Effect of Therapeutic Ultrasound and Maternal Cooling Gel Pad for Perineal Pain Following Vaginal Delivery with Episiotomy

Arati Mahishale1*, Ashwini Chougala1 and Shobhana Patted2

1Institute of Physiotherapy, KLE University, Belgaum, Karnataka, India
2Department of OBG, KLE University, Belgaum, Karnataka, India

Abstract

Background and objectives: About 70% of women suffer trauma with or without episiotomy to the perineum during vaginal delivery and this commonly causes pain and discomfort which may persist for months postpartum. The present study was aimed to evaluate the effectiveness of therapeutic ultrasound and cooling maternal gel pads for perineal pain following vaginal delivery.

Materials and methods: After obtaining ethical clearance from Institutional Ethical Committee, 30 women who underwent vaginal delivery with episiotomy and complained of perineal pain were recruited and randomly allocated to control (n=15) and interventional group (n=15). A written informed consent was signed by all the participants. Physiotherapy intervention included therapeutic ultrasound, cooling maternal gel pad for experimental group and placebo therapeutic ultrasound for control group twice daily for a period of 3 days. Outcome measures included Visual Analog Scale (VAS) for pain measurement and REEDA (Redness, Edema, Ecchymosis, Discharge, Approximation) scale for healing process, which were documented on 1st day pre intervention and 3rd day post intervention respectively.

Results: The results showed statistically significant reduction in VAS and REEDA scores in experimental groups with p=0.02.

Conclusion: Therapeutic ultrasound and maternal cooling gel pad proved to be effective in reducing perineal pain following vaginal delivery with episiotomy.

Keywords: Perineal pain; Therapeutic ultrasound; Maternal cooling gel pad; Episiotomy

Introduction

Pain in the perineal region after birth is mainly due to surgical incision termed as episiotomy or due to perineal tear [1]. Episiotomy at the time of vaginal delivery is a common surgical incision to the perineum in obstetrical procedure. It is done during second stage of labour. Approximately 33% women with the vaginal delivery had episiotomy by the year 2000 [2,3]. Episiotomy is more common with operative than spontaneous vaginal deliveries [4]. Perineal pain in the early postpartum period has been reported to be most common cause of maternal morbidity. The liberal use of episiotomy causes perineal damage and it may increases risk of incontinence and sexual discomfort. Pain following episiotomy appears to be universal. The mother undergoing episiotomy is characterized by greater blood loss with risk of improper wound healing and increased pain during early puerperium [5]. Pain and discomfort from perineal trauma can be a distressing experience of early motherhood and leads to discomfort when sitting, standing, walking and moving. The provision of safe and effective pain relief for perineal trauma using therapeutic ultrasound, rectal analgesia, oral analgesics, non-pharmacological application such as cooling gel pads are recommended but lack of evidences [6]. Therapeutic ultrasound and cooling maternal gel pad are said to be used in the first few days after vaginal delivery to reduce perineal pain. The mechanism by which therapeutic ultrasound may improve tissue repair and reduce pain have been reviewed by Dyson [7,8]. A few well conducted controlled trials of clinical efficacy of ultrasound have all been small and lacks evidence for its clinical implication on perineal pain.

Very limited research has been done to evaluate the effect of topical application and perineal cold gel pad as an alternative way of treatment for reduction of perineal pain [9]. Hence the present study was done to evaluate the combined effectiveness of therapeutic ultrasound and cooling maternal gel pad for perineal pain following vaginal delivery with episiotomy.

Material and Methods

Study design

The present study was designed as a randomized controlled trial aimed to find the effectiveness of therapeutic ultrasound and maternal cooling gel pad for perineal pain following vaginal delivery with episiotomy.

Source of data

Data was collected at K.L.E’s Dr. Prabhakar Kore Hospital and Medical Research Centre, Belgaum, Karnataka, India from September 2011 to November 2011.

Sampling design

Non probability/convenience sampling

Sample size: 30 (female) participants following vaginal delivery with episiotomy were recruited and randomly allocated to Group- A

*Corresponding author: Arati Mahishale, Assistant Professor, Institute of Physiotherapy, KLE University, Belgaum, Karnataka, India, E-mail: mphysioarati@yahoo.com
Received June 28, 2013; Accepted August 26, 2013; Published August 28, 2013
Copyright: © 2013 Mahishale A, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.
The lesser the score indicates better healing (Table 1). The REEDA Scale has a four point categorical score (0-3) representing no pain and 10 represents severe pain. The secondary scale to measure pain intensity. It consists of 10cm scale, where 0 represents no pain and 10 represents severe pain. The mean value of VAS after intervention in control group was 5.8 ± 1.7 with p value 0.56 and 3.2 ± 1.3 in experimental group. There was statistically significant difference seen in pain score after 3 days of intervention in experimental group with p value 0.02 (Table 2/Figure 1).

**Data analysis**

Data was entered in an electronic database and was analyzed using SPSS 16. Independent t-test was used to estimate the difference between the groups in each outcome. The significance level was set at p<0.05.

**Results**

30 participants were recruited for the study with 15 participants in experimental group and 15 in control group. There was no statistical significant difference in demographic characteristics of participants in both the groups; hence the baseline characteristics were well matched in the two groups.

**Pain score values**

The mean value of VAS before intervention was 6.7 ± 1.4 in control group and 7.2 ± 1.6 in experimental group. The mean value of VAS after intervention in control group was 5.8 ± 1.7 with p value 0.56 and 3.2 ± 1.3 in experimental group. There was statistically significant difference seen in pain score after 3 days of intervention in experimental group with p value 0.02 (Table 2/Figure 1).

**REAEDA score values**

The mean value of redness was 1.63 ± 0.781, edema 1.38 ± 0.48, ecchymosis 0.78 ± 0.96, discharge 0.24 ± 0.31, approximation 1.47 ± 0.26 before intervention in control group and the mean value of redness 1.8 ± 0.71, edema 1.46 ± 0.56, ecchymosis 0.5 ± 0.83, discharge 0.3 ± 0.42 and approximation 1.61 ± 0.34 experimental group (Table 3). There was no statistically significant difference detected in redness, ecchymosis, edema, discharge and approximation before intervention in both the groups. After 3 days of intervention, the mean value of redness 1.49 ± 0.67, edema 0.89 ± 0.53, ecchymosis 0.62 ± 0.71, discharge 0.31 ± 0.33 and approximation 1.13 ± 0.55 were noted in control group (Table 4/Figure 2) and 0.62 ± 0.55 in redness, 0.37 ± 0.41 in edema, 0.09 ± 0.26 in ecchymosis, 0.34 ± 0.48 in discharge and 0.53 ± 0.44 in approximation were noted in experimental group (Figure 3). There was statistically significant difference seen in redness, edema, ecchymosis and approximation after 3 days of intervention in experimental group and there was no difference was seen in the component of discharge between the two groups.

**Discussion**

Postpartum perineal pain is so common that alternative strategies can be readily compared in randomized controlled trials [4]. There is little formal research on the treatment of perineal pain following vaginal delivery. Perineal pain is managed with oral analgesics, local

<table>
<thead>
<tr>
<th>Points</th>
<th>Redness</th>
<th>Edema</th>
<th>Ecchymosis</th>
<th>Discharge</th>
<th>Approximation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>Closed</td>
</tr>
<tr>
<td>1</td>
<td>Within 0.25 cm of incision bilaterally</td>
<td>Less than 1 cm from incision</td>
<td>Within 0.25 cm bilaterally or 0.5 cm Unilaterally</td>
<td>Serum</td>
<td>Skin separation 3 mm or less</td>
</tr>
<tr>
<td>2</td>
<td>Beyond 0.5 cm of incision bilaterally</td>
<td>1-2 cm from incision</td>
<td>0.25-1 cm bilaterally or 0.5-2cm unilaterally</td>
<td>Serosanguineous</td>
<td>Skin and subcutaneous fat separation</td>
</tr>
<tr>
<td>3</td>
<td>Beyond 0.5 cm of incision bilaterally</td>
<td>Greater than 2 cm from incision</td>
<td>Greater than 1 cm bilaterally or 2 cm unilaterally</td>
<td>Bloody, purulent</td>
<td>Skin and subcutaneous fat and fascial separation</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Reeda scale.

<table>
<thead>
<tr>
<th>Groups</th>
<th>VAS(pre intervention)</th>
<th>VAS(post intervention)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (Group A)</td>
<td>6.7 ±1.4</td>
<td>5.8 ± 1.7</td>
<td>0.56</td>
</tr>
<tr>
<td>Experimental (Group B)</td>
<td>7.2 ± 1.6</td>
<td>3.2 ± 1.3</td>
<td>0.02</td>
</tr>
</tbody>
</table>

Table 2: Pain score on 1st day pre intervention and 3rd day post intervention.
application like gel pads, spray, creams, ice packs, cold bath, warm bath, aromatherapy, electromagnetic energy, therapeutic ultrasound but very few studies have been done to report the literature [13,14]. A randomized trial by Diane Ramler and Joyce Roberts on comparison of cold and warm sitz baths for relief of postpartum perineal pain concluded that cold sitz baths were more effective than icepack and epifoam [17]. Effectiveness of cooling gel pads and ice pack on perineal pain showed higher level of satisfaction with cooling gel pad group when compared with other groups and also showed reduced pain intensity and better wound healing process [17]. The present study result is consistent with the findings of the previous studies where the experimental group which received maternal cooling gel pads and therapeutic ultrasound showed statistically significant reduction in pain and increased healing process as noted by REEDA scale.

Specific studies for use of ultrasound for perineal pain reported only 4 randomized controlled studies [18-20]. Ultrasound consists of inaudible high frequency mechanical vibration created when electrical energy converted to acoustic energy through deformation of a piezoelectrical crystal in the transducer. The waves produced through the propagation of molecular collision and vibration [21]. Increased molecular motion produces microfriction between the molecules and heat generated from friction causes increase tissue permeability [22]. The therapeutic ultrasound acts as a reverse piezoelectric effect [23]. Grant et al. [10] compared the results of ultrasound with pulsed electromagnetic energy and sham treatment where ultrasound therapy showed improvement in a linear analog scale but was not statistically significant. A randomized placebo controlled trial where ultrasound therapy for persistent postnatal perineal pain and dyspareunia was used showed active therapeutic ultrasound and placebo therapeutic ultrasound both showed reduction in perineal pain, however the study

<table>
<thead>
<tr>
<th>Variables</th>
<th>Control (Group A)</th>
<th>TUS+MCG (Group A)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redness</td>
<td>1.63 ± 0.78</td>
<td>1.8 ± 0.71</td>
<td>0.29</td>
</tr>
<tr>
<td>Edema</td>
<td>1.38 ± 0.48</td>
<td>1.46 ± 0.56</td>
<td>0.31</td>
</tr>
<tr>
<td>Ecchymosis</td>
<td>0.76 ± 0.96</td>
<td>0.5 ± 0.83</td>
<td>0.56</td>
</tr>
<tr>
<td>Discharge</td>
<td>0.24 ± 0.31</td>
<td>0.3 ± 0.42</td>
<td>0.61</td>
</tr>
<tr>
<td>Approximation</td>
<td>1.47 ± 0.26</td>
<td>1.61 ± 0.34</td>
<td>0.23</td>
</tr>
</tbody>
</table>

(TUS: Therapeutic ultrasound, MCG: Maternal cooling gel pads)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Control (Group A)</th>
<th>Experimental (Group B)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Redness</td>
<td>1.49 ± 0.67</td>
<td>0.62 ± 0.55</td>
<td>0.003</td>
</tr>
<tr>
<td>Edema</td>
<td>0.89 ± 0.53</td>
<td>0.37 ± 0.41</td>
<td>0.02</td>
</tr>
<tr>
<td>Ecchymosis</td>
<td>0.62 ± 0.71</td>
<td>0.09 ± 0.26</td>
<td>0.003</td>
</tr>
<tr>
<td>Discharge</td>
<td>0.31 ± 0.33</td>
<td>0.34 ± 0.48</td>
<td>0.15</td>
</tr>
<tr>
<td>Approximation</td>
<td>1.13 ± 0.55</td>
<td>0.53 ± 0.44</td>
<td>0.001</td>
</tr>
</tbody>
</table>
showed that the subjects had bruising effect with the use of ultrasound. However in our study it did not show any bruising effect. The study also showed statistically significant differences in pain and better healing process. The authors concluded that larger trials are needed to clarify the effect of episiotomy treatment for perineal pain [10].

In a study where hot, cold or warm treatment to perineal trauma was evaluated using REEDA scale confirmed that REEDA scale is a useful measure for perineal healing process [11,24]. The present study has used REEDA scale as the secondary outcome measure to evaluate the healing process of episiotomy.

There were many randomized clinical trials were conducted on maternal cooling gel pads and on therapeutic ultrasound for perineal pain which were evaluated individually. The present study was to evaluate the combined effect of maternal cooling gel pads and therapeutic ultrasound for perineal pain following vaginal delivery with episiotomy.

Conclusion

Maternal cooling gel pad and therapeutic ultrasound can be used as a alternative non invasive treatment for relieving perineal pain and promote healing following vaginal delivery with episiotomy to aid functional independence during the postnatal period.

References