ORIGINAL RESEARCH PAPER
Volume-6 | Issue-12 | December-2017 | ISSN No 2277 - 8179 | IF : 4.176 | IC Value : 93.98
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

EFFECTIVENESS OF GLYCERIN MAGNESIUM SULFATE ON PERIPHERAL INTRAVENOUS INFUSION COMPLICATIONS

Nursing

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ABSTRACT

Background: Patients admitted in the hospital for treatment; 90% of cases receive peripheral intravenous (PIV) therapy to treat various conditions. The patients are prone to get Peripheral Intravenous Complications (PIVC). The complication of PIVC includes superficial thrombophlebitis, pain and intravenous infiltration. Nurses should be vigilant of the right interventions to expedite comfort for the patients on intravenous therapy and take measures to reduce the complications.

Objectives: Assess the effect of glycerin magnesium sulfate on PIVC, associate the PIVC scores with the selected demographic variables.

Methods: A quasi- experimental pretest and posttest design was adopted in this study. 30 samples were selected with purposive sampling technique. Glycerine magnesium sulfate was applied twice a day for three days.

Findings: The calculated paired't' value of PIVC such as Superficial thrombophlebitis, pain and intravenous infusion were statistically highly significant at p<.001.

Conclusion: Glycerin magnesium sulfate was effective to treat PIVC. Nurse administrator can arrange readymade glycerin magnesium sulfate solution available in all the wards in order to treat PIVC.

KEYWORDS

Glycerin Magnesium sulfate, Peripheral Intravenous Complications, superficial thrombophlebitis, pain, intravenous infusion

INTRODUCTION

Patients with minor or major ailments need to be treated and observed by the medical team which requires hospitalization. The administration of fluids via intravenous (IV) infusion is common and very safe. It is estimated that in U.K 20- 80% of patients with peripheral venous cannula develop phlebitis[1].According to Infusion Nurses Society recommend that the intravenous infusion site should be monitored for 48 hours and if any signs of infection, infiltration, pain or extravasation were identified at the early stage, it is better to remove and re-site the intravenous cannula. The patients are prone to get intravenous complications such as superficial thrombophlebitis, pain over the IV site, infiltration and extravasation etc[2]. The preventive measures of superficial thrombophlebitis such as anchor the needle or catheter securely at the insertion site change the cannula every 72 hours in adult patients. The nursing interventions moist warm compress will help to relieve inflammation[3]. Mostafa Abolfotouh, et al conducted a prospective study on incidence and predictors of peripheral intravenous catheter-induced complications. The finding revealed that the onset time of PIVC complications is 30.7 hours to 52.64 hours. If, vigilance over the intravenous infusion sites it may lengthen the hospital stay, increase cost of treatment, pain when the cannula re-sites[4]. Anabela Salgueiro Oliveira et al had conducted study on incidence of phlebitis in patients with peripheral intravenous catheters was 11.09. The finding of the study showed that the risk factors are related to the use of prescribed medication and the catheterized limb[5]. The phlebitis is rarely infectious and usually resolves quickly after catheter removal. Elevate the extremity to promote reabsorption of fluid into vasculature. Apply warm compress, moist heat and administer topical, oral NSAID's to relieve pain and inflammation[6].

The administration of intravenous fluids is an integral part of patient care in hospital allowing for the delivery of parental fluids, medications and additives. In modern medical practice up to 80% of hospitalized patients receive IV therapy either peripheral or central at some point during their admission for medication, fluids, nutrition etc. The risk of complication dwells in the aspects such as choice of cannula, selection of vein, obtaining venous access, duration of peripheral cannula use etc[7].Thrombophlebitis is the most common complication associated with peripheral intravenous catheters (PIVCs) and accounts for considerable iatrogenic morbidity[8]. The reported incidence of phlebitis ranges from ten percent (10%) to ninety percent (90%) of peripheral intravenous catheterization[9]. Hence the investigator realized the burden of the condition and aimed to evaluate the effectiveness of glycerine magnesium sulfate on peripheral intravenous complications.

OBJECTIVES

Assess the effect of glycerin magnesium sulfate on peripheral intravenous infusion complications.

Associate the peripheral intravenous infusion complication scores with the selected demographic variables.

HYPOTHESES

H_1: There will be significant difference in the level of superficial thrombophlebitis on application of glycerin magnesium sulfate.

H_2: There will be significant difference in the level of pain on application of glycerin magnesium sulfate.

H_3: There will be significant difference in the level of intravenous infiltration on application of glycerin magnesium sulfate.

MATERIALS AND METHODS

A Quantitative research approach of quasi experimental pretest and posttest design was adopted in this study. After obtaining the ethical permission from the Institutional Ethical Committee of Sri Muthukumaran Medical College Hospital and Research Institute Chennai, (R. No: 33/ IEC- SMMCHRI/ p. no. 6/2016), the investigator conducted the study. 30 study participants were selected based on purposive sampling technique of those who fulfil the criteria such as both male and female patients with peripheral intravenous infusion, patients in the age group of above 20 years and below 60 years, willing to participate, patients with IV cannula on minimum of 2 to 3 days (48 – 72 hours), patients who get the minimum score of 0 - 4 in Infiltration scale patients who get the score of visual infusion phlebitis scale (1 to 5). A formal informed consent was obtained from the study participants. The investigator collected the data of PIVC by using standardized tool such as Jackson's Visual Infusion Phlebitis scale (superficial thrombophlebitis), visual analog scale (pain), Infiltration scale (intravenous infiltration).

Pretest (O1) was conducted. Application of glycerin magnesium sulfate (20 gm of magnesium sulfate mixed with 100 ml of glycerin) applied on infiltrated site twice a day for three days. Posttest was conducted at the end of each day and documented as posttest 1 (O2), posttest 2 (O3) and posttest 3 (O4).

FINDINGS

Fig 1: Distribution of PIVC1- Superficial Thrombophlebitis in pre and posttest N= 30

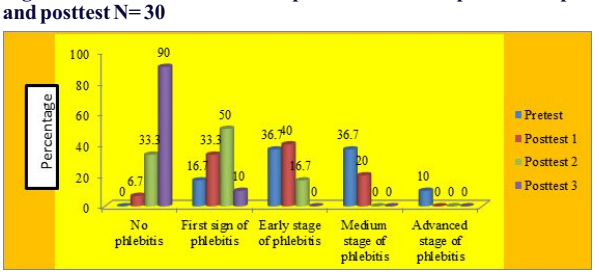


Table 1: Distribution of PIVC2 –Pain in pre and posttest.

N=30

Sl. No	Complication 2 (Pain)	No Pain (0 Score)		Mild Pain (1-2)		Moderate Pain (3-6)		Severe pain (7-10)	
		N	%	n	%	n	%	n	%
1	Pretest	0	0	6	20	24	80	0	0
2	Posttest1	0	0	11	36.7	19	63.3	0	0
3	Posttest2	5	16.7	24	80	0	0	0	0
4	Posttest3	24	80	6	20	0	0	0	0

Table 2: Distribution of PIVC3 - Intravenous infiltration in pre and posttest.

N=30

Sl. No	Complication 2 (Pain)	No Pain (0 Score)		Mild Pain (1-2)		Moderate Pain (3-6)		Severe pain (7-10)	
		N	%	n	%	n	%	n	%
1	Pretest	8	26.7	20	66.7	2	6.7	0	0
2	Posttest1	18	60	12	40	0	0	0	0
3	Posttest2	30	100	0	0	0	0	0	0
4	Posttest3	30	100	0	0	0	0	0	0

Table 3: Comparison of PIVC in pre and posttest

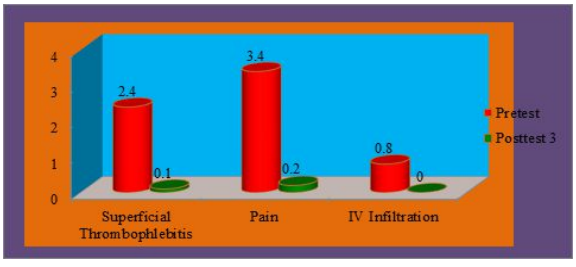
N= 30

S. No	Observations	Superficial thrombophlebitis				Pain				Intravenous infiltration			
		Mean	SD	MD	Paired 't' value	Mean	SD	MD	Paired 't' value	Mean	SD	MD	Paired 't' value
1.	Pretest	2.4	0.89	0.67	7.65	3.4	1.08	1.2	9.95	0.8	0.55	0.4	4.47
	Posttest1	1.73	0.87		(S) ***	2.2	0.71		(S)***	0.4	0.49		(S)***
2.	Posttest1	1.73	0.87	0.9	30.81	2.2	0.71	1.13	14.39	0.4	0.49	0.4	4.47
	Posttest2	0.83	0.7		(S) ***	1.1	0.69		(S)***	0	0		(S)***
3.	Posttest2	0.83	0.7	0.73	6.9	1.1	0.69	0.9	7.56	0	0	0	NS
	Posttest3	0.1	0.31		(S) ***	0.2	0.41		(S)***	0	0		
4.	Pretest	2.4	0.89	2.3	14.99	3.4	1.08	3.2	15.9	0.8	0.55	0.8	7.96
	Posttest3	0.1	0.31		(S) ***	0.2	0.41		(S)***	0	0		(S)***

*** p< .001 S - Significant

Fig.2 : Comparison of mean scores of PIVC between pre and posttest on application of glycerin magnesium sulfate

N= 30



There was no significant association found between demographic variables with the PIVC.

DISCUSSION

The distribution of PIVC 1 (superficial thrombophlebitis), 11 (36.7%) the samples had early and medium stage of phlebitis in pretest. In posttest 3 majority of the samples 27 (90%) had no phlebitis. The comparison score of PIV complication 1 (superficial thrombophlebitis), pretest and posttest 3 and mean difference were 2.4±0.89; 0.1±0.31 and 2.3 respectively. The calculated 't' value was statistically highly significant at p< 0.001. The findings explained that glycerin magnesium sulfate can be used effectively in PIV complication 1 (superficial thrombophlebitis). The study result is consistent with the similar studies conducted by **Ravindra HN, (2015), Yambem M, et al. (2013)** Study results prove that there was statistically highly significant difference at p< .001[10, 11]. Hence $\mathbf{H_1}$ was **accepted.**

The distribution of PIV complication 2 (pain), evident that majority of the samples 24 (80%) experienced moderate pain in pretest. In posttest 3 majority of the samples 24 (80%) experienced no pain. The comparison scores of PIV complication 2 (Pain) pretest and posttest 3 and mean difference and the calculated't' value was statistically highly significant at p<.001. This finding revealed that glycerin magnesium sulfate can be used effectively to reduce pain. This present study result is consistent with the study conducted by **Shinde Mahadeo B, et al. (2015).** The study proved that in pre-treatment 43.3% of samples experienced mild pain and 16.7% of samples experienced pain severely. Post treatment 2 (6.7%) of samples with severe pain and 63.3% had experienced no pain[12]. Hence $\mathbf{H_2}$ was **accepted.**

The distribution of PIV complication 3 (Intravenous infiltration) majority of the samples 20 (66.7%) had mild infiltration in pretest, and in posttest 3 all the 30 (100%) samples had no infiltration. The comparison scores of PIV complication 3 (Intravenous infiltration) pre and posttest 3 mean differences were 0.8±0.55; 0±0 and 0.8 respectively. The calculated paired 't'value was statistically highly significant at p<0.001. This finding described that glycerin magnesium sulfate can be used effectively in PIV complication 3 (Intravenous infiltration). This present study result is consistent with the study conducted by **Shinde Mahadeo B, et al., (2015),** that findings indicate that the magnesium sulfate fomentation is slightly better than the cold compress in reducing of intravenous therapy related infiltrations[12]. Hence $\mathbf{H_3}$ was **accepted.**

CONCLUSION:

Glycerin magnesium sulfate was effective to treat PIVC. Hence readymade glycerin magnesium sulfate solution can be made available in all the wards in order to treat PIVC.

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