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Randomized Control Trial to Assess the Effectiveness of Glycerin with Magnesium Sulphate Application on Level of Superficial Thrombophlebitis among Patient Receiving Intravenous Infusion at HSK Hospital Bagalkot

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Abstract **Original Research Article**

Background of the study: The concept of intermittent use of an intravenous (I.V) catheter began in the early 1970s, when a stopcock was added to plastic tubing on a winged needle. Almost all patients admitted to hospital require a peripheral intravenous catheter to provide access for administration of drugs and fluids and parenteral nutrition. Thrombophlebitis is a common complication in the hospital and many factors contributing to the development of thrombophlebitis. Magnesium Sulphate with Glycerin dressing and Heparinoid ointment application are found to be used widely for the management of phlebitis. It is becoming a common practice in hospitals, both intervention are more effective in prevention of thrombophlebitis. ***Aim*:** The study was to assess the effectiveness of glycerin with magnesium sulphate application on level of superficial thrombophlebitis. ***Methodology*:** The research design selected for this study was true-experimental pre-test and post-test control group research design. The sample size comprises of 60 patients with superficial thrombophlebitis admitted at HSK Hospital Bagalkot. The sampling technique adopted for this study will be simple random technique. In the present study the data will be collected by standard tool visual infusion phlebitis for, the data was analyzed by using descriptive and inferential statistics in terms of mean percentage by distribution, paired "t" test and Chi square test for association. ***Result:*** The finding revealed that the difference between pre test and post test scores of the thrombophlebitis patients shows that, difference between mean pre test [3.9] and mean posttest [1.67] scores, found to be statistically difference at 0.05 level of significant **[t= 19.63 (p valve=0.0001) p<0.05]**. The mean post test level of thrombophlebitis will be significantly lower than the mean pre test level of thrombophlebitis among patients receiving intravenous infusion. ***Conclusion***: The study proved that pre test and post test scores of the thrombophlebitis patients shows that, difference between mean pre test mean and SD [3.9±0.691] and mean, SD of posttest [1.679±0.680] scores, paired t test [t= 19.63 (p valve=0.0001) p<0.05] was used for analysis the effectiveness of glycerin with magnesium application The compare the mean and standard deviation of the post test level of thrombophlebitis among patients receiving intravenous infusion in experimental group and control group. In experimental group the mean, standard deviation score [1.679±0.68] and in control group the mean, standard deviation score [1.6±0.66]. The calculated independent t value was 1.725 used for comparison between experimental group and control group.

Keywords: Assess, effectiveness, thrombophlebitis, application, Heparin gel, $MgSO_4$, Glycerin.

INTRODUCTION

Intravenous cannulation is the corner stone of medical practice. The use of intravenous device is an integral part of patient care and these devices are used for administration of fluid, nutrient, medication and blood product. Now a days in hospital setting, intravenous (IV) therapy has become a major component of patient care. Intravascular lines are used for monitoring pressures, administering drugs like antibiotics, analgesics and fluids like ringer lactate, normal saline dextrose normal saline [1].

Thrombophlebitis is the inflammation of a vein associated with the formation of a blood clot. Peripheral venous thrombophlebitis is defined as the inflammation of a peripheral vein caused by irritation to the lining of the vessel. Peripheral venous thrombophlebitis is common in patients who are receiving intravenous therapy. 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 [2].

Multiple factors increases the risk of thrombophlebitis. The most important element is the length of time the catheter remains in the site. Various infusates, including certain antibiotics, potassium, parenteral nutrition, chemotherapeutic agents and blood products may predispose to intravenous catheter related complication. Thrombophlebitis remains a common complication of continuous intravenous infusion, despite the use of plastic infusion sets and various types of pre sterilized plastic cannula. Phlebitis is more likely to develop when medications delivered through the catheter particularly more than four times a day, catheters were inserted near the elbow and when using infusion pump [3].

Glycerine is an organic compound, which is a polyol compound and is odorless. It moisturizes the skin and cleanses. It instantly kills all the bacteria as soon as it comes in contact with the bacteria Glycerin can be made from natural products such as vegetable oil, or can be synthesized from propylene alcohol. The result is an alcohol-based product that is an ingredient in many skin-care products. Glycerin, also called glycerol, can be used for both cosmetic purposes and as a treatment for medical conditions of the skin. Most people are very tolerant of glycerin, without experiencing irritation. The effects of glycerin on skin are a healthier, more natural-looking appearance [4].

Thrombopob and other ointments and paste applied for infusion related Thrombophlebitis. One among them is the magnesium Sulphate paste. Magnesium Sulphate is a chemical compound commonly available in dry form as Epsom salts containing Magnesium Sulphate, with the formula $MgSO_4$. Magnesium sulphate as a medication is used to treat and prevent low blood magnesium and seizures. It is also used in the treatment of torsades, depointes, severe asthma excaberations, constipation, and barium poisoning. The application of Magnesium sulphate It is applied to inflammatory skin condition. Glycerin is moisturizes the skin and cleanses. It also forms a protective layer that helps prevent moisture loss. It is applied to inflammatory skin conditions such as boils and carbuncles. It is also applied to promote healing of wound and ulcers to withdraw pus and exudates by osmosis [1].

Complications from superficial thrombophlebitis are rare. However, if you develop DVT, the risk of serious complications increases. Complications might include: Blood clot in the lungs (pulmonary embolism). Lasting leg pain and swelling (post-phlebetic syndrome). This condition, also known as post-thrombotic syndrome, can develop months or years after you've had DVT. The pain can be disabling

Globally 60% of patients develop intravenous complications. In developed countries approximately 1,25,000 complications reported yearly. The complication rate in India is between 78-82%. The management of intravenous complication is according to the severity of complication. The common management for infiltration and phlebitis are ice application, warm application, heparin ointment or gel, moist heat application, antiseptic cream, anti inflammatory cream, analgesics and antibiotics [5].

MATERIAL AND METHODS

Study design and participants

Research approach: True experimental pre test and post test control group design. The sample size comprises of 60 (30 experimental & 30 control group) patient with superficial thrombophlebitis admitted at HSK Hospital Bagalkot. The sampling technique adopted for this study will be simple random. In the present study the data will be collected by standardized visual infusion phlebitis scale.

Instruments

Standardized Visual Infusion Phlebitis Scale:

The Visual Infusion Phlebitis Scale was designed to assess the level of thrombophlebitis receiving intravenous infusion, before and after intervention. It contains various signs of thrombophlebitis such as Redness, pain, swelling. Fever, venous card palpation which was comprehensively scored as level of thrombophlebitis ranging from Grade 0-5 Score of interpretation of VIP scale.

Grade	Description
GRADE 0	• No signs of phlebilitis
GRADE I	• Slight pain or slight redness near IV site
GRADE II	• Pain and redness at the IV site
GRADE III	• Pain along the path of cannula • Redness around site • Swelling

GRADE IV	• Pain along the path of cannula • Redness around site • Swelling • Palpable venous cord
GRADE V	• Pain along the path of cannula • Redness around site • Swelling • Palpable venous cord • Pyrexia

Data Collection Procedure

The data collection was carried out from 11-05-2024 to 17-05-2024, among superficial thrombophlebitis patients who are undergoing treatment the BVVS HSK Hospital and Research Centre, Bagalkot. Permission was obtained from the Medical superintendent of BVVS HSK Hospital before data collection. Written consent was obtained from 60 subjects. Superficial patients were selected on the basis of Probability simple random sampling technique. Then the investigator conducted pretest on assessment of level of thrombophlebitis among patients by using visual infusion phlebitis scale. Then the application of glycerin with magnesium sulphate for experimental group and heperine gel of control group three time to 3 days and 5 day. Then the post test severity of thrombophlebitis was assessed after intervention for all the five days.

Data Analysis

The data will be analyzed by using descriptive and inferential statistics. Numerical data obtained from the sample will be organized and summarized with the help of descriptive statistics like frequency and percentage distribution, mean, median, standard deviation and correlation coefficient. Univariate analysis will be done for description and distribution of samples according to their socio-demographic factor and symptoms of thrombophlebitis, l chi square test, will be used to determine the association between glycerine with magnesium sulphate and heparin gel and socio demographic factors of patient. Independent t-test/Mann whitney'sU test will be used to determine the effectiveness of glycerine with magnesium sulphate on level thrombophlebitis among patient will receiving intravenous infusion.

RESULTS

Description of socio-demographic characteristics of subjects

- **Age in year(control group):-** Percentage wise distribution of patient according to their age in years reveals that the Majority (26.7%) of thrombophlebitis patients were in the age group of 51-60 years old and above, **Age in year(experimental group):-** Percentage wise distribution of patient according to their age in years reveals that the Majority (40%) of thrombophlebitis patients were in the age group of 41-50 years old and above, **Gender (control group): -** Percentage wise distribution of patient according to their gender reveals that the Majority of thrombophlebitis patients were males (60%) and remaining (40%) were females. **Gender (experimental group): -** Percentage wise distribution of patient according to their gender reveals. That the Majority of thrombophlebitis patients were males (80%) and remaining (20%) were females. **Education (control group): -** Percentage wise distribution of patient according to their education reveals that the majority of thrombophlebitis patients were (66.7%) had secondary education. **Education (experimental group): -** Percentage wise distribution of patient according to their education reveals that the majority of thrombophlebitis patients were (66.7%) had graduation and above. **Occupation (control group): -** Percentage wise distribution of patient according to their occupation reveals that the majority of thrombophlebitis patients according to their occupation (40%) were daily wages and private employees. **Occupation (experimental group):** - Percentage wise distribution of patient according to their occupation reveals that the majority of thrombophlebitis patients according to their occupation (40%) were home maker. **Size of cannula (control group):-** Percentage wise distribution of patients according to their size of cannula reveals that the of Size of cannula of thrombophlebitis patients with 20 G were (66.67%), and remaining were18G (33.3%). **Size of cannula (experimental group):-** Percentage wise distribution of patients according to their size of cannula reveals that the majority of thrombophlebitis patients according to their size of cannula with were 18 G (53.33%), and were 20G (33.3%),were 16G and 22G (6.67%). **Duration of cannulation(control group** Percentage wise distribution of patients according to their duration of cannulation reveals that the majority of thrombophlebitis patients according to their duration of cannula were (46.7%) between 24-48 hrs, were (20%) between 48-72and >72 hrs and remaining were24 hrs (13.3%) **Duration of cannulation (experimental group):-** Percentage wise distribution of patients according to their duration of cannulation reveals that the majority of

thrombophlebitis patients according to their duration of cannula were (33.3%) between 48-72 hrs, were (26.7%) between 24-48and >72 hrs and remaining were24 hrs (13.3%).

To Evaluation of the Effectiveness of glycerin with magnesium sulphate application on level of superficial thrombophlebitis among patients receiving intravenous infusion

Table: - There will be significant difference between of Mean of Pre and post test VIP scores towards reduction of thrombophlebitis among patient receiving intravenous infusion, N=60

Level of thrombophlebitis	Mean	SD	Mean Diff.	SD Diff.	% of effect	t-value	p-value
Pre-test	3.9	0.69	2.23	0.01	79.9	19.63	0.0001*
Post-test	1.67	0.68					

Findings related to the significance of the difference between pre test and post test scores of the thrombophlebitis patients shows that, difference between mean pre test [3.9] and mean posttest [1.68] scores, found to be statistically difference at 0.05 level of significant [t= 19.63 (p valve=0.0001) p<0.05]. As Hypothesis states, H_1: The mean post test level of thrombophlebitis will be significantly lower than the mean pre test level of thrombophlebitis among patients receiving intravenous infusion.

Hence it is clear that there is a statistically difference between mean post test level of thrombophlebitis and mean pre test level of thrombophlebitis among patients receiving intravenous infusion. Hence H_1 is accepted.

To Compare the effectiveness of glycerin with magnesium sulphate dressing and control group (heparin gel) thrombophlebitis patient receiving intravenous infusion, N=60

Group	Total score	Mean	SD	M.D	T. CAL	P Table
Experimental Group	**05**	**1.5**	**0,68**	**0.3**	**1.725**	**0.448**
Control Group	**05**	**1.8**	**0.66**			

*p<0.05

Represents to compare the mean and standard deviation of the post test level of thrombophlebitis among patients receiving intravenous infusion in experimental group and control group. In experimental group the mean score was 1.5 with standard deviation of 0.68 and in control group the mean score was 1.8 with standard deviation of 0.66. The mean difference was 0.3 and the calculated t value was 1.725 indicating that there was a significant difference in post test level of thrombophlebitis among patients receiving intravenous infusion in experimental group and control group at P<0.05 level.

To find out the Association between pr tests level of thrombophlebitis with their selected socio demographic variables among patients receiving intravenous infusion (control group) N=60

Control GROUP						
SL NO	**I) SOCIODEMOGRAPHIC VARIABLE**	**DF**	**CHAI SQUERE**	**TABLE VALUE**	**P VALUE**	**ASSOCIATION**
1	Age	1	0.02	3.84	0.9	Not significant
2	Gender	1	0.63	3.84	0.42	Not significant
3	Religion	1	0.53	3.84	0.46	Not significant
4	Marital status	1	1.41	3.84	0.23	Not significant
5	Education	1	0.6	3.84	0.68	Not significant
6	Family monthly income in RS	1	1.41	3.84	0.23	Not significant
7	Occupation	1	0.02	3.84	0.88	Not significant
	II) CLINICAL DEMOGRAPHICAL VARIABLE					
1	SIZE OF IV CANNULA	1	0.02	3.84	0.89	Not significant
2	Duration of IV cannula	1	0.53	3.84	0.42	Not significant
3	Duration of admission	1	0.23	3.84	0.63	Not significant
4	Site of cannulation	1	1.41	3.84	0.23	Not significant

DF = Degree of freedom
α= 0.05
***= Significant**
NS = Not significant
"P" is <0.05

Findings related to the association between pretest VIP scores of thrombophlebitis patients with their selected socio demographic variables reveals that, there was no significant association found between the pre test level of superficial thrombophlebitis score of patients of Age (χ2=0.02, P=0.9), Gender (χ2=0.63, P=0.42), Religion (χ2=0.53, P= 0.46), Marital status (χ2=1.41, P=0.23), Educational status (χ2=0.6, P= 0.68), occupation (χ2=0.02, P=0.88), family monthly income (χ2=1.41, P=0.23), size of iv cannula (χ2=0.02, P=0.89), Duration of treatment(χ2=0.53, P=0.42), Duration of admission (χ2=0.23,P=0.63), Site of cannulation (χ2=1.41, P=0.23).

Hence H2: is the all socio demographic variables.

EXPERIMENTAL GROUP						
SL NO	**I) SOCIODEMOGRAPHIC VARIABLE**	**DF**	**CHI SQUERE**	**TABLE VALUE**	**P VALUE**	**ASSOCIATION**
1	Age	1	3.76	3.84	0.05	Not significant
2	Gender	1	0.12	3.84	0.72	Not significant
3	Religion	1	0.02	3.84	0.88	Not significant
4	Marital status	1	1.41	3.84	0.23	Not significant
5	Education	1	3.85	3.84	0.05	Significant
6	Family monthly income in RS	1	0.38	3.84	0.5	Not significant
7	Occupation	1	3.85	3.84	0.5	Significant
	II) CLINICAL DEMOGRAPHICAL VARIABLE					
1	SIZE OF IV CANNULA	1	0.12	3.84	0.72	Not significant
2	Duration of IV cannula	1	0.06	3.84	0.8	Not significant
3	Duration of admission	1	0.04	3.84	0.84	Not significant
4	Site of cannulation	1	0.28	3.84	0.6	Not significant

Findings related to the association between pretest VIP scores of thrombophlebitis patients with their selected socio demographic variables reveals that, there was significant some education and occupation and remaining no significant association found between the pretest level of superficial thrombophlebitis score of patients of Age (χ2=3.76, P=0.05), Gender (χ2=0.12, P=0.72), Religion (χ2=0.02, P= 0.88), Marital status (χ2=1.41, P=0.23), Educational status (χ2=3.85, P= 0.05), occupation (χ2=3.85, P=0.05), family monthly income (χ2=0.38, P=0.5), size of iv cannula (χ2=0.12, P=0.72), Duration of treatment(χ2=0.06, P=0.8), Duration of admission (χ2=0.04,P=0.84), Site of cannulation (χ2=0.28, P=0.6).

Hence H3: is accepted in education, occupation and rejected in all remaining the socio demographic variables.

DISCUSSION

Findings related to the significance of the difference between pre test and post test scores of the thrombophlebitis patients shows that, difference between mean pre test [3.9] and mean posttest [1.67] scores, found to be statistically difference at 0.05 level of significant [t= -19.63 (p valve=0.0001) p<0.05]. it means that effectiveness of glycerin with magnesium sulphate on more effective reduction of superficial patient receiving intravenous infusion Hypothesis 1 is accepted.

The study represents to compare the mean and standard deviation of the post test level of thrombophlebitis among patients receiving intravenous infusion in experimental group and control group. In experimental group the mean score was 0.68 with standard deviation of 0.68 and in control group the mean score was 1.8 with standard deviation of 0.66. The mean difference was 0.3 and the calculated t value was 1.725 indicating that there was a significant difference in post test level of thrombophlebitis among patients receiving intravenous infusion in experimental group and control group at P<0.05 level.

As per my study results there was no association between the levels of pre test muscle cramp scores with the selected socio demographic variables such as Age, Gender, religion, Educational status, Occupation, family monthly income, marital status, size of cannula, duration of cannula, duration of admission, site of cannulation.

RECOMMENDATIONS

- Similar study can be conducted to assess the effectiveness of glycerin with magnesium sulphate on reduction of superficial thrombophlebitis Similar type of study can be conducted for a large group.
- Similar study can be conducted as a comparative study between interventional methods.

CONCLUSION

The mean post test VIP score of thrombophlebitis in the experimental group (1.5) is lesser than mean posttest VIP score of thrombophlebitis in the control group (1.8), hence the study revealed that the effectiveness of glycerin with magnesium sulphate

application on level of superficial thrombophlebitis among patient receiving intravenous infusion. The calculated t value (1.725) is greater than the table value (0.897) at 0.05 level of significance, showed that there is a significant difference between the two groups, hence it is significant. Therefore, H1 is accepted.

Ethical Consideration

The study was approved by the Institutional Ethical Clearance Committee, BVVS Sajjalashree Institute of Nursing Sciences, Bagalkot.

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Conflicts of Interest: There are no conflicts of interest.

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