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Effect of Topical Heparin Jelly versus Saturated Magnesium Sulphate Fomentation for Care of Post IV Cannulation Phlebitis among Children in a Selected Hospital, Kolkata

Kaberi Das

Abstract: ***Introducing peripheral intravenous access in children is a common but stressful pediatric procedure. Peripheral intravenous line causes hazards like phlebitis and thrombophlebitis. Early treatment of this complication can reduce hematoma, air embolism and catheter related blood stream infection or prolong hospitalization. The investigator conducted an experimental study with the objectives to assess the effect of topical application of Heparin Jelly as compared to saturated Magnesium sulphate (MgSo4) hot fomentation for care of post intravenous cannulation phlebitis among children. Quasi experimental design was adopted and purposive sampling technique was used to select 30 children with post intravenous cannulation phlebitis. Data collection was done using Baxter scale. Data obtained was tabulated and analyzed in terms of objectives of the study using descriptive and inferential statistics. The study findings revealed that both treatment was effective but when both treatment were compared, it found that saturated magnesium sulphate fomentation was more effective than the heparin jelly in reducing phlebitis at p<0.05 level of significance. It is inferred that the saturated magnesium sulphate fomentation is comparatively more effective than topical heparin on management of cannula induced phlebitis.***

Keywords: Heparin Jelly, Saturated Magnesium sulphate fomentation, post intravenous cannulation, phlebitis, effect, and children

1. Background of the Study

Vascular access is an essential component of medical care for the hospitalized patients.[1] It is used for the administrations of IV medications, fluids, bloods & blood products.[2]. Tripathi S(2008) reported that peripheral infusion is commonly used for children. Since children have to undergo many infusions for the administration of medications they will be at a higher risk of developing phlebitis also duo to their fragile veins. The vein in children are not easily visible and required skilled personnel for the cannula insertion, if not there can be damage and infiltration. Phlebitis affects to about 20 to 40 of all children receiving IV therapy [3].

Naomi P, et al. (2002) conducted a study stated that twenty (20%) to eighty (80%) of patients treated by peripheral intravenous catheters are susceptible to some form of complication [4]

A study conducted by Yambem M, Madhale M, Bagi D.(2015) stated that thrombophlebitis is the most common complication associated with peripheral intravenous catheters and account for considerable iatrogenic morbidity[5].

Paula L, Maura M.(2004) in their article Troubleshooting pediatric peripheral IVs Phlebitis Stated that phlebitis may caused by mechanical (misplacement of catheter), chemical (administration of medicine) or bacterial (due to proliferation of bacteria).[6]

2. Need of the Study

Nurses need to be aware of and consider certain interventions to reduce phlebitis when maintain IV therapy in patients. Now-a-days new trend of child care is atraumatic care. Some studies had also shown that the effectiveness of topical heparin jelly and MgSo4 fomentation both the interventions which reduces IV related phlebitis. Morison AE.(2007) stated that MgSO4 fomentation is effective and inexpensive interventions for relieving phlebitis. It gets absorbed into the skin easily, reduce inflammation and stiffness, thus alleviate pain and promote tissue metabolism as well as the process of healing [7]. So the researcher wants to find evidence based answer that which one is more effective and cost effective on management of phlebitis.

Objective: To find out the effect of topical application of heparin jelly and Saturated MgSo4 fomentation on post IV cannulation phlebitis and to compare the effect of both interventions on phlebitis.

Research Methodology

In this study quasi experimental time series with multiple treatment design was adopted. Thirty children were selected from pediatric medicine and surgery wards between the age group of 3-12 years with phlebitis resulting from post IV cannulation.

The purposive sampling technique was used to select the sample and random assignment was done while selecting the treatment option for Gr A and Gr B. Each group compromised a sample of fifteen.

The tool used for data collection consist of the following
Tool-1: Demographic Variable and background data sheet of children through record analysis and observation (content validity done by seven experts)

Tool -2: Baxter Scale: For assessment of severity Phlebitis through observation.(it is a standard and valid tool). Pretesting and Inter rater reliability done r value was 0.84.

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Data collection procedure

Thirty children were selected by purposive sampling technique. Both the groups were divided into two names as Gr A receiving Heparin Jelly and Gr B receiving saturated MgSo4 fomentation therapy. Each group comprised of 15 samples. Both the groups for treatment were selected by random assignment.

The children were taken as sample with post IV cannulation phlebitis within 24 hrs to maintain the homogeneity. Assessment of phlebitis was done by Baxter scale before treatment and 15 minute after treatment in group A and group B. Group A was treated with topical application of Heparin Jelly (application on 5 cm surrounding the phlebitis site) they were observed before the treatment and 15 minutes after the treatment. Group B was treated with saturated MgSo4 fomentation for 10 minutes. They were observed before the treatment and 15 minutes after treatment. Treatments were given for four consecutive days, one time daily. Pre-treatment and post-treatment observation scores were recorded.

3. Results

The findings of the present study (Table-1) showed that majority of the children belonged to the age group 6-9 yrs (47%) in Gr A & 53 percent in Gr-B suffered from post IV cannulation phlebitis. The site of IV insertion which developed phlebitis are at wrist – 60 percent in Gr-A and 53 percent in Gr-B. The children with IV plus antibiotics had highest occurrence of phlebitis (47%) in both groups. The children with IV cannula developed phlebitis from third day onwards that was 33% in Gr-A and 60% in Gr-B.

Table 1: Frequency and Percentage distribution of both groups, N=30

Demographic variables and background information	*Heparin Jelly Gr A (n =15)*		*Magnesium Sulphate Gr B (n =15)*	
Age in years	**f**	**%**	**F**	**%**
3-5	3	20	4	27
6-9	7	47	8	53
10-12	5	33	3	20
Site of IV insertion				
Ventral fore arm	3	20	5	33.33
Wrist	9	60	8	53.3
Brachial Plexus	3	20	2	13.33
Types of IV fluids				
IV fluid	2	13	5	33
IV + Antibiotics	7	47	7	47
Antibiotics	2	13	1	7
Others	4	27	2	13
Duration of IV cannulation				
Day 1	1	7	1	7
Day 2	4	27	2	13
Day 3	5	33	9	60
Day 4	5	33	3	20

Table 2, 3 showed that the topical application of heparin jelly was effective as paired-t value (Day2, 3, 4) were (2.75, 3.75, 10.7 & 11.8 ($p<0.05$) respectively. Table 4, 5 showed that the Saturated Magnesium sulphate fomentation was effective as paired-t value (Day 1,2,3) were 9.41, 13.8, 15.16 &16.25 ($p<0.05$) respectively. The both treatment was effective but when both treatment was compared,(Table-6) it found that saturated Magnesium sulphate fomentation was more effective as independent 't' value (Day 2, 3, 4) were 4.14, 5.13, & 6.08 ($p<0.01$, $p< 0.05$) respectively

Table 2: Mean, SD, Mean difference and paired 't' values of the pre treatment observation score of day 1 with post treatment Observations score of day 1, 2, 3 and 4 in Gr-A, n=15

Observations	*Mean*	*SD*	*Mean D*	*t value*
Day 1 Pre treatment (OH1) Post treatment (OH2)	 3.46 3.4	0.25	0.06	1
Day 2 Pre treatment (OH1) Post treatment (OH4)	 3.46 3.13	0.47	0.33	2.75
Day 3 Pre treatment (OH1) Post treatment (OH6)	 3.46 2.86	0.63	0.6	3.75
Day 4 Pre treatment (OH1) Post treatment (OH8)	 3.46 2.06	0.52	1.4	10.7

$t_{(14)}$ =2.14, $p<0.05$
H- Heparin therapy

Table 3: Mean, SD, Mean difference and paired 't' value of Post treatment observation scores between day 1 and day 4 in Gr A, n=15

Observations	Mean	SD	Mean D	't' value
Post-treatment (OH2) Post-treatment (OH8)	3.4 2.06	0.47	1.34	11.08

$t_{(14)}$ =2.14, $p<0.05$
H=Heparin therapy

Table 4: Mean, SD, Mean difference and paired 't' of pre treatment observations score of day1 with post treatment Observations score of day 1, 2, 3 and 4 in Gr B, n=15

Observations	*Mean*	*SD*	*Mean D*	*'t' value*
Day 1 Pre treatment (OM1) Post treatment(OM2)	 3.4 3.26	0.34	0.14	1.62
Day 2 Pre treatment (OM1) Post treatment (OM4)	 3.4 2.26	0.50	1.14	9.41
Day 3 Pre treatment (OM1) Post treatment (OM6)	 3.4 1.73	0.48	1.67	13.8
Day 4 Pre treatment (OM1) Post treatment (OM8)	 3.4 0.66	0.70	2.74	15.16

t (14) =2.14, $p<0.05$
M= Saturated MgSo4 fomentation

Table 5: Mean, SD, Mean difference and paired 't' values between the post treatment observation score of day1 and day 4 in Gr B, n=15

Observations	Mean	SD	Mean D	't' value
Post-treatment (OM2)	3.26	0.47	1.34	16.25
Post-treatment(OM8)	0.66	0.63	2.60	

t (14) =2.14, $p<0.05$

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Table 6: Mean, SD, Mean difference and independent 't' values of phlebitis score between both Gr A and Gr B, N=30

Observations *Severity of phlebitis*	*Mean*	*SD*	*Mean D*	*'t' value*
Day 1 Post treatment (OH2) Post treatment(OM2)	 3.4 3.26	0.14	0.23	0.60
Day 2 Post treatment (OH4) Post treatment (OM4)	 3.13 2.26	0.87	0.21	4.14
Day 3 Post treatment (OH6) Post treatment (OM6)	 2.86 1.73	1.13	0.22	5.13
Day 4 Post treatment (OH8) Post treatment (OM8)	 2.06 0.66	1.4	0.23	6.08

t (28) =2.05, p<0.05

4. Discussion

The findings of this present study results showed that saturated MgSo4 is more effective (t (28) =2.05, p<0.05) in reduction of severity of phlebitis than heparin jelly. The findings of the study was supported by Saini B, Paul P. (2011) revealed that MaSo4 application was most effective intervention in reducing the superficial thrombophlebitis as compared to the application of heparinoid [8].

Another study conducted by Biswas D. (2005) to compare the effect of four selected nursing interventions. One of the comparative treatments was MaSo4 dressing with dry hot fomentation and with glycerin Maso4 dressing without dry hot fomentation. Results showed that MgSo4 had a significant effect of pain reduction on phlebitis which correlates with the researcher findings [9].

5. Conclusion

The results of the study showed that there was significant difference on the management of post IV catheter induced phlebitis between group A and group B. Thus saturated MgSo4 is more effective than the topical heparin jelly. This is easily available and cost effective method than heparin jelly. As the concept of atraumatic care and preventive aspects are gaining more focus in nursing practice, interventions like fomentation of saturated MgSO4 could be promoted as an institutional policy and implemented for the children with peripheral venous catheter related phlebitis.

6. Recommendation

The study can be replicated on larger sample in another setting with other treatment strategies.

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