

To Assess the Effectiveness of Hot Versus Cold Glycerin Magsulf Application in Relieving Phlebitis among Patients in a Selected Hospital

Rajeshree Sunil Arsul

Abstract

Background of Study: In modern medical practice, approximately 90% of patients in acute care setting receive some form of intravenous infusion therapy (JeniseWillin, 1999). Phlebitis is one of the most common complications of IV therapy. Among hospitalized patients, 25% to 70% of patients receiving IV therapy develops phlebitis. According to statistics, the most common grade of phlebitis were 1 and 2 (37% and 53.6%, respectively) [1]. *Objectives:* 1. To assess the degree of phlebitis, 2. To determine the effect of cold glycerin magsulf application in relieving phlebitis, 3. To determine the effect of hot glycerin magsulf application in relieving phlebitis, 4. To compare the effectiveness between cold and hot glycerin magsulf application in relieving phlebitis. *Methods and Material:* This study was conducted with the objectives to determine the effect of hot and cold glycerin magsulf application in relieving phlebitis among patients in a selected hospital. Hence evaluative research approach was considered as appropriate. With this approach it would be possible to evaluate the effectiveness of hot and cold glycerin magsulf application in relieving phlebitis. It consists of two group's pre- test post- test, designed to assess the effectiveness of hot and cold glycerin magsulf in relieving phlebitis. The research design selected for the present study was quasi experimental two group pre-test and post-test design. Study conducted in medical surgical wards target population was patient with infusion phlebitis. Samples collected by purposive sampling technique. Research tool was standard infusion phlebitis scale and descriptive and inferential statistically, paired test "t" test was used for analysis. Reliability was established by inter-rater method and it was found as $r = 0.88$. *Results:* Majority of sample i.e. 96.6% were found with grade 3. None of sample had Grade 1 and Grade 5. For the grade 4 phlebitis need to do further study, this 4 degree of phlebitis not relieved in 5 days of intervention with hot and cold glycerin magsulf application. As per day of relief proved that hot glycerin magsulf application was more effective than the cold glycerin magsulf application. All over 56% of sample in hot glycerin magsulf application and 26.63% of sample in cold glycerin magsulf application got relief on the 3rd day and 43% of sample in cold glycerin magsulf application and 6.67% of hot glycerin magsulf application relief on the 4th day. Majority of sample got relief on the 3rd day with hot glycerin magsulf application. So hot glycerin magsulf application was more effective than cold glycerin magsulf application in relieving phlebitis. The effectiveness of hot and cold glycerin magsulf application in relieving phlebitis at pre and posttest. Mean, standard deviation and mean difference values were compared and student's paired 't' test was applied at 0.05 level of significance. The tabulated 't' value was 2.05. The calculated 't' value was much higher

Authors Affiliation

M. Sc. Nursing, Medical Surgical Nursing (Cardio Vascular & Thoracic Nursing), Maharashtra University of Health Sciences, Nashik, Maharashtra-422003, India.

Reprints Requests

Smt. Rajeshree Sunil Arsul,
Muktagiri Apartment 14,
Opposit Lady Hording
Hospital, Akola - 444005,
Maharashtra.
E-mail:
rajeshreearsul@gmail.com

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than the tabulated value at 0.05 level of significance which is statistically acceptable level of significance. Hence it is statistically interpreted that hot and cold glycerin magsulf applications in relieving phlebitis were effective. *Conclusion:* In this study, during a period of data collection the visual infusion phlebitis scale was used, onset of phlebitis, degree of phlebitis, site and size of cannulation were observed. Data showed that, majority of sample were found with grade three phlebitis and both the interventions i.e. hot glycerin magsulf and cold glycerin magsulf application both are effective which is already proved but as compare to cold glycerin magsulf application hot glycerin magsulf application is more effective in relieving phlebitis. Sample with grade 4 Phlebitis is not relieved in four days of intervention. Further study may need to prove this. In conclusion investigator state that the aim of investigator was achieved. This study can improve the outcome of nursing practice, which has been proven to be relevant also from a legal point of view. In fact, evidence based nursing is safer both for patients and nurses themselves.

Keywords: Assessment; Effectiveness; Hot glycerin magsulf application; Cold glycerin magsulf application; Phlebitis; Patients:

Introduction

Health is a dynamic process and it is always changing. It is continuously changing as a person adapts to changes in the internal and external environments to maintain a state of physical, emotional, intellectual, social, developmental, and spiritual well-being. Illness is a process in which the functioning of a person is diminished or impaired in one or more dimensions, when compared to the person's previous condition [2].

An impairment of the normal state of a human being that interrupts or modifies its vital functions is known as disease. Disease is a main reason for the people to seek medical help and admission in hospitals. According to American hospital association, hospitals are licensed institutions with at least six beds whose primary function is to provide diagnostic and therapeutic client services for medical conditions [3].

When patients are unable to take fluids and nutrients and are unable to make use of their gastrointestinal system effectively. The common practice is to feed patient through the vein. This method of feeding to patient is known as intravenous infusion. Claude Barnad is known to be the father of infusion by the end of 19th century. Various improvements in intravenous administration of fluid and increase knowledge concerning body fluids and their role in the human body have resulted in popularizing this technique in every day hospital practice. Compared with other route of administration, intravenous route is the fastest way to deliver fluids and medication throughout the body [4].

Intravenous devices are an important and common aspect of hospital practice for the

administration of medications, nutrients, fluids, blood products and to monitor the hemodynamic status of a person. Phlebitis is one of the most common complications of IV therapy. Among hospitalized patients, 25% to 70% of patients receiving IV therapy develops phlebitis. Phlebitis refers to the subjective clinical manifestation at an access site with two of the following symptoms: redness, pain, swelling, palpable venous cord. It can lead to infection or thrombus formation. Symptoms develop over hours to days and resolve in days to weeks.

There are three different types of phlebitis including mechanical, chemical and infectious. Mechanical phlebitis occurs when a peripheral intravenous catheter is not secured properly, leading the catheter to change position within the vein. Chemical phlebitis is caused by highly vesicant irritants such as drugs.

Drug irritation was indicated as the most significant predictor of phlebitis such as antibiotics, blood products, and glucose containing fluids. Infectious or bacterial phlebitis is caused when an infectious agent is introduced into the peripheral intravenous catheter. Infectious phlebitis can be caused by contamination of the catheter tip anytime during IV insertion. Infectious phlebitis may also occur if a cannula is left in place longer than recommended by the Center for Disease Control and prevention [5].

Intravenous therapy has become a lifesaving as well as life sustaining therapy and is increasingly being performed by nursing staff in hospitals. Nurses spend up to 2/3rd of their time for IV therapy related responsibilities. Therefore, initiating IV infusion is a challenging skill in nursing.

Factors associated with the development of infiltration are integrity and state of veins, insertion technique, cannula location, insertion into the bony

extremity or movable joints, size of cannula, use of steel needles, infusion of certain drugs, duration of therapy, increased length of time over 24hrs, blood flow problems in the region, hyperosmolar parenteral fluids, pH, acidic infusates, chemotherapeutic drugs and duration of soft tissue exposure to vesicants [6].

Local responses to warm and cold occur through stimulation of temperature sensitive receptors in the skin. Impulses travel from the periphery to the hypothalamus and the cerebral cortex. The hypothalamus then initiates heat producing or heat reducing location of the body. The conscious sensations of temperature are aroused in the cerebral cortex. These interventions are effective by decreasing swelling through cold application, decreasing stiffness through warm magnesium sulfate application and increasing large diameter nerve fiber input to block small diameter pain fiber messages by cold and warm application [7].

Warm Glycerin magnesium sulfate application can act by the osmotic action of the Glycerin magnesium sulfate enabling the movement of fluid from the interstitial space with the skin acting as the membrane between topical magnesium sulfate has been used traditionally in the treatment of abscess by causing vasodilation and resolving by pointing of pus.

Glycerin acts as a solvent of magnesium sulfate and its hygroscopic action helps in reducing swelling due to interstitial fluid. The warmth generated acts by vasodilation to improve fluid reabsorption and can reduce swelling and pain.

Administering drugs by the intravenous route has advantages. Often the nurse uses the intravenous route in emergencies when a first acting drug must be delivered quickly. The intravenous route is also best when constant therapeutic blood levels must be established. Some medications are highly alkaline and irritating to muscles and subcutaneous tissues. These drugs cause discomfort when given intravenously [8].

Infiltration occurs when a catheter or needle penetrates the vessel wall during venipuncture or later slip out of the vein and allows intravenous solution to flow into surrounding tissues.

This is manifested as swelling from increased tissue fluid around the venipuncture site, pallor, warmth, decreased flow of rate, stop of flow and pain resulting from edema and increasing proportionately as the infiltration worsens [9].

Hypotheses

H_0 - There is no significant difference between the

effect of hot and cold glycerine magsulf in reducing phlebitis.

H_1 - There is a significant difference between the effect of hot and cold glycerin mugsulf in reducing phlebitis.

Methods and Materials

The research design selected for the present study was quasi experimental two group pre-test and post-test design. The study was conducted in a selected hospital. The rationale for selecting this setting was easy transport, familiarity with the setting, administrative approval, cooperation and availability of subject. This research study was based on General System Theory by Ludwig Von Bertalanffy, it is a set of interrelated part of working together to achieving a common goal. The population selected for the present study, was all medical and surgical patients admitted in the hospital. In this study included the patients those who were developed infusion phlebitis. Sample consisted of 60 patients who had developed infusion phlebitis in selected hospital and who were admitted in medical and surgical wards during the period of data collection. Purposive sampling was adopted for sampling and sample was divided into two groups randomly.

Plan for Tool Preparation

A standardized Visual Infusion Phlebitis (VIP) scale was selected.

TOOL-1 Demographic section was covered to assess the demographic data of the clients such as age, site of IV cannulation, Gauge of IV cannulation, IV cannula in situ or removes, day of intervention started, type of application were used.

TOOL-II Visual infusion phlebitis scale was used to assess the effectiveness of peripheral intravenous cannula induced phlebitis.

Baseline proforma was used to record the score of phlebitis observes in sample.

Results

The Table 1 shows that 40% of the sample with hot glycerin magsulf application and 33.3% with cold glycerin magsulf application had grade 2, 53.3% of the sample with hot glycerin magsulf application and 43.3% with cold glycerin magsulf application had grade 3, 6.7% of the sample with hot glycerin

magsulf application and 23.3% with cold glycerin magsulf application had grade 4 respectively. None of sample had Grade 1 and Grade 5.

Majority of sample i.e. 96.6% were found with grade 3.

Note: In this study grade is considered as degree.

Effectiveness: The degree of reduction in phlebitis either by application of cold or hot glycerin magsulf as measured in terms of Jackson’s visual infusion phlebitis scale.

Table 2 shows the comparison of score in cold glycerin magsulf application and hot glycerin magsulf application on day 1, day 2, day 3 and day 4

among patients of selected hospital. Mean, standard deviation and mean difference values were compared and student’s paired ‘t’ was applied at 0.05 level of significance. The tabulated t-value for df =30-1 i.e 29 degrees of freedom, for the 0.05 level of significant was 2.05. The calculated ‘t’ value was much higher than the tabulated value at 0.05 level of significance for all the days, which is statistically acceptable level of significance. In addition the calculated ‘p’ value for day 2, day3 and day 4 was 0.008, 0.002 and 0.036 which is ideal for any population. Hence it was statistically interpreted that hot is more effective than the cold glycerin magsulf application in relieving phlebitis.

Note:

Table 1: Distribution of sample in relation to degree of phlebitis

N=60

Sr. No.	Grade	Hot glycerin magsulf application		Cold glycerin magsulf application	
		f	%	f	%
1	Grade 1	0	0%	0	0%
2	Grade 2	12	40%	10	33.3%
3	Grade 3	16	53.3%	13	43.3%
4	Grade 4	2	6.7%	7	23.3%
5	Grade 5	0	0%	0	0%

Effectiveness: The degree of reduction in phlebitis either by application of cold or hot glycerin magsulf as measured in terms of Jackson’s visual infusion phlebitis scale.

Table 3. shows that 6.67% of sample from hot group and 23.33% from cold group got no relief in four day of application, on the day first no

one had got relief, 30% of sample from hot group and 6.67% of sample from cold group got relief on 2nd day, 56.67% of sample from hot group and 26.67% of sample from cold group got relief on 3rd day and 6.67% of sample from hot group and 43.33% of sample from cold group got relief on 4th day.

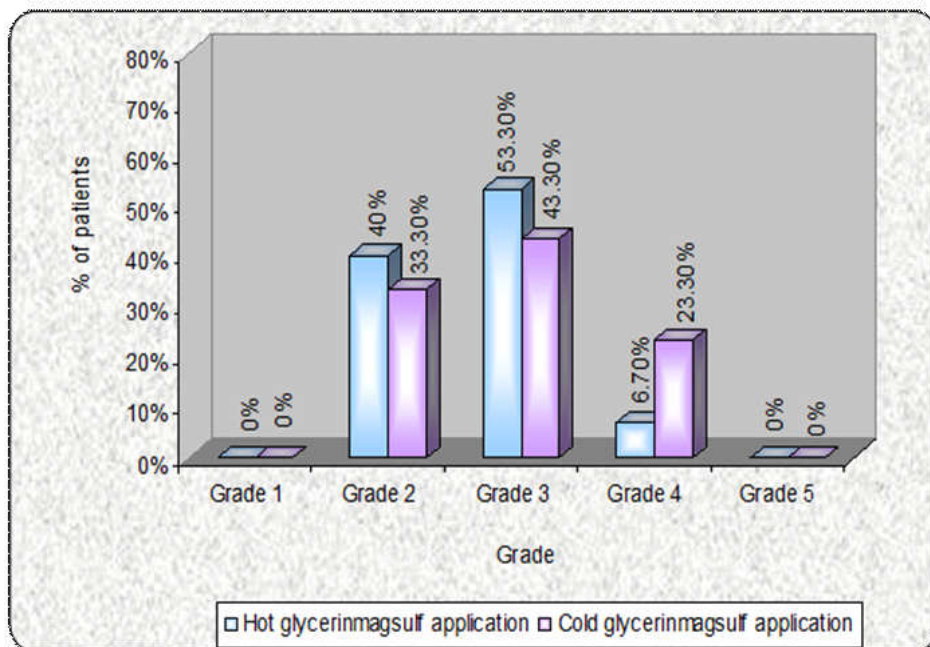


Fig. 1: Distribution of sample in relation to degree of phlebitis

Table 2: Day wise effectiveness of hot and cold glycerin magsulf application in relieving phlebitis

N=60

Sr. No.	Day	Hot Glycerin magsulf application	Cold Glycerin magsulf Application	Mean Difference	t-value	p-value
1	Day 1	2.63±0.65	2.90±0.75	0.26±0.18	1.46	0.150 NS,p>0.05
2	Day 2	1.62±0.96	2.33±1.04	0.71±0.26	2.73	0.008S,p<0.05
3	Day 3	0.62±1.02	1.65±1.41	1.03±0.31	3.24	0.002 S,p<0.05
4	Day 4	0.26±1.01	1.03±1.67	0.76±0.35	2.14	0.036 S,p<0.05

Discussion

The findings of the study were discussed with reference to the objectives stated in abstract and with the findings of the other studies in this section. The present study was undertaken as, “To assess the effectiveness of hot versus cold glycerin magsulf application in relieving phlebitis among patients in a selected hospital”.

A similar study was conducted on effectiveness of cold application, heparinoid application and magnesium sulfate application on superficial thrombophlebitis among patients in selected hospitals of Indore. Three-group pretest and posttest design was adopted for the study. Sample were selected using purposive sampling and they were randomly assigned into three groups.

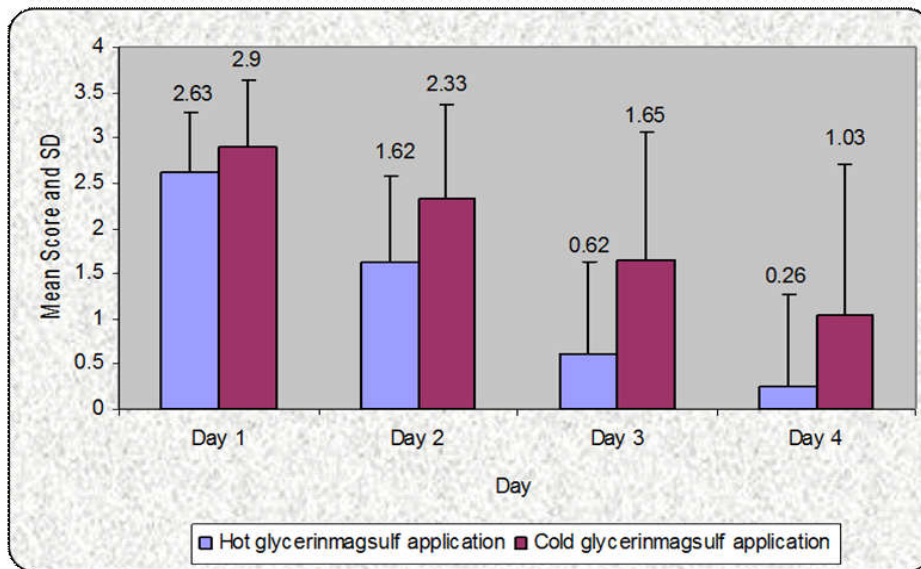


Fig. 2: Day wise comparison between effect of hot and cold glycerin magsulf application in relieving phlebitis

Table 3: Effectiveness of hot and cold glycerin magsulf application in relieving phlebitis in relation to day of relief

N=60

Sr. No.	Day	Hot glycerin magsulf application		Cold glycerin magsulf application	
		f	%	f	%
1	No Relief	2	6.67%	7	23.33%
2	1 st day	0	0%	0	0%
3	2 nd day	9	30%	2	6.67%
4	3 rd day	17	56.67%	8	26.67%
5	4 th day	2	6.67%	13	43.33%

The finding of the study indicated that the computed t value of cold application group (‘t’=14.33), heparinoid application group (‘t’ =11.90) and magnesium sulfate application group (‘t’ =20.82) were statistically significant, which suggested that all three interventions were effective in reducing the signs and symptoms of superficial thrombophlebitis.

This study concluded that magnesium sulfate application was most effective intervention in reducing the superficial thrombophlebitis [10].

In this presented study, two group pretest posttest was done, Sample were selected by purposive sampling technique and divided into two groups randomly. To assess the effectiveness of both the

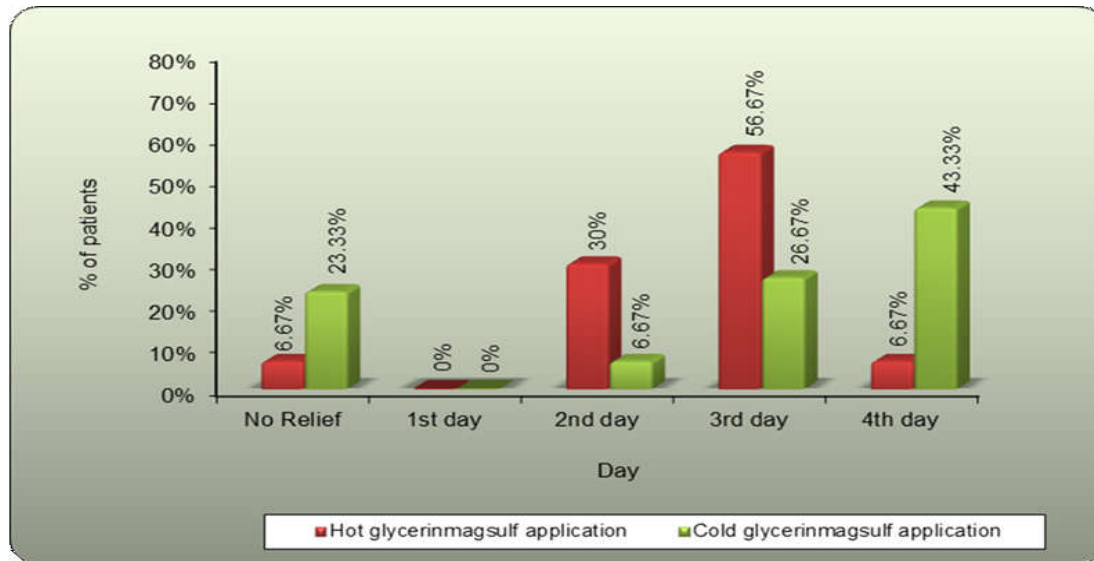


Fig. 3: Effectiveness of hot and cold glycerin magsulf application in relieving phlebitis in relation to day of relief

groups “t” test was applied and mean deference was calculated for significant deference. Study concluded that magnesium sulfate application was more effective intervention in reducing the phlebitis.

Recommendations

On the basis of the findings of the study, it is recommended that,

- A similar study can be replicated on a larger population.
- A similar study can be done as a true experimental study with control group and randomization.
- Make a protocol of hot glycerin magsulf application in three times a day to relieve infusion phlebitis.

Conclusion

After the detailed analysis, this study leads to the following conclusion:

In this study, during a period of data collection the visual infusion phlebitis scale was used, onset of phlebitis, degree of phlebitis, site and size of cannulation were observed. Data showed that, majority of sample were found with grade three phlebitis and both the interventions i.e. hot glycerin magsulf and cold glycerin magsulf application both are effective which is already proved but as compare to cold glycerin magsulf application hot glycerin magsulf application is more effective in relieving

phlebitis. Sample with grade 4 Phlebitis is not relieved in four days of intervention. Further study may need to prove this.

In conclusion,investigator state that the aim of investigator was achieved. This study can improve the outcome of nursing practice, which has been proven to be relevant also from a legal point of view. In fact, evidence based nursing is safer both for patients and nurses themselves.

Definitions

Assessment: Observe the sign of phlebitis before and after application of hot or cold glycerin magsulf.

Effectiveness: The degree of reduction in phlebitis either by application of cold or hot glycerin magsulf as measured in terms of Jackson’s visual infusion phlebitis scale.

Hot glycerin magsulf application: A gauze piece soak in hot (105°F) magnesium sulfate granules saturated with glycerin, topically applied and secure with a four inch roller bandage three times a day, for four days.

Cold glycerin magsulf application: Application of a gauze piece wrung from cold (68°F) glycerin magsulf past and secure with a four inches roller bandage, applied for three times a day, for four days.

Phlebitis: A painful swelling and raised temperature at the intravenous infusion site along with hardness (induration), redness (erythema), and palpable venous cord.

Patients: Patients those who are developed infusion phlebitis.

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