



Research Article

A STUDY TO ASSESS THE EFFECTIVENESS OF TOPICAL APPLICATION OF SESAME OIL VERSUS MAGNESIUM SULPHATE WITH GLYCERIN AMONG PATIENT WITH PERIPHERAL INTRAVENOUS CANNULA INDUCED PHLEBITIS

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Key words:

- **Sesame oil dressing** - It refers to a gauze soaked in sesame oil, topically applied on 5cm around the site of phlebitis and secured with roller bandage twice a day for 5 days.
- **Magnesium sulphate with glycerine dressing**: It refers to a gauze soaked in magnesium sulphate granules saturated with glycerin, topically applied on 5cm around of site of phlebitis and secured with roller bandage twice a day for 5 days.

ABSTRACT

Background of The Study: In modern medical practice up to 80% of hospitalised patients receive intravenous therapy at some point during their admission. Compared with other routes of administration, the intravenous route is the fastest way to deliver fluids and medications throughout the body. This does not come without any adverse effect. Phlebitis is the most common complication of intravenous injections with symptoms including painful swollen vein, warmth, erythema, tenderness with a red line streaking along the vein.

Method and Material: Two group pre test and post test design was used. Setting: The setting of the study was Dr. B.R.A, M. Hospital Raipur(C.G.). Sampling technique: Purposive and convenient technique of sampling was adopted for the present study and the sample size was 40 (20 in experimental group and 20 in control group). Tools used consists questionnaire for socio demographic variables and a Standard Visual Infusion Phlebitis (V.I.P.) Score for assessing the phlebitis score and also Visual Analogue scale for phlebitis pain rating.

Result: The descriptive and inferential statistics was used for analysis of pre test and post test among patients with peripheral IV cannula induced phlebitis. Analysis was done by using descriptive statistics (mean, standard deviation) and inferential statistics (t-test and chi-square test). Paired t test score of experimental group and control group was 21.48 and 17.68 respectively which was > 4.89 (critical value) which shows that the obtained mean difference was a true difference and not by chance. Unpaired t test score was 0.34 which was less than the critical value 2.02 thus it was found not significant at 0.05 level of significance.

Conclusion: It can be inferred from the findings that both sesame oil and magnesium sulphate with glycerine are effective in reducing IV cannula induced phlebitis.

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INTRODUCTION

The devices for intravenous therapy usually include a hypodermic needle, peripheral venous cannula or intravenous catheter and this is the most common invasive procedure among patients admitted to hospital. It is estimated that 200 million peripheral intravenous devices are placed each year in America alone, while one in three inpatients have at least one peripheral venous catheter in situ. The phlebitis incidence was found as the fourth highest infection in hospitalized patients. Indonesia has contributed in phlebitis incidence as the fifth highest in the world wide after India, Iran, Malaysia, and Philippines.

Need For the Study

Various procedures have been suggested to prevent phlebitis, including administering heparin, dilution of drugs, and use of topical corticosteroids, none of which is without complications. The phlebitis incidence was found as the fourth

highest infection in hospitalized patients. Indonesia has contributed in phlebitis incidence as the fifth highest in the world wide after India, Iran, Malaysia, and Philippines. Heparin is associated with the risk of bleeding at the operation site and thrombocytopenia, and corticosteroids are followed by increased risk of infection through impaired defence system. Thus, it is recommended to use simpler, more economical, and available methods. One of these methods seems to be the use of complementary and alternative medicine, an example of which is applying sesame oil.

REVIEW OF LITERATURE

- NilufarNekuzad, TaherehAshke Torab (2012) conducted study to assess the prevention of chemotherapy induced phlebitis. 60 patient with rectum cancer who were admitted for chemotherapy randomly divided into two equal group: control and intervention, 10 drop sesame oil was applied twice a day for 14 days externally in

interventional group and control group received nothing. And the results seems that external use of sesame oil is effective, safe and well tolerated.

- **Monalisa No. 77 Samarinda, June 2014**, This study was aimed to determine the effectiveness of applying sesame oil to the pain intensity of phlebitis in cancer patients undergoing chemotherapy. Using a randomized controlled trial design 40 samples were divided into groups: control and intervention groups. Results recommended that sesame oil can be used to reduce phlebitis pain in patients undergoing chemotherapy.
- **Shaly Selva Grace, Mrs. Florence Segaran, 2018**, conducted a study in the general surgical and orthopaedic wards among 110 patients. The subjects were randomly allocated to control and experimental group using Sequentially Numbered, Opaque Sealed envelopes (SNOSE) method. Subjects were observed for 48 hours with an interval of 24 hours. Visual infusion phlebitis scale and numeric pain intensity scale were used to collect data. Results: Result showed that Glycerine Magnesium Sulphate paste was more effective than Heparinoid (Thrombophob) Ointment application based on the observation at 24 hours ($p < 0.0001$). This study demonstrated evidence on the more effective intervention (Glycerine Magnesium Sulphate paste) for the management of phlebitis.
- **Zhifang Chen, WU Juan, 2013**, 60 patients were randomly divided into the observation group and the control group (30 cases in each group). The external application of Ruyi golden powder which was prepared with 75% alcohol into a paste was used in the observation group and 50% magnesium sulphate was used in the control group. The total effective rate of two groups of patients was 93.3% in the observation group and 66.7% in the control group, the significant difference was found by the comparison of the two groups. The external application of Ruyi golden powder with alcohol in the treatment of phlebitis caused by amiodarrone is better than magnesium sulfate.

Objectives of the Study

- To assess the baseline level of phlebitis among patient with iv cannula.
- To assess the effectiveness of sesame oil on phlebitis of experimental group.
- To assess the effectiveness of magnesium sulphate with glycerine on phlebitis of control group.
- To compare the effectiveness of sesame oil versus magnesium sulphate with glycerine on phlebitis.
- To find out the association between socio- demographic variables with effects of sesame oil and magnesium sulphate with glycerine.

RESEARCH METHODOLOGY

Conceptual framework

In this study Dorothy Orem's self care deficit theory was applied

Self care - In this research study patient cleans site of phlebitis before topical application of sesame oil and magnesium sulphate with glycerine.

Self care agency- In this study 40 samples has taken which are as (20) experimental group, and (20) control group.

Self care deficit- In this study patient has having complaining with pain, erythema in the site of peripheral induced phlebitis.

Nursing agency- In this study Standard visual Infusion phlebitis (V.I.P.) scale is used for detecting phlebitis. Before topical application, cleaning the body parts wherever affected area is present, then apply the Sesame oil to (20 experimental group) and magnesium sulphate with glycerine (20 control group) and. It has to be repeated for twice a day 5days.

Study Design and Period

Two group pre test and post test design using a quantitative approach was conducted on

Population

The target population of the present study comprises of patient with peripheral IV cannula induced phlebitis who are admitted in Dr. B.R.A.M. hospital Raipur.

Setting of the Study

The setting of the study was Dr. B.R.A.M. Hospital Raipur(C.G.). It is located in 1 km to the Government college of Nursing, Raipur.

Sample & Sampling Technique

The sample of the population of the present study was 40 (20 in experimental group and 20 in control group) among peripheral IV cannula induced phlebitis patients selected from the Dr. B.R.A.M. Hospital Raipur (C.G.). Purposive and convenient techniques of sampling was adopted to select the subjects from the peripheral IV cannula induced phlebitis patients in Dr. B.R.A.M. Hospital Raipur (CG.).

Inclusive Criteria

- Patients who have IV cannula induced phlebitis score 2 – 5 (V.I.P. scale).
- Patients who are available at the time of data collection.
- Patients who are willing to participate during data collection.

Exclusive Criteria

- Patients who are not available at the time of data collection.
- Patients who have a chronic haematological disease, diabetes.
- Patients who are not willing to participate during data collection.

Variables of the Study

According to Polit and Hungler, (1999), variables is an attribute of a person or object that varies and taken on different values within the population under study.

In the present study the variables are: -

Independent Variables

In the present study, the independent variable is topical application of sesame oil and magnesium sulphate with glycerine.

Dependent Variables

In the present study, the dependent variable is peripheral IV cannula induced phlebitis.

Sociodemographic Variables

In the present study, the Age, Gender, Religion, previous Educational qualification, Marital status, and previous knowledge about IV cannula induced phlebitis

Development and Description of the Tools

The tools of present study was organized in two sections:

Section A: It consists of socio demographic variables for socio demographic data include Age, Religion, Educational status, Food pattern, Family income per month etc.

Section B: This section consists of Standard Visual Infusion Phlebitis (V.I.P.) Score for assessed the phlebitis score and Also use Visual Analogue scale for phlebitis pain rating.

Data Collection Procedure

Data collection period was from 26/12/2021- 31/12/2021 , 03/01/2022- 07/01/2022 & 09/01/2022 -13/01/2022. 40 sample of patients admitted in Dr. B.R.A.M. Hospital Raipur (C.G.).

The patient’s were selected on the basis of inclusion criteria after obtaining consent from the subject.

Plan for Data Analysis

Analysis of the data planned on the basis of objectives and hypothesis. The data plan to be analysis both descriptive and inferential statistics and the following plan for analysis would be worked out.

- Organize the data in master sheet.
- Data on the background variable will be analysed by frequency and percentage distribution to describe sample characteristics.
- Scoring Standard Visual Infusion Phlebitis(V.I.P.) scale
- Calculating average score, mean median and standard deviation
- Computing the chi- square method to establish the association between selected demographic variables Data will be expressed in table and figure for better clarification.

Ethical Cosideration

Following steps were identified regarding ethical consideration for present study:-

- The research problem and objectives were approved by the institute research ethical committee.
- Due permission from institute ethical committee was obtained on 04/12/2021.
- Informed written consent was taken from the participant.
- Anonymity of the participants was ensured.
- Confidentiality of the data was maintained.

Findings Related To Socio Demographic Profile of the Subjects in Frequency and Percentage

Section – I

S.No	Demographic Variables	Control Group Number	Control Group Frequency%	Experimental Group number	Experimental Group Frequency%
Age group					
1	19 - 25 years	6	30	6	30
	26- 35 years	4	20	4	20
	36- 40 years	5	25	4	20
	>= 41 years	5	25	6	30
Sex					
2	Male	6	30	11	55
	Female	14	70	9	45
Religion					
3	Hindu	19	95	17	85
	Muslim	1	5	1	5
	Christian	0	0	1	5
	Others	0	0	1	5
Educational status					
4	Illiterate	6	30	9	45
	middle school	2	10	3	15
	higher school	8	40	7	35
	Graduation & above	4	20	1	5
Monthly income					
5	Below 10,000	9	45	12	60
	>=Rs10,000	11	55	8	40
Residence					
6	Rural	9	45	16	80
	Urban	11	55	4	20
Family type					
7	Nuclear family	8	40	5	25
	Joint family	12	60	15	75
	Extended family	0	0	0	0
Food habits					
8	Vegetarian	3	15	1	5
	Non-vegetarian	17	85	19	95
Days of cannulisation					
9	2 days	4	20	3	15
	4 days	12	60	6	30
	5 days	3	15	10	50
	> 5 days	1	5	1	5
Total no. of cannulization after admission					
10	1	14	70	6	30
	2	6	30	13	65
	3	0	0	1	5
	Above 3	0	0	0	0
Previous knowledge					
11	Yes	7	35	11	55
	No	13	65	9	45
Reason of patient admission					
12	Medical	6	30	13	65
	Surgical	14	70	7	35

- In relation to age , Depicts that, out of 40 sample, in experimental group the maximum n= 20 , (6) 30% belongs to 19-25 years of age, (4) 20% belongs to 26-35years of age, (4) 20% belongs to 36- 40 years of age, (6) 30% belongs to above 41 years of age and in control group maximum sample N=20, (6) 30% belongs to 19-25 years of age, (4) 20 % belongs to 26 – 35 years of age, (5)2 5% belongs to 36– 40 years of age, (5) 25% belongs to above 41 years of age.
- In relation to gender, Depicts that, out of 40 sample, in experimental group the maximum sample N= 20, 11(55%) male, 9 (45%) and in Control group the maximum sample N=20, 6(30%) male, 14(70%) female.

- In relation to education status Depicts that, out of 40 sample, in experimental group the maximum sample (9) 45% are illiterate, (3) 15% are middle school, (7) 35% are higher education, (1) 5% are graduate & above education, in control group the maximum sample (6) 30% are illiterate, (2) 10% middle education, (8)40 % are higher education, (4) 20 % are graduate and above education.
- In relation to religious depicts that, out of 40 sample, in experimental group the maximum N= 20, 17 (85%) of Hindu, 1(5%) of Muslim, 1(5%) of Christian, 1(5%) of others and in control group 19 (95%) of Hindu, 1(5%) of Muslim.
- In relation to monthly income) depicts that, out of 40 sample, in experimental group the maximum sample 12 (60%) are belongs to below 10,000 monthly income, 8(40%) are belongs to above 10,000 monthly income and in control group the sample 9(45%) are belongs to below 10,000 monthly income, 11(55%) are belongs to above 10,000 monthly income.
- In relation to family type depicts that, out of 40 sample, in experimental group the maximum sample 5 (25%) belongs to nuclear family,15 (75%) belongs to joint family and in control group 8 (40%) belongs to nuclear family, 12(60%) belongs to joint family.
- In relation to residence area depicts that, out of 40 sample, in experimental group the maximum sample 16 (80%) belongs to rural area, 4 (20%) belongs to urban area and in control group 9 (45%) belongs to rural area, 11(55%) belongs to urban area.
- In relation to food habits depict that, out of 40 sample in experimental group the maximum sample 19 (95%) are non vegetarians, 1(5%) are vegetarian and in control group 17 (85%) are non vegetarian, 3 (15%) are vegetarian.
- In relation to day of cannulisation depict that, out of 40 sample in experimental group the maximum sample 10 (30%) subjects are 5 days of cannulization, 6 (30%) subjects are 4 days of cannulization, 3 (15%) subjects are 2 days of cannulization, 1 (5%) are above 5 days of cannulization and in control group 12 (60%) are 4 days of cannulization, 4 (20%) are 2 days of cannulization, 3 (15%) are 5 days of cannulisation, 1 (5%) are above 5days of cannulisation.
- In relation to total no of cannulization after admission depict that, out of 40 samples in experimental group the maximum sample 13 (65%) 2 no. of total cannulization after admission, 6 (30%) 1 no. of cannulization after admission, 1 (5%) 3 no. of total cannulization after admission and in control group 14 (70%) 1 no. of cannulization after admission, 6(30%) 2 no. of cannulizations after admission.
- In relation to previous knowledge depict that, out of 40 sample, in experimental group the maximum sample 11 (55%) have a previous knowledge regarding phlebitis, 9(45%) heve no previous knowledge regarding phlebitis and in control group 13 (65%) have previous knowledge regarding phlebitis, 7 (35%) have previous knowledge regarding phlebitis.
- In relation to reasons of patients admission, depict that out of 40 sample in experimental group the maximum

sample 13 (65%) medical reasons of admission, 7 (35%) surgical reason of admission and in control group 14 (70%) surgical reasons of admission, 6 (30%) medical reasons of admission.

Section II to Assess The Effectiveness of Sesame Oil on Phlebitis of Experimental Group.

Table no.5.2 (PAIRED’ T ‘TEST) comparison between pre-test and post- test Mean score, Mean percentage and standard deviation of experimental group.

Experimental group	V.I.P score				
	Max score	Min-Max	Mean	Mean%	SD
Pre-test	5	2-4	2.75	55	0.72
Post-test	5	0-1	0.3	6	0.47

Paired ‘t’ value=21.48 df=19 Critical value=4.89 , P<0.0001 HS

Figure 5.3 column diagram showing that comparison between mean score and standard deviation of experimental group. Table no. 5.3 (figure 5.3) depict that, in the analysis of mean post test among IV cannula induced phlebitis, in pre test mean score of experimental group was 2.75, Mean % was 55% and SD was found to be 0.72 and in post test mean score was 0.3, mean% was 6% and sd was 0.47 . And the paired ‘t’ value = 21.48.

To Assess the Effectiveness of Magnesium Sulphate with Glycerine on Phlebitis of Control Group

Table No.5 (Paired ‘T’ Test) comparison between pre- test and post- test Mean score, Mean percentage and standard deviation of control group.

Control group	V.I.P score				
	Max score	Min-Max	Mean	Mean%	SD
Pre-test	5	2-5	2.9	58	0.85
Post-test	5	0-1	0.25	4.17	0.44

paired ‘t’ value=17.68 df=19 Critical value=4.89 , P<0.0001 HS

Figure 5.5 column diagram showing that comparison between pre –test and post-test mean score and standard deviation of control group.

Table no. 5.5 (figure 5.5) depict that, in the analysis of mean post-test among IV cannula induced phlebitis, in pre-test mean score of control group was 2.9, Mean % was 58% and SD was found to be 0.85 and in post-test mean score was 0.25, mean% was 4.17% and sd was 0.44, and paired ‘t’ value = 17.68 was highly significant at p <0.0001 level

To Compare the Effectiveness of Sesame oil Versus Magnesium Sulphate with Glycerine on Phlebitis

Table no. 5. 7 (Unpaired ‘T’ Test) showing comparison Between the experimental group and control group

	Post-test V.I.P score				
	Max score	Min-Max	Mean	Mean%	SD
Control group	5	0-1	0.25	4.17	0.44
Experimental group	5	0-1	0.30	6	0.47

Unpaired ‘t’ value=0.34 df=38 Critical value=2.02 , P>0.05 NS

Figure 5.7 column diagram showing that the post test comparison between the experimental group and control group.

Table 5.7 (figure 5.7) depict that, in the analysis of mean post test among IV cannula induced phlebitis, mean score of control group was 0.25, mean % was 4.17% and SD was found to be 0.44, mean score of experimental group was 0.30, Mean % was 6% and SD was found to be 0.47 and unpaired 't' value = 0.34 was not significant at p>0.05 level.

Section III
To Find Out the Association between Socio- Demographic Variables with Post-Test Effects of Sesame Oil

group among Peripheral IV cannula induced phlebitis patients with age, the chi square value 0.16, df = 3, and critical value = 7.82 which was not significant at p > 0.05 level.

Gender, the chi value 0.08 df = 1 and critical value = 3.84 and which was not significant at p > 0.05 level.

Religion, the chi square value 1.51, df= 1 and critical value =3.84 which was not significant at p > 0.05 level.

Experimental group-Post-test V.I.P score								
Age	IV sites appear healthy (0)	Slight pain near PIVC site (1)	Pain, erythema, swelling (2)	Pain along the path of the cannula, Erythema, Induration (3)	Pain along the path of cannula, Erythema, swelling, palpable venous cord (4)	Pain along the path of cannula, Erythema, swelling, palpable venous cord, pyrexia(5)	Total	Chi square value/df/Critical value/P value
19 - 25 years	4(66.67%)	2(33.33%)	0(0%)	6(100%)				
26- 35 years	3(75%)	1(25%)	0(0%)	4(100%)				0.16/3/7.82/P>0.05 Non significant
36- 40 years	3(75%)	1(25%)	0(0%)	4(100%)				
>= 41 years	4(66.67%)	2(33.33%)	0(0%)	6(100%)				
2Sex								
Male	8(72.73%)	3(27.27%)	0(0%)	11(100%)				0.08/1/3.84/P>0.05 Non significant
Female	6(66.67%)	3(33.33%)	0(0%)	9(100%)				
3. Religion								
Hindu	11(64.71%)	6(35.29%)	0(0%)	17(100%)				
Muslim	1(100%)	0(0%)	0(0%)	1(100%)				1.51/1/3.84/P>0.05 Non significant
Christian	1(100%)	0(0%)	0(0%)	1(100%)				
Others	1(100%)	0(0%)	0(0%)	1(100%)				
4. Educational status –								
Illiterate	7(77.78%)	2(22.22%)	0(0%)	9(100%)				
middle school	2(66.67%)	1(33.33%)	0(0%)	3(100%)				2.61/3/7.82/P>0.05 Non significant
higher school	5(71.43%)	2(28.57%)	0(0%)	7(100%)				
Graduation & above	0(0%)	1(100%)	0(0%)	1(100%)				
5 Monthly income								
Below 10,000	8(66.67%)	4(33.33%)	0(0%)	12(100%)				0.16/1/3.84/P>0.05
>=Rs10,000	6(75%)	2(25%)	0(0%)	8(100%)				
6 Residence								
Rural	10(62.5%)	6(37.5%)	0(0%)	16(100%)				2.14/1/3.84/P>0.05 Non significant
Urban	4(100%)	0(0%)	0(0%)	4(100%)				
7 Family type								
Nuclear family	5(100%)	0(0%)	0(0%)	5(100%)				2.86/1/3.84/P>0.05 Non significant
Joint family	9(60%)	6(40%)	0(0%)	15(100%)				
Extended family								
8 Food habits								
Vegetarian	1(100%)	0(0%)	0(0%)	1(100%)				0.45/1/3.84/P>0.05 Not significant
Non- vegetarian	13(68.42%)	6(31.58%)	0(0%)	19(100%)				
Control group-V.I.P score								
9 Day of cannulisation	IV sites appear healthy (0)	Slight pain near PIVC site (1)	Pain, erythema, swelling (2)	Pain along the path of the cannula, Erythema, Induration (3)	Pain along the path of cannula, Erythema, swelling, palpable venous cord (4)	Pain along the path of cannula, Erythema, swelling, palpable venous cord, pyrexia(5)	Total	Chi square value/df/Critical value/P value
2 days	2(66.67%)	1(33.33%)	0(0%)	3(100%)				
4 days	3(50%)	3(50%)	0(0%)	6(100%)				0.06/3/7.82/ P>0.05 Non significant
5 days	8(80%)	2(20%)	0(0%)	10(100%)				
> 5 days	1(100%)	0(0%)	0(0%)	1(100%)				
10 Total no. of canalization after admission								
1	5(83.33%)	1(16.67%)	0(0%)	6(100%)				
2	9(69.23%)	4(30.77%)	0(0%)	13(100%)				2.84/2/5.99/P>0.05 Non significant
3	0(0%)	1(100%)	0(0%)	1(100%)				
>3								
11 Previous knowledge								
Yes	5(45.45%)	6(54.55%)	0(0%)	11(100%)				7.01/1/3.84/p<0.05 Non significant
No	9(100%)	0(0%)	0(0%)	9(100%)				
12 Present reasons of patient admission								
Medical	8(61.54%)	5(38.46%)	0(0%)	13(100%)				1.26/1/3.84/P>0.05 Non significant
Surgical	6(85.71%)	1(14.29%)	0(0%)	7(100%)				

Table 6.1 depict that analysis to find out the association between socio demographic variables, post test effects within sesame oil magnesium sulphate with glycerine control

Educational level, the chi value 2.61 ,df = 3 and critical value 7.82 which was not significant at p= 0.05 level.

Monthly income, the chi square value 0.16, df = 1 and critical value = 3.84 which was not significant at P>0.05 level.

Residence area, the chi square value 2.14, df= 1 and critical value= 3.84 which was not significant at P>0.05 level.

Family type, the chi square value =2.86, df =1 and critical value = 3.84 which was not significant at p> 0.05 level.

Food habits, the chi square value = 0.45 df =1 and critical value = 3.84 which was not significant at p> 0.05 level.

Days of canulization, the chi square value = 0.06 df =3 and critical value = 7.82 which was not significant at p> 0.05 level

Total no. of canulization after admission, the chi square value = 2.84 df =2 and critical value = 3.84 which was not significant at p> 0.05 level

Previous knowledge, the chi square value = 7.01, df =1 and critical value = 3.84 which was not significant at p> 0.05 level

Present reason of patient admission, the chi square value = 1.26 df =1 and critical value = 3.84 which was not significant at p> 0.05 level.

CONCLUSION

From the findings of the study it can be concluded that, The topical application of sesame oil and magnesium sulphate with glycerine were effective on reducing the level of phlebitis. There was a no significant association between the post-test scores of phlebitis score with their demographic variables in experimental group and control group. The unpaired t-test with control group and experimental group showed value of t less than tabulation t value. Hence we can conclude that there was no significant difference in effectiveness of sesame oil and magnesium sulphate with glycerin in reducing phlebitis among patient with iv cannula.

Limitations of the Study

Study is limited to –

- The sample size is limited to 40 (20 experimental group and 20 control group) patients.
- The sample is limited to only patient with peripheral IV cannula induced phlebitis with score 2 to 5 according to VIP Score (Visual infusion phlebitis Score total 0-5)
- The study is limited to selected hospital Dr. B.R.A.M. hospital Raipur C.G.
- The study is limited to subjects who were present at the time of study.
- The study is limited to subjects who were willing to participate in the study.

Summary and Future Scope

Phlebitis is a very common complication of peripheral venous catheters and it can be treated effectively by various methods. sesame oil and magnesium sulphate with glycerine both were found to be effective in reducing phlebitis. An extensive research is necessary regarding more cost and time effective method to reduce peripheral intra venous cannula induced phlebitis.

A research study can be conducted for use of anti – inflammatory products in preventing phlebitis.

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