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Effectiveness of intermittent normal saline flushing in maintaining the patency of intravenous cannula

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Cover Page Footnote

The researchers acknowledge the contribution and the cooperation provided by the authority of the institution and the participants of the study.

Original article

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Abstract

Introduction: Blockage of intravenous cannula (IV) is one of the major discomforts faced by the patients. Nurses not only directly administer the medication to the patients but also experience the difficulty while administering the medication through non-patent IV cannula. It is one of the major roles of a nurse to maintain the patency of IV Cannula by just following a flushing technique. **Methods:** A Quasi-experimental study was conducted among 60 patients on intermittent intravenous medication, 30 each in experimental and control group who met the inclusion criteria. Purposive sampling technique was used for selecting the sample. Data were collected from the subjects 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 was given to the control group. The patency was observed twice daily for both the groups until 72 hours through the observational checklist. **Results**: The findings revealed that in the experimental group, after the intervention of saline flushing, (83.33%) patients had patent intravenous cannula for 72 hours. There was a significant difference in the patency status of intravenous cannula between the experimental and the control group ($t_{(58)}$ = 4.98 at 0.05 level of significance). There was statistically no significant association found between the patency of intravenous cannula with the selected extraneous variables like type of medication, size of cannula and site of cannulation. **Conclusion:** It was concluded that normal saline flushing could be used in maintaining the patency of IV cannula.

Keywords: Intermittent Normal Saline Flushing, Patency, Intravenous Cannula, Patients

Introduction

According to Zingg & Pittet (2009), peripheral venous catheters (PVC) are the most frequently used invasive devices in the hospital and up to 70percent of patients require a peripheral venous line during their hospital stay.Babadi, Ghadiriyan, & Hosseini (2015),report that despite advances in the field of intravenous therapy, phlebitis is still a common complication of peripheral venous catheter. Finding an appropriate solution to prevent and reduce the incidence of this complication remains challenging. 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. Study reported the effectiveness of normal saline over heparin in catheter patency and its associated complications (Tuten & Gueldner , 1991). However, there is still a significant amount of ambiguity surrounding the issue because of heterogeneity in the studies and variability in clinical practice. 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

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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

1. To determine patency of intravenous cannula after intermittent normal saline flushing in experimental group.
2. To find out the association between patency of intravenous cannula with selected extraneous variables (type of medication, size of cannula, site of cannula).

Material and Methods

The research design chosen for this study was quasi-experimental. The study was conducted among patients on intermittent intravenous medication (twice daily) at DownTown hospital, Assam. The patients from the general medical and surgical wards were included in the study. The sample size was 60 (30 each in experimental and control Group respectively).Purposive sampling technique was used to select the samples. Patients with intermittent intravenous medication were included in the study and patients who were receiving continuous infusion and getting blood transfusion were excluded from the study. The method is represented as a consort flowchart in Figure 1.

Tools for data collection:

The following instruments were used for data collection:

Tool 1: Patency checklist was used for assessing the patency status of intravenous cannula. It had two sections. *Section A*: Consisted of seven criteria regarding patency of Intravenous cannula i.e., resistance, leaking, infiltrations, hardening of tissue, erythema at the access site, any other change of colour and pain. The scoring was: Yes-0 Score, No-1 Score: Maximum score=7, Minimum score =0.Presence of any criteria indicated that the cannula was not patent.

Section B: Consisted of three criteria regarding i.e., types of medication, size of cannula and site of cannulation

Tool 2: Pain scale (the Pain scale used was Universal Pain Assessment Tool)

*No separate tool was used for demographic data.

To determine the content validity, the draft of the tool along with the criteria checklist was submitted to five experts and there was 80-100 percent agreement on all items.Reliability of the tool was established using inter-observer method and the reliability was found to be 0.95.Hence, the tool was found to be highly reliable for the study.

Procedure for data collection

Prior to the data collection, ethical committee of Assam Down Town University, Panikhaiti, Assam approved the study and permission was obtained from the Executive Director of DownTown Hospital, Guwahati. Data were collected from the patients after taking informed consent. From the first day of intravenous cannulation, normal saline flushing with 2ml of normal saline was administered intermittently twice daily after administering intravenous medication twice daily for 72 hours to experimental group whereas in the control group, the intravenous drugs were given as routine and no saline flushing. The patency status of IV Cannula was observed twice daily for both the groups until 72 hours through the observational checklist.

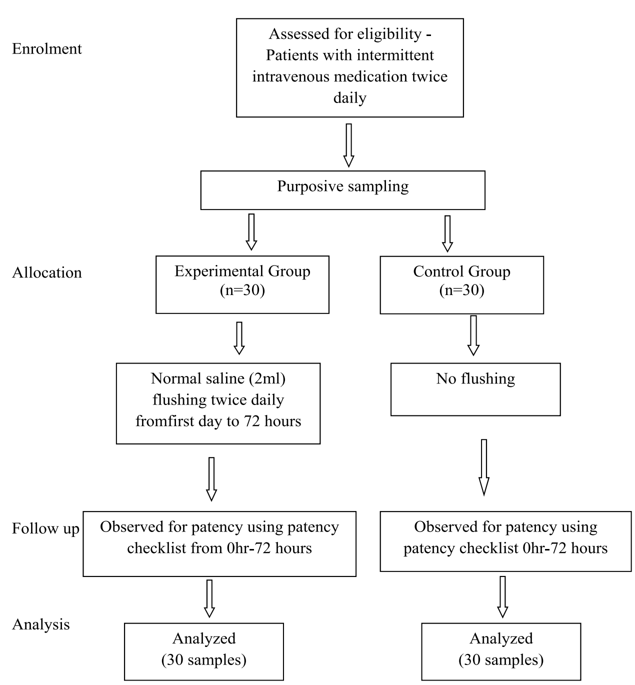

Figure 1. Consort flow chart

Results

Majority of the patients 22(73.33%) from experimental group and 23(76.67%) from control group were getting powder antibiotics. Most of the patients 18(60%) from experimental and 16 (53.33%) from control group were getting IV gastric acid inhibitors. Majority of the patients 21(70%) from experimental and 23(76.67%) from control group were not getting IV antiemetic. Majority of the patients 27(90%) from experimental and 25(83.33%) from control group were not getting any other intravenous medication. Majority of the patients 25(83.33%) from experimental and 22(73.33%) from control group were using 20G cannula. From the experimental group 16(53.33%) and 15(50%)from the control group were having intravenous cannula at dorsal surface of the hand, and 14(46.67%) from the experimental group and 15(50%) from the control group were having intravenous cannula at the inner arm.

Majority of the patients 25(83.33%) in the experimental group was having patent intravenous cannula for 72 hours and the intravenous cannula was patent in only 7(23.33%) in the control group as indicated in Figure2.

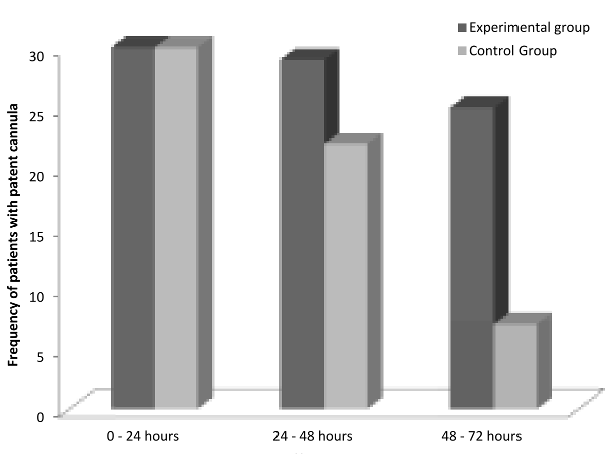

Figure 2. Bar diagram showing comparison of patients with "Patent" intravenous cannula according to the hours in experimental and control group.

Independent t-test was computed to find out the significant difference in the patency status of intravenous cannula between the experimental and control group. The details are presented in Table 1.

Table 1: Comparing the patency of intravenous cannula between experimental and control group for 72 hours (i.e. 6th observation). n = 60

Group	Sample	Mean	Standard deviation	Df	Independent "t" test
Experimental	30	6.23	1.94	58	4.98*
Control	30	3.07	2.876		

*Significant <0.05

Table 1 indicates that the mean of experimental group score 6.23 was higher than the mean of control group score 3.07. The calculated independent't' value ($t_{(58)}$ = 4.98 at 0.05 level of significance) was greater than the table value ($t_{(58)}$=2.00 at 0.05 level of significance) inferring that the intermittent normal saline was effective in maintaining the patency of intravenous cannula.

The association findings showed no significant association between the patency of intravenous cannula and the selected extraneous variables i.e., antibiotics, gastric acid inhibitors, antiemetic, any other intravenous medication, size of cannula and site of cannulation at 0.05 level of significance.

Discussion

The study intended to evaluate the effectiveness of intermittent normal saline flushing in maintaining the patency of intravenous cannula among patients on intermittent intravenous medication. The findings of the present study support the findings of Kaur, Sharma, & Jain, (2006) which revealed that the intermittent normal saline was effective in maintaining the patency of intravenous cannula. Sucheta, (2006) in her study found that both heparinized solution and non-heparinized solution were effective for the maintenance of patency of peripheral intracathline. The present study findings are further supported by the study conducted by (Babadi, Ghadiriyan, & Hosseini, 2015)where it was found that performing saline lock in the intervention group compared with the control group, which did not have saline lock, had significant impact in reducing the incidence of phlebitis .

The association findings of the present study showed no significant association between the patency of intravenous cannula with selected extraneous variables i.e., types of medication (antibiotics, gastric acid inhibitors and any other), size of cannula, site of cannulation. In a study conducted byWalsh, Toeg, & Mellor in 1991,it was reported that antibiotic was found to be associated with an increased rate of complications necessitating cannula removal even with the intermittent injection with heparin saline. The study finding contradicted the study findings of Kaur, Thakur, Kaur, & Bhalla, (2011) where it was found that there was significant relationship between the phlebitis and administration of antibiotics.

Conclusion

This study reported that intermittent normal saline flushing twice daily was effective in maintaining the patency of intravenous cannula and there was no association between the patency of intravenous cannula with the selected extraneous variables such as types of medication, size of cannula and site of cannulation.

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