The Effects of Nursing Intervention on Pain Control during Chemoport Needle Insertion

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Abstract. The purpose of this study was to examine the effects of various anesthetic methods to the level of pain felt by cancer patients during Chemoport needle insertion. The anesthetics evaluated were a topically-applied anesthetic cream (Lidocaine Cream), cryotherapy, and cutaneous stimulation. This study was based on non-equivalent control group design. A total of 120 subjects participated in the study; 90 subjects were included in the experimental group (application of Lidocaine cream, cryotherapy, and cutaneous stimulation) while 30 subjects were included in the control group. The hypothesis was tested through one-way ANOVA, while Duncan’s Multiple Range Test was used for post-hoc comparison. Hypothesis I presumed that, “When the Chemoport needle is inserted to the patients, there will be a significant difference in pain scores between the experimental group (Lidocaine cream group, cryotherapy group, and cutaneous stimulation group) and control group (without anesthetics).” According to the results, the Hypothesis I was validated with the following results: subjective pain score: F=26.76, p<.000; and objective pain score: F=17.00, p<.000. With this result, a post-hoc assessment was made through Duncan’s Multiple Range Test. Based from the result, the pain scores (subjective and objective scores) were significantly lower than the scores derived from the control group. The patients’ level of pain decreased depending on the anesthetic method used according to this order or ranking: Lidocaine cream group, cryotherapy group, and cutaneous stimulation group. According to the results, all anesthetic methods (i.e., application of Lidocaine Cream, cryotherapy, and cutaneous stimulation) applied before Chemoport needle insertion were effective in reducing the patients’ level of pain. In summary, all of the three anesthetic methods evaluated in this study reduced the cancer patients’ level of pain during Chemoport needle insertion. Therefore, it is expected that the three intervention measures (application of Lidocaine Cream, cryotherapy, and cutaneous stimulation) can contribute to the effective management of pain and anxiety during Chemoport needle insertion in the clinical setting (but still depending on the particular subject and other hospital factors).

Keywords: Vascular access ports, pain, EMLA, cryotherapy, cutaneous stimulation
1 Introduction

Chemotherapy effectively treats cancer and helps extend the lives of patients. These patients submit themselves to chemotherapy not only once, but several times to complete the treatment cycle. Chemotherapy involves medical intervention through the veins; as such, there is an increased risk of phlebitis, flare phenomenon, and extravasation and the patients often experience extreme pain caused by needle insertion [1, 2]. Central venous access is mainly used when stimulating drugs or high concentration solution need to be administered, or when it is difficult to use the peripheral blood vessels for the administration of anticancer drugs [3]. The use of implantable central venous port has its advantages: wound dressing is not needed; the patients may continue with their daily activities; it has lower infection rate; and it can be easily managed [4]. Recently, the use of Chemoport, an implantable central venous port, has been promoted and supported by the National Health Insurance in Korea. Consequently, its application rate among cancer patients has increased.

Venipuncture, a painful and invasive treatment, is often performed by medical professionals. In the clinical setting, pain that accompanies injection or medical treatment is often generally underestimated since such pain is assumed to be temporary and a normal procedure during medical treatment. However, patients often undergo such pain and it may delay their recovery period. In terms of psychological perspective, the patients may feel aggravated pain as they associate a high level of pain experienced during injection. Particularly for cancer patients who receive chemotherapy, the Chemoport application site is punctured with a thick needle at every injection; thus, it is important for a nurse to reduce the accompanying pain accordingly.

However, in the real clinical setting, there has been no proper intervention provided to patients in order to reduce pain generated at the Chemoport application site. But due to increased attention on the matter, pain management has been highlighted as an important part of nursing intervention.

Among non-invasive intervention measures that aim to reduce pain generated by invasive treatment, several remedies may be applied such as topical analgesic ointments (eutectic mixture of local anesthetics: 2.5% lidocaine and 2.5% prilocaine), skin irritant, massage, cold and heat application, cognitive behavior approach, distraction, guided imagery therapy, relaxation therapy, and transcutaneous electrical nerve stimulation. These interventions have low risks or side-effects when applied as compared to other invasive approaches.

Regarding previous studies conducted on Chemoport needle, the one by Moon [5] reported that Lidocaine cream was more effective than cryotherapy in terms of pain alleviation. Seo [6] also reported that among pediatric cancer patients, Lidocaine cream was effective in reducing pain at Chemoport needle insertion sites.

In this study, the effects of cryotherapy, Lidocaine Cream application, and cutaneous stimulation were examined, particularly their effects on the pain and anxiety experienced by cancer patients who received regular chemotherapy through Chemoport. Moreover, the differences among intervention methods were verified.
2. Method

2.1 Design

This non-equivalent control group quasi-experimental study intended to examine the effectivity of anesthetic methods (i.e., Lidocaine Cream application, cryotherapy, and cutaneous stimulation) to pain and anxiety reduction among the cancer patients during Chemoport needle insertion. These patients were hospitalized in the ward of Hemato-Oncology Department of K General Hospital in Seoul. The research was conducted after obtaining approval of the Institutional Review Board of K General Hospital (KBC 13072).

2.2 Subjects

This study targeted 120 chronic cancer patients who received regular chemotherapy through hospitalization in the ward of Hemato-Oncology Department of K General Hospital located in Seoul. The sample size was determined by using G-Power based on α=0.05 of significance level, power=.80, and effective size=.80. Thus, the total sample size determined was 92 subjects and considering the drop-out rate of each group, the total number of subjects was decided as 120. For the three experimental groups, 30 subjects were allocated for each group (total of 90 subjects) while 30 subjects were assigned to the control group.

2.3 Procedure

The dependent variable was evaluated by measuring the pain level during Chemoport needle insertion while different interventions were applied (e.g., Lidocaine Cream, cryotherapy, and cutaneous stimulation). Three experimental groups were applied with Lidocaine Cream, cryotherapy, or cutaneous stimulation before Chemoport needle insertion. On the other hand, the control group did not receive any treatment during Chemoport needle insertion. Eventually, the pain levels experienced by the different groups were compared, and the most effective intervention measure was determined.

2.4 Instrument and Reliability

The patients’ pain levels were assessed using Numeric Rating Scale (NRS, developed by John, et. al [7]) and objective pain was examined by Pain Behavior Checklist developed by Park [8]. This checklist is composed of: 10 items on facial expression with score ranging from 0 to 4; 8 items on voice change with score ranging from 0 to 4; and 11 items on sweating with score ranging from 0 to 2. The score on objective pain ranges from 0 to 46 points. An assigned nurse per patient continuously observed and assessed each item of the instruments. The reliability of the instruments was Cronbach α=0.72.
2.5 Data Collection and Analysis

For data collection, the cancer patients who were hospitalized in the ward of Hemato-Oncology Department and who satisfied the criteria were considered as the target subjects. Only those who voluntarily consented to study participation after understanding the purpose of the study were taken into account and after collecting information on the potential subjects, the experimental and control groups were randomly selected by utilizing the table of random numbers. The data was analyzed by using IBM SPSS Statistics 20.0. The general characteristics of the experimental and control groups were analyzed through frequency, percentage, and standard deviation. Moreover, homogeneity was analyzed through Chi-square test while One-way ANOVA was implemented to assess pain and pre-homogeneity between the experimental and control groups for hypothesis testing. Lastly, Duncan’s Multiple Range Test was used for post-hoc analysis.

3 Result

In this study, there was no significant difference shown between the experimental and control groups in terms of the subjects’ general characteristics or disease-related factors. However, when an assessment was made on subjective pain scores (during Chemoport needle insertion) among the three experimental groups (Lidocaine cream group, cryotherapy group, and cutaneous stimulation group) and one control group, there was statistically significant difference among the four groups ($p<.001$). Similarly, there was statistically significant difference among the four groups in terms of the scores obtained regarding objective pain ($p<.001$).

4 Conclusion

This study aimed to determine the effective nursing intervention measure that can reduce pain and anxiety experienced by chemotherapy patients during Chemoport needle insertion. The intervention measures specifically assessed were Lidocaine Cream, cryotherapy, and cutaneous stimulation.

In summary, all of the three anesthetic methods evaluated in this study reduced the cancer patients’ level of pain during Chemoport needle insertion. Therefore, it is expected that the three intervention measures (application of Lidocaine Cream, cryotherapy, and cutaneous stimulation) can contribute to the effective management of pain and anxiety during Chemoport needle insertion in the clinical setting (but still depending on the particular subject and other hospital factors).
References