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Investigation of the effectiveness in the reduction of pain EMLA cream intramuscular cephalosporin in the application

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Abstract

Background: This was carried our as a quasi-experimental study to designate the effectiveness of "Emla cream" on patients taking I.M cephalosporin treatment. One the methods available for use in both children and adults before the painful procedures is to use a local anesthetic cream. Emla, a new tropical anesthetic cream, is a mix of two local anesthetics which are prilocaine and lidocaine. Use of this method preferred for relieving pain becomes widespread in recent years. Local administration, easy-to-use characteristics increase the interest to Emla.

The Aim is own study, intramuscular injection is one of the most painful invasive intervention. Because of this reason, the study was conducted to examine the effectiveness of emla cream in reducing pain related with intramuscular injection. Especially antibiotics that inject with sterile water are the most painful.

Method: This research was carried out on 60 patients in a public hospital located in an eastern province of Turkey between 2009 and 2010. "Emla cream" was administered to the experimental group 1 hour before the intramuscular injection. Control group patients on the other hand were not applied with anything other than routine nursing activities. By means of applying Visual Analogue Scale (VAS) Pain Assessment Scale to the patients in both groups, the researcher recorded the pain scores. To evaluate the data, percentage chi-square, average and t tests were used.

Results: As a consequence of the study with "Emla Cream", it was determined that the intramuscular injection pain of the patients in the experimental group was relieved but it wasn't statistically significant ($p>0.05$). It was also established that of the invasive procedures, intramuscular injection application hurt the patients the most and the patients would feel more secure if the nurse gave information about the drug and made some explanations and the patients considered the pain would be higher if the amount of drug increased.

Conclusion: It was determined that administration of Emla cream wasn't effective in relieving the pain for I.M cephalosporin application.

Introduction

Nursing is an occupation established on the philosophy of relieving the pain and the role of nurse in pain control is to assess the reasons, characteristics of the pain, the factors affecting the pain control and other relevant factors thereof [1]. The nurse ought to contribute to the relieving process of the patient, knowing the pain relief methods. Pain experience is a dynamic process and nurses are also ethically responsible for pain management and relieving the pain [2,3]. The objective of an effective pain management is not only to reduce the physical discomfort but also to shorten the period in the clinic and reduce the health care costs to minimum [4]. Because they are the closest personnel to the patients for communication in the health care process, nurses are known to have a key role in increasing the effectiveness of pain treatment and patient satisfaction. Intramuscular injection administration, one of the parenteral drug administrations, is performed to keep the pain under control, however almost all individuals have pain and discomfort during this administration. Intramuscular (IM) injection is a remarkably painful application which causes discomfort. Intramuscular injection is a method to administer the drug into the large muscle mass. While IM injection is very commonly used in the inpatient treatment institutions, it is also administered to the individuals having applied to primary healthcare for vaccination or outpatient care. Mainly the irritant drugs are administered in this way. Since the muscular layer has more blood vessels than the subcutaneous tissue, absorption is very quick. Moreover, it was determined that the majority of the appliers preferred dorsogluteal (DG) region for I.M injection. It is reported that cephalosporin group antibiotics among the drugs administered as I.M, I.M administrations were very painful and pain, redness and induration occurred on the injection region after the procedure. It was reported in the conducted researches that cephalosporin administered to the patients with distilled water hurt a lot and increased sensitivity was observed in the injection region. Moreover, it was determined that too much pain, induration and sensitivity were apparent in the patients administered with high dose of cephalosporin. The undesirable conditions such as pain, induration, sensitivity, and redness to occur in the post-injection region reduce the comfort of the pain and make it hard for the patient to comply with treatment. It was determined that these local complications were because of the administration duration

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of drug, amount of drug and non-compliance with the injection technique of the drug. Pain relieving solutions may be administered before the procedure in order to reduce the pain feeling which is one of the complications depending on the administration. Nurses must be careful about the complications to occur in the clinical use of the cephalosporin supported by evidences. Particularly regarding the pain to occur during the I.M injection application, it is critical to administer the drug into deep muscle mass, by means of using correct injection technique slowly. Another important point for intramuscular injection application is the amount of drug to be administered. The amount of drug for an adult is around 2.5-4 ml. Administration of 4 ml or below drug is expected to cause no too much pain or discomfort. Using higher amounts of drug makes the absorption harder and therefore increases the pain due to the pressure. Additionally, quick or slow administration of drug affects the pain. Recommended administration time for 1 ml drug is 10 seconds [5-10]. Quick administration of drug increases the level of pain. Correct positioning of the patient is important for the deepness of the muscle and for full injection of the drug. For I.M injection, selection of correct muscle group for the correct injection technique and conformity of the drug amount with the relevant muscle are critical. For the dorsogluteal region, the patient can be positioned face down or laterally, foots should be turned inwards for internal rotation of hip joint, and pollex must be looking at each other. If the patient has been positioned laterally, the upper leg must be put in front of the lower leg by bending through the hip and knee. Such positions allow the muscles get loose and let the people feel less pain. For the ventrogluteal region, the patient can be placed in supine position or laterally. If the patient is positioned face down, foots must be turned inwards, if he/she is positioned laterally, upper leg must be put in front of the lower leg by bending through the hip and knee, and the knees must be pushed towards the abdomen if patient is in supine position. It is very critical in I.M injection to find the correct region and select the correct muscle group for the correct injection technique, and compliance of the drug amount with the relevant muscle. Ventrogluteal region is a region which can be used in all ages. Dorsogluteal region is the most preferred I.M injection region. Since the region is located very close to sciatic nerve, it is important to determine the location of injection. World Health Association recommends the routine use of dorsagluteal region as the injection side [11-18].

To sum up the study aimed to examine the effectiveness of emla in reducing pain related with intramuscular injection.

Population and sample of research

The population of the research is 60 adult patients who were admitted to the Erzurum Atatürk University Süleyman Demirel Medical Faculty Yakutiye Hospital Internal Medicine Clinic and were applied to I.M cephalosporin. Ethical Board's approval was obtained during the planning of the research. The physicians and nurses in the internal medicine clinic were informed about the objective and method of the research in detail. Moreover, before the data collection, the patients were explained with the objectives of the study and the method to follow, their questions were answered and then patient's approval obtained. Since the answers must be given on voluntary basis, it was paid attention that the patients to be included in the research were the eager ones. The patients were informed about the application and application steps. In line with the permission of experimental group, before the I.M cephalosporin administration, local anesthetic Emla cream was administered. The half of the 5 gm cream in tubes (2.5 gm Emla cream) was put on the injection region and the region was covered with plastic bandage, after 1 hour, injection procedure was applied following the cleaning of the cream and skin antisepsis. 30 people in the experimental group were administered with Emla cream topically one hour before the injection. In the first 1 minute after the I.M injection application, pain level of patients was evaluated by applying VAS Visual Analogue Scale. The obtained VAS score value was recorded in patient identification form. For the reliability of the parametric tests, VAS scale was applied to the experimental group 2 times a day in the morning and evening and average of the measurement results was taken.

Statistical analyses

The data collected in accordance with the objective of the study were evaluated using the SPSS 11.5 statistics program on a computer. In statistical evaluation of the data, tests used and the parameters applied to are given below. Average, percentile and chi-square tests were utilized for the distribution of patients' identifying characteristics; chi-square was used for comparing the identifying characteristics between groups, and t test was used for comparing the pain scores. $P<0.05$ was considered statistically significant in the calculations.

Table 1. Average, percentage and chi-square tests were used for the identifying characteristics of the patients.

Identifying characteristics	**Experiment group**				**Control group**				**Total**	
Gender	**S**	**%**	**x^2**	**p**	**S**	**%**	**x^2**	**p**	**S**	**%**
Male	14	46.6	0.133	0,715	17	56.6	0.533	0.465	31	51.6
Female	16	53.3			13	43.3			29	48.3
Total	30	100			30	100			60	100
Identifying characteristics	**X**	**SS**			**X**	**SS**	**t**	**p**		
Age	46.5	18.4			38.6	19.8	1.602	0.115		
Kilogram	68.6	11.4			66.3	11.3	0.759	0.451		

Table 2. Distribution of some invasive procedures by groups considered to be painful by the patients.

	Experimental group				**Control group**			
	S	**%**	**x^2**	**p**	**S**	**%**	**x^2**	**p**
			33.6	0.000			43.7	0.000
Blood taking procedure	1	3.3			3	10.0		
Intramuscular injection application	18	60.0			20	66.7		
I.V catheter application	9	30.0			6	20.0		
Intravenous (I.V) drug administration	2	6.7			1	3.3		
Total	30	100.0			30	100.0		

Table 3. Distribution of Patients' Opinions on I.M Injection (S=60).

	Yes		No	
	S	%	S	%
If the nurse performs the injection slower,less pain will be felt	42	70	18	30
If the nurse gives information before the injection about whether it will be painful or not, I will feel more secure	48	80	12	20
If the amount of drug increases, then my pain will also increase	48	80	12	20
Pressure on or massaging the region after the injection application will reduce my pain	46	76.6	14	23.4

Table 4. Pain score averages between experimental and control groups.

Groups	Number	x	Ss
Experimental Group	30	64.0	5.506
Control Group	30	68.5	6.355

Findings

Based on the average age of Experimental and Control groups, the average age of the experimental group was designated as 46.5, average age of the control group was 38.6. No significant difference was determined between the age averages of both groups (P>0.05). Considering the weight averages of the groups, the weight average of experimental group was 68.6 while the weight average of control group was 66.3. Consequently, it was found that the experimental and control groups were similar with regards to weight and age averages (Tables 1 and 2).

According to this table, of the patients in experimental group; 3.3% stated blood taking procedure was very painful, 6.7% stated I.V drug administration was very painful, and 60% stated I.M injection application was very painful. On the other hand, while blood taking was very painful for 10%, I.M injection application was painful for 66.7%, I.V catheter application was painful for 20%, and I.V drug application was painful for 3% of the patients included in the control group. Consequently, it is apparent for both of the groups that I.M injection application was the most painful (Table 3).

70% of the patients in Table 3 indicated that the level of pain will be lesser if the nurse performs the intramuscular injection slowly. 80% of the patients stated they will feel more secure if the nurse gives information about the drug before the intramuscular application. And 80% of the patients in our study stated that the pain will be more if the amount of drug increases, while 76.6% told that pressure or massage applied on the injection region following the I.M injection application will reduce the level of pain (Table 4).

Given that the pain score averages between the experimental and control groups are compared, pain score average of the experimental group was found as 64 while the pain score average of control group was 68.5. Although the pain score average of the experimental group was lower than the control group, no statistically significant difference was designated between them (p>0.05).

Conclusion

Upon examining the distribution of the pain levels of some invasive procedures applied in the hospital by groups, invasive procedures hurt the most according to the patients can be seen in Table 2. It was apparent according to the patients that the application which is the most painful is intramuscular injection. According to literature, one of the complications of intramuscular injection application is extensive pain. Applications of injections that are not conforming to the technique such as patient being in the wrong position, identifying the injection region wrongly, not injecting right amount of drug appropriate for the muscle, injecting the drug fast, injecting the region that has tissue damage, tip of the needle being blunt, not choosing length of needle properly can cause pain to the individual. It is indicated in the literature that as a result of quick injection pain can occur due to the pressure on the tissue and stated how many milligrams of drug should be injected to which muscle. Overdose of the drug can increase the pain level. The more the amount of drug increases, the more the risk of injury for sciatic nerve and sense of pain increases. A slight pressure applied on the injection area prevents the drug from penetrating into subcutaneous tissue and also reduces the bleeding from the injection region, however not too much pressure should be applied onto the injection area. Gently rubbing the injection area helps both distribution of the drug and facilitates absorption, walking also helps absorption of the drug. In other sources, it is reported that post-injection massage causes additional tissue and vessel damages. As a result of the study, it was found out that information given before application relieves the patient remarkably and patient feels more secure. The procedures with possibility to cause pain should be applied gently and it must be orally told that the discomfort of the patient is acceptable. The patient should be well informed about the procedures to be applied, his/her questions should be answered. Regarding the score averages of the experimental and control groups, it is seen that the pain score average of the experimental group was lower than pain score average of the control group. This difference was not statistically significant (p>0.05). The reduction in the average pain score of the experimental group may stem from the pain-relief during the entry of the needle. In this case, it might be considered that Emla cream only has an effect on the superficial skin texture and no anesthetic effect on deeper muscle tissue. It is indicated in the prescribing information of the Emla cream that 60 minutes waiting period shows anesthetic effect up to 2 mm muscle deepness while 120 minutes waiting affects up to 4 mm muscle deepness. It is not wrong to say that the Emla cream reduces the pain occurring on the superficial skin texture, but it is not effective on the pain resulting from the drug's own characteristic.

We did wait 1 hour before the injection during our study. Therefore, the effect of anesthesia may not have reached to deeper muscle. It is a disadvantage for the cream to have a long waiting period and this situation creates a tiring situation for the patients.

The results were showed that emla is not more effective thanks. The other methods, hard to use, also waiting time is long, also nurses and patients think that it takes long time to apply.

As a results emla cream application is increase the workload of nurses and it can be suggested that more efficient methods must be found.

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