

A Comparative Study to Assess the Effectiveness of Glycerin with Magnesium Sulphate Versus Heparin – Benzyl Nicotinate (Thrombophob) Ointment on Management of Thrombophlebitis among Patients Admitted in Intensive Care Units (ICU) of Selected Hospital In Belgaum, Karnataka

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Abstract: ***Background:** Eighty percent (80%) of patients being admitted to hospital receive intravenous therapy.¹ Peripheral venous thrombophlebitis (PVT) is the most common complication in patients who receive intravenous therapy. Seventy percent (70%) to eighty percent (80%) of thrombotic complications occur in the superficial and deep veins of the upper extremity due to the presence of peripheral intravenous catheters.² Glycerin magnesium sulphate application and heparinoid (thrombophob) ointment application are found to be used widely for the management of thrombophlebitis. **Objective:** To assess the effectiveness of glycerin with magnesium sulphate as compared to heparin– benzyl nicotinate (thrombophob) ointment on management of peripheral intravenous catheter induced thrombophlebitis. **Material and method:** Data collection was done using Modified Jackson's Phlebitis scale. Data obtained was tabulated and analyzed in terms of objectives of the study using descriptive and inferential statistics. **Results:** The study findings revealed that glycerin magnesium sulphate application was found to be more effective than the heparin benzyl-nicotinate ointment (thrombophob) application on management of thrombophlebitis at $p \leq 0.05$ level of significance. **Conclusion:** The findings of the study revealed that application of glycerin with magnesium sulphate is more effective than heparin – benzyl nicotinate (thrombophob) ointment on management of cannula induced thrombophlebitis.*

Keywords: Thrombophlebitis, peripheral venous thrombophlebitis, effectiveness, glycerin magnesium sulphate, heparin benzyl nicotinate (thrombophob) ointment.

1. Introduction

In healthcare setting, peripheral intravenous catheter (PIVCs) are a critical tool in the delivery of patient care.³ Eighty percent (80%) of patients being admitted hospital receive intravenous therapy.⁴ The purpose of intravascular catheterization includes administration of fluids, drugs, blood products and nutritional solution etc.

Although such catheters provide necessary vascular access, they are associated with some risks and complications that can have impact on the clinical status and outcome of the patient.⁴ Studies had shown that twenty percent (20%) to eighty percent (80%) of patients treated by peripheral intravenous catheters are susceptible to some form of complication.⁵ Thrombophlebitis is the most common complication associated with peripheral intravenous catheters (PIVCs) and accounts for considerable iatrogenic morbidity.⁶ The reported incidence of phlebitis ranges from ten percent (10%) to ninety percent (90%) of peripheral intravenous catheterization.⁵

Glycerin magnesium sulphate application and heparinoid (thrombophob) ointment application are also found to be used widely for the management of thrombophlebitis. It is becoming a common practice in hospitals. Some studies had also shown the effectiveness of both the interventions. Even though glycerin magnesium sulphate and heparin-benzyl nicotinate ointment are widely used in hospitals, the amount to be applied, how to apply, frequency of application, which of the intervention is more effective, is still confusing and debatable question to nurses and also there are little evidence showing about that which one is more effective and cost effective on management of thrombophlebitis. The main aim of the study is to find evidence based answer to this dilemma that may form the basis for establishment of peripheral venous catheter induced thrombophlebitis management protocols in the institution included in the study.

2. Materials and Method

An evaluative approach was used in this study and the research design was one group pre test post test design (pre-experimental design). The sample size of the study was thirty (30) patients with thrombophlebitis (15 in group I and 15 in group II). The non probability purposive sampling technique was used to allocate the subjects into group I (glycerin magnesium sulphate application) and group II (heparin benzyl nicotinate ointment (thrombophob application). The data collection instrument was Modified Jackson's phlebitis scale.

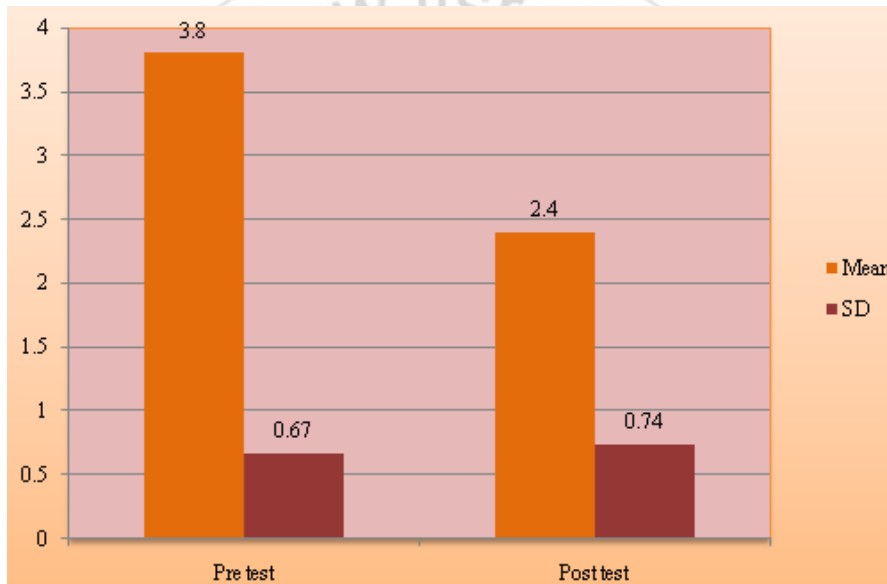
3. Results

Section I: Pre test mean and standard deviation, post test mean and standard deviation of thrombophlebitis scores in group I (glycerin magnesium sulphate application) and group II (heparin benzyl nicotinate ointment application).

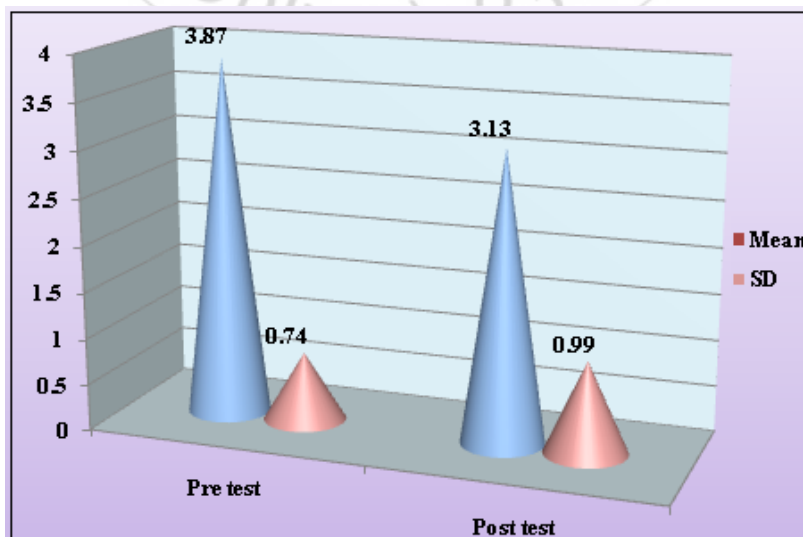
Table 1: Mean pre test score and standard deviation, mean post test score and standard deviation for thrombophlebitis among the subjects in group I (glycerin magnesium sulphate application) and group II (heparin benzyl nicotinate ointment application).
 n =15 for group I
 n=15 for group II

	Group I		Group II	
	Pre test scores	Post test scores	Pre test scores	Post test scores
Mean	3.80	2.40	3.87	3.13
SD	0.67	0.74	0.74	0.99

Table 1 depicts the mean pre test and post test scores of thrombophlebitis in group I were 3.80 and 2.40 respectively and the pre test and post test scores of standard deviation were 0.67 and 0.74 respectively. The mean pre test and post test scores of thrombophlebitis in group II were 3.87 and 3.13 respectively and the pre test and post test scores of standard deviation in group II were 0.74 and 0.99 respectively.



Graph 1: Bar graph showing mean and standard deviation (SD) of pre test and post test in group I



Graph 2: Conical graph showing mean and standard deviation (SD) of pre test and post test in group II.

Section II: Comparison between pre test and post test scores of thrombophlebitis within group I (glycerin magnesium sulphate application) and within group II (heparin benzyl nicotinate application).

Table 2: Mean difference, standard deviation and paired 't' test values of thrombophlebitis scores of the subjects within group I (glycerin magnesium sulphate application) and within group II (heparin benzyl nicotinate application).
 n =15 for group I
 n=15 for group II

Paired 't' test					
	Mean difference	Standard deviation	t _{cal} value	df	t _{tab} value
Group I	1.4	0.51	10.69*	14	2.145
Group II	0.73	0.46	6.20*	14	2.145

*p≤ 0.05

Table 2 revealed that in group I the obtained 't' value was 10.69 which was significant at p≤ 0.05 level. This revealed that glycerin magnesium sulphate application was effective on management of thrombophlebitis. In group II the obtained 't' value was 6.20 which was significant at p≤ 0.05 level. This revealed that heparin benzyl nicotinate (thrombophob) ointment was effective on management of thrombophlebitis.

SECTION III: Comparison of thrombophlebitis post test scores between both groups.

Table 3: Mean difference, standard error difference, unpaired 't' values of thrombophlebitis scores between group I and group II.
 n=30

	Unpaired 't' test			
	Mean difference	Standard error difference	t _{cal}	t _{tab}
Post test	0.73	0.32	2.301*	2.048

*p≤ 0.05

Table 3 revealed that the comparison of the mean post test scores between the group I and group II by unpaired 't' test yielded p value ≤ 0.05. This suggested that there was a highly significant difference observed; hence hypothesis was accepted i.e. the mean post interventional score of glycerin with magnesium sulphate was more effective than heparin – benzyl nicotinate (thrombophob) ointment on peripheral intravenous catheter induced thrombophlebitis at 0.05 level of significance.

4. Discussion

Section I: Pre test mean and standard deviation, post test mean and standard deviation of thrombophlebitis scores in group I (glycerin magnesium sulphate application) and group II (heparin benzyl nicotinate application).

The results revealed that in group I the mean pre test scores of thrombophlebitis was 3.80 and the mean post test scores was 2.40. The standard deviation of pre test scores of thrombophlebitis was 0.67 and post test scores was 0.74. In group II the results revealed that the mean pre test scores of thrombophlebitis was 3.87 and the mean post test scores was 3.13. The standard deviation of pre test scores of thrombophlebitis in group I was 0.74 and standard deviation of post test scores was 0.99.

Section II: Comparison between pre test and post test scores of thrombophlebitis within group I

The comparison between pre test and post test within the group was done using paired 't' test. The comparison was based on observations made before the interventions and after the intervention.

Paired 't' test within group I (glycerin magnesium sulphate application)

Paired 't' test results showed significant management of thrombophlebitis (p≤ 0.05) after the application of glycerin magnesium sulphate [t_{cal} =10.69 > t_{tab}=2.145]. The mean difference was 1.40 and standard deviation was 0.51.

The findings of the study was supported by a similar study conducted by **Zhao Y, Hao Y, Zhang H, Shi J, Xie Y** at Post-doctoral Station of China Academy of Chinese Medical Sciences, Beijing. The findings revealed that the phlebitis was significantly reduced by external application of magnesium sulphate as compared to control group at p<0.05.⁶

Another study conducted by **Hua G, Ying-Jia L, Hui-Juan M** proved that glycerin magnesium sulphate effectively reduced the treatment time of peripheral phlebitis. The study also revealed that glycerin magnesium sulphate was safe, simple and effective method with many advantages.⁷

Paired 't' test within group II (heparin benzyl nicotinate (thrombophob))

Paired 't' test results showed significant management of thrombophlebitis (p≤0.05) after the application of heparin benzyl nicotinate (thrombophob) ointment [t_{cal}=6.20 > t_{tab}=2.145]. The mean difference was 0.73 and standard deviation was 0.46.

The findings of the study was consistent with another study conducted by **Vilardell M, Sabat D, Arnaiz JA, Bleda MJ, Castel JM, Laporte JR et al** which revealed that the topical heparin was safe and effective for the treatment of superficial phlebitis secondary to indwelling intravenous catheter.

Section III: Comparison of thrombophlebitis post test scores between both the groups.

Analysis was done by using unpaired 't' test. The results of the study revealed that comparison of the post test scores between group I and groups II yielded p≤ 0.05(t=2.301) where highly significant difference was observed between the groups. This study was supported by a similar study conducted by **Saini B, Paul P** revealed that magnesium sulphate application was more effective intervention in reducing thrombophlebitis as compared to the application of heparinoid.⁸

5. Conclusion

The results of the study showed that there was significant difference on the management of peripheral intravenous catheter induced thrombophlebitis between the group I and group II. Therefore the research hypothesis, H₁ is accepted. Thus, application of glycerin with magnesium sulphate is more effective than heparin – benzyl nicotinate (thrombophob) ointment on management of cannula induced

thrombophlebitis. Therefore, this intervention could be promoted as an institutional policy and implemented for the management of thrombophlebitis for patients with peripheral venous catheter related thrombophlebitis.

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