7%) and cephalic vein 7 (46.7%), were the preferred site of cannulation for most of the subjects in the experimental group. Whereas in control group preferred site of cannulation for most of the subjects were metacarpal vein, 10(66.7%).
- Data revealed that type of fluid infused; majority of subjects in the experimental group were receiving crystalloids, i.e. 10 (66.7%). Whereas in control group majority of subjects were receiving 9 (60.0%)crystalloids.
- It can be concluded that all p values calculated using fisher's exact test are more than 0.05 and therefore not significant. So, both groups were homogenous in the above mentioned aspects.
- It can be also concluded that groups were homogenous in terms of pre-test VIP score as mean pre-test VIP scores (3.07) of experimental and control group were same.

The data presented in Table 2 showed that the mean pre-test VIP score (3.07) with SD=0.70 was more than the mean post-test VIP score (1.33) with SD=0.49 in the experimental group with mean difference of 1.73 which was found to be statistically significant as evident from 't' value (11.309) for df (14) at 0.05 level of significance. Thus, the null hypothesis H01 is rejected and research hypothesis H1 is accepted. Therefore, this indicates that cold application was effective in reducing phlebitis in the experimental group.

The data presented in Table 3 showed that the mean pre-test VIP score (3.07) with SD=0.59 was more than the mean post-test VIP score (1.27) with SD=0.46 in the control group with mean difference of 1.80 which was found to be statistically significant as evident from 't' value (12.435) for df (14) at 0.05 level of significance. Thus, the null hypothesis H02is rejected and research hypothesis H2 is accepted. Therefore, this indicates that ice pack application was effective in reducing phlebitis in the control group.The data presented in Table 4 shows that mean post-test VI Pscore1.33 with SD=0.49 of the experimental group is greater than the mean post-test VIP score 1.27 with SD=0.46 of the control group with the mean difference of 0.06 which is evident from 't' value (0.28) for df (28) at 0.05 level of significance which was not significant at 0.05 level. Hence null hypothesis H03 is accepted. Therefore there is no significant ice pack application in relieving phlebitis. This indicates that ice pack application treatments was effective in relievingphlebitis.

Conclusion

The findings of the present study suggest that cold application was effective on phlebitis.

Acknowledgement

All praise and thanks to the Almighty Allah, who guided and directed my life and bestowed blessings upon me in the form of strength, wisdom and enlightening force behind all my efforts in making this study a success. I would like to express my heartfelt thanks and gratitude to all faculties who guided me to complete this study. It is my privilege to convey my sincere gratitude and thanks to and the participants who had participated in this study.

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