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Evaluate the effectiveness of cold compress, versus magnesium-sulphate application on superficial thrombophlebitis among patients admitted in selected hospital Udaipur, Rajasthan

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Abstract

Introduction: Intravenous (IV) therapy has become a major component of patient care. Intravascular lines are used for purposes varying from monitoring pressures, administering drugs and fluids. A common problem encountered during IV therapy is the phlebitis, ie the inflammation of the venous wall near the point of entry of the cannula into the veins. It is often due to patient movement and disruption of vein at the site of insertion of the cannula. The patients who are on cytotoxic drugs, hyper osmolar agents and vasoactive drugs are more prone to phlebitis.

Methodology: The methods adopted for the present study was quantitative experimental research approach as the study aimed at development of visual infusion phlebitis (VIP) scale for assessing the severity of superficial thrombophlebitis of 60 patents with superficial thrombophlebitis using non probability convenience sampling technique. Data collected by observational check list. Quasi experimental: non randomized control group design, the study was conducted in Geetanjali Hospital, Ananta Hospital & Pacific Hospital at Udaipur.

Result: The effectiveness of cold compress and magnesium sulphate on superficial thrombophlebitis of 60 patients with superficial thrombophlebitis. The calculated value is greater than the table value at 0.001 levels. Hence the research hypothesis (H_1) was accepted that there is a significant difference between pre-test & post-test score. There is an association between pre-test degree of superficial thrombophlebitis with their selected socio-demographic variables; hence the research hypothesis (H_2) was accepted.

Conclusion: The study highlights the significance of exploring the foremost effective intervention out of the many good practices currently in use in the prevention and management of superficial thrombophlebitis.

Keywords: Effectiveness, cold compress, magnesium sulphate & superficial thrombophlebitis

Introduction

Today in hospital setting, intravenous (IV) therapy has become a major component of patient care. Intravascular lines are used for purpose varying from monitoring pressures, administering drugs and fluids. A common problem encountered during IV therapy is the phlebitis, ie the inflammation of the venous wall near the point of entry of the cannula into the veins. It is often due to patient movement and disruption of vein at the site of insertion of the cannula. The patient who are on cytotoxic drugs, hyper osmolar agents and vasoactive drugs are more prone to phlebitis.

Peripheral Intravenous (IV) cannulation is an invasive procedure which predispose the patient to an increased risk of local and systemic infection from micro-organisms introduced either at the time of insertion or when in situ. Peripheral IV cannula related infections are associated increased mortality, prolonged hospitalization and increased costs. Infections are most commonly caused by staphylococci. The predominant source of these micro-organisms is likely to be form the patients endogenous flora colonizing the skin or from the hands of the health care practitioner^[2].

The Infusion Nurses Society National Standards of Practice (Australia) stated that a nurse who administers IV medication or fluid must know its adverse effects and appropriate interventions to be taken before starting the infusion.

Although many strategies to reduce this failure have been suggested, because of its multi factorial etiology, IV administration still continues to fail. Hence nurse need to be aware of and consider certain intervention to reduce phlebitis when managing IV therapy in patients [3].

Phlebitis can be categorized as chemical, mechanical or bacterial; however, two or more of the kind of irritation often occur simultaneously. Infusion Nurses Society has identified specific standards for assessing phlebitis [4].

Grade Clinical criteria

1. No clinical symptoms
2. Erythema at access site with or without pain
3. Pain at access site, erythema, oedema, or both streak formation and palpable venous cord (1 inch or short).
4. Pain at access site with erythema, streak formation, palpable venous cord (linger than 1 Inch), and purulent drainage.

Pain at access site with erythema, streak formation, palpable venous cord (linger than 1 Inch), and purulent drainage.⁵

Investigator during clinical practices had experienced that there is higher incidence of superficial thrombophlebitis among patients who are receiving continuous intravenous therapy. In these conditions some patient receive cold compress or magnesium sulphate application, but this is not prove that which method is most effective method for reducing the signs and symptoms of superficial thrombophlebitis. Various investigators investigate effect of cold compress to reducing superficial thrombophlebitis, while some other investigator investigate effect of cold compress to reducing superficial thrombophlebitis and in clinical practices magnesium sulphate application uses to reducing superficial thrombophlebitis.

Statement of Problem

“Evaluate the effectiveness of cold compress, versus magnesium-sulphate application on superficial thrombophlebitis among patients admitted in selected hospital Udaipur, Rajasthan.”

Objectives of the Study

- To assess the pre intervention thrombophlebitis in experimental and control group.
- To assess the post intervention thrombophlebitis in experimental and control group.
- To compare the effect of cold compress, and magnesium-sulphate application.
- To find the association between selected socio-demographic variable /clinical variable and pre-test assessment of superficial thrombophlebitis.

Hypothesis

- **H₁**-There is a significant effect of cold compress and magnesium sulphate application on superficial thrombophlebitis.
- **H₂**-There is a significant difference among cold compress versus magnesium-sulphate application in reducing superficial thrombophlebitis.

Methodology

The methods adopted for the present study was quantitative

experimental research approach as the study aimed at development of visual infusion phlebitis (VIP) scale for assessing the severity of superficial thrombophlebitis of 60 patents with superficial thrombophlebitis using non probability convenience sampling technique. Data collected by observational check list. Quasi experimental: non randomized control group design, the study was conducted in Geetanjali Hospital, Ananta Hospital & Pacific Hospital at Udaipur.

Criteria for sample selection

Inclusion criteria

- Patient in between 18-60 years age.
- Patient who are receiving continuous IV therapy.
- Patients admitted in Hospital
- Patient who do not suffer from any dermatological disorders
- Patient who develop superficial thrombophlebitis.
- Patient who not receiving analgesic.

Exclusion criteria

- Patient with no superficial thrombophlebitis in upper extremity.
- Patients with dermatological disorders.
- Patients with any bleeding disorders, injury to the same limb, pre-existing lymphatic obstruction

Development and description of tool

The tool was developed based on review of literature, opinion from experts in the field of medical and nursing. The following steps were undertaken to prepare the final tool.

The tool consists of two sections

Section A: Demographic variable:

It consists of demographic variables of the patient, that includes age, sex, education, dietary pattern, use of substance, source of information, use of vibrating device, number of prick, size of IV cannula, types of medication, site of IV cannula.

Section B: Assessment of superficial thrombophlebitis by using VIP scale.

Table 1: Visual infusion phlebitis scale

VIP Scale	Score
No sign of phlebitis	0
Possible first sign of phlebitis	1
Early stage of phlebitis	2
Medium stage of phlebitis	3
Advance stage of phlebitis	4
Advance stage of thrombophlebitis	5

A standardized tool developed by Ms. Andrew Jackson to assess the severity of phlebitis. Minimum score of the scale is zero (no phlebitis) and maximum five (severe phlebitis). The total score is interpreted as mild (<2), moderate (2-3), and severe (>3).

Reliability of the tool

The researcher used standard tool so reliability of the tool is $r = 0.85$.

Ethical consideration

Ethical considerations are vital to any research study because of the influence on the researchers ability to acquire and retain participants.

The researcher has done cold compress and magnesium sulphate application on superficial thrombophlebitis among patients at selected Hospitals, Udaipur. The proposed study was conducted after the approval of the Institutional Human Ethical Committee. Permission were obtained from the concerned authorities. Informed consent were obtained from the patient participating in study. participates had given the right to withdraw from the study at any time they want and assurance was given to the study subjects that, the privacy and anonymity of the individual will be maintained confidentially

Method of data collection

After obtaining the required permission from the concerned authorities and informed consent from the patients, the investigator introduce himself, explain the purpose of the study and collect the data pertaining the demographic variables. The study will be conducted in the following phases.

Phase 1: The investigator will assess the superficial thrombophlebitis in both experimental and control group.

Phase 2: Cold compress and magnesium sulphate will be administered by researcher to the experimental group for 20 minutes. This will be followed for three days and will be given thrice a day. There will be no intervention for the control group.

Phase 3: After the end of the intervention (3th day), post test score of superficial thrombophlebitis will be assessed by VIP scale in both experimental group and control group.

Plan for data analysis

The Researcher used Descriptive statistics which include frequency, percentage and mean, medium and standard deviation to assess the demographic variables of patient with superficial thrombophlebitis. Inferential statistics such as 't' test was used to compare the effectiveness of pre and post-test assessment. Chi-square test was done to find out the association between the severity of superficial thrombophlebitis and demographic variables.

Projected outcome

After the study, the researcher will know whether cold compress and magnesium sulphate have much effect on the superficial thrombophlebitis among patient admitted with superficial thrombophlebitis in experimental group.

Study result

Section A: socio-demographic data and clinical variable

- **Among 20 patents with superficial thrombophlebitis in experimental group A:** 8 (40%) belonged to the age group 47-60 years, were 12 (60%) belonged to the male, were 6 (30%) belonged to the Primary education & secondary education, were 12 (60%) belonged to the vegetarian, were 9 (45%) belonged to the smoking, were 8 (40%) belonged to mass media, were 18 (90%) belonged to no, were 8 (40%) belonged to 2 prick, were 12 (60%) belonged to 22 G, were 15 (75%) belonged to crystalloid and were 12 (60%) belonged to cephalic vein.
- **Among 20 patents with superficial thrombophlebitis in experimental group B:** 7 (35%) belonged to the age group 47-60 years, were 11 (55%) belonged to the male, were 7 (35%) belonged to the Primary education, were 11 (55%) belonged to the vegetarian, were 12 (60%) belonged to the smoking, were 9 (45%) belonged to health personnel, were 17 (85%) belonged to no, were 9 (45%) belonged to 2 prick, were 12 (60%) belonged to 20 G, were 12 (60%) belonged to crystalloid and were 10 (50%) belonged to cephalic vein.
- **Among 20 patents with superficial thrombophlebitis in control group:** 9 (45%) belonged to the age group 47-60 years, were 14 (70%) belonged to the male, were 8 (40%) belonged to the Primary education, were 11 (55%) belonged to the mixed, were 8 (40%) belonged to the smoking, were 10 (50%) belonged to health personnel, were 17 (85%) belonged to the no, were 8 (40%) belonged to 2 prick, were 16 (80%) belonged to 20 G, were 10 (50%) belonged to crystalloid and were 12 (60%) belonged to cephalic vein.

Section B

Assessment of superficial thrombophlebitis by: Visual infusion phlebitis (VIP) scale.

Table 2: Pre and Post- test level of VIP Scale among patients with thrombophlebitis. (N=60)

VIP Scale	Experimental Group A				Experimental Group B				Control Group			
	Pretest		Posttest		Pretest		Posttest		Pretest		Posttest	
	N	%	N	%	N	%	N	%	N	%	N	%
No sign of phlebitis	0	00	00	00	00	00	04	20	00	00	00	00
Possible first sign of phlebitis	0	00	08	40	00	00	08	40	00	00	01	05
Early stage of phlebitis	03	15	10	50	02	10	06	30	00	00	02	10
Medium stage of phlebitis	12	60	02	10	10	50	02	10	13	65	12	60
Advance stage of phlebitis	05	25	00	00	08	40	00	00	07	35	05	25
Advance stage of thrombophlebitis	00	00	00	00	00	00	00	00	00	00	00	00

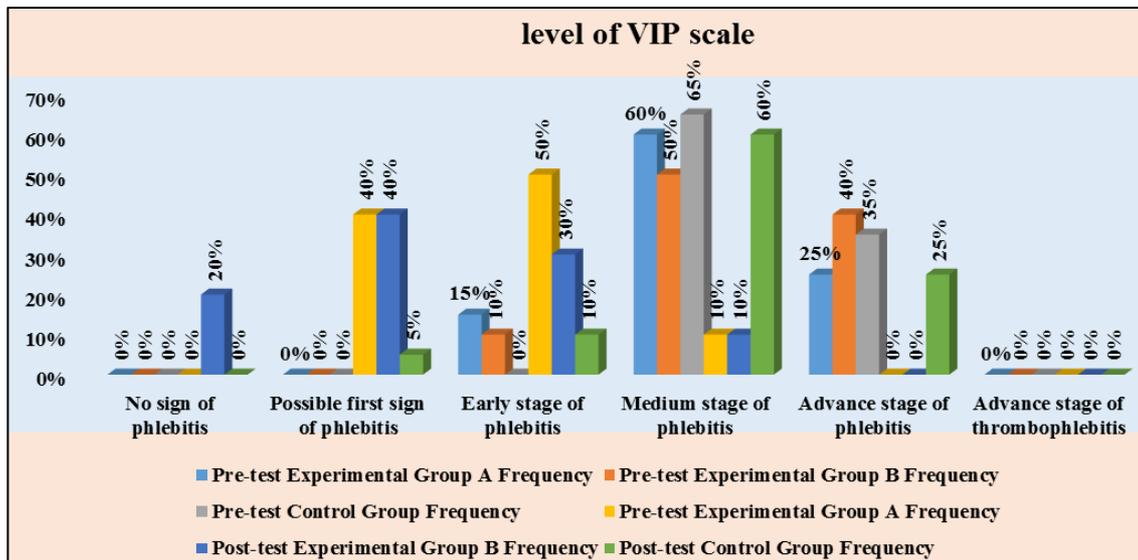


Fig 1: Pre and Post- test level of VIP Scale among patients with thrombophlebitis

Figure 1 & Table 2: Experimental group A: Depicts that majority of participates in pre-test with superficial thrombophlebitis 12 (60%) had medium stage of phlebitis, 5 (25%) had advance stage of phlebitis, 3 (15%) had early stage of phlebitis and none of them had no sign of phlebitis, possible first sign of superficial thrombophlebitis and advance stage of thrombophlebitis, in post-test with superficial thrombophlebitis 10 (50%) had early stage of phlebitis, 8 (40%) had possible first sign of phlebitis, 2 (10%) had medium stage of phlebitis and none of them had no sign of phlebitis, possible first sign of phlebitis, advance stage of phlebitis and advance stage of thrombophlebitis.

Experimental group B: Depicts that majority of participates in pre-test with superficial thrombophlebitis 10 (50%) had medium stage of phlebitis, 8 (40%) had advance stage of phlebitis, 2 (10%) had early stage of phlebitis and none of them had no sign of phlebitis, possible first sign of phlebitis and advance stage of thrombophlebitis, in post-test with superficial thrombophlebitis 8 (40%) had possible first sign of phlebitis, 6 (30%) had early stage of phlebitis, 4 (20%) had no sign of phlebitis, 2 (10%) had medium stage of phlebitis and none of them had advance stage of phlebitis and advance stage of thrombophlebitis.

Control group: Depicts that majority of participates in pre-test with superficial thrombophlebitis 13 (65%) had medium stage of phlebitis, 7 (35%) had advance stage of phlebitis and none of them had no sign of phlebitis, early stage of phlebitis, possible first sign of phlebitis and advance stage of thrombophlebitis, in post-test with superficial thrombophlebitis 12 (60%) had medium stage of phlebitis 5 (25%) had advance stage of phlebitis, 2 (10%) had early stage of phlebitis, 1 (5%) had possible first sign of phlebitis, and none of them had no sign of phlebitis and advance stage of thrombophlebitis.

Section C: Analysis of Effectiveness of cold compress and magnesium sulphate among patients with Superficial thrombophlebitis

- Experimental Group A: Findings related to effectiveness of cold compress on thrombophlebitis. The result shows that, the paired 't' test value in

experimental group A was 16.30 respectively. It was significant at $P < 0.001$ level.

- Experimental Group B: Findings related to effectiveness of magnesium sulphate on thrombophlebitis. The result shows that, the paired 't' test value in experimental group B was 20.18 respectively. It was significant at $P < 0.001$ level.
- Control Group: Findings related to effectiveness on thrombophlebitis. The result shows that, the paired 't' test value in experimental group B was 20.18 respectively. It was not significant at $P < 0.001$ level.

From above result, it is clear that the calculated 't' value in experimental group A and B (16.30 and 20.18 were much higher than the 'p' value at 0.001 level of significance hence hypothesis H_1 is accepted.

Section D: Findings related to association between selected demographic Variables and clinical data

- The above table reveals that there is a significant association between superficial thrombophlebitis with socio demographic and clinical variables such as age in years (12.80), size of IV cannula (13.33) and site of IV cannula (13.21) were significantly at $P < 0.05$, and others not significant at $P < 0.05$ level.
- The above table reveals that there is a significant association between superficial thrombophlebitis with socio demographic and clinical variables such as dietary pattern (6.32), number of prick, (13.78) size of IV cannula (13.66) and site of IV cannula (13.33) were significantly at $P < 0.05$, and others not significant at $P < 0.05$ level.
- The above table reveals that there is a significant association between superficial thrombophlebitis with socio demographic and clinical variables such as age in year (2.05), gender (0.90), educational status (4.41), dietary pattern (0.90), use of substance (2.35), source of information (1.49) use of vibrating device (4.12), and others not significant at $P < 0.05$ so H_2 was not accepted

Discussion

The main objective of the study was compare the effectiveness of magnesium sulphate and cold compress on superficial thrombophlebitis.

The finding of this study have clearly shown that magnesium sulphate was more effective than cold compress (20.18 & 16.30) in reducing superficial thrombophlebitis, although both interventions were found to be effective.

The above result supported by, Alwin T Varghese, Moly Kt (2018) [6] conducted a study to effectiveness of magnesium sulfate with glycerine versus cold compress on patients with peripheral intravenous cannula induced phlebitis. Quasi-experimental pre-test post-test study on 60 subjects, 30 in each group, with interventions magnesium sulfate with glycerine application to one group and cold compress to another group of patients with PIVC induced phlebitis was done in a tertiary care hospital, Kerala. Purposive sampling with random allocation of subjects to each group was done. A standardized visual infusion phlebitis (VIP) scale was used to assess the severity of PIVC induced phlebitis. The findings of this study have clearly shown that magnesium sulphate with glycerine was more effective than cold compress $F(1, 57)$ value (5.362 and 10.36, $P < 0.05$) in reducing PIVC induced phlebitis, although both the interventions (magnesium sulfate with glycerine as well as cold compress) were found to be effective.

A similar comparative, three groups pre-test, post-test, and quasi-experimental study were conducted by Saini and Paul (2011) [7] to study the effectiveness of cold application, magnesium sulfate application and also heparinoid application on superficial thrombophlebitis on 45 patients in Choithram Hospital and Research Centre, Indore. The cold application was given to experimental Group C, for a period of 20 min, experimental group (H) was intervened by gentle massage with Thrombophob ointment and similarly in experimental group (M), magnesium sulfate dressing was done by dipping the gauze in the magnesium sulfate glycerine solution and applying it on phlebitis area. All applications were given 3 times a day for 3 days. The finding of the study indicated that the computed "t" value of cold application group ('t'14=14.33), heparinoid application group ('t'14=11.90), and magnesium sulfate application group ('t'14=20.82) were statistically significant at $P < 0.001$, which suggested that all three interventions were effective in reducing the signs and symptoms of superficial thrombophlebitis. The computed "F" ratio of all the three groups ($F_{2,42}=10.10$, $P < 0.001$) showed that the three applications differ significantly from each other. The mean difference of magnesium sulfate group (18.34) was higher than the cold application (13.33) and heparinoid application (12.8) group. This indicated that magnesium sulfate application was most effective in reducing the signs and symptoms of superficial thrombophlebitis.

In yet another study conducted by Yambem *et al.* [8] at Belgam, it was found that application of glycerin with magnesium sulfate was more effective than heparin - benzyl nicotinate (Thrombophob) ointment in the management of cannula induced thrombophlebitis.

The study findings have reinforced the effectiveness of magnesium sulfate with glycerine in reducing PIVC induced phlebitis than cold compress. However, more researches in homogenous groups are required to strengthen similar cost-effective interventions to alleviate the discomfort and agony of patients with phlebitis.

Conclusion

The study highlights the significance of exploring the foremost effective intervention out of the many good practices currently in use in the prevention and management of superficial thrombophlebitis.

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