



“A Study To Evaluate The Effectiveness Of Normal Saline Flushing To Maintain The Patency Of Peripheral Venous Catheter Among Intravenous Cannulated Patients Admitted At Era Hospital, Lucknow.”

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ABSTRACT

Aims & objectives: To evaluate the effectiveness of normal saline flushing to maintain the patency of peripheral venous catheter among intravenous cannulated patients.

Methodology: The study was conducted using quantitative research approach at Era Hospital, Lucknow. The samples were collected using Non Probability Convenience Sampling Technique and quasi experimental non randomized control group design was used in this study. The conceptual framework utilized in this study in this study was “WIEDENBACH” a **Helping Art of Clinical Nursing** (1964). A total of 40 samples were selected to be a part of this study. Before conducting the study written consent was obtained from the participants keeping in mind all the ethics, rules and regulations of the study. The tool used for data collection was a questionnaire on Clinical Variables of I.V. Cannula was prepared and standard tool Visual Infusion Phlebitis Scale. The tool 3 parts in it. The first part consisted of 4 demographic variables questions to obtain a baseline data of every individual participating in the study. The second part of tool consisted of Clinical Variables of IV Cannula: It was prepared by researcher which consists of 8 items to measure clinical data of subjects. And the third part of tool consisted of Visual infusion phlebitis scale is a standard tool for monitoring infusion site. This scale was evaluated in study by Gallant and Schultz. The tool consists of 6 items ranging from 0-5. The data was collected by administering the tool to the samples after providing intervention to intravenous cannulated patients for 3 consecutive days. The data was analysed using SPSS package. The researcher found there is no association found between patency with selected clinical variables in experimental group and control group.

Result: The Quasi- experimental with post test only control group design was used. Forty subjects who were newly cannulated and have B.D IV medication were included in the study in which 20 subjects were selected as experimental and control group each subjects in experimental group had given normal saline flushing. The socio- demographic and clinical data of the patient was collected. The patency of IV cannula was assessed by the standardized tool Visual Infusion Phlebitis (VIP) scale in both groups. It was developed by Andrew Jackson, consultant nurse and scale was evaluated in the study by Gallant and Schultz. Descriptive statistics, chi-square were used to analyze the data.

Discussions: The findings of the study are discussed under the following headings:

- To assess the effectiveness of normal saline flushing by comparing the patency of peripheral venous catheter in experimental and control group.
- To find out the association between patency of peripheral venous catheter with selected clinical variables in experimental and control group.

Keywords- Normal Saline, Peripheral Venous Catheter, Intra Venous, Patency, Patients

INTRODUCTION

“Prepare and prevent, don't repair and repent.”

Intravenous therapy is the infusion of liquid substances directly into a vein. The word intravenous simply means within a vein¹. In modern practice upto 80% of hospitalized patients receive intravenous treatment. Intravenous therapy is a treatment that infuses fluids, medications, blood or blood products into a vein for treatment of a patient. Intravenous therapy is an effective and fast-acting way to administer fluid or medication treatment in an emergency situation, and for patients who are unable to take medications orally.

The complications of intravenous therapy include infiltration, extravasation, hypersensitivity, infection, air embolism, hematoma, phlebitis and thrombophlebitis. The complications can be minimized by the use of flushing.

Today the insertion and care of peripheral intravenous catheters is a routine task for nurses in the clinical setting. Flushing procedure is necessary before and after the administration of intravenous medications. The nurse who provides infusion therapy should have clinical knowledge and technical expertise. Clinical management of patients shall be established in organizational policies, procedures and practice, guidelines and shall be according to applicable standards of practice.

The Centre for Disease Control (CDC) recommends routine replacement of peripheral IV cannulas every 72 to 96 hours in adult patients to restrict the potential of developing phlebitis. Current guidelines from the United Kingdom and Australia recommend routine replacement of peripheral intravenous cannulas every 48-72 hours to prevent infusion phlebitis and rare but life threatening peripheral cannula related bacteraemia.

NEED FOR THE STUDY

In the study conducted by Kaur, Thakur, Kaur, & Bhalla, (2011), normal saline lock was found to be highly effective for maintaining patency of intra venous cannula. During the research practice in the clinical area, it was observed that patients with intermittent intravenous medication face difficulties due to loss of patency of intravenous cannula and it led to infiltration, redness, and edema, phlebitis and causes of pain. More over patients as well as the caregiver find difficulty due to frequent changing of intravenous cannula. This pointed out the importance and the need of maintaining the patency of intravenous cannula. Therefore, the researcher identified the need for conducting research regarding the topic:

OBJECTIVES OF THE STUDY:

- To assess the effectiveness of normal saline flushing by comparing the patency of peripheral venous catheter in experimental and control group.
- To find out the association between patency of peripheral venous catheter with selected clinical variables in experimental and control group.

OPERATIONAL DEFINITION

Evaluate- In this study evaluate refers to the assessment of peripheral venous catheter before and after normal saline flushing.

Effectiveness- In this study, effectiveness refers to the degree to which peripheral patency is maintained after normal saline flushing.

Normal saline- In this study, normal saline refers to sterile non-pyrogenic solution with concentration of 0.9gm of NaCl in 100ml.

Patency- In this study, patency refers to easy administration of medication to the patient without any pain, erythema, swelling, induration, palpable venous cord and inflammation of the cannulated site.

Intravenous catheter- In this study intravenous catheter refers to the catheter inserted into the vein for administering medicines as ordered by the physician for the therapeutic purpose.

Patients- In this study, patient refers to intravenous cannulated patients admitted at Era Hospital, Lucknow elderly hospitalized patient with age 20-60 years.

HYPOTHESIS

H₁-There will be significant difference in patency of peripheral venous catheter before and after saline flushing.

H₀-There will be no significant difference in patency of peripheral venous catheter before and after saline flushing.

REVIEW OF LITERATURE

Literature related to normal saline flushing

E. Varalakshmi , Usharani. S. (2018), Conducted a study to assess the effectiveness of Intermittent Flushing of Normal Saline to maintain a patency of intravenous cannulation among Hospitalized patient in Saveetha Medical College and Hospital. A Quasi-experimental study was conducted among 60 patient on intermittent intravenous medication, 30 each in experimental and control group who met the inclusive criteria. Purposive sampling technique was used for selecting the sample. Data were collected from the subject using patency checklist. From the first day of intravenous cannulation, normal saline flushing with 2ml of normal saline was administered intermittently twice daily after administering intravenous medication for 72 hours to experimental group and no saline flushing given to control group. The findings revealed that in the experimental group, after the intervention of saline flushing, (96.6%) patients had patent intravenous cannula for 72 hours. There was a significant difference in the patency status of intravenous cannula between the experimental and control group ($t = 2.278$ at 0.05 level of significance).

Literature related to maintaining the patency of peripheral venous catheter

Eastwood Jacqueline et al. (2019), Conducted a study on Maintaining Patency of Central Venous Catheters in Adults. The meta-analysis found very low-quality evidence to suggest that heparin resulted in fewer CVC occlusions (RR 0.7 [95%CI 0.51 to 0.95], ten studies, 1672 participants). The Committee noted that using heparinised saline has a number of disadvantages over sodium chloride 0.9% in this indication. Notably, there is an increased demand on aseptic services already under significant pressure and an increased cost (approximately £3 day for heparinised saline versus £1 per day for sodium chloride 0.9% injections). The provision of prefilled syringes of heparinised saline uses up aseptic capacity that could be used for other products. Using heparinised saline means exposure to an active medicine that may cause adverse effects such as allergy and bleeding complications. Good technique when flushing and locking a central venous catheter is important in order to maintain positive pressure and avoid backflow.

Literature related to intravenous cannulated patients

Singh Nandita et al. (2019), Conducted a study to Assessing and Flushing a Peripheral Intravenous Line. It is important to assess and maintain the IV catheter according to institutional policies and nursing standards of practice. The regular assessment of the insertion site and the surrounding areas for signs of complications is necessary to prevent IV catheter complications, including infiltration, phlebitis, infection, extravasation, or catheter dislodgement. Routine IV maintenance is equally important to preserve line patency and to reduce the risk of occlusion, thrombosis, and thrombophlebitis. According to the CDC, peripheral IV catheters (PIV) may be kept in place for as long as 96 h, with proper care and maintenance. This video demonstrates the assessment and maintenance of peripheral IV lines, including general considerations before initiating the procedure, assessing the injection site for associated complications, and maintaining catheter patency by flushing it with the normal saline solution.

DATA ANALYSIS AND INTERPRETATION

Analysis is the examination and evaluation of relevant information to select the best course of action from various alternatives systematic investigation to establish facts or principles and to collect information on a subject, to carry out investigation into particular sequence. Analysis is the process of scrutinizing the data by placing it in categories and applying the statistical procedures:

The analyzed data was organized according to objectives and presented under the following major headings:

Section 1 (A): Findings on demographic characteristics of the subjects.

Frequency and percentage distribution of demographic variables in experimental and control groups.

Section I (B)

Clinical variables of IV cannula

Section II

Visual Infusion Phlebitis Scale

Table No : 1

Frequency and percentage distribution of demographic characteristics of subjects of Experimental Group

N=20

SL No.	Demographic Variables	Frequency Distribution	Frequency percentage (n%)
1	Age (in years)		
	20-30	04	20
	31-40	08	40
	41-50	06	30
2	Gender		
	Male	10	50
	Female	10	50
3	Previous hospitalization		
	Yes	04	20
	No	16	80
4	Duration of hospitalization		
	1-2 days	0	0
	3-4 days	06	30
	5-6 days	06	30
	More than 6 days	08	40

Table No : II

Frequency and percentage distribution of demographic characteristics of subjects of Control Group

N=20

SI No.	Demographic Variables	Frequency Distribution	Frequency Percentage (n%)
1	Age (in years)		
	20-30	04	20
	31-40	06	30
	41-50	04	20
2	Gender		
	Male	10	50
	Female	10	50
3	Previous hospitalization		
	Yes	06	30
	No	14	70

4	Duration of hospitalization		
	1-2 days	04	20
	3-4 days	06	30
	5-6 days	10	50
	More than 6 days		

Table No: 3

Comparison of experimental and control group subjects with the patency of IV cannula on day 3 (N=40)

Patency	Experimental Group f (%)	Control Group f (%)	Chi -square	df	P
Patent	15 (37.5)	2 (5)	19.67	1	3.84
Non-patent	5 (12.5)	18 (45)			

S= Significant at p value <0.05

Table No : 4

Association of patency with selected clinical variables in experimental group. (N=20)

SL No.	Clinical Variables	Patent f (%)	Non-patent f (%)	Chi Square Value	Df	p
1.	Location of IV cannula			6.667	2	5.99 * S
	Dorsum of hand	5 (25)	5 (25)			
	Inner aspect of forearm	3 (15)	0 (0)			
	Outer aspect of forearm	0 (0)	0 (0)			
	Lateral aspect	7 (35)	0 (0)			
2	Size of IV cannula			.a	-	-
	16 G	0 (0)	0 (0)			
	18 G	0 (0)	0 (0)			
	20 G	15 (75)	5 (25)			
	22 G	0 (0)	0 (0)			
3	Types of IV fluid					

	Isotonic	8 (40)	2 (10)	0.800	3	7.82
	Hypotonic	3 (15)	1 (5)			**
	Hypertonic	1 (5)	1 (5)			NS
	Intravenous infusion drug	3 (15)	1 (5)			
4	Frequency of medication					
	Once daily	0 (0)	0 (0)	.a	-	-
	Twice a day	0 (0)	0 (0)			
	Thrice a day	15 (75)	5 (25)			
	More than three times a day	0 (0)	0 (0)			
5	I.V cannula securement device					
	Leucoplast	0 (0)	0 (0)	.a	-	-
	Easy fix	15 (75)	5 (25)			
	Micropore	0 (0)	0 (0)			
	Tegadem	0 (0)	0 (0)			
6	Intravenous site care					
	None	15 (75)	5 (25)	.a	-	-
	Once a day	0 (0)	0 (0)			
	Twice a day	0 (0)	0 (0)			
	More than 2 times	0 (0)	0 (0)			
7	Type of drug administered					
	Antibiotics	12 (60)	4 (20)	.000 ^a	-	
	Analgesics	3 (15)	1 (5)			
	Corticosteroids	0 (0)	0 (0)			
	Inotropes	0 (0)	0 (0)			
8	Number of attempted in cannulazation					
	Once	13 (65)	5 (25)	0.741	1	3.84
	Twice	2 (10)	0 (0)			**
	More than 2 times	0 (0)	0 (0)			NS

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

S= Significant at p value <0.05

NS= Non-Significant at p value <0.05

Table No: 5

Association of patency with selected clinical variables in control group.
(N=20)

SL No.	Clinical Variables	Patent f (%)	Non- patent f (%)	Chi Square Value	Df	P
1	Location of IV cannula			0.952	2	5.99 NS
	Dorsum of hand	2 (10)	12 (60)			
	Inner aspect of forearm	0 (0)	2 (10)			
	Outer aspect of forearm	0 (0)	0 (0)			
	Lateral aspect	0 (0)	4 (20)			
2	Size of IV cannula			.a	-	-
	16 G	0 (0)	0 (0)			
	18 G	0 (0)	0 (0)			
	20 G	2 (10)	18 (90)			
	22 G	0 (0)	0 (0)			
3	Types of IV fluid			0.952	2	5.99 NS
	Isotonic	2 (10)	12 (60)			
	Hypotonic	0 (0)	4 (20)			
	Hypertonic	0 (0)	0 (0)			
	Intravenous infusion drug	0 (0)	2 (10)			
4	Frequency of medication			.a	-	-
	Once daily	0 (0)	0 (0)			
	Twice a day	0 (0)	0 (0)			
	Thrice a day	2 (10)	18 (90)			
	More than three times a day	0 (0)	0 (0)			
5	I.V cannula securement device			.a	-	-
	Leucoplast	0 (0)	0 (0)			
	Easy fix	2 (10)	18 (90)			
	Micropore	0 (0)	0 (0)			
	Tegaderm	0 (0)	0 (0)			
6	Intravenous site care			.a	-	-
	None	2 (10)	18 (90)			
	Once a day	0 (0)	0 (0)			
	Twice a day	0 (0)	0 (0)			
	More than 2 times	0 (0)	0 (0)			
7	Type of drug administered					

8.	Antibiotics	2 (10)	16 (80)	0.247	1	3.84
	Analgesics	0 (0)	2 (10)			NS
	Corticosteroids	0 (0)	0 (0)			
	Inotropes	0 (0)	0 (0)			
	Number of attempted in cannulazation					
	Once	2 (10)	10 (50)	1.481	1	3.84
	Twice	0 (0)	8 (40)			NS
	More than 2 times	0 (0)	0 (0)			

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

S= Significant at p value <0.05

NS= Non Significant at p value <0.05

SUMMARY

The researcher attempts to evaluate the effectiveness of normal saline flushing to maintain the patency of peripheral venous catheter among among intravenous cannulated patients patients in Era Hospital, Lucknow. The study made use of quantative research approach. The population in this study was patients admitted in Era Hospital, Lucknow. A convenient sampling was adopted to select 40 patients (20 patients in experimental group and 20 patients in control group) based on certain predetermined criteria. The data was collected using questionnaires on clinical variables of I.V cannula and the patency of IV cannula was assessed by the standardized tool visual infusion phlebitis (VIP) scale. The conceptual framework for the study was based on Weidenbach's Helping Art Clinical Nursing Theory. The goal was to maintain the patency of peripheral venous catheter. The standard scale visual infusion phlebitis scale was used. 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. The reliability of the scale was determined by inter- rater reliability method which was 0.86. The data obtained from the samples were analyzed and interpreted in terms of objectives and hypothesis of the study. Descriptive statistics(frequency, percentage) and inferential statistics (chi-square test) were used for data analysis, the level of significance was set at 0.05 levels.

CONCLUSION

“A study to evaluate the effectiveness of normal saline flushing to maintain the patency of peripheral venous catheter among intravenous cannulated patients admitted at Era Hospital, Lucknow,” conclude that there was a significant difference in the patency of peripheral venous catheter between the experimental and control groups.

IMPLICATIONS

The present study had several implications for nursing education, nursing practice, nursing administration and nursing research.

Nursing Education

- Findings of the study can be used by nursing educators to educate nursing students, which will help them to learn more about the importance of maintaining the patency of peripheral venous catheters in patients.
- While doing procedure demonstrations, teachers can focus on the correct technique of IV cannulation, proper injection technique and nursing care.

Nursing practice

- The findings of the study can be useful for staff nurses regarding saline flushing for patients with peripheral venous catheter.
- Nurses gain skill in maintaining the patency of peripheral venous catheter.
- The findings of the study can be useful in administering normal saline flush to maintain the patency of peripheral venous catheter, in order to avoid serious complications.
- Nurses understand the importance of saline lock in maintain the patency of peripheral venous catheter.
- Maintaining patency of peripheral venous catheter will result in better patient outcomes.

Nursing administration

Being a nurse administrator, one can instruct on all staff nurses regarding the principles to be followed for the procedure of IV cannulation, proper method of administering IV injections and nursing care. Also, In-service Education can be organized on the same.

Nursing research

- The essence of research is to build a body of knowledge in nursing as evolving profession. The findings of present study serve as basis for the professionals and the students to conduct further studies. The generalization of the study can be made by replications of the study.
- In India only a few research studies have been done on to find out the effectiveness of normal saline flushing in maintain the patency of peripheral venous catheter. Research on normal saline flushing in the peripheral venous catheter should involve interdisciplinary research teams and findings should be communicated through journals and other medias. Teachers can direct and motivate the nursing researchers so that they can conduct research in the same and different specialities and thereby professional independence can be achieved.

RECOMMENDATIONS

A similar study can be undertaken on the larger scale for better generalization.

A comparative study can be done with heparin and normal saline flush.

LIMITATIONS

Study is limited to the ERA Hospital at Lucknow. In this, convenient sampling was used for random assignment of subjects and single setting was used for data collection.

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