

## Research Article

# Effect of Ice Cube Application on Pain Perception and Ecchymosis of Patients with Cardiovascular Problems Prior to Giving Low Molecular Weight Heparin.

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## Background of the Study

Cold application is simple and inexpensive therapy which has been accepted for decades as an effective non-pharmacologic intervention for pain management (Todd A, 1995). It increases pain threshold, decreases the inflammatory reaction and spasm of the muscles (Swenson C, 1996). Various methods such as ice packs, ice towels, ice massage, Gel packs, refrigerated gases and inflatable splints can be used. Ice is the most widely used and efficient form of cryotherapy in medicine today (Sauls J, 1999).

The duration of ice application is shorter than that of heat, usually lasts for less than 15 minutes, however, it produces longer lasting effect, provided that the tissues are actually cooled. The vasoconstriction effect of therapeutic cold is beneficial for reducing post-traumatic swelling of pain and for reducing hemorrhage into the soft tissues (Karuna kara RG1999).

Cold is commonly used treatment in acute tissue injuries and has been shown to reduce pain effectively in the postoperative period after orthopedic surgery procedures (Solan JP, Matson, 1998). However, the evidence bases to support the common practice of superficial cold is limited and there is need for future higher quality randomized control trials.

Ecchymosis is a kind of injury, usually caused by injections (Balci A R, 2008), especially of low molecular weight heparin which inhibits platelet action and the side effect itself is bleeding and thrombocytopenia. In this capillary are damaged, allowing blood to seep into the surrounding tissue. After local trauma, red blood cells are phagocytosed and degraded by macrophages; the blue red colour is produced by enzymatic conversion of hemoglobin into bilirubin, which is more blue-green. The bilirubin is then converted into hemosiderin, a golden-brown color, which accounts for color changes of the bruise, and recognized, by their characteristic blue or purple colour, very large bruised area more than 1cm is called Ecchymosis, which does not become pale with pressure. They often induce pain but are not dangerous. However, Ecchymosis caused by antiplatelet and thrombin inhibitor injections can be serious and can lead to hematoma (Middleton C, 2003). Also swelling may be severe, which then including pain poses as a serious problem as well as also causes other severe damage.

Low molecular weight heparins (LMWH) have established their niche as an important class of antithrombotic compounds for prevention and Treatment of various Thromboembolism (Jeffery I, 1997). Low -molecular weight heparins have replaced unfractionated heparins (UFH) worldwide following the publication of the consensus for prevention and treatment of Thromboembolism by the National Institute for Clinical Excellence (NICE). LMWH is prepared from

UFH by controlled enzymatic or chemical depolymerization. It contains less than 18 saccharine units with molecular weight ranging from 3000 to 7000 Delton.

## Need of the Study

Subcutaneous low molecular weight heparins are frequently prescribed for the prevention of deep vein thrombosis and other cardiovascular conditions. One of the most commonly encountered adverse physiological responses to this intervention is the formation of hematomas at the injection site. This creates challenge for the nurses attempting to minimize hematoma formation and/or patient discomfort during the treatment regimen.

The subcutaneous administration of the anticoagulant low molecular weight heparin is frequently performed nursing intervention. Bruising (Bluish discoloration) occur after some times but not for all such injections, and for some not for all the patients. This has implications for nursing; not only patient experience the physical discomfort and the psychological impact of visible body trauma but bruising and indurations' limit the possible sites for future injections.

Subcutaneous heparin injection often causes problems such as bruise, pain, indurations and hematoma at injection site. Bruising that result from heparin injections may lead to anxiety, disruption of body image, the rejection of the treatment in patients, and the reduction of the reliance of patient.

As ecchymosis resulting from low molecular weight heparin (LMWH) reaches its peak at 48hrs & begins to resolve around 72hrs of injection. In order to comply with treatment modality, pain reduction & thereby providing physical and psychological comfort to the patients, it is therefore incumbent upon health care professional to be knowledgeable & sensitive towards adverse outcomes result from LMWH therapy and promote safety and comfort to the patients.

Although there are many actions performed to prevent this complication while administering injection, but researcher selected the cheapest, easily available, noninvasive, non-pharmacological

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object (ICE CUBE), thinking benefits of cold are numerous and she will be using ice cubes for control of pain and ecchymosis in patients receiving LMWH prior to giving injection. So that nurses can utilize knowledge & time for Evidence Based Practice.

**Statement of the Problem: Effect of ice cube application on pain perception and ecchymosis of patient with cardiovascular problems prior to giving low molecular weight heparin.**

**1.Objective of the study:** To assess and evaluate the levels of pain perception among experimental and control group of patients suffering with cardiovascular problems with or without application of ice cube prior to injection of heparin.

2.To assess and evaluate the Ecchymosis of experimental and control group of patients suffering with cardiovascular problems with or without application of ice cube prior to injection of Heparin.

3. To determine the association between levels of pain perception of patient suffering with cardiovascular problems with selected demographic variables among experimental and control group.

**The literature review for the present study has been organized under the following headings:**

1.cold application in reducing pain and Ecchymosis following subcutaneous injection of low molecular weight heparin and other injections

2.Techniques of subcutaneous injection.

3.Clinical uses of low molecular weight heparin.

**Methodology**

The study was conducted at safderjung Hospital, New Delhi, Purposive sampling technique was done from cardiology ward and CCU to obtain adequate samples. The sample comprises of 30 experimental group patients and 30 control group patients suffering with cardiovascular problem. the conceptual framework of this study is based on the system model proposed by Ludwig Von Bertalanffy in 1957. Quasi experimental research approach was adopted for the study with posttest only control group design.

**SYMBOLIC PRESENTATION OF THE RESEARCH DESIGN:**

One group as experimental group and other group as control group.

E X O1 (Experimental group)

C - O2 (Control group)

Key:

E = Experimental group.

C = Control group

X = Treatment with the application of ice cold Compress for three to five minutes.

O<sub>1</sub> = Observation of Experimental group for pain and Ecchymosis one time.

O<sub>2</sub> = Observation of control group for pain and Ecchymosis one time.

Schematic Representation of Research Design. Table 1

The independent variable for the study was the ice cube application for 3 mts. and the dependent variables are pain perception and Ecchymosis. The tools used for data collection were, Structured interview schedule for sample characteristics, Numerical rating scale

**Table 1**

Sample	Day-1			Day-3
Experimental group	Application of ice cold compress for 3 to 5 mts.	Injection of low molecular heparin at abdomen	Observation of pain perception immediately after withdrawing needle by using NRS (numerical rating scale)	Observation of Ecchymosis total surface area by transparent ruler scale after 48 hours.
Control group	_____	do	do	Do

**Table 2: Comparison of pain**

Group	Median(Range)	P-value
Experiment group	1(1-5)	0.0005
Control group	4(1-5)	

Figure 1

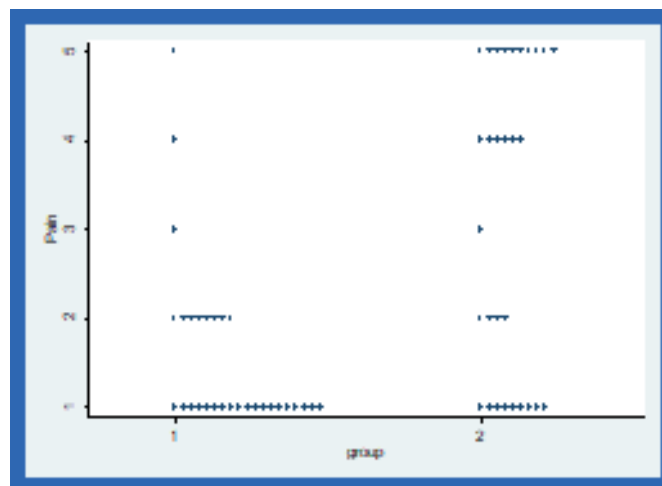


Figure 2

**Table 3: Frequency distribution of levels of pain perception among Experimental and control group**

Level of pain perception	Experimental group		Control group	
	Frequency	Percentage	Frequency	Percentage
Mild(1-3)	28	93.3 %	14	46.7 %
Moderate (4-6)	2	6.7 %	16	53.3 %

Figure 3

for pain for subjective assessment, Transparent ruler scale to measure the total surface area of Ecchymosis, and for treatment Ice cube in latex glove for giving cold compress. The data were collected from

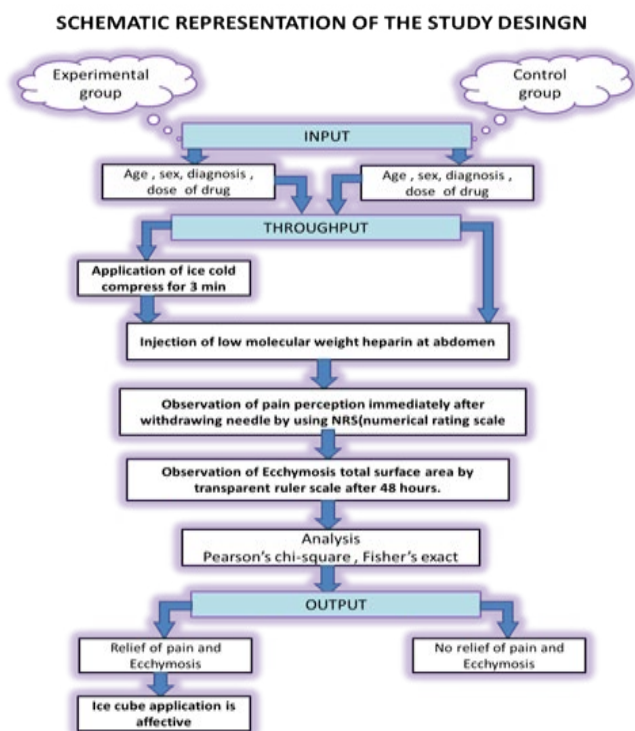
Ecchymosis	Experimental group	Control group	P value
Yes/No	n(%)	n(%)	
Yes	2(6.6)	4(13.3)	0.671#
NO	28(93.3)	26(86.6)	

Figure 4

SAMPLE CHARACTERISTICS	Experimental Group	Control Group	P-value
	n=30 n(%)	n=30 n(%)	
AGE			0.441*
<45	7(23.3)	6(20.0)	
45-55years	6(20.0)	7(23.3)	
55-65years	14(46.7)	10(33.3)	
65& above	3(10.0)	7(23.3)	
SEX			0.058*
Male	16( 53.3)	23(76.6)	
Female	14( 46.7 )	7(23.2)	
EDUCATIONAL STATUS			0.128#
Illiterate	12(40.0)	10(33.3)	
Primary school level	8(26.7)	3(10.0)	
Middle school level & above	10(33.3)	17(56.6)	
RELIGION			0.552*
Hindu	21(70.0)	24(80.0)	
Others	9(30.0)	6(20.0)	
DIAGNOSIS			0.787*
HT,CAD, MI	10(33.3)	11(36.7)	
	20(66.7)	19(63.3)	
DOSAGE			0.405*
40mg.	22(73.33)	19(63.3)	
60mg.	8(26.7)	11(36.7)	
DAY OF DOSAGE			1.000#
1-3day	28(93.3)	27(90.0)	
4-6day	2(6.7)	3(10.0)	

\*pearsonchi square  
#fishers exact

Figure 6



#fisher's exact

Figure 5

13th February to 29 February 2012. Subjects were asked to rate pain by showing the flash chart of standard pain rating scale immediately after the needle was withdrawn and Ecchymosis was observed 48hrs after the day of injection. The obtained difference between experimental and control group Ecchymosis score and pain perception score was found to be.

## Conclusion

Application of ice cube was effective for experimental group in reducing pain clinically and statistically in cardiovascular patients and decreasing the development of Ecchymosis clinically it is 6.6%, in experimental group 13.3% in control group but statistically it is nearer as it is done for small group.

Majority of patients felt relaxed due to decrease in pain by the technique of injection given by researcher as well as application of ice cube was accepted.

## Recommendations

- The study can be replicated on a larger sample for making generalization.
- Comparative study can be done to evaluate effectiveness of ice cube application prior and after giving subcutaneous injection of heparin on pain perception and prevention of ecchymosis.
- Comparative study can be done on effectiveness of cold application by using different modalities