Iranian Red Crescent Medical Journal

SHORT COMMUNICATION

The Effect of Heat Therapy on Labor Pain Severity and Delivery Outcome in Parturient Women

F Behmanesh[1,2]*, H pasha[2], M Zeinalzadeh[2]

[1]School of Midwifery and Nursing, Sari Islamic Azad University, Mazandaran, Iran,[2]Department of Obstetric and Gynecology, Babol University of Medical Sciences, Babol, Iran

Abstract

Background: Pain relief for labor, as an acute and severe pain, has been considered for many years. The aim of this study was to determine the effect of heat therapy on labor pain and the time of labor in primigravida women referring to the affiliated hospitals of Babol University of Medical Sciences during 2006-2007.

Methods: In this study, 64 nulliparous women were randomly divided into two groups (heat therapy and routine care group). The control group received routine care in the obstetrics ward but the heat therapy group used warm bag for the low back since the cervix dilated about 3-4 cm to the end of the first stage of labor and for perinea at the second stage as well as the routine cares. The severity of pain was determined on dilatation of 3-4, 6-7 and 9-10 cm and at the end of the second stage of labor by Mc Gill pain questionnaire.

Results: Comparison of the two groups showed a significant decrease in the intensity (severity) of pain in the heat therapy group in the first stage, and on dilatation of 6-7 cm and 9-10 cm, and in the second stage of labor. Also, in the heat therapy group duration of the first and third stages of labor decreased but that of the second stage of labor showed no significant difference between the two groups.

Conclusion: According to the results of this study, it seems that heat affects the intensity of pain in the first and second stages of labor and shortens the first and third stages of labor.

Keywords: Heat therapy; Labor; Pain; Parturient

Introduction

Pain is a common phenomenon and an inevitable part of childbirth process.[1] Labor pain is a complicated, personal, mental and multi-factorial phenomenon, affected by economic, social, cultural, biological and psychological factors.[2] Continuous labor pain affects respiratory system, blood circulation, endocrine glands and other activities of the body.[3] Effective control of labor pain like other acute pains is very important for health and society.[4]

One of the non-pharmaceutical methods for labor pain reduction is heat therapy. Using heat with various means during labor is simple, cheap and available, it does not need any previous skills, and if used appropriately, it will have few side effects. There are not many randomized controlled trials on using heat or cold for pain control during labor; however, their effect on other clinical situations has been studied.[5]

It seems that heat stimulates heat receptors of the skin and deeper tissues, and it may reduce pain, as proposed in gate control theory.[6] The other effect of heat therapy is probably shortening the duration of labor. Khamis and collegues showed that heat induces a significant increase in uterine activity without causing any abnormal fetal heart change.[7]

Now, because of the undefined effect of heat therapy on labor outcome, we tried to assess its effect on the mode of delivery, Apgar score of neonates, maternal bleeding, uterine contractility and the height of the fundus an hour after delivery. Up to now, there has been no recognized preference of labor pain for the mother and fetus, and there are some identified

***Correspondence:** Fereshteh Behmanesh, MSc, Instructor of College of Midwifery and Nursing, Sari Islamic Azad University, Mazandaran, Iran. Tel: +98-111-2234695, Fax: +98-111-2229591, e-mail: f24farzan@yahoo.com, f24farzan45@gmail.com

Received: June 10, 2008 Accepted: November 9, 2008

harmful effects for both of them, so it would be important to reduce or alleviate labor pain.[8] There are few studies conducted in other countries on heat therapy and also there is no study in Iran about this subject. On the other hand, using this method is easier than other methods like acupuncture, massage, TEN, hypnosis and acupressure and it does not need skilled individual. In addition, fear of labor pain has led to an increase in cesarean requisition in Iran,[9] so it is necessary that modern methods of painless delivery vogues in our country in order to avoid cesarean section and its side effects. This study tried to assess duration of labor stages in the heat therapy and routine control group.

Material and Methods

This clinical trial was performed on all 18-35 year old women referring to maternity hospital of Babol Medical University. Sixty four primiparous women entered the study and were randomly divided into two groups (32 women in heat therapy group and 32 in the control one). Inclusion criteria were age between 18-35 years old, being at the beginning of active phase of labor, gestational age between 37-41 weeks, single pregnancy, cephalic presentation of the fetus, and primiparous women. Exclusion criteria were any psychotic and diagnosed anatomic disorder, chronic diseases such as cardiopulmonary disease, diabetes mellitus, skin disease, any damage, inflammation and eczema in the heat therapy region, women with gestational hypertension, polyhydraminus and oligohydramimus known with sonography, women with fetal movement reduction, intrauterine growth retardation, fetal death, history of chronic pelvic pain, CPD, women with a history of infertility, and abnormal pattern of fetal heart rate. We selected the samples based on inclusion and exclusion criteria and assessed the cervix dilation by vaginal examination. Cases with dilatation of <3-4 centimeters were randomly allocated into two groups and after taking written consent we explained our technique and used rule pain for both groups. Before any intervention, pain severity was measured when the cervix dilated to 3-4 cm. In the heat therapy group after establishing a good sentimental relation with parturient, the investigator used a warm bag to heat the low back part of the parturient based on her consent. The minimal time for using warm bag in the first stage was 80 minutes. In the second labor stage, the investigator put the warm bag in the patients' perinea. The minimal time for warm bag in the perinea region was 5 minutes. Evaluation of pain severity in the first labor stage was done in cervical dilation of 3-4cm, 6-7 cm and 9-10cm, and evaluation of pain severity in the second stage of labor was done after delivery. We used Mc gill linear scale for evaluating and measuring pain severity.[10]

The control group only received routine care of labor and persistent attendance of the investigator and pain severity was measured just as that for the heat therapy group. The duration of the first, second and third labor stages was measured by a digital watch in both groups and the time interval between examinations for proper diagnosis was measured. Apgar score of the neonates was recorded at 1 and 5 minutes after birth. Other criteria such as maternal bleeding status, uterine contraction, and the height of the fundus were recorded by the investigator. SPSS software was used to analyze the data. The means in two groups were compared by t-test, and p-value less than .05 was considered significant.

Results

In this study, 64 primiparus women referring to Babol Medical University were selected. Most of the cases were 18-24 years old (67.2%) and were housekeepers (84.4%), having high school education (48.4%). The mean gestational age in both groups was 39-40 weeks. Our results showed that pain severity in cervical dilation 3-4 cm (before intervention) was the same in both groups. In cervical dilatation 6-7 cm (p=0.02) and dilatation 9-10cm (p=0.01), showing a significant difference between two groups, the mean of the pain severity in the first labor stage in the heat therapy and control groups was (8.14±0.99) and (8.88±1.02), respectively (p<0.001). A significant difference in pain severity in the first and second labor stages between the two groups was shown (Table 1). With regard to Tables 2-4, the findings showed that the mean duration of the first labor stage (p<0.001) and 3rd labor stage (p<0.001) differed significantly between the two groups, but in the 2nd labor stage, the mode of delivery, perineal tear, apgar score., and maternal bleeding status were similar in both groups and uterine contraction and the height of the fundus in the first hour after delivery had no significant difference between the two groups (p>.05).

Table 1: Mean pain severity in the 1st (after intervention) and 2nd labor stages and comparison between two groups.

Labor stage: group	Min	Max	Mean	Standard deviation	*p* value
First:					
Heat therapy	3	10	8.14	0.99	0.01
Control	3	10	8.88	1.20	
First:					
Heat therapy	5	10	8.25	1.39	<0.001
Control	4	10	9.65	1.99	

Table 2: Mean duration of the 1st labor stage in both groups.

Groups	Heat therapy		Control		Total	
mean duration of 1st stage	No.	Percent	No.	Percent	No.	Percent
<120	15	46.9	0	0	15	46.9
120-180	4	12.5	11	34.4	15	23.4
181-240	8	25	12	375	20	31.3
>240	5	15.6	9	281	14	21.9
Total	32	100	32	100	64	100
Mean		161.56		219.84		190.70
Standard deviation		73.97		50.63		69.40

Minimum: 80, Maximum: 330

Table 3: Mean duration of the 2nd labor stage in both groups.

Groups	Heat therapy		Control		Total	
mean duration of 2nd stage	No.	Percent	No.	Percent	No.	Percent
<20	4	12.6	1	3.2	5	7.8
20-35	19	59.4	18	56.2	37	57.8
36.50	8	25	11	34.4	19	29.7
>50	1	3.2	2	6.2	3	4.7
Total	32	100	32	100	64	100
Mean		30.21		34.06		32.14
Standard deviation		15.28		18.29		11.51

Minimum: 15, Maximum: 20

Table 4: Mean duration of the 3rd labor stage in both groups.

Groups	Heat therapy		Control		Total	
mean duration of 3nd stage	No.	Percent	No.	Percent	No.	Percent
<5	2	6.2	0	0	2	3.1
5-10	30	93.8	24	75	54	84.4
>20	0	0	8	25	8	12.5
Total	32	100	32	100	64	100
Mean		7.34		10.75		9.04
Standard deviation		2.40		3.36		3.37

Minimum: 4, Maximum: 20

Discussion

Our results showed that pain severity in the heat therapy group was less than that in the control group in the first and 2nd labor stages. Also, heat therapy caused reduction in labor pain. In 2006, Cluett studied the role of immersion in water in pregnancy and labor and showed that warm water immersion during

labor reduced labor pain.[11]

Geissbuhler *et al.* compared water birth with land birth and showed that the patients in water birth group needed less obstetrical analgesia and warm water caused pain reduction in 69% of the patients.[12] Similarly, Grodzka *et al.* showed that labor in warm water bath caused labor pain reduction in 76% of all cases.[13] Comparing the results of this study with those of others, we can conclude that heat therapy has some useful effects and the parturient feels less pain. Although the mentioned studies investigated the effect of immersion in warm water, the main point in all the surveys is warming the region or environment. So, we used these studies for comparing to our study. As to the duration of labor stages, our findings showed that the mean duration of the 1st and 3rd labor stages in the heat therapy group was shorter than that in the control group but the mean duration of the 2nd stage of the labor did not differ in both groups.

This is not in the same line with Ohlsson *et al.* [14] findings that showed there was no significant change between water birth and routine care groups during the first labor stage in primiparous women. However, Grodzka *et al.* and Cluett implied that warm water caused reduction in duration of labor stage.[13,15] Malarewicz *et al.* revealed that warm water had a profitable influence which is shortening the labor stages.[16] Khamis *et al.* studied the effect of local application of heat on the abdominal wall on the uterine activity in primiparous women and found that heat induced a significant increase without causing any abdominal fetal heart changes.[7] We used dry heat therapy in our study but we did not find a similar study, so we compare our study with those using wet heat therapy. The reasons for disagreement of our study results with those of other studies can be using oxytocin in the present study, racial differences, and warm water immersion in other studies as compared with dry heat therapy only in the perinea region in our study. Heat induces blood circulation in the uterine, affecting the force and severity of uterine muscle contraction.

Instrumental delivery had no significant difference between the two groups. As in our study, Ohlsson *et al.* and Eckert *et al.* showed no significant difference between their two groups in the mode of delivery.[14,17] We evaluated the frequency of perineal tear in the two groups and found that most of the cases had episiotomy (%93.8). Two cases in the heat therapy group and 2 in the control group had perineal tear grade I, the two groups being similar in this criterion. Leah studied that heat compression in the perinea region caused perineal tear grade II, III.[18] This difference may be due to the high prevalence of episiotomy in our study while 60 out of 64 women underwent episiotomy. This research reveals that heat therapy does not decrease perineal tear.

Comparing the apgar score at 1 and 5 minutes between the two groups, we found that the mean apgar score in 1 and 5 minutes was similar between the two groups. In a study in Finland (2005), the effect of heat stress on the uterine contraction, fetal heart rate, and fetal movement was researched, revealing that the fetal heart rate increased from 146 beats per minute to a maximum of 157 beats per minutes after thermal stress and the newborns were all in a good condition at delivery.[19] Our results indicated that heat therapy had no positive or negative effect on the neonate's apgar score.

Maternal bleeding status, uterine contraction and the height of the fundus an hour after delivery showed no difference between the two groups and most of the cases had normal uterine contractions an hour after delivery and the height of the fundus was under the umbilicus after delivery. Geissbuehler *et al.* showed that the mother's blood loss is the lowest in water birth.[12] Also, Malarewicz *et al.* indicated that immersion in warm water did not weaken uterine contraction.[16] As to our results, it was shown that bleeding did not differ between the two groups, and heat therapy with muscle relaxation does not cause inability in uterine contraction and abnormal bleeding after delivery. Probably heat therapy induces muscle relaxation, increases the mother's peace, induces endorphin release, and increases the internal oxytocin, causing uterine contraction and decreased bleeding after delivery. Finally, it seems necessary to say that these are just some theories of investigators from scientific texts but the real mechanism is not exactly clear.

As shown by the findings of our study, heat therapy with warm bag is very effective for pain during labor, reducing pain severity in the first and 2nd labor stages and the duration of 1st and 3rd labor stages. It is hoped that the results of the present research contribute to the improvement and promotion of the quality of obstetrical care.

Acknowledgment

We would like to thank all those who helped us in doing this research.

Conflict of interest: None declared.

References

1 Abushaikha L, Oweis A. Labour pain experience and intensity: a Jordanian perspective. *Int J Nurs Pract* 2005;**11**:33-8. [15610342] [doi:10.1111/j.1440-172X.2005.00496.x]

2 Fraser MD, Cooper AM. Myles text book for midwives. 4th edition. Edinburgh, Churchill living stone, 2003; p:343.

3 Loeser JD. Bonica managment of pain. Willkins, Lippincott co, 2001; p:1930.

4 Bonica J.Management of pain. 2th edition. Philadelphia, 2000; p:365.

5 Simkin P, Bolding A. Update on nonpharmacologic approaches to relieve labor pain and prevent suffering. *J Midwifery Womens Health* 2004;**49**:489-504. [15544978]

6 Habananda T. Non pharmacological pain relief in labour. *J Med Assoc Thai* 2004;**87**:194-202

7 Khamis Y, Shaala S, Damarawy H, Romia A, Toppozada M. Effect of heat on uterine contractions during normal labor. *Int J Gynecol Obstet* 1983;**21**:491-3. [6141112] [doi:10.1016/0020-7292(83)90041-3]

8 Naghibi KH, Allameh Z, Montazeri K. Painless delivery or c- section. Farda farhang, Isfahan, 2001;82.

9 Faridi Tazehkand N. Review of anesthesia and painless delivery in midwifery. Hayan- abasaleh, Tehran 2002;1.

10 Wall P, Melzack R. Text book of pain. 4th edition. Edinburg, Churchill living stone, 2000.

11 Cluett ER. Immertion in water in pregnancy, labour and birth. Cochrance Databace of Systematic Reviews. 2006; Issue 4.

12 Geissbuehler V, Stein S, Eberhard J. Waterbirths compared with landbirths: an observational study of nine years. *J Perinat Med* 2004; **32**:308-14. [15346814] [doi:10.1515/JPM.2004.057]

13 Grodzka M, Makowska P, Wielgoś M, Przyboś A, Chrostowska J, Marianowski L. Water birth in the parturients' estimation. *Ginekol Pol* 2001;**72**:1025-30. [11883203]

14 Ohlsson G, Buchhave P, Leanderssson U, Nordström L, Rydhström H, Sjölin I. Warm tub bathing during labor: maternal and neonatal effects. *Acta Obstet Gynecol Scand* 2001; **80**:311-4. [11264604] [doi:10.1034/j.1600-0412.2001.080004311.x]

15 Cluett ER. Immertion in water in pregnancy, labour and birth. Cochrance Databace of Systematic Reviews. 2006; Issue 4.

16 Malarewicz A, Wydrzynski G, Szymkiewicz J, Adamczyk-Gruszka O. The influence of water immersion on the course of first stage of parturition in primiparous women. *Med Wieku Rozwoj* 2005;**9**:773-80. [16733285]

18 Eckert K, Turnbull D, MacLennan A. Immersion in water in the first stage of labor: a randomized controlled trial. *Birth* 2001;**28**:84-93. [11380379] [doi:10.1046/j.1523-536X.2001.00084.x]

19 Albers LL, Sedler KD, Bedrick EJ, Teaf D, Peralta P. Midwifery care measures in the second stage of labor and reduction of genital tract trauma at birth: a randomized trial. *J Midwifery Womens Health* 2005; **50**:365-72. [16154062] [doi:10.1016/j.jmwh.2005.05.012]

20 Vähä-Eskeli K, Erkkola R. The effect of short-term heat stress on uterine contractility, fetal heart rate and fetal movements at late pregnancy. *Eur J Obstet Gynecol Reprod Biol* 1991; **38**:9-14. [1988331] [doi:10.1016/0028-2243(91)90200-5]