The Effect of Warm Compress Bistage Intervention on the Rate of Episiotomy, Perineal Trauma, and Postpartum Pain Intensity in Primiparous Women with Delayed Valsalva Maneuver Referring to the Selected Hospitals of Shiraz University of Medical Sciences in 2012-2013

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ABSTRACT

BACKGROUND: Genital trauma during vaginal delivery may result from episiotomy, spontaneous perineal tears (perineum, vagina), or both. In 2012, this study aimed to investigate the effect of warm compress bistage intervention on the rate of episiotomy, perineal trauma, and postpartum pain intensity in the primiparous woman with delayed Valsalva maneuver.

METHODS: In this randomized clinical trial, which was performed in hospitals in Shiraz, Iran, in 2012-2013, 150 women were randomly divided into 2 groups: 1 intervention and 1 control. The intervention group received warm compress bistage intervention at 7-cm and 10-cm dilatation and zero position during the first and second stages of labor for 15 to 20 minutes, whereas the control group received the hospitals’ routine care. After delivery, the prevalence of episiotomy; intact perineum; location, degree, and length of rupture; and postpartum pain intensity were assessed in the 2 groups.

RESULTS: The results revealed a significant difference between the intervention and control groups regarding the frequency of intact perinea (27% vs 6.7%) and the frequency of episiotomy (45% vs 90.70%). In addition, the frequency of the location of rupture ($P = .019$), mean length of episiotomy incision ($P = .02$), and mean intensity of pain the day after delivery ($P < .001$) were significantly lower in the intervention group compared with the control group. However, the rate of ruptures was higher in the intervention group.

CONCLUSIONS: Warm compress bistage intervention was effective in reducing episiotomies and the mean length of episiotomy incision, reducing pain after delivery, and increasing the rate of intact perineum. However, the rate of ruptures slightly increased in the intervention group compared with the control group.

KEYWORDS: warm compress, episiotomy, perineal trauma, postpartum pain intensity

INTRODUCTION

Routinely performed for 80 years, episiotomy is a procedure that is defined as cutting the perineal muscles; this is often performed in the second stage of labor to promote acceleration, improve maternal outcomes, and facilitate childbirth. Although the performances of episiotomy reduced between 1992 and 2003, it was performed in primiparous women up to the end of 1970s.$^{1-4}$

Since 1980, the rate of use of episiotomy during childbirth has decreased from 64% to less than 30%; however, during that same time, the repair of perineal lacerations during delivery has increased from 11% to greater than 40%.$^{5,6}$ In addition, 70% to 85% of women suffer from perineal pain following episiotomy.
and perineal tear, and 22% had pain for up to 8 weeks after delivery. Some pains were shown to last up to a year or longer.7

Some research results indicated that episiotomy had no effect on the reduction of perineal lacerations and could even result in a deep rupture. Therefore, prevention of episiotomy decreased the perineal trauma.3

In general, genital trauma is accompanied by various short- and long-term complications in women. Previous studies have shown that various complications, including rupture of the anal sphincter, urinary and fecal incontinence, rectovaginal fistula, perineal pain, dyspareunia, and increased bleeding, occurred after episiotomy.8–11 In addition, pain, blood loss, and the need for stitches presented just after delivery. Pain and discomfort, in turn, could disturb maternal-infantile interaction, sexual relationships, and the woman’s recovery after delivery.12

Studies have shown a high rate of episiotomy in many developed countries. In the past, this rate has been reported to be 62.5% in the United States, 80% in Argentina, and 30% in Europe.13,14 However, following a series of clinical changes in many obstetric units in America, the rate of vaginal deliveries with episiotomy, which was 60.9% in 1979, declined to 24.5% in 2004.15

Clinical trials conducted in the United States hospitals have revealed the use of episiotomy and nulliparity as the main risk factor for severe (third- or fourth-degree) perineal lacerations during delivery.16,17 Similar to other surgical incisions, episiotomy may lead to pain, bleeding, infection, damage to the rectal sphincter and mucosa, and more perineal pain and dyspareunia during the early postpartum period.18 Episiotomy has also been shown to increase the risk of posterior perineal trauma.19

Unpublished data from hospitals in Iran have shown the rate of episiotomy to be 39% among primiparous women, which is higher than the evidence-based recommendations for optimal patient care.20 Moreover, a previous study carried out in Iran demonstrated that episiotomy increased the risk of third- and fourth-degree perineal lacerations and their subsequent complications, including pain, dyspareunia, and incontinence. Therefore, episiotomy was not recommended in Iran.20

Evidence has indicated that the highest rate of pain during delivery was related to the second stage and was reported to be more intense than the pain felt by patients with cancer and arthritis.21 Because of the restriction in using medicinal analgesics such as pethidine during the second stage of labor, nonpharmacological methods should be utilized. For instance, perineal warm packs and warm compresses have been shown to reduce genital trauma and increase the woman’s comfort in the second stage of labor.22–25 A survey in 210 maternity units in England demonstrated that one-third of the deliveries were performed using perineal warm compresses.21

Because management and protection of the perineum are the main goals during vaginal delivery, and a limited number of studies have been conducted on thermotherapy and prevention of perineal damages in Iran, this study made use of warm packs in 7- to 8-cm and 10-cm dilatation. The researchers also controlled Valsalva maneuver, which is believed to be a major factor in the loss of perineal integrity. The present study aims to determine the effect of warm compress bistrate intervention on prevention of perineal trauma, postpartum pain intensity, and length of the first and second stages of delivery in primiparous women with delayed Valsalva maneuver referring to the selected hospitals of Shiraz University of Medical Sciences in 2012.

MATERIALS AND METHODS

After gaining the approval of the Ethics Committee of the Shiraz University of Medical Sciences, this randomized clinical trial was conducted in hospitals in Shiraz, Iran, from July 2012 to March 2013. Based on the study objectives, considering α = 5%, power of 80%, and effect size of 20%, the authors determined a .140-subject sample size (70 subjects in each group) for the study. However, considering the interventional nature of the study, repeated measurements, and loss rate of 10%, the authors increased the sample size to 150 subjects (75 in each group).

The study samples were selected from the women referring to Zeinabiyeh, Shoushtari, and Hafez Hospitals in Shiraz, Iran, for vaginal delivery using purposive sampling. These women were randomly divided into the warm compress bistrate intervention group and the control group.

The inclusion criteria were as follows: primiparous state, 18 to 35 years of age, gestational age of 37 to 42 weeks, singleton pregnancy, cephalic presentation, fetal weight between 2000 and 3500 g, insuffering pelvic stenosis and any other diseases, hemoglobin level of greater than or equal to 11 mg/dL, lack of any perineal or vaginal lesions, occiput anterior position, not having used local analgesia and analgesic methods, such as Entonox gas, and not having used perineal massage or other methods for preparing the perineum during pregnancy. Conversely, the exclusion criteria of the study were remaining in the second stage of labor for more than 2 hours, using forceps or vacuum, incidence of any event necessitating acceleration of delivery or cesarean delivery, such as detachment and meconium defecation, and making use of analgesic drugs or Entonox gas.

The study data were collected using a questionnaire including demographic, medical, and pregnancy-related information; an observation form including the information regarding labor stages, episiotomy, and ruptures; and the visual analog scale (VAS).

After the women’s hospitalization in the delivery unit, they were randomly allocated to the intervention and control groups. Then, the study objectives were explained to the participants, and written informed consents were obtained. In the intervention
group, the warm compress was used at 7-cm and 10-cm dilatation and zero position for 15 to 20 minutes. The intervention continued through the contractions. In the second stage, Valsalva maneuver was delayed until the pregnant woman felt spontaneous straining. Then, the warm compress was used in zero and lower positions. In doing so, the compress was removed from its package and put in a plastic bag. Then, it was put in a sterile dish containing 70°C water for 12 minutes. Afterward, the compress was wrapped in a sterile soft towel and put on the perineum for 15 to 20 minutes. It should be noted that the perineal area was frequently checked regarding the erythema, and in the case of excessive erythema, the compress was removed. The control group received only routine care, that being the routine Ritgen maneuver.

All the study samples gave birth to their children in lithotomy position. Delivery was performed by either a midwifery instructor or the midwives working in the delivery unit. Episiotomy was also performed based on the opinion of the instructor or the midwives. After delivery (the fourth stage), the researcher completed the study questionnaire, including information about episiotomy, intact perinea, and the location, degree, and length of laceration. Length of laceration and episiotomy incision were measured using a sterile tape meter. In order to reduce bias, the perineum, and the location, degree, and length of laceration.

Intensity of Pain After Delivery

The intensity of postpartum pain was determined using McGill’s VAS in both study groups. After describing VAS to the study participants, the participants were required to mark their intensity of pain in the first and second stages of labor. The VAS is a numerated ruler, which is interpreted as follows: 0 meaning no pain, 1 to 3 meaning mild pain, 4 to 6 meaning average pain, 7 to 9 meaning pain, and 10 meaning the most intense pain possible.

Because the intervention and delivery took place in the same location, the study could not be blinded. One of the limitations of this study was the presence of different opinions regarding the need for episiotomy and skills in perineal control. This was eliminated to some extent by holding an orientation session. Another study limitation was the difference among the pregnant women’s tissues, which was almost controlled by random allocation of the women into 2 groups. The pregnant women’s pain thresholds were also different, which was again controlled by randomly dividing the participants into 2 groups.

Ethical Considerations

This research project was approved by the local ethics committee of the Shiraz University of Medical Sciences, and written, informed consents were obtained from all of the participants. In addition, the control group was provided with the results after completion of the study (IRCT no. 2014051511706N7).

RESULTS

The results of the t test and \( x^2 \) test revealed no significant difference between the intervention and control groups regarding age (\( P = .89 \)), gestational age (\( P = .85 \)), and level of education (\( P = .09 \)). However, the results of Fisher exact test through the Monte Carlo method showed a significant difference between the intervention and control groups as to the frequency of intact perinea (27% vs 6.7%) and frequency of episiotomy (45% vs 90.70%) (\( P < .001 \)) (Table 2). In addition, an odds ratio analysis demonstrated by 95% confidence interval that the probability of intact perineum was higher in the warm compress group compared with the control group (Table 3). Moreover, a significant difference was found between the intervention and control groups with respect to the rate of first- and second-degree lacerations (19% vs 1.3%), as well as that of third- and fourth-degree lacerations (8.1% vs 1.3%). The results of Fisher exact test also revealed a significant difference between the 2 groups regarding the frequency of laceration location (\( P = .019 \)). In this respect, the highest frequency was related to the perineum and the posterior vaginal wall in both study groups (Table 3). The independent t test and Mann-Whitney U test

The present study), because of the short and stiff perineum, laceration grades 3 and 4 should be used to reduce episiotomy.

### Table 1. CLASSIFICATION OF PERINEAL TEARS

<table>
<thead>
<tr>
<th>Degree</th>
<th>Anatomical Lesion</th>
</tr>
</thead>
<tbody>
<tr>
<td>First-degree</td>
<td>First-degree tears occur where the fourchette and vaginal mucosa are damaged, and the underlying muscles are exposed, but not torn</td>
</tr>
<tr>
<td>Second-degree</td>
<td>Second-degree tears are to the posterior vaginal walls and perineal muscles, but the anal sphincter is intact</td>
</tr>
<tr>
<td>Third-degree</td>
<td>Third-degree tears extend to the anal sphincter that is torn, but the rectal mucosa is intact</td>
</tr>
<tr>
<td>Fourth-degree</td>
<td>Fourth-degree tears occur where the anal canal is opened, and the tear may spread to the rectum</td>
</tr>
</tbody>
</table>
were used to compare the 2 groups concerning the mean length of episiotomy incision. Accordingly, the mean length of episiotomy incision was lower in the intervention group in comparison with the control group ($P < .002$) (Table 4). Finally, the results of the $t$ test showed that the mean intensity of pain on the first day after delivery was significantly lower in the intervention group compared with the control group ($P < .001$).

**DISCUSSION**

Warm packs and compresses applied to the genitals are widely used by midwives in different countries to decrease genital trauma and increase the woman’s comfort during delivery.21 Also, controlled studies have not been done using heat or ice therapy during labor.30 Another aim of the present study was to compare outcomes with or without massage therapy because it generates heat, and thermal receptors in the skin and deep tissues are stimulated by heat, which may reduce pain (due to gate control theory), thus providing relaxation of the perineal area.31

The present study was the first clinical trial conducted on this issue in Iran. In this study, 68% of the participants (22.7% of the intervention group) underwent episiotomy. Among them, 16.7% had intact perinea, whereas 15.3% experienced different lacerations. The prevalence of episiotomy in this study was similar to that reported by Abraham et al32 (62%), but higher than the measure reported by the American College of Obstetricians and Gynecologists (33%).4,32 The results of the study by Albers33 showed no significant difference between the study groups regarding the rate of episiotomy.

In the current study, all the study participants underwent mediolateral episiotomy. By contrast, in Abraham et al32 study, 67% of the subjects underwent midline episiotomy, and the rest went through mediolateral episiotomy.

In the present study, the prevalence of episiotomy was significantly lower in the intervention group compared with the control group. The results of a meta-analysis (2 studies on 1525 women) indicated the considerable effects of warm compresses on reduction of lacerations and perineal trauma (relative risk, 0.48 [95% confidence interval, 0.28–0.84]).34 Other studies have also reported that midwives and accoucheurs utilized various techniques to decrease the rate of episiotomy, perineal trauma, genital trauma, and pain. However, no studies have mentioned the best and most effective technique for perineal control before delivery to reduce spontaneous lacerations; even after 3 months of follow-up, no difference was seen between the women who had or had not received massage therapy.5,6,33,35 Yet, physiology literature has indicated that using a perineal compress in the second stage of labor led to vasodilation, increased blood flow to the region, increased relaxation, increased muscle stretch (which is effective in pain transmission through reduction of nociceptive stimulation), an increase in collagen extensibility, and improving comfort for pregnant women.36,37

The findings of the present study revealed a significant difference between the 2 study groups regarding the frequency of intact perinea. Furthermore, the warm compress had a positive effect on reduction of lacerations. In contrast, Stamp et al5 stated that perineal massage during the second stage of labor had no effect on the rate of intact perinea. In the Labrecque et al58 study, antenatal perineal massage demonstrated a nonsignificant increase of the rate of intact perinea. The results of the study by Mei-dan et al39 also showed no significant difference between the study groups regarding the frequency of intact perinea.

<p>| Table 2. RESULTS OF ODDS RATIO ANALYSIS ON INTACT PERINEUM IN THE 2 GROUPS |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|</p>
<table>
<thead>
<tr>
<th>Perineum Status</th>
<th>Intervention n (%)</th>
<th>Nonintact Perineum n (%)</th>
<th>$P$ Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intact Perineum</td>
<td>20 (27)</td>
<td>54 (73)</td>
<td>&lt;.001 2.4</td>
</tr>
<tr>
<td>Not using warm compresses</td>
<td>5 (6.7)</td>
<td>70 (93.3)</td>
<td></td>
</tr>
</tbody>
</table>

<p>| Table 3. COMPARISON OF THE FREQUENCY OF LOCATION OF LACERATIONS IN THE 2 GROUPS |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|</p>
<table>
<thead>
<tr>
<th>Site of Rupture</th>
<th>2-Stage Intervention n (%)</th>
<th>Control n (%)</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posterior wall of the vagina and perineum</td>
<td>15 (20.3)</td>
<td>5 (6.7)</td>
<td>.019</td>
</tr>
<tr>
<td>Anterior (labia and clitoris)</td>
<td>5 (6.7)</td>
<td>2 (2.7)</td>
<td></td>
</tr>
<tr>
<td>With the posterior wall of the anterior portion</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td></td>
</tr>
<tr>
<td>No tear</td>
<td>54 (73)</td>
<td>68 (90.7)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>75 (100)</td>
<td>75 (100)</td>
<td></td>
</tr>
</tbody>
</table>

<p>| Table 4. COMPARISON OF THE MEAN LENGTH OF EPISIOTOMY INCISION IN THE 2 GROUPS |
|-----------------------------|-----------------------------|-----------------------------|--------------|</p>
<table>
<thead>
<tr>
<th>Variable</th>
<th>2-Stage Intervention Mean (SD)</th>
<th>Control Mean (SD)</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Episiotomy incision length</td>
<td>33.80 (8.77)</td>
<td>5.2 (1.4)</td>
<td>&lt;.002</td>
</tr>
<tr>
<td>Postpartum pain</td>
<td>0.62 (0.65)</td>
<td>1.16 (1.1)</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>
In the current study, the intensity of lacerations was significantly lower in the control group compared with the intervention group. Albers33 investigated 3 methods, namely, warm compresses, massage with lubricants, and no intervention until the crowning point on reduction of genital trauma during labor. The study results showed no significant difference among the 3 groups regarding the rate of first- and second-degree lacerations. Nonetheless, Beckmann and Garrett40 assessed the effect of perineal massage since the 34th week of gestation up to the beginning of labor on reduction of the prevalence of lacerations in Australia. According to those results, the frequency of episiotomy was lower in the perineal massage group, and a significant difference was observed between primiparous and multiparous women in this regard. Thus, the authors in that case concluded that perineal massage during pregnancy reduced perineal trauma, episiotomy, and perineal pain after delivery.40

In the study by Hastings-Tolsma et al.41 the rate of episiotomy was lower, but the rate of lacerations was higher in the lithotomy position after using oils or lubricants. The results of the 2 aforementioned studies were consistent with the current study. Several observational studies and trials have indicated that routine episiotomy led to an increase in anal sphincter rupture; on the other hand, episiotomy did not appear to protect against severe perineal lacerations.1-4,42 Moreover, some researchers rejected the idea that episiotomy was accompanied by less pain and better recovery in comparison to laceration.43

The results of the present study showed that the mean length of episiotomy an incision was lower in the intervention group compared with the control group. The research by Eogan et al.44 revealed that an increase in the episiotomy angle reduced the risk of third-degree laceration (anal sphincter trauma).44 Moreover, Verspyck et al.45 conducted a meta-analysis on the studies published on episiotomy incision from 1980 to 2005 and expressed that episiotomy with shorter incision and lower angle was used as a routine method. Inappropriate length, angle, and location of episiotomy not only increase such problems as perineal pain, anal sphincter injuries, dyspareunia, defecatory dysfunction, and wound healing complications, but also prevent achieving desirable outcomes.24

In this study, warm compresses reduced trauma and the intensity of the women’s pain after delivery. In general, warm compresses and massage with lubricants have been mentioned to have potential treatment effects, including vasodilation, increase in blood flow, tissue extensibility, muscle relaxation, and reduction of pain perception.37,46 However, 2 previous randomized studies indicated that warm compresses had no effects on the reduction of stitches in primiparous women.30,37

Albers et al.47 evaluated the effect of warm compresses, massage with lubricants, and no interventions on reduction of genital trauma in 1211 women in an educational hospital in New Mexico. The results showed no significant difference among the 3 groups regarding the intensity of genital trauma. This might be due to the fact that being nulliparous and the infant’s weight have been revealed to have an effect on perineal trauma.47 Race, ethnicity, and patient education may also play a role in this regard. Although these factors cannot be changed, attempts can be made to minimize genital trauma during vaginal delivery. Albers et al.33 reported a 34% reduction in perineal stitches due to performance of episiotomy or instrumental delivery.33 In addition, the 80% reduction in perineal stitches in the study by Dahlen et al.37 resulted from performance of episiotomy (11%) and utilization of vacuum (10%).37

Although warm compresses were effective in reducing the prevalence of episiotomy and increasing intact perinea, lacerations increased in the intervention group. In another study, perineal massage before labor decreased the rate of perineal stitches in primiparous women.40

Dahlen et al.37 conducted a randomized controlled trial in Australia to assess the effect of warm compress application in the second stage of labor on perineal outcomes in 717 primiparous women in 2 hospitals. The study participants were divided into an intervention (n = 360) and a control group (n = 357). In the intervention group, a midwife used a pad heated by warm water (38°C to 44°C) against the woman’s perineum from the beginning of perineal dilation up to the time of birth. If necessary, the pad was heated again during the second stage. According to the results, a warm compress was not effective in reducing the probability of rupture, and 80% of the women in both groups needed stitches. However, the women in the intervention group showed a 2-fold increase in the probability of anal rupture (8.7% vs 4.2%), severe pain at birth (31% vs 25%), and “the most intense pain in life” (51% vs 34%). Yet, they reported considerably less pain in the first 2 days after delivery. They also reported less urinary incontinence 3 months after delivery (9.7% vs 22.4%).

In the current study, the intervention group participants showed more flexibility and extensibility compared with those in the control group in the way that midwives used smaller incisions. Small incisions are accompanied by less bleeding and complications, confirming the long-term effects of warm compress application. Moreover, small incisions reduce pain, burn, and infection after delivery, eventually resulting in a faster ability to resume sexual relationships.48 Dahlen et al.37 also confirmed the long-term effects of warm compresses.

**Conclusions**

The present study findings revealed that warm compress bistage intervention increased the rate of intact perinea, reduced the rate of episiotomy and postpartum pain, and slightly increased the...
rate of lacerations. In addition, this method had no negative effects on delivery outcomes, including fetal health, instrumental delivery, and uterine contractions. Therefore, this method may increase women’s satisfaction and encourage them to select natural vaginal delivery. Thermotherapy is a simple, safe, effective, and inexpensive nonpharmacological analgesic method that does not require any specific skills. Therefore, it can play a key role in a woman’s satisfaction with the delivery experience.

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