



## EFFECTIVENESS OF NORMAL SALINE LOCK IN MAINTAINING THE PATENCY OF I.V. CANNULA

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### ABSTRACT

**Introduction:** PIV catheters insertion is a common procedure for the administration of medications, fluids and blood products. There are variety of complications associated with the insertion of venous access devices such as thrombophlebitis and extravasations.

**AIM:** The present study aimed to assess the effectiveness of Normal Saline Lock in maintaining the patency of I.V. cannula among patients admitted in GGSMH, Faridkot.

**Materials and Methods:** Quasi-experimental with post test only control group design was used. Sixty subjects who were newly cannulated and have b.d. I.V. medication were included in the study in which 30 subjects were selected as experimental and control group each. Subjects in experimental had given Normal Saline Lock The socio-demographic and clinical data of the patient was collected through interview schedule. The patency of I.V. cannula was assessed by the standardized tool Visual Infusion Phlebitis (VIP) scale in both groups. Descriptive statistics, chi-square test were used to analyze the data.

**Results:** There is significant maintenance of patency of I.V. cannula in experimental group ( $p = 0.007$ ). No association was found between patency and socio-demographic and clinical variables.

**Conclusion:** Normal Saline Lock is an effective method in maintaining the patency of I.V. cannula.

**Keywords:** Patency, PIV, Normal Saline Lock

### INTRODUCTION

Peripheral intravenous (PIV) catheters insertion is a common procedure in hospitals. Millions of patients require vascular access for the administration of medications, fluids, nutritional solutions and blood products. PIV is usually placed in a vein of hand or arm.<sup>1</sup>

The insertion of a peripheral venous cannula is required in more than 60% of patients admitted to hospital. Peripheral venous cannulation is performed by a variety of health care professionals throughout many health care settings.<sup>2</sup>

There are variety of complications associated with the insertion and utilization of venous access devices which are generally either local or systemic in nature. The non-patency of I.V. cannula found to be the major complication that can cause the other local and systemic complications such as thrombosis, thrombophlebitis, extravasations, infiltration, pulmonary embolism and blood stream infections.<sup>3</sup>

The incidence of thrombophlebitis due to intravenous therapy is 18-30%.<sup>4, 5, 6</sup> Multiple factors such as age, sex, material of cannula, duration of cannulation & site of I.V. cannula are responsible for the development of phlebitis.

In a rapidly growing number of patients who do not require fluids intravenously, it is desirable to provide immediately accessible established intravenous (I.V.) route for intermittent intravenous injections of drugs such as antibiotics and antiarrhythmic drugs.<sup>7</sup>

Normal Saline Lock technique is one of the effective method for maintaining the patency of I.V. cannula because in this saline remains in the catheter as well as in the tube which decreases the chances of blockage and thus it reduces the risk of

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circulatory overload, vascular irritation, bacterial contamination, cost of I.V. equipment, easy to use and increases patient comfort.<sup>7</sup> The efficacy of Normal Saline Lock in maintaining the patency of I.V. cannula has been reported in various studies.

Heparin and normal saline solutions have been commonly used as I.V. lock irrigants. Despite its beneficial antithrombotic effects, heparin has been reported to contribute to the development of phlebitis, decrease platelet count, and cause of iatrogenic hemorrhage. Researchers have indicated that flushing with normal saline prevents local tissue damage, drug incompatibilities, and iatrogenic hemorrhage, and it can also reduce the cost of maintaining peripheral devices.<sup>1</sup> Thus saline has been chosen as lock irrigants by the investigator.

In US, since 1985, daily saline flushes (8 hourly) are used as a standard protocol for intermittent infusion. The use of sodium chloride (0.9%) for intravenous lock was recommended by American Society of Health System Pharmacists and Infusion Nurses Society. It is evidently proved that saline lock reduces the incidences of phlebitis, infiltration and blockage of I.V. cannula. Studies have shown that 82% cannula are found patent when saline lock is used (8 hourly).<sup>3</sup>

During clinical experience, investigator has observed the blockage of I.V. cannula in wards and no standard protocol is adopted for maintaining it. So, the investigator selected this problem to address. The main objectives of the study were to assess the effectiveness of Normal Saline Lock in maintaining the patency of I.V. cannula and to find the association of patency with selected socio-demographic and clinical variables.

## METHODOLOGY

A quasi-experimental study with quantitative approach was done to assess the effectiveness of Normal Saline Lock in maintaining the patency of I.V. cannula and to find the association of patency with selected socio-demographic and clinical variables. The present study was conducted at two medicine wards of Guru Gobind Singh Medical Hospital, Faridkot. The population for the study was 60 patients who were admitted in medicine wards and were conveniently selected at Guru Gobind Singh Medical Hospital, Faridkot. The group included only those patients who were on b.d. I.V. medication and were willing to participate in the study. Patients on anticoagulant medicines and on continuous I.V. fluids were excluded from the study. After the selection of study subjects, identification profile of patients was filled in the

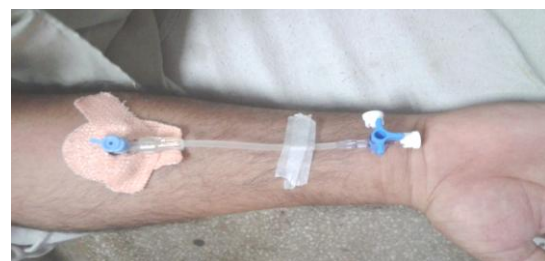
record performa. Total two measures were used to collect data from the subjects.

**Tool 1(A) - Socio demographic profile of patient:** It was developed by researchers which consists of 8 items to measure demographic data of the subjects. These items were age, gender, marital status, educational status, income of family per month, place of residence, physical status, and physical activity. The data was collected using interview schedule. Content validity of tool was determined by experts in the field of medical-surgical nursing and medicine respectively. Content appropriateness, clarity and relevance were ascertained by language expert. The reliability of the tool was determined by test-retest method and it was found to be  $r=1$

**Tool 1(B) – Clinical Profile of patient:** It was developed by researchers which consists of 9 items to measure clinical data of the subjects. These items were site of cannulation, gauge of I.V. cannula, type of drug administered, material of I.V. cannula, I.V. site care, I.V. cannula securement device, number of attempted cannulation, rate of medication infusion, diagnosis. The data was collected using interview schedule. Content validity of tool was determined by experts in the field of medical-surgical nursing and medicine respectively. Content appropriateness, clarity and relevance were ascertained by language expert. Content appropriateness, clarity and relevance were ascertained by language expert. The reliability of the tool was determined by test-retest method and it was found to be  $r=1$

**Tool 2 - Visual Infusion Phlebitis Scale:** Visual infusion phlebitis scale is a tool for monitoring infusion site. It is the tool recommended by the Royal College of Nursing for monitoring infusion site. It was developed by Andrew Jackson, Consultant nurse, Intravenous therapy and Care, Rotherham General Hospital et al. This scale was evaluated in study by Gallant and Schultz.<sup>8</sup> The tool consists of 6 items ranging from 0-5. According to appearance of I.V. cannulation site, there are 5

**Figure No.1: Subject receiving intervention of Normal Saline Lock (Used with permission of the subject)**



stages of phlebitis. After assessing the appearance of cannulation site, the patient is given different scores. The VIP scale is used in various studies where it is used to measure the stages of phlebitis.<sup>6, 8-13</sup> Reliability of the scale was determined by inter-rater reliability method which was 0.86.

Try out of the tools and intervention was done to ensure the reliability and understanding of the tool. Pilot study was conducted in medicine wards at Guru Gobind Singh Medical Hospital, Faridkot to find feasibility of the study and it was found to be feasible.

As shown in Figure No.1, while doing the

intervention, firstly patency was assessed by ability to irrigate the I.V. cannula with 1ml distilled water without resistance in the morning and evening before administering b.d. I.V. medication in the experimental and control groups. In the experimental group after administering b.d. I.V. medication Normal Saline Lock flush syringe was inserted with extension tube into the catheter which was applied on the patient catheter and flushes it with 2ml of saline. Clamp the extension tube while flushing the last 0.2ml of solution to create the positive pressure so that some fluid remains inside the tube and some in the catheter of the patient and then secure the tubing with tape.

**Table No. 1: Baseline comparison of experimental and control group with regard to socio-demographic variables. (N = 60)**

Variables	Exp. f (%)	Cont. f (%)	$\chi^2/df$	p
<b>Age (in years)</b>				
a) $\leq 20$	2 (3.3)	1 (1.7)	0.552;	0.907;
b) 21-40	10 (16.7)	12 (20)	df=3	NS
c) 41-60	14 (23.3)	13 (21.7)		
d) $>60$	4(6.7)	4 (6.7)		
<b>Gender</b>				
a) Male	18 (30)	16 (26.7)	0.271;	0.602;
b) Female	12 (20)	14 (23.3)	df=1	NS
<b>Marital Status</b>				
a) Married	22 (36.7)	23 (38.3)	1.308;	0.727;
b) Unmarried	4 (6.7)	3 (5)	df=3	NS
c) Divorced/Separated	1 (1.7)	0 (0)		
d) Widow/Widower	3 (5)	4 (6.7)		
<b>Educational status</b>				
a) Illiterate	14 (23.3)	15 (25)	1.002;	0.910;
b) upto primary	4 (6.7)	6 (10)	df=4	NS
c) upto secondary	6 (10)	5 (8.3)		
d) upto higher secondary	2 (3.3)	1 (1.7)		
e) Graduation and above	4 (6.7)	3 (5)		
<b>Income of family per month(Rs)</b>				
a) Upto 10000	18 (30)	18 (30)	0.4;	0.940;
b) 10001-15000	8 (13.3)	7 (11.7)	df=3	NS
c) 150001-20000	1 (1.7)	2 (3.3)		
d) $>20000$	3 (5)	3 (5)		
<b>Place of residence</b>				
a) Rural	20 (33.3)	19 (31.7)	0.73;	0.787;
b) Urban	10 (16.7)	11 (18.3)	df=1	NS
<b>Physical status</b>				
a) Obese	7 (11.7)	7 (11.7)	0.107;	0.948;
b) Normal body build	17 (28.3)	16 (26.7)	df=2	NS
c) Thin	6 (10)	7 (11.7)		
<b>Physical activity</b>				
a) Heavy worker	13 (21.7)	15 (25)	0.325;	0.850;
b) Moderate worker	12 (20)	10 (16.7)	df=2	NS
c) Sedentary worker	5 (8.3)	5 (8.3)		

NS=Non Significant at p value  $<0.05$

**ETHICAL CONSIDERATIONS**

Study approval was taken from ethical committee of the University College of Nursing, Baba Farid University of Health Sciences, Faridkot and written permission was taken to conduct the study from competent authority of Guru Gobind Singh Medical Hospital, Faridkot. Study procedure was explained and written information was given to the subjects. Informed written consent from the subjects was taken. Participants who were willing to participate were included in the study. Anonymity of study subjects and confidentiality was maintained.

**STATISTICAL ANALYSIS**

Statistical analysis was done by using SPSS (16) software. The descriptive statistics (frequency, percentage) and in inferential statistics (chi-square test) was used for statistical analysis. The chi-square test was used to assess the effectiveness of Normal Saline Lock in maintaining the patency of I.V. cannula and to find the association of patency with selected socio-demographic and clinical variables. The p value at <0.05 was considered is statistically significant.

**RESULTS**

As shown in table 1, in experimental group,

**Table No. 2: Baseline comparison of experimental and control group with regard to clinical variables. (N = 60)**

Variables	Exp. f (%)	Cont. f (%)	$\chi^2/df$	p
<b>Site of cannulation</b>				
a) Dorsum of hand	12 (20)	13 (21.7)	1.174;	0.759;
b) Inner aspect of forearm	11 (18.3)	12 (20)	df=3	NS
c) Outer aspect of forearm	6 (10)	5 (8.3)		
d) Any other	1 (1.6)	0 (0)		
<b>Gauge of I.V. cannula</b>				
a) 20G	0 (0)	0 (0)	0.351;	0.554;
b) 22G	28 (46.7)	29 (48.3)	df=1	NS
c) 24G	2 (6.7)	1 (1.6)		
<b>Material of I.V. cannula</b>				
a) Stainless Steel	0 (0)	0 (0)	.a	–
b) Teflon	30 (50)	30 (50)		
c) Any other	0 (0)	0 (0)		
<b>I.V. cannula securement device</b>				
a) Leucoplast	0 (0)	0 (0)	1.017;	0.313;
b) Dynaplast	29 (48.3)	30 (50)	df=1	NS
c) Paper Tape	1 (1.7)	0 (0)		
<b>Number of attempted cannulation</b>				
a) First	20 (33.3)	23 (38.3)		
b) Second	8 (13.3)	6 (10)	0.828;	0.661;
c) More than 2 times	2 (3.3)	1 (1.7)	df=2	NS
<b>IV site care</b>				
a) None	30 (50)	30 (50)	.a	–
b) Once a day	0 (0)	0 (0)		
c) Twice a day	0 (0)	0 (0)		
d) More than two times	0 (0)	0(0)		
<b>Type of drug administered</b>				
a) Antibiotics	21 (35)	22 (36.7)	1.357;	0.716;
b) Antacids	0 (0)	1 (1.7)	df=3	NS
c) Corticosteroids	2 (3.3)	2 (3.3)		
d) Any other	0 (0)	0 (0)		
e) Combined	7 (11.7)	5 (8.3)		
<b>Rate of medication infusion</b>				
a) Slow	2 (3.3)	0 (0)	2.219;	0.330;
b) Medium	26 (43.3)	27 (45)	df=2	NS
c) High	2 (3.3)	3 (5)		

.a=No statistics can be computed as variable is constant, S=Non Significant at p value <0.05

maximum number of the subjects was of 41-60 years age group, male and married. Approximately one fourth of the subjects were illiterate. Majority of the subjects had earning up to Rs 10000, reside in rural area and had normal body build. Approximately one fourth of the subjects were heavy worker. In control group, maximum number of the subjects was of 41-60 years age group, male and married. One fourth of the subjects were illiterate. Majority of the subjects had earning up to Rs 10000, reside in rural area and had normal body build. One fourth of the subjects were heavy worker. Both the groups were comparable as per socio-demographic variables as per  $\chi^2$  test ( $p < 0.05$ ).

As shown in table 2, in experimental group, maximum number of subjects had I.V. cannula on the dorsum of hand with the size of 22G. All cannulas had teflon material and does not receive I.V. site care. Approximately all of the subjects had

with cardiac disorders. In control group, maximum number of subjects had I.V. cannula on the dorsum of hand with the size of 22G. All cannulas had teflon material, secured with dynaplast and does not receive I.V. site care. Majority of the subjects received I.V. cannula in first attempt and received antibiotics at medium rate. Both the groups were comparable as per clinical variables as per  $\chi^2$  test ( $p < 0.05$ ).

As shown in figure 1, this shows the distribution of subjects as per their patency of I.V. cannula on Day 1, Day 2 and Day 3 in the study. On Day 1, all subjects of both the groups (100%) had patent I.V. cannula in the morning as well as in the evening. On Day 2, in the morning all subjects (100%) had patent I.V. cannula in both the groups, but on the same day evening (Day 2), control group subjects had (86.7%) patent I.V. cannula whereas in experimental group subjects had (100%) patent I.V. cannula. On Day 3 morning, all

**Table No. 3: Comparison of experimental and control group subjects with the patency of IV cannula on Day 3. (N = 60)**

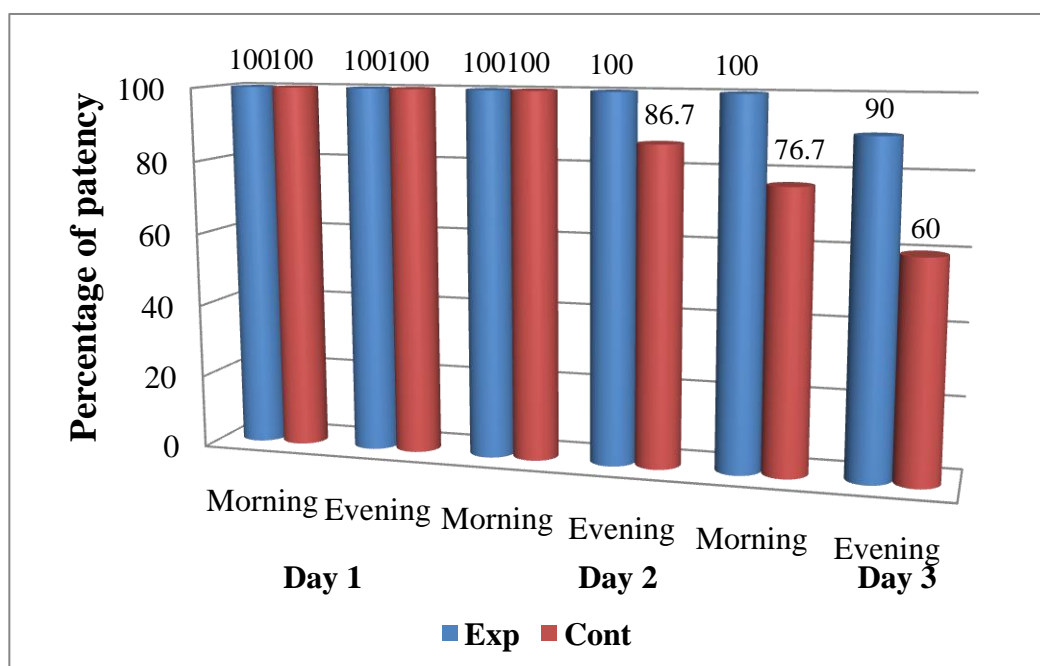
Patency	Total f (%)	Exp group f (%)	Cont group f (%)	$\chi^2/df$	p
Patent	45 (75)	27 (45)	18 (30)	7.2;	0.007*
Non-patent	15 (25)	3 (5)	12 (20)	df=1	

\*Significant at p value <0.05

cannula secured with dynaplast. Majority of the subjects received I.V. cannula in first attempt, received antibiotics at medium rate and diagnosed

subjects (100%) in experimental group had patent I.V. cannula whereas in control group, three fourth subjects (76.7%) had patent I.V. cannula. On 3<sup>rd</sup>

**Figure No. 2: Bar graph showing the distribution of subjects as per their patency of I.V. cannula on Day 1, Day 2 and Day 3 in the study. (N = 60)**



day evening, experimental group subjects had (90%) patent IV cannula whereas control group subjects had only (60%) patent I.V. cannula. By looking in this data, it can be said that experimental group subjects had more patency of I.V. cannula than control group.

As shown in the table no. 3, majority (45%) of the cannula were patent in experimental group at the end of Day 3 whereas only 5% cannula were non-patent. Maximum (30%) of the cannula were

group in maintaining the patency of IV cannula at p value <0.05.

This shows that that there is more patency of I.V. cannula in experimental group than in control group. Hence, it can be concluded that Normal Saline Lock is effective in maintaining the patency of I.V. cannula in experimental group subjects.

As shown in the table no. 4, there was no significant association of patency with age, gender, marital status, educational status, income of

**Table No. 4: Association of patency with selected socio-demographic variables in experimental group. (N = 30)**

Variables	Patent f (%)	Non-patent f(%)	$\chi^2/df$	p
<b>Age (in years)</b>				
a) ≤20	2(6.7)	0(0)	0.952;	0.813;
b) 21-40	9(30)	1(3.3)	df=3	NS
c) 41-60	12(40)	2(6.7)		
d) >60	4(13.3)	0(0)		
<b>Gender</b>				
a) Male	16(53.3)	2(6.7)	0.62;	(FE) 1;
b) Female	11(36.7)	1(3.3)	df=1	NS
<b>Marital Status</b>				
a) Married	19(63.3)	3(10)	1.212;	0.750;
b) Unmarried	4(13.3)	0(0)	df=3	NS
c) Divorced/Separated	1(3.3)	0(0)		
d) Widow/Widower	3(10)	0(0)		
<b>Educational status</b>				
a) Illiterate	13(43.3)	1(3.3)	3.016;	0.55;
b) upto primary	3(10)	1(3.3)	df=4	NS
c) upto secondary	6(20)	0(0)		
d) upto higher secondary	2(6.7)	0(0)		
e) Graduation and above	3(10)	1(3.3)		
<b>Income of family</b>				
a) Upto 10000	15(50)	3(10)	2.22;	0.528;
b) 10001-15000	8(26.7)	0(0)	df=3	NS
c) 150001-20000	1(3.3)	0(0)		
d) >20000	3(10)	0(0)		
<b>Place of residence</b>				
a) Rural	17(56.7)	3(10)	1.67;	(FE) 0.5;
b) Urban	10(33.3)	0(0)	df=1	NS
<b>Physical status</b>				
a) Obese	6(20)	1(3.3)	0.868;	0.648;
b) Normal body build	15(50)	2(6.7)	df=2	NS
c) Thin	6(20)	0(0)		
<b>Physical activity</b>				
a) Heavy worker	11(36.7)	2(6.7)	1.011;	0.603;
b) Moderate worker	11(36.7)	1(3.3)	df=2	NS
c) Sedentary worker	5(16.7)	0(0)		

NS=Non Significant at p value <0.05

FE=Fisher Exact test

patent in control group at the end of Day 3 whereas 20% cannula were non-patent. As per chi square test, there is significant difference ( $\chi^2=7.2$  and  $p=0.007$ ) between experimental and control

family, place of residence, physical status, physical activity in experimental and control group.

As shown in the table no. 5, there was no significant association of patency with site of cannulation, gauge of I.V. cannula, material of I.V.

of attempted cannulation, I.V. site care, and type of drug administered in experimental and control

**Table No. 5: Association of patency with selected clinical variables in experimental group. (N = 30)**

Variables	Patent f (%)	Non-patent f (%)	$\chi^2/df$	p
<b>Site of cannulation</b>				
a) Dorsum of hand	10(33.3)	2(6.7)	1.38;	0.71;
b) Inner aspect of forearm	10(33.3)	1(3.3)	df=3	NS
c) Outer aspect of forearm	6(20)	0(0)		
d) Any other	1(3.3)	0(0)		
<b>Gauge of I.V. cannula</b>				
a) 20G	0(0)	0(0)	0.238;	(FE) 1;
b) 22G	25(83.3)	3(10)	df=1	NS
c) 24G	2(6.7)	0(0)		
<b>Material of I.V. cannula</b>				
a) Stainless Steel	0(0)	0(0)	.a	---
b) Teflon	27(90)	3(10)		
c) Any other	0(0)	0(0)		
<b>I.V. cannula securement device</b>				
a) Leucoplast	0(0)	0(0)	0.115;	(FE) 1.;
b) Dynaplast	26(86.7)	3(10)	df=1	NS
c) Paper Tape	1(3.3)	0(0)		
<b>Number of attempted cannulation</b>				
a) First	19(63.3)	1(3.3)	2.78;	0.25;
b) Second	6(20)	2(6.7)	df=2	NS
c) More than 2 times	2(6.7)	0(0)		
<b>I.V. site care</b>				
a) None	27(90)	3(10)		
b) Once a day	0(0)	0(0)	.a	---
c) Twice a day	0(0)	0(0)		
d) More than two times	0(0)	0(0)		
<b>Type of drug administered</b>				
a) Antibiotics	19(63.3)	2(6.7)		
b) Antacids	0(0)	0(0)		
c) Corticosteroids	1(3.3)	1(3.3)	4.34;	0.114;
d) Any other	0(0)	0(0)	df=2	NS
e) Combined	7(23.3)	0(0)		

.a=No statistics can be computed as variable is constant

NS=Non Significant at p value <0.05

FE=Fisher Exact Test

cannula, I.V. cannula securement device, number of attempted cannulation, I.V. site care, and type of drug administered in experimental and control group.

As shown in the table no. 6, there was no significant association of patency with age, gender, marital status, educational status, income of family, place of residence, physical status, physical activity in experimental and control group.

As shown in the table no. 7, there was no significant association of patency with site of cannulation, gauge of I.V. cannula, material of I.V. cannula, I.V. cannula securement device, number

group.

## DISCUSSION

The findings of the present study revealed that upto day 3 evening, 90% cannula remained patent in experimental group and 60% cannula were patent in control group.

It is supported by the study conducted by Maninder Kaur et al<sup>3</sup> who reported that upto day 3 evening, 96.7% cannula remained patent in experimental group and 56.7% cannula were patent in control group. So, it shows that Normal Saline Lock is effective in maintaining the patency of I.V. cannula.

Also another study by Karen LeDuc<sup>14</sup> on efficiency of normal saline versus heparin solution supported that normal saline is effective in maintaining the patency of I.V. cannula. Goode CJ

heparin to maintain the patency of I.V. cannula. Goossens GA<sup>17</sup> conducted a study on comparing normal saline versus diluted heparin provides support that normal saline is safe and effective

**Table No. 6: Association of patency with selected socio-demographic variables in control group. (N = 30)**

Variables	Patent f (%)	Non-patent f (%)	$\chi^2/df$	p
<b>Age (in years)</b>				
a) ≤20	1(3.3)	0(0)	1.26;	0.738;
b) 21-40	7(23.3)	5(16.7)	df=3	NS
c) 41-60	7(23.3)	6(20)		
d) >60	3(10)	1(3.3)		
<b>Gender</b>				
a) Male	10(33.3)	6(20)	0.89;	(FE) 1;
b) Female	8(26.7)	6(20)	df=1	NS
<b>Marital Status</b>				
a) Married	12(40)	11(36.7)	3.309;	0.191;
b) Unmarried	2(6.7)	1(3.3)	df=2	NS
c) Divorced/Separated	0(0)	0(0)		
d) Widow/Widower	4(13.3)	0(0)		
<b>Educational status</b>				
a) Illiterate	10(33.3)	5(16.7)	2.77;	0.596;
b) upto primary	2(6.7)	4(13.3)	df=4	NS
c) upto secondary	3(10)	2(6.7)		
d) upto higher secondary	1(3.3)	0(0)		
e) Graduation and above	2(6.7)	1(3.3)		
<b>Income of family per month(Rs)</b>				
a) Upto 10000	11(36.7)	7(23.3)	1.36;	0.714;
b) 10001-15000	5(16.7)	2(6.7)	df=3	NS
c) 150001-20000	1(3.3)	1(3.3)		
d) >20000	1(3.3)	2(6.7)		
<b>Place of residence</b>				
a) Rural	13(43.3)	6(20)	1.53;	(FE)
b) Urban	5(16.7)	6(20)	df=1	0.2;
				NS
<b>Physical status</b>				
a) Obese	6(20)	1(3.3)	4.85;	0.088;
b) Normal body build	10(33.3)	6(20)	df=2	NS
c) Thin	2(6.7)	5(16.7)		
<b>Physical activity</b>				
a) Heavy worker	11(36.7)	4(13.3)	2.78;	0.249;
b) Moderate worker	4(13.3)	6(20)	df=2	NS
c) Sedentary worker	3(10)	2(6.7)		

**NS=Non Significant at p value <0.05  
FE=Fisher Exact test**

et al<sup>15</sup> conducted a study to determine the effects of heparin flush versus saline flush solutions which reported that normal saline is more effective in maintaining the patency of I.V. cannula.

Cook L et al<sup>16</sup> evaluated the effect of heparinized lock vs normal saline lock supported that the normal saline is more effective than

locking solution than heparin.

The reason for effectiveness of Normal Saline Lock is that because in this the catheter is attached to extension tubing containing saline (fluid barrier) which is maintained by positive pressure to keep blood from travelling up from the vein and clotting inside the catheter.



The probable acceptance of Normal Saline Lock is that it is simple, non-invasive, easily accessible, cost-effective, has less side-effects, easy to learn

male sex, cannula inserted at wrist and duration of cannulation of more than 3 days causes the non-patency of IV cannula. Similar study conducted by

**Table No. 7:- Association of patency with selected clinical variables in control group. (N = 30)**

Variables	Patent f (%)	Non-patent f (%)	$\chi^2/df$	p
<b>Site of cannulation</b>				
a) Dorsum of hand	9(30)	4(13.3)	0.962;	0.618;
b) Inner aspect of forearm	6(20)	6(20)	df=2	NS
c) Outer aspect of forearm	3(10)	2(6.7)		
d) Any other	0(0)	0(0)		
<b>Gauge of I.V. cannula</b>				
a) 20G	0(0)	0(0)	1.55;	(FE) 0.4;
b) 22G	18(60)	11(36.7)	df=1	NS
c) 24G	0(0)	1(3.3)		
<b>Material of I.V. cannula</b>				
a) Stainless Steel	0(0)	0(0)	.a	---
b) Teflon	18(60)	12(40)		
c) Any other	0(0)	0(0)		
<b>I.V. cannula securement device</b>				
a) Leucoplast	0(0)	0(0)	.a	---
b) Dynaplast	18(60)	12(40)		
c) Paper Tape	0(0)	0(0)		
<b>Number of attempted cannulation</b>				
a) First				
b) Second	14(46.7)	9(30)	0.924;	0.63;
c) More than 2 times	3(10)	3(10)	df=2	NS
	1(3.3)	0(0)		
<b>I.V. site care</b>				
a) None	18(60)	12(40)		
b) Once a day	0(0)	0(0)	.a	---
c) Twice a day	0(0)	0(0)		
d) More than two times	0(0)	0(0)		
<b>Type of drug administered</b>				
a) Antibiotics	13(43.3)	9(30)		
b) Antacids	1(3.3)	0(0)		
c) Corticosteroids	1(3.3)	1(3.3)	0.758;	0.86;
d) Any other	0(0)	0(0)	df=3	NS
e) Combined	3(10)	2(6.7)		

.a=No statistics can be computed as variable is constant

NS=Non Significant at p value <0.05

FE=Fisher Exact Test

and implement and is non-pharmacological method for maintaining the patency of I.V. cannula.

The present study revealed that there is no association of patency with socio-demographic and clinical variables. But in some studies it is found that there is association of various socio-demographic and clinical variables.

Prabhjot Kaur et al <sup>12</sup> conducted a study to see the effect of various risk factors contributing to non-patency of I.V. cannula and concluded that

Ruchi Saini et al <sup>6</sup> to determine the various risk factors of non-patency of I.V. cannula reported that use of forearm as the site of insertion, longer duration of cannula, administration of medications such as antibiotics are the contributing factors for the non-patency of I.V. cannula.

Singh R et al <sup>11</sup> conducted a study to evaluate the contributing risk factors related to non-patency of I.V. cannula and reports that male sex, small catheter size (20G), insertion at the sites of forearm, intravenous drug administration causes the non-patency of I.V. cannula. Maki DJ et al <sup>18</sup>

conducted a study to determine the risk factors associated with the non-patency of I.V. cannula and reports that intravenous antibiotics, female sex, prolonged catheterization, catheter material (vialon, teflon), previous catheterization are the risk factors contributing to non-patency of I.V. cannula.

The reason for no association of the socio-demographic and clinical variables in this study is due to small study sample (60 patients), single setting and the involvement of only those patients who are on b.d. I.V. medication.

### IMPLICATIONS AND RECOMMENDATIONS

Normal Saline Lock is effective in maintaining the patency of peripheral venous catheter so; it should be incorporated in the training of nurses in the hospital. Ward in charge and clinical instructor should arrange the clinical teaching for nurses and nursing students. Findings of the study will act as a catalyst to carry out more extensive research in a large sample and in other settings.

The present study was conducted on 60 patients in the medicine ward so similar study could be replicated on large sample to validate and generalize its findings in different settings. A comparative study can be done with heparin and normal saline and other methods can also be used for maintaining the patency of I.V. cannula.

### CONCLUSION

There are varieties of complications associated with the insertion and utilization of venous access devices such as thrombosis, thrombophlebitis, extravasations, infiltration and pulmonary embolism .The intervention of Normal Saline Lock is effective in maintaining the patency of I.V. cannula in experimental group. There was no significant association between the patency and socio-demographic & clinical variables.

### LIMITATIONS

In this, convenient sampling was used for random assignment of subjects and single setting was used for data collection. The patients who are on anticoagulant medications and on continuous fluids were excluded from the study.

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