AN EXPERIMENTAL STUDY TO ASSESS THE EFFECTIVENESS OF NORMAL SALINE FLUSH VERSUS HEPARIN FLUSH IN MAINTANING THE PATENCY OF PERIPHERAL INTRAVENOUS CANNULA IN THE PATIENT RECEIVING INTERMITTENT INTRAVENOUS MEDICATION

ABSTRACT

Aim: The present study indicates an experimental study to assess the effectiveness of normal saline flush versus heparin flush in maintaining the patency of peripheral intravenous cannula in the patients receiving intermittent intravenous medication.

Study design: The conceptual framework which was adopted for this study was based on Ernestine Wiedenbach's helping art of clinical nursing theory (1964) known as prescriptive theory in a modified form. The present study was conducted at medical unit of Sanjeevan Hospital Dariyaganj New Delhi.

Purpose: The main Objective of the study were to access the patency of intravenous cannula with intermittent saline flush and Heparin flush in patients having intravenous cannula receiving intermittent medication and compare their effectiveness.

Methodology:The research approach adopted was a true experimental approach and the research design was multiple treatment, pre-test, post-test control group design.The independent variable for the study were normal saline flush and heparin flush & the dependent variables were patency of peripheral IVcannula.

Data analysis and Results

The data was analysed using descriptive and inferential statistics in terms of frequency, percentage and chi square.

Saline flushing and heparin flush are equally effective in maintaining the patency of peripheral IV cannula.Normal saline flusheh not only reduces the patient's discomfort but also reduces the health care cost of patients.

A similar study can be done on patient receiving chemotherapy to see effect of saline flushing versus heparin

flush on the severity of occurrence of chemotherapy induced phlebitis. onclusion:

On the basis of the study findings the recommendations made for future research. A

cannulaand duration ofIV therapy.

Keywords:*Cannula,Heparin,Saline,Thrombosis*

INTRODUCTION

Intravenous Catheterization is the most common invasive procedure among patients admitted to hospital.The insertion and care of peripheral intravenous catheters is a routine task for nurses in all kinds of care.

The non-potency of I.V. cannula is fund to be the major cause of other local and systemic complications i.e. thrombosis and blood stream infections.Careful adherence to guidelines and procedures can minimize these risks.[1]

About 20-30% of patients receiving peripheral intravenous therapy develop local complications such as infiltration, thrombophlebitis and infection.[2]

Maintenance of patency of the IV catheters is essential as essential as resisting a catheter may produce discomfort to patient and increased cost.[3]

Heparin sodium used to be the traditionally used medication as anticoagulant in those catheters in order to prevent clotting, minimise the incidence of phlebitis as it enhances antithrombin III activity and compensates coagulation factors XII,and X.[4]

Hephzibha,conducted a systemic review of the study on heparin versus normal saline flush solution.[5]

The hospital protocols for flushing IV line vary from no routine IV cannula flushing, flushing with 0.9% NS solution to the use of heparin solution in India there are lots of differences in maintaining the IV line patency,even in the same hospital.[6]

This study will improve the clinical practice and patient care in all the clinical are as of hospitals of the as peripheral IV cannula is the most common invasive procedure done for the hospitalized patients.

An experimental study to assess and evaluate the effectiveness ofnormal saline flush versesheparin flush in maintaining the patency of peripheral intravenous cannula in the patients receiving intermittent intravenous medication in a selected hospital of New Delhi.

METHODS AND METHODOLOGY

In the present study population comprises of all the patients who are 18 years and above of age with peripheral intravenous cannula receiving intermittent IV medication.

INDEPENDENT VARIABLE

i. Normal saline flush
ii. Heparin flush

DEPENDENT VARIABLE

i. Patency of cannula
ii. Resistance to flush

SAMPLE CRITERIA

InclusiveCriteria

1. Patients who were18years and above ofage.
2. Both male and female
3. Patient with peripheral IV cannula receiving intermittent IV medication 2 times a day.
4. Patient with peripheral IV cannula insertion not more than 36 hours.

Exclusive Criteria

1. Patientsbelow18years of age
2. Patientwhohaveactive bleeding
3. Patient who are on anticoagulant therapy
4. Patient who had historyof hypersensitivity to any anticoagulant therapy
5. Patient who were on chemotherapy
6. Patients who bleeding disorders
7. Patients who were on intravenous fluids

SAMPLE SIZE

Pilotstudy:9 sample subjects, 3 each inexperimental group 1,experimental group 2,and control group.

Final Study For final study, 60 sample subjects,20 each in experimental group1 and group2 and control group.

DATA COLLECTION PROCEDURE

Formal administrative approval was obtained from the concerned authority of Sanjeevan Hospital Dariyaganj, New Delhi.

Final study was conducted from the medical unit of Sanjeevan Hospital Dariyaganj New Delhi.Total 60 patients who met the sampling criteria were selected for thestudy through purposive technique[7] and then randomly assigned to 3 groups experimental group 1(saline flush) and experimental group2(heparin flush) and control group.After selecting the sample subjects, informed written consent was taken from the subjects and their relatives. Patients were interviewed[8] for the demographical data using questionnaire.The information with regard to factors involved in the administration of IV medication through peripheral IV cannula was filled in the structured Performa.After observing the IV cannula site and checking the patency,intermittent medication was administered followed by IV cannula flushing with different solutions in both the groups every 12 hrly. Post intervention assessment was done to record data on patency (Infiltrationscale & Numeric pain rating scale).Patients were followed up for 60 hours (3 days) two times a day(8am and 8pm), at 0 hr, 12 hr,2hr, 36hr,48 hr & 60hr with same intervention and assessment data wasrecorded immediately in the observation schedule.

RESULTS AND DISCUSSION

Data obtained were analyzed,tabulated and interpreted according to the objectives of the study by employing describe and inferential statistics. [9,10]

TABLE-1

Frequency and percentage distribution of sample characteristics of the patients

N=60

S.No.	Sample Characteristics	ExperimentalGroup 1 (saline)n=20		ExperimentalGroup 2 (heparin)n=20		Controlgroup n=20		Total 'f'	Total %
		f'	%	f'	%	f'	%		
1	**GENDER**								
1.1	Male	9	45	11	55	8	40	28	47
1.2	Female	11	55	9	45	12	60	32	53
2	**AGEINYEAR**				0				
2.1	18-28	3	15	2	10	4	20	9	15
2.2	29-38	5	25	10	50	9	45	24	40
2.3	39-48	5	25	3	15	3	15	11	18

2.4	49-58	5	25	2	10	2	10	9	15
2.5	59 and above	2	10	3	15	2	10	7	12
3	**DIAGNOSIS**								
3.1	Respiratory diseases	3	15	2	10	2	10	7	11
3.2	cardiac diseases	1	5	2	10	2	10	5	8
3.3	Neurological diseases	2	10	2	10	2	10	6	10
3.4	Renal Diseases	2	10	2	10	3	15	7	12
3.5	Gastro enterological Diseases	2	10	2	10	3	15	7	12
3.6	Endocrinological Diseases	2	10	3	15	4	20	9	15
3.7	Others(Typhoid,Fever,HIV, Acute,Gastritis, Anaemia, Herpeszosteretc.	8	40	7	35	4	20	19	32
4	**PREVIOUS HOSPITALIZATION (last one year)**								
4.1	Yes	4	20	3	15	6	30	13	22
4.2	No	16	80	17	85	14	70	47	78
5	**DURATION OF PREVIOUS HOSPITALIZATION**								
5.1	Less than 5days	5	25	4	20	6	30	15	25
5.2	6-10 days	8	40	9	45	7	35	24	40
5.3	11-15 days	4	20	3	15	4	20	11	18
5.4	More than 15 days	3	15	4	20	3	15	10	17

Figure1: Pie diagram showing percentage distribution of patients as per their gender

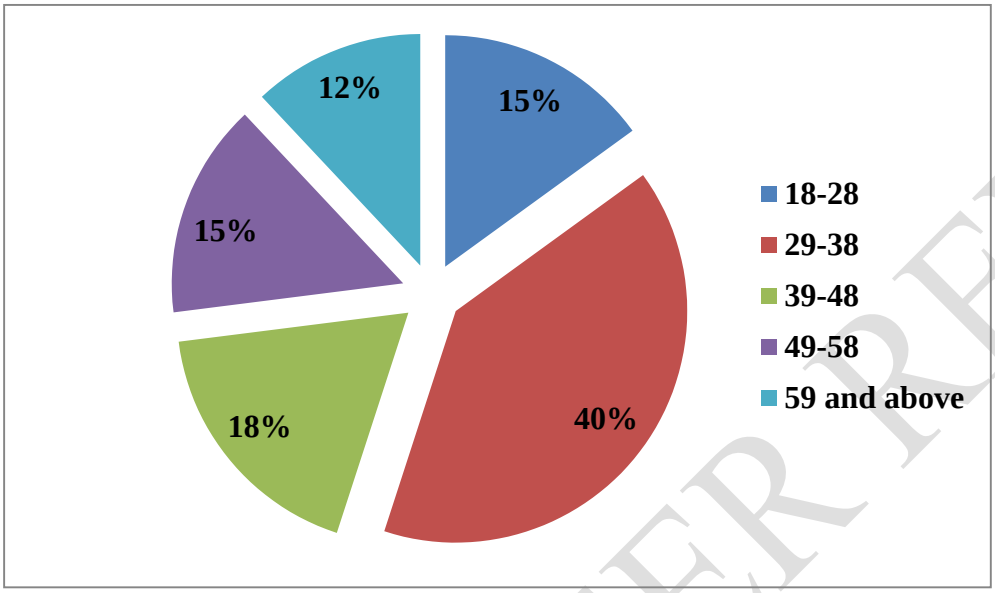


TABLE-2. Frequency and percentage distribution of varioius clinical variables of the patients

N=60

S.no	CLINICAL VARIABLE	Experimental Group 1 (saline)n=20		Experimental Group 2 (heparin)n=20		Control groupn =20		Total'f'	Total %
		f'	%	f'	%	f'	%		
CALCULATION RELATED FACTOR									
1	**IV CANNULA INSERTED BY**								
1.1	Doctor	14	70	13	65	8	40	35	58
1.2	Nurse	6	30	7	35	12	60	25	42
2	**SIZE OF CANNULA**								
2.1	18G	2	10	3	15	4	20	9	15
2.2	20G	12	60	10	50	9	45	31	52
2.3	22G	6	30	7	35	7	35	20	33
3	**DURATION OF IV CANNULA INSERTION**								

3.1	Upto12 hrs.	6	30	7	35	6	30	19	32
3.2	13-24 hrs	10	50	9	45	8	40	27	45
3.3	24-36 hrs	4	20	4	20	6	30	14	23
PATIENT RELATED FACTOR									
4	**SITE OF CANNULA**								
4.1	Dorsum	7	35	7	35	6	30	20	33
4.2	Wrist	7	35	8	40	7	35	22	37
4.3	Forarm	4	20	4	20	5	25	13	22
4.4	Antecubital region	2	10	1	5	2	10	5	8
5	**AVOIDANCE OF PREVIOUS SITE**								
5.1	Yes	20	100	19	95	18	90	57	95
5.2	No	0	0	1	5	2	10	3	5
6	**ACTIVITY OF PATIENT**								
6.1	Completely ambulatory	0	0	0	0	2	10	2	3
6.2	Walk occasionally	9	45	12	60	10	50	31	52
6.3	Restricted activity	11	55	8	40	8	40	27	45
TREATMENT RELATED FACTORS									
7	**DURATION OF IV THERAPY**								
7.1	Upto12 hrs.	6	30	5	25	8	40	19	32
7.2	13-24 hrs	10	50	11	55	9	45	30	50
7.3	25-36 hrs	4	20	4	20	3	15	11	18
8	**IV MEDICATION ADMINISTRATION**								
8.1	Antibiotics through IV push	8	40	7	35	9	45	24	40

	Antibiotics through IV push + antibiotics through infusion	4	20	3	15	5	25	12	20
8.3	Antibiotics through IV push Corticosteroids	3	15	4	20	4	20	11	18
8.4	Antibiotics through IVpush+antibiotics through infusion+corticosteroids	5	25	6	30	2	10	13	22

Data presented in **TABLE-2** ,reveals that

1. Majority of IV cannula's that is 58% were inserted by doctors and 42% were inserted bynurses
2. Data of IV cannula related factors shows that maximum patients were having cannula of 20G size that is 52%, followed by 22 G (33%) and minimum number of patients with 18 G size cannula(15%) only.
3. Data as regard to duration of cannulation and duration of therapy shows that, that the majority of patients had IV cannula insertion and duration of IV therapy between 13-24 hours(45%), followed by 32% up to 12 hours and 23% upto 25-36 hours.
4. As regard to the patient related factor, the data shows that the site of IV cannula insertion inmost of the patient was wrist 37%, followed by 33% at dorsum, 22% on the fore arm and 8% at the anticubital region.
5. The data shows that the most of the patients were walking occasionally(52%) followed by 45% of patients with restricted activityand only 3% were completely ambulatory.

6. Data further shows that the majority of the patients were on antibiotics with IV push only 40%,22% Antibiotics through IV push+antibiotics through infusion+corticosteroids,20%Antibiotics through IV push + antibiotic through infusion and followed by 20% Antibiotics through IV push+antibiotic through infusion and 18% Antibiotics through IV push Corticosteroids.

Figure 2:Bar graph showing percentage distribution of the patients as per the size of IV cannula.

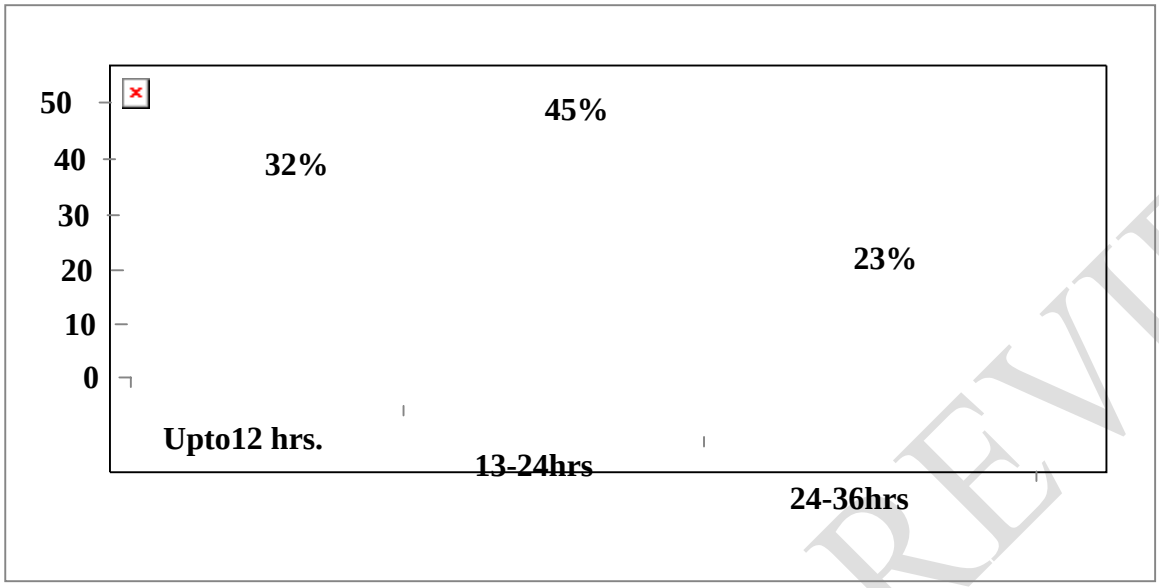


Figure 3:Conical graph showing percentage of patients as per the duration of IV cannula insertion.

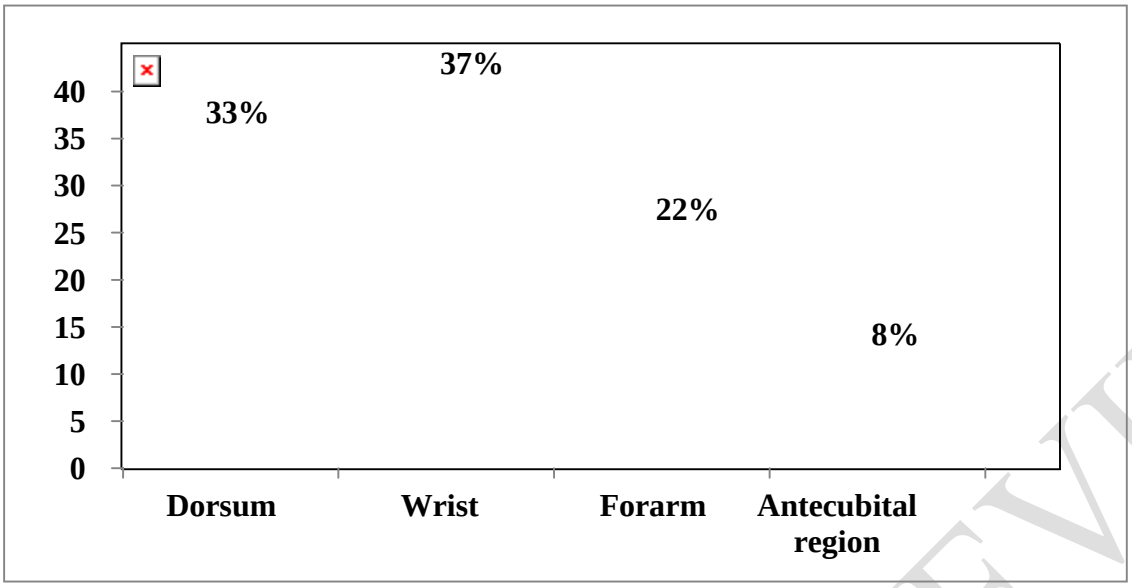


Figure 4:Cylindrical graph showing percentage distribution of patients as per the site of IV cannula.

COMPARISION OF PATENCY OF IV CANNULA

This section describe the finding related to frequency and percentage of post intervention potency of peripheral IV cannula of patients receiving intermittent IV medication through peripheral IV cannula on 3 days of post intervention observation.[11,12]

TABLE-3

Frequency and percentage of post intervention patency of IV cannula in experimental groups and control group

N=60

Group	DAY 1(At 12 Hrs.)				DAY 2(At 36 Hours)				DAY3(At 60 Hours)			
	Patent		Non-Patent		Patent		Non-Patent		Patent		Non-Patent	
	f'	%	f'	%	f'	%	f'	%	f'	%	f'	%
1. Exp Group 1(Saline flush)n=20	20	100	0	0	20	100	0	0	18	90	2	10
2. Exp Group 2(Heparin flush)n=20	20	100	0	0	20	100	0	0	19	95	1	5
3.Controlgroup (No flushing)n=20	20	100	0	0	16	80	4	20	12	60	8	40

The data given in table shows that-

- Patency of IV cannula was found to be 100% among all the groups on day1
- Patency of IV cannula in experimental group1was100%,experimental group 2 was 100% and control groupit was 80%on day2.

- Patency of IV cannula in experimental group 1 was 90 %, experimental group 2 was 95% and ,whereas it was 60%in control group on day3.

❖ The data of all 3 days at different time show that increase in time duration of peripheral IVcannulation results more number of blockage (non patency) in IV cannula of control group as compared to experimental group1 and experimental group2 in which IV cannula were flushed.

Figure 5
Bar graph showing the percentage distribution of patency of IV cannula in experimental groups and control group patients on day1.

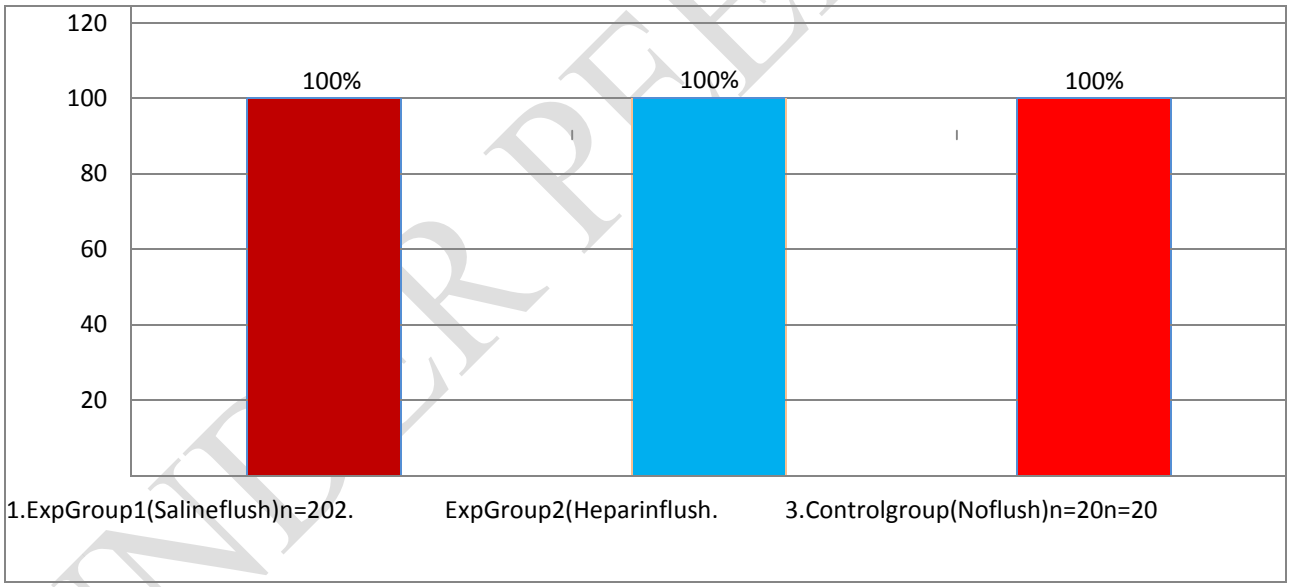
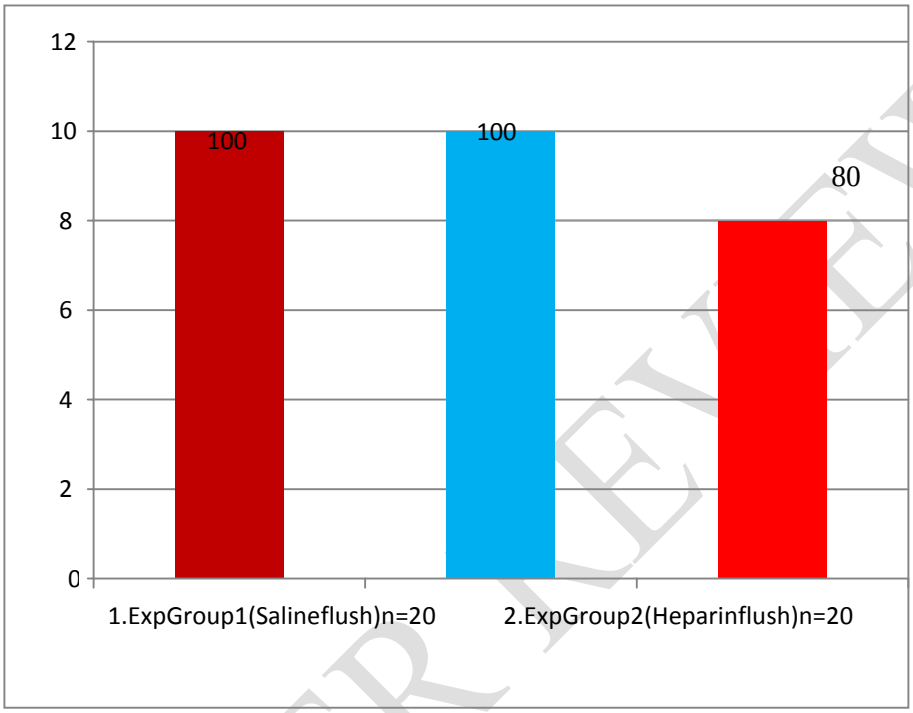


Figure 6:Bar graph showing the percentage distribution of patency of IV cannula in experimental groups and control group patients on day2



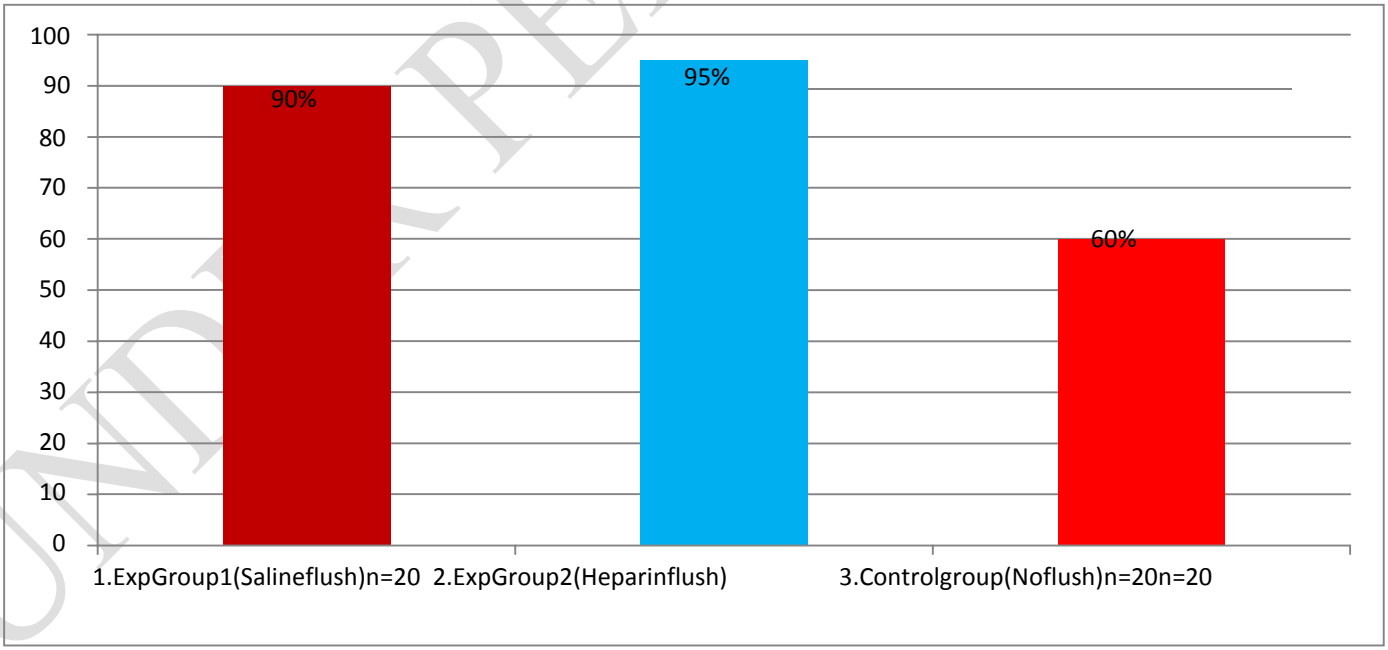


Figure 7:Bar graph showing the percentage distribution of patency of IV cannula in experimental groups and control group patients on day 3.

TABLE-4 Association between the post intervention patency of IV cannula of Experimental groups and Control group on day1,day2,and day3

N=60

DAY AND TIME	Experimental group1(saline flush)n=20		Ex. Gp. 2 (heparin flush)n=20		Control gp.=20		Degree of freedom	Chi sq. value	Chi square value obtained
	Patent	NonPatent	Patent	Non Patent	Patent	Non patent			
DAY1 at 12hr	20	0	20	0	20	0	2	5.99	4.1379 NS
DAY2 at 36hr	20	0	20	0	16	4			2.0339 NS
DAY3 at 60	18	2	19	1	12	8			10.00* Sig.

*significant at 0.05 level NS-Non significant

The data given in theTable-4 revealed that:

1. There was significant association between experimental group1,experimental group2,and control group in maintaining the patency of IV cannula on day 1. As the obtained Chi-Square value 4.1379 was less than the table value.[13]

2. There was significant association between experimental group 1, experimental group 2, and control group in

maintaining the patency of IV cannula on day 2.as the obtained Chi-Square value 2.0339 was less than the table value.

3. There was no significant association between experimental group 1, experimental group 2, and control group in maintaining the patency of IV cannula on day3.as the obtained Chi-Square value was more than the table value.[14]

- The data given in table 4 shows that with each day, the Chi-Square value is increasing due to loss of patency in control group.So, as the number of cannula blockage is increased in control group on 3rdday there was a significant different found between experimental group and control group as evident from obtained Chi-Square value (10.00) which is more than the tablevalue(5.99) this shows that initially the patency of IV cannula was same in experimental groupand control group but with the increase in the time duration there was different found in the IV cannula patency in these groups,

- In order to determine the significant association between the patency of peripheral intravenouscannula line in experimental group 1 and experimental group 2, Chi-Square was calculated and these findings are presented in **Table 5**

TABLE-5 Association between the post intervention patency of IV cannula of Experimental group1and Experimental group 2 on day 1, day 2, and day3

N=60

DAY AND TIME	Experimental group1(saline flush)n=20		Experimental group2(heparin flush)n=20		Degree of freedom	Chi sq. value	Chi sq. Value
	Patent	Non Patent	Patent	Non Patent			
DAY1 (at12hrs)	20	0	20	0	2	5.99	4.13 NS
DAY2 (at36hrs)	20	0	20	0			4.13 NS
DAY3 (at60hrs)	18	2	19	1			2.034 NS

*Significantat0.05level NS-Nonsignificant

The data given in table-5 revealed that:

1. There was a significant association found between experimental group 1 and experimental group 2 in maintaining the patency of IV cannula on day 1. The data obtained Chi-Square value (4.13) was less than the table value.

2. There was a significant association found between experimental group 1 and experimental group 2 in maintaining the patency of IV cannula on day 2. The data obtained Chi-Square value (4.13) was less than the table value.[15,16,17]

3. There was a significant association found between experimental group 1 and experimental group 2in maintaining the patency of IV cannula on day 3. The data obtained Chi-Square value (2.034) was less than the table value.

- This data is given in table 5 shows that experimental group 1(saline flush) and experimental group 2(heparin flush) are showing similar result in terms of maintaining the patency of IVcannula of patient receiving intermittent IV medication. In all 3 days there was no statistically significant difference found between experimental group1 and experimental group2 as evident from obtained Chi-Square value which is very less than the table value (5.99) in all 3days, so the association between experimental group 1 and 2 is true association and not by chance.

DISCUSSION OF THE FINDING

The present study was aimed to assess the effectiveness of normal saline flush versus heparin [18,19] flush in maintaining the patency of peripheral intravenous cannula in patients receiving intermittent IV medication in selected hospital of New Delhi.

In this section, the major findings of the present study have been discussed with reference to the results obtained by other investigators in the same aspect.

The finding of the present study showed that there is significant association between flushing of IV canuula and patency of peripheral IV cannula.[20,21] This finding is consistent with the findings of the research studies conducted by Choudhary, V.S [5] Vinoli. S (2007) and Kaur Maninder. et al. [19]

They reported that intermittent flush found to be highly effective and best method to be used in clinical studies to standardize the patency of cannula.[23]

The findings of the present study showed that there is an association between normal saline flush and heparin flush (10 unit dose) in maintaining the patency of peripheral intravenous cannula.

This finding is consistent with the finding of the research studies conducted by Kathryn M., et al. (2003) and Harahan & Berends (2000) where they found that both normal saline flush and heparin

flush (10 unit dose) are equally effective in the maintaining the patency of peripheral IV cannula

CONCLUSION

On the basis of the findings of the present study, the following conclusion can be drawn:

1. There was a significant association between patency of peripheral IV cannula and flushing of IVcannula.

2. There was a significant association between experimental group 1 (saline flush) and experimental group2(heparin flush) in maintaining the patency of peripheral IV cannula.

3. Maintenance of patency of peripheral IV cannula was depend on the type of IV medication used and it is independent of all other factors like size of IV cannula, site of IV cannula, duration of insertion ofIV cannulaand duration ofIV therapy**.[24]**

Present study has shown that the majority of patients in control group had blockage of peripheralIV cannula. Further the study has also identified thatflushing of peripheral IV cannula with saline flush and heparin flush has shown equal effect in maintaining the patency of IV cannula. The study emphasize the need to follow a standard protocol for flushing the peripheralIV cannulatoprevent blockage.

Present research indicates that saline flush and heparin flush give similar result in maintaining the patency of IV cannula, so the practice of using heparin as a flushing agent can be changed to normal saline flush which is safer and cheaper as compared to the heparin flush.

An exploratory study can be done to investigate the incidence of intravenous local vascular complications and to evaluate some important related factors.

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