

Effect of Cold Application on Pain Relief during Intravenous Cannulation for Cancer Patients

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KEYWORDS

Intravenous
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ABSTRACT

Background: The cannulation of intravenous Analgesia is rarely experienced after this unpleasant procedure, which can also induce stress and worry.

Objective: The purpose of the study was to ascertain how cold affected the degree of pain during intravenous cannulation. **Methodology:** A randomized controlled trial was carried out at the oncology department of AL-Al-Haboubi Teaching Hospital in Dhi-Qar from January 4, 2024, until February 3, 2024. After the sample was selected, 102 patients were divided into two groups in order to achieve the study's objective: 50 patients were assigned to the control group and 52 patients to the experimental group. The experimental group was given cold gel, and self-report data collection was used. A visual analogue scale of 10 cm was used to measure pain.

Results: The experimental group's post-test results showed a low mean pain score (28.76+20.491), while the control group's data analysis results showed a high mean score (M+SD 76.54+20.427) and severe discomfort during cannulation insertion. The mean pain score during cannulation insertion varied significantly ($p=.001$) between the experimental and control groups following the use of cold treatment. **Conclusions:** According to the study's findings, the cool approach helped to lessen intravenous cannulation pain. **Recommendations:** The study advised patients to be chilled when receiving intravenous cannulation.

1. Introduction

Globally, the prevalence and death rates from cancer are rising quickly (1). By 2023, there would be 1,958,310 new instances of cancer and 609,820 cancer-related deaths in the US, according to estimates (2). Over the past ten years, the Middle East has seen a rise in the prevalence of cancer, particularly in Iraq (3). Chemotherapy and intravenous (IV) injections of antibiotics are essential parts of cancer treatment for patients, including those with blood cancers and solid tumors (4) IV therapy is a common treatment given by nurses in chemotherapy units; nevertheless, no matter the size of the cannula used, there was no discernible decrease in patients' sense of pain (6). Pain is the most commonly reported adverse impact linked to catheter use; more than half of patients requiring cannulation report experiencing both pain and anxiety. One could argue that because medication is given so regularly (7) because anxiety is a complicated emotion with both physical and mental components (8,9), adult patients' pain and anxiety are not given enough attention. Cancer patients typically have higher anxiety levels than persons with other illnesses (3,10). Nurses are essential in managing pain and reducing its severity (11–15).

Numerous pharmacological and non-pharmacological methods have been shown in the literature to be successful in minimizing discomfort during peripheral intravenous (PIV) procedures. Non-pharmacological methods are not frequently used in Iraq to treat injection-related pain (11). Non-pharmacological techniques that are simple to apply, economical, time-saving, and free of side effects are required to reduce discomfort during PIC (16). A cheap method of pain relief is ice therapy. It functions by obstructing or halting the transmission of pain impulses. The method most frequently employed in clinics is applying a cold pack made of non-toxic Gel. (17). The research was carried out as a clinical trial for patients having PIV cannulation. Its goal is to ascertain how patients' suffering during IV cannulation was impacted by the cold.

2. Methodology

When peripheral vein implantation was performed on cancer patients, a true experimental design—a randomized controlled trial—was used. It began in the oncology department of Al-Haboubi Teaching Hospital in Dhi-Qar city on January 3 and ended on February 3, 2024. The following criteria were used to choose the sample: patient with cancer in an oncology facility; patient aged 18 to 70; patient free of mental or communication impairments. Exclusion Criteria)Patients who had any breakage or abrasion, infection or break in the skin of the area where ice would be placed, nerve damage in the affected extremity, or known sensitivity to cold, such as Raynaud's illness or sickle cell disease, Patients with pre-existing discomfort (such as peripheral neuropathy, persistent pain, fractures above the placement site, etc.) were administered topical or parenteral analgesics within six hours of the procedure without the use of anesthesia or analgesics beforehand.

A sample of 102 patients receiving cannulation in an oncology facility was chosen using a basic random sampling technique. Sample study at (figure 1). Each of the two participants in the study is given a box containing four cards, two of which are numbered, which are the study participants, and two are unnumbered, which are those excluded from the study . Following their selection, the study participants also get two white envelopes, with a different color inside representing the study or control group. The control group is shown as red, and the control group is shown as yellow. 102 patients were divided into two groups at random. The instruments utilized to collect the data were the self-report and the VAS scale self-report, which were used after the intravenous cannulation procedure went well.

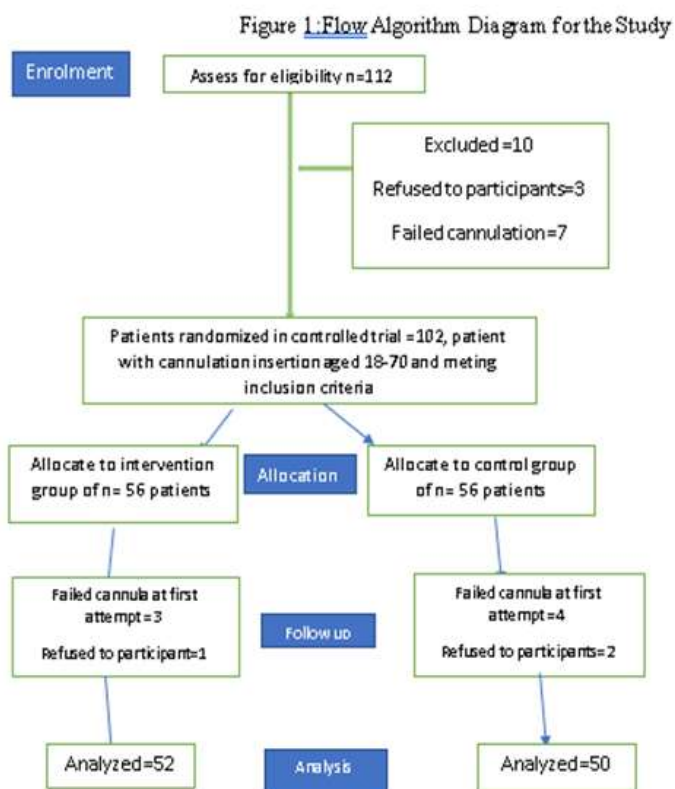


Figure 1: diagram of study sample

Visual Analogue Scale for Pain: The visual analog scale for pain is a widely used instrument for measuring pain using a method of assessment. The VAS has a good level of reliability (0.97), according to the ICC, for measuring acute pain. A 10-centimeter line is used by the VAS to represent pain intensity (19).

Intervention: Prior to application, make sure the ice is frozen. Tourniqueting the patient's wrist was done prior to the use of cannulation devices. As per usual procedure, we identified the appropriate vein

on the dorsum hand and sanitized the surrounding area with an alcohol swab. After that, we let it dry. To hold the ice on the wrist after application, tape was used. Ice was administered 3-5 centimeters proximal, or nearer to the body, 30-60 seconds before to cannula insertion, and it stayed there until the treatment was finished. Following a successful cannula insertion, the level of pain was assessed using the VAS. The patient indicated where they felt their level of discomfort in the experimental and control groups on the VAS line by pointing to that place. Employing stander care, control applied insertion without any hindrance.

Clinical trial registration: The IRCT code for the trial, which was entered into the Clinical Trial Register (75562), was 20230310057672N3. We followed all guidelines set forth by the World Medical Association's Declaration of Helsinki.

Ethical consideration: Every patient who took part in the oncology unit received an informed consent letter from the researcher in order to gain full authorization for inclusion in the current study. Additionally, they were made aware of their option to decline to answer any questions throughout the performance and to stop taking part in the study at any time. The study protocol was accepted by the ethics committee of Baghdad University's College of Nursing in Baghdad, Iraq (approval code: 22-11-2023).

Statistical analysis: For the information analysis, we used SPSS26.0. Both inferential and descriptive statistics (frequency, percentage, mean score, standard deviation, and Mann-Whitney U test) were used to examine the data.

3. Result and Discussion

(Table 1): Significant Difference in Pain with regard to Application of Cold Maneuver among Patients with Cancer

Groups	Pain					
	M.	SD	Mann-Whitney U	Z-score	p-value	Sig.
Control	76.54	20.427	89.000	-7.730	.001	H.S
Intervention	28.76	20.491				

M: Mean, SD: Standard deviation, p: Probability, Sig.: Significance, HS: High Significant

This table shows that the use of the cold maneuver is very helpful in reducing pain during cannulation insertion, as seen by the substantial difference in pain score reduction between the experimental group and the control group (p-value=.001).

Discussion:

The level of pain was reduced in experimental group when applied cold compared with control group at (Table 1). The finding agrees some research, Mostafa et al., reported that using an effective cold therapy can reduce pain during vaccinations (20) . Meha conducted a study in Punjab with 60 adult patients undergoing IV catheterization. According to the study, applying ice to patients receiving IV significantly reduced their level of pain (21).According to Karale and Satve, the study found that ice is an accessible, reasonably priced technique of pain management and that the experimental group's pain levels decreased during venipuncture (22). 50 Indian participants in all were divided into the experimental and control groups. In certain research, ice application was also used on youngsters, and it shown how well it relieved pain during invasive operations. Gaikwad et al., studying a total of sixty kids for two groups in India. The results of the study show that giving children ice therapy is a practical and useful way to reduce their discomfort while receiving IV treatments. (23) In a different study by Bastami et al. carried out in Iran, the 30 people in the control group received no treatment, whereas the 31 people in the experimental group received an ice pack prior to the artery being pierced. The VAS pain scores for the two groups differed statistically significantly at ($p < 0.05$). According to a study,

using a cold pack to reduce pain before an artery puncture is simple (24–26). Due to the small number of adult studies on the application of cold intravenous catheters, the current study (27, 28) has limitations. We conducted this controlled trial study because it is essential to raise the bar for nursing research, reduce patient suffering, and improve nursing practices—all of which are lacking in the nursing professions.

4. Conclusion and future scope

Since ice is inexpensive and simple to use, the present study suggests using a non-pharmacological method to reduce pain in the experimental group rather than the control group. Nursing staff was also advised to use cold applied ice for intravenous cannulation.

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