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Efficacy of Topical Anesthesia Cream in Reducing the Pain Associated with Intravenous Cannulation

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Abstract: ***Pain is the unpleasant sensory and emotional experience associated with actual or potential tissue damage. Early pain experiences due to IV cannulation, may play a vital role in shaping an individual's pain response. Though, adequate pain relief during IV cannulation, using topical anesthetics is a growing practice as health care providers, striving for pain free and pleasant hospital stay for patients, in India its use has been limited, hence the researcher is interested to assess the effectiveness of topical anesthesia on pain experience among patients undergoing intravenous cannulation. From the results of the current study it could be concluded that, using the topical anesthesia Lidocaine before IV cannulation is effective in reducing the patient's pain, and develops no allergic reaction. The aim of this study is divided into two parts as to determine and compare the level of pain during intravenous cannulation among experimental and control groups and to associate their level of pain with the selected demographic variables among experimental and control group. Research design: Experimental design was adopted to conduct the current study where two groups pre-test post-test design was used. Tool: Collecting data among patients admitted in different multi-specialty hospitals in Tamilnadu. The investigator obtained the written permission from the authorities to conduct the study. For the experimental group five minutes before the first attempt of IV cannulation, Lidocaine cream was applied on the preferred site, and for the control group, without topical application of Lidocaine, the first IV cannulation was performed. The patients in both group were asked to rate their pain perception using the standard pain assessment scale rating from 0 to 10.The effectiveness of Lidocaine cream was compared by the pain scores between two groups. Conclusion:It could be concluded that, using the topical anesthesia Lidocaine before IV cannulation is effective in reducing the patient's pain, and develops no allergic reaction.***

Keywords: Topical Anesthesia Lidocaine Cream,Intravenous Cannulation, Pain

1. Introduction

Intravenous cannulation is one of the most common invasive procedure among patients admitted in hospital. (Salma et al, 2011). Lidocaine is used for treating pain, itching, soreness and discomfort of the skin or mucous membranes due to certain conditions such as eczema, scratches, minor burns, insect bites, and hemorrhoids. Lidocaine cream is an anesthetic, which works by preventing nerves from transmitting painful impulses to the brain. The Lidocaine/tetracaine cream, (Pilaglis, Galderma Laboratories, Texas, USA), one of the newer combination options, offers effective pain alleviation that has been evaluated in numerous clinical trials. This combination anesthetic is associated with a very favorable profile because of its ease of use and mild side effects compared to other topical local anesthetics. Case finding should be continuous process and not a "once and for all project" to identify the feasibility and impact of the intervention. Pushpamala.R.(2014)

Cannulation causes moderate or severe pain in a substantial number of children and adults. Some institutions have procedures for minimizing the predictable pain of cannulation. Any vein puncture including peripheral IV catheterization with a medium to large gauge catheter, can cause some degree of pain and anxiety.

The researcher wanted to significantly associate the difference in level of pain between experimental and control group, undergoing IV cannulation.

2. Aim

The aim of this study is divided into two parts:

1) To determine and compare the level of pain during intravenous cannulation among experimental and control groups.
2) To associate their level of pain with the selected demographic variables among experimental and control group.

The Clinical Question for this research was,Should hospital patients receive topical anesthetics prior to IV cannulation rather than no local anesthetics as a measure to reduce the pain? The hypothesis for the research question was there is a significant difference in the pain score between experimental and control group of patients, undergoing IV cannulation and there is a significant association between the level of pain, among the patients undergoing IV cannulation and the selected socio-demographic variables.

3. Research Design

Experimental design was adopted to conduct the current study where two groups pre-test post-test design was adopted. Patients, who require new Intravenous Line, understand using the tool on Pain scale, willing to

participate, and admitted in male and Female medical ward, with physician order, were included in this study. Patients who have IV line already in place, unable to perceive and respond to pain, not capable of understanding the tool, and unable to rate and express their pain level and with a history of lidocaine allergy who'd taken pain medication within the previous four hours were also excluded from the study. Independent variable was application of topic anesthetic creamand the dependent variable was the level of pain, where the Extraneous variables were Age, gender, religion, marital status, educational status, body built, size of cannula, previous exposure to IV cannulation, presence of pain due to any chronic diseases. The study was conducted among the patients at multispecialty hospital, DharmapuriDt. Tamilnadu. After obtaining the institutional review board approval, all subjects provided written informed consent prior to participation.

Sample: Subjects were selected using random sampling method through lottery technique, a total of sixty two patients were recruited, admitted in general ward, two of the subjects excluded from the study because they required more than one attempt at venipuncture, and multiple needle sticks are known to increase anxiety and may cause pain to be reported inaccurately. First time intravenous cannulation, of ages between 22 and 70 years were included. Thirty patients were randomly assigned into to experimental and thirty were assigned in control group.

Research Tool
It was organized in two sections as follows, 1. Socio-demographic variables, 2.Standardized pain assessment tool numeric rating scale.

Section A: It consist of ten items, which include age, gender, religion, marital status, education status, previous exposure to IV cannulation, size of cannula, site of cannula and presence of pain due to any chronic diseases. Section 2 is a Standardized pain assessment tool: Verbal Numeric rating scale. Reliability of the tool was estimated by using Test Re test method, which measures the co-efficient of internal consistency. It was calculated by karl pearsons corelation coefficient formula, calculated at .97. Content validity of the questionnaire was assured by a panel of 7 experts in the field of medical surgical nursing. Also, reliability was tested by Karl Pearson's correlation formula (r= 0.89, P=0.001).

4. Description of the Tool

Verbal Numeric Rating : The intensity of pain perception was measured with a modified verbal numeric rating scale in which, "0" represents no pain and 10 represents the worst pain imaginable, the pain score between 1-3, is interpreted as mild , 4-6 as moderate, 7-10 as severe.

Numeric	*Description*
0	Pain free
1	Very minor annoyance
2	Minor annoyance but discomforting
3	Annoying enough to be distracting but tolerable
4	Can be ignored if you really involved in your work, but still distracting.
5	Can't be ignored for more than 30 minutes, very distressing.
6	Can't be ignored for any length of time, intense pain.
7	Makes it difficult to concentrate, interferes with sleep, very intense pain.
8	Physical activity severely limited, nausea and dizziness may happen, utterly horrible pain.
9	Unable to speak, crying out of moaning uncontrollably, near delirium, excruciating, unbearable.
10	Unimaginable pain, unspeakable, pain makes to pass out.

5. Review of Literature

For decades, clinical researchers have recommended using intradermal lidocaine to reduce the discomfort of IV. Intradermal administration cause slight discomfort during the initial needle insertion, since un buffered lidocaine is acidic, buffering the lidocaine with sodium bicarbonate reduces this discomfort, with the drawback of Short shelf life and it causes pain.(Oluwatola Afolabi,2013)

It is also recommended that we apply it 45-60 minutes to take full effect, however some research has found that it can take partial effect and IV pain can be reduced in as little as 5 minutes. (Kris.A et al 2001). Lidocaine/tetracycline cream offers the advantages typical of many topical anesthetics, including fast, effective pain reduction. (Tina Alster,2013). The effect of topical anesthetic cream is also revealed by CampBellJones.V.(2010) where, the Wong-Baker pain rating scale was used to measure the amount of pain before intravenous cannulation, and findings from this study indicated that lidocaine and NSP provided equal anesthetic effects.

6. Intervention

The investigator obtained the written permission from the authorities to conduct the study. For the experimental group five minutes before the first attempt of IV cannulation, Lidocaine cream was applied on the preferred site, and for the control group, without topical application of Lidocaine, the first IV cannulation was performed. The patients in both group were asked to rate their pain perception using the standard pain assessment scale rating from 0 to 10.The effectiveness of Lidocaine cream was compared by the pain scores between two groups.

7. Results

Participants ranged in the age group between21 and 60 years. Among experimental group, 30% were between21-30 years, 26.7% were between 31-40, 10% were between 41-50 years, 20 % were between 51-60 yrs, and 13.3 % were 60 yrs and above. From Control group the age ranges from 21-30 (13.3%), from 31 to 40(20%), between 41 and 50 (23.3%), 51-60(26.7%) and 61-70 is 16.7%. Of the 60 respondents in Experimental group, the majority (70%) are moderately built, Thin built 23.3%, and obese 6.7%, and in the control group 13.33, 83.3, 3.3 respectively.

Findings also suggest that neither catheter size nor the site

had any remarkable effect on pain perception among two groups. Among the participants from Experimental group, the most commonly used site for cannulation was the cephalic vein (50%), basilic vein (16.7%), and dorsal Meta carpel vein (13.33%).

T test was applied to determine the effectiveness of topical anesthetic cream and Chi-square was utilized to find out the association between pain score with selected socio-demographic variables.The level of pain among Experimental group is as follows: Mild 93.3 %(28), Moderate- 6.7 %(2) and in Control group as follows: Mild-15(50%) Moderate 15(50%).The mean percentage of the pain score of experimental group was 23.3%, compared to the control group 35%, where the mean differences, statistically prove the effect of topical anesthesia. Findings of the current study also revealed that, there are no significant associations between their pain score and selected demographic variables. No patients developed any severe allergic reaction due to Lidocaine. The nurses and nursing students in order to enhance their knowledge and practice can use the teaching protocol as ready reference. (Pushpamala.R.2015)

8. Conclusion

From the results of the current study it could be concluded that, using the topical anesthesia Lidocaine before IV cannulation is effective in reducing the patient's pain, and develops no allergic reaction.

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