

Original Article

Effectiveness Magnesium Sulphate Crystal Fomentation Vs Paste Application for Phlebitis among Children Receiving Peripheral Infusion who are Admitted at Selected Hospital at Mangalore

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Abstract

Background : Peripheral cannulation is one of the commonly used procedures in children, as they have to undergo many infusions for the administration of medications. The nurse is responsible for maintaining and monitoring IV infusion site and promptly detecting any complication like phlebitis, infiltration, air embolism, infection and fluid overload. In children phlebitis is the most commonly seen due to their fragile veins and therefore special attention should be given to minimize the occurrence of phlebitis and also to treat it effectively.

Objective : to determine the effectiveness magnesium sulphate crystal fomentation vs glycerin magnesium sulphate paste application for phlebitis among children receiving peripheral infusion.

Setting & Design : Regional Advance Pediatric Care Center (RAPCC), Mangalore.

Material and Methods : Quasi experimental design phlebitis measurement chart and observation checklist for erythema.

Result and Conclusion: the mean pre-treatment scores of phlebitis were significantly reduced after the treatment with magnesium sulphate fomentation and with glycerin magnesium sulphate paste application. The mean post treatment score of phlebitis at $p < 0.05$. Glycerin magnesium sulphate paste was effective in reducing swelling and induration when compared to magnesium sulphate crystal fomentation.

Keywords : Phlebitis; peripheral infusion; glycerin magnesium sulphate paste; magnesium sulphate crystals.

Introduction

Intravenous therapy is increasing especially in children and it has also manifested some minor side effects like pain, trauma, swelling, temporary joint immobility. The study estimated that over 80% of all children hospitalised receive IV therapy¹. These can lead to life threatening conditions like thrombosis, embolism, and variety of infections and so on if proper care is not considered promptly. Phlebitis is

one of the common side effect seen after IV therapy. It is defined as the inflammation of the vein and is considered as an adverse patient outcome³. Phlebitis or infiltration is the escape of fluid into the

subcutaneous tissues due to the dislodgement or malfunctioning of the cannula. Magnesium sulphate can be very useful in preventing and treating phlebitis². Thus the researcher would want to find out the better and cost effective method of reducing phlebitis using the Magnesium preparation, when compared with the traditionally used magnesium Paste.

Objectives of the study were to:

- ∞ Determine the effectiveness of magnesium sulphate crystal fomentation on phlebitis.
- ∞ Determine the effectiveness of glycerin magnesium sulphate paste application on phlebitis.
- ∞ compare the effectiveness of both intervention on phlebitis

Purpose of the study was to find the effect of magnesium product in reducing phlebitis

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Materials and methods

A quasi-experimental approach with pre-test post-test design was used for the study. The study sample consisted of 60 children with phlebitis, where 30 children were placed in group I, treated with magnesium sulphate crystal fomentation and 30 children were placed in group II, treated with glycerin magnesium sulphate paste application. Purposive sampling technique was used to select the children. The study was conducted at Regional Advance Pediatric Care Centre (RAPCC), Mangalore. The tool was developed after intensive review of literature, consultation and discussion with experts and also with the personal experience of the researcher. Tool was validated by 13 experts in the field of Pediatrics and Pediatric nursing. The final tool consisted of three parts. Part 1: Demographic Proforma Part 2: Phlebitis Measurement Chart Part 3: Observation Checklist for Erythema. The assessment of phlebitis was done prior to the application of magnesium sulphate crystal fomentation and glycerin sulphate paste application by using phlebitis measurement chart and observation checklist for erythema. Post treatment assessment was conducted on the 3rd day using the same phlebitis measurement chart and observation checklist for

erythema. A pre-treatment assessment was conducted to assess the phlebitis by using phlebitis measurement chart and observation checklist for erythema, after which the interventions were administered to both groups respectively for three days 3 times a day (6am+ 2 pm+ 10 pm). A post treatment assessment was conducted on the third day using the same tool. Ethical clearance was obtained from concerned institution. The investigator conducted the pilot study on 10 children, five in treatment I and five in treatment II who satisfied the inclusion and exclusion criteria. The main study was done on 60 children 30 in treatment I and 30 in treatment II. Informed consent was taken from subjects and confidentiality was assured. The **Inclusion criteria was:** Children between the age group of 1-12 years receiving peripheral infusion including chemotherapeutic infusions.

Statistical Methods

The results were analysed using descriptive statistics like mean, standard deviation and inferential statistics like 't' test. Pre-treatment and post treatment of both the treatment groups were record and compiled for analysis.

Results

Table 1: Demographic Data (N=60)

Demographic data	Items	Frequency	Percentage
Age in years	1-4	12	20
	5-8	21	35
	9-12	27	45
Gender	Male	32	53.3
	Female	28	46.7
Site of intravenous Insertion	Doral palm	32	53.33
	Ventral aspect of fore arm	13	21.67
	Wrist and antecubital fossa	12	20
	Dorsal vein of leg	8	5
Types of fluids	Hydrational fluid	43	71.67
	Inotropic infusion	0	0
	Vasodilator infusion	6	3.33
	Antibiotic	2	10
	Chemotherapeutic drug infusion	9	15
duration of infusion	0-30	5	8.33
	31-60	41	68.33
	61-90	13	21.67
	>91	1	1.67

Table 2 : Effectiveness of magnesium sulphate crystal fomentation (N=30)

Parameters	Pre-treatment		Post-Treatment		Paired differences		't' value	p <0.05
	Mean	SD	Mean	SD	Mean	SD		
Swelling	33.05	22.02	5.13	4.31	27.92	19.31	7.92*	0.000
Induration	17.26	10.70	3.03	2.76	14.24	9.57	8.15*	0.003
Erythema	2.07	0.64	0.73	0.63	1.33	0.55	13.36*	0.000

 $t_{29}=2.045$ at $p<0.05$

*significant

Table 3 : Effectiveness of application of glycerin magnesium sulphate paste (N=30)

Parameters	Pre-treatment		Post-Treatment		Paired differences		't' value	p <0.05
	Mean	SD	Mean	SD	Mean	SD		
Swelling	29.09	22.37	2.47	1.99	26.62	22.01	6.62*	0.237
Induration	11.36	9.11	1.36	1.34	10.01	8.89	6.16*	0.208
Erythema	2.0	.69	0.43	0.56	1.57	0.63	13.71*	0.003

*significant

Table 4: Comparison of the effectiveness of the two modalities of treatment in the reduction of phlebitis after the application of interventions (N=30+30=60)

Treatment groups	magnesium sulphate crystal fomentation		glycerin magnesium sulphate paste application		Paired differences		't' value	p <0.05
	Mean	SD	Mean	SD	Mean	SD		
Pre - treatment								
Swelling	33.05	22.02	29.09	22.37	3.96	0.349	0.692	0.492
Induration	17.27	10.70	11.37	9.11	5.90	1.59	2.300*	0.025
Erythema	2.07	0.64	2.0	0.69	0.067	0.055	0.387	0.700
Post - Treatment								
Swelling	5.1283	4.32	2.47	1.99	2.66	2.33	3.061*	0.003
Induration	3.029	2.76	1.36	1.35	1.67	1.413	2.974*	0.004
Eythema	0.73	0.64	0.43	0.57	0.3	0.071	1.920	0.060

*significant

Discussion

Effectiveness of magnesium sulphate crystal fomentation

These findings were supported by a study done for managing local tissue damage caused by extravasation of pharmorubicin with hydrophatic compress by Xueming J, Yun L in China in 2005. 50% magnesium sulphate solution and 2% lidocaine and hexadecadrol therapy were used. Here 50% magnesium sulphate solution was found to be effective in reducing phlebitis⁵.

Effectiveness of Glycerin Magnesium Sulphate Paste Application

A study was done by Biswas D in her dissertation to compare the effect of four selected nursing interventions on patients with phlebitis related to peripheral intravenous infusion in Kolkata, West Bengal in 2005 like ichthammol belladonna dressing (treatment I), glycerin magnesium

sulphate dressing (treatment II), ichthammol belladonna dressing along with hot fomentation (treatment III) and glycerin magnesium sulphate dressing (IV). It was found that ichthammol belladonna dressing along with hot fomentation was more effective among the four modalities, but it also said that glycerin magnesium sulphate was being used effectively in the treatment of phlebitis⁴

Comparison of Two Modalities of Treatment in the Reduction of Phlebitis in Children.

These findings are supported by the study done by Huo G, Ying-Jia L, Hui-Juan M on the efficacy of glycerin magnesium sulfate emulsion on the treatment of peripheral phlebitis in 2006. The treatment with glycerin magnesium sulfate emulsion was found to take less time 2.16 & 0.39 days compared to control group (treated with

50% magnesium sulphate solution) which took 5.17 & 1.15 days⁶. The results of another study done by Lakhani AK, Merchant RJ, Khowaja K in 2006 using glycerin magnesium sulphate paste (treatment I) and magnesium sulphate salt solution (treatment II) also support the present study. It was found that third day post application score of treatment I were 0.7071 and that of treatment II was 1.7571. This clearly indicates that glycerin magnesium sulphate paste was effective in reducing phlebitis⁷.

Recommendations

More studies could be conducted on the large sample and using other form of magnesium products. A study could be conducted to determine the effectiveness of either of the treatments in reducing pain or palpable cord lengths. A study could be conducted to determine the effectiveness of other cost effective modalities like ice application in treatment of phlebitis.

Conclusions

Thus glycerin magnesium sulphate paste application was

found to be very effective when compared with magnesium sulphate fomentation in reducing swelling and in duration. This study concludes that the magnesium products are very effective in reducing phlebitis and other infusion related complication. It is a very cost effective method with minimal resources, requires minimal training too, and very easy to use with little or no complications. The study was conducted only on a small sample and limited participants for a very short period thus generalisation is not possible.

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