

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

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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 increase 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

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(control group) with n=15 and group B (experimental group) with n=15 using envelope method.

Inclusion criteria: Women 18-35 years of age

1. Women who underwent episiotomy during vaginal delivery.
2. 12 hours after vaginal delivery with episiotomy.
3. Participants who were willing to participate in the study.

Exclusion criteria:

1. Infection of the incision.
2. Urinary tract infection.
3. Post partum hemorrhage.
4. Febrile condition.

Intervention: Approval was obtained from the institutional ethical review board prior to the commencement of the study. Demographic data was recorded and physical examination was carried out prior to intervention. 30 participants were recruited and randomly allocated to one of two groups: namely control group or experimental group. A written informed consent was obtained from the study participants. The control group (A) received placebo therapeutic ultrasound for 5 minutes twice daily for 3 days and participants in the experimental group (B) received maternal cooling gel pad for 10-15 minutes and therapeutic ultrasound given with frequency of 3 MHz, intensity of 0.5W/cm² with 1:1 pulse interval for 5 minutes twice daily for 3 days [10] and for maternal cooling gel pad the temperature recommended for therapeutic effect was 55F (12.6 c) and outcome measurements were taken 1st day of before intervention and 3rd day of after intervention.

Outcome measures: Primary outcome measure was visual analog scale to measure pain intensity. It consists of 10cm scale, where 0 represents no pain and 10 represents severe pain. The secondary outcome measure used was REEDA scale for assessing the healing process [11,12]. REEDA Scale has a four point categorical score (0-3) that measures five components associated with the healing process. Each item is rated on a scale of 0 to 3 and scores may range from 0 to 15. The lesser the score indicates better healing (Table 1).

R-Redness

E-Edema

E-Ecchymosis

D-Drainage

A-Approximation

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).

REEDA 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 the both 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

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

Table 1: Reeda scale.

Groups	VAS(pre intervention)	VAS(post intervention)	p-value
Control (Group A)	6.7 ± 1.4	5.8 ± 1.7	0.56
Experimental(GroupB)	7.2 ± 1.6	3.2 ± 1.3	0.02

Table 2: Pain score on 1st day pre intervention and 3rd day post intervention.

Pain VAS

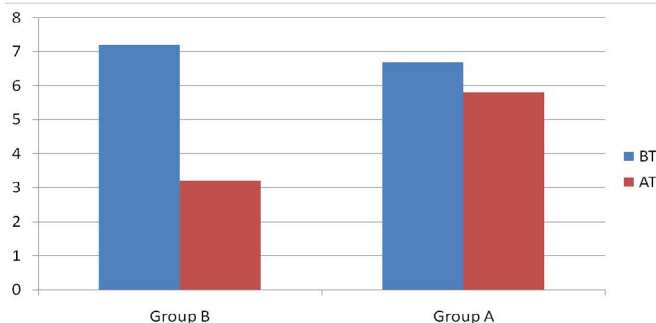


Figure 1: The graph between Mean Values of VAS before and after intervention.

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

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

Table 3: Comparison of REEDA scales between two groups before intervention.

Variables	Control(Group A)	experimental(GroupB)	p-value
Redness	1.49 ± 0.67	0.62 ± 0.55	0.003
Edema	0.89 ± 0.53	0.37 ± 0.41	0.02
Ecchymosis	0.62 ± 0.71	0.09 ± 0.26	0.003
Discharge	0.31 ± 0.33	0.34 ± 0.48	0.15
Approximation	1.13 ± 0.55	0.53 ± 0.44	0.001

Table 4: Comparison of REEDA scales between two groups after intervention.

Group A

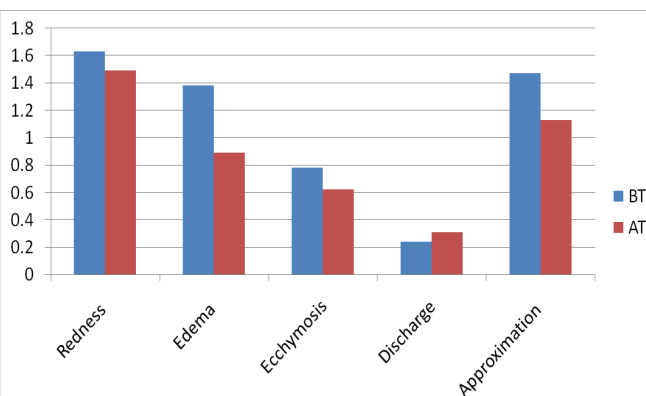


Figure 2: Statistical differences after three days of intervention in Control group.

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 in relieving perineal

pain. It has been reported that ice application can produce a strong analgesic effect in many painful conditions [6].

Cold therapy is said to reduce the level of pain and perineal edema by acting on nerve fibers and by decreasing the soft tissue temperature by reducing the metabolism of cells and produces constriction of blood vessels. Cryotherapy decreases nociceptive input and perception through local and central nervous system mechanisms. In response to cold, the vasoconstrictive response decreases the release of local vasodilating substances, which decreases nociceptor sensitization [15,16]. In a randomized controlled trial to compare the effectiveness of icepacks and epifoam with cooling maternity gel pads showed reduced perineal trauma in post partum women and maternity gel pads 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]. It improves blood flow, increases skin and cell membrane permeability, alters vascular wall permeability and facilitates soft tissue healing [16]. 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

Group B

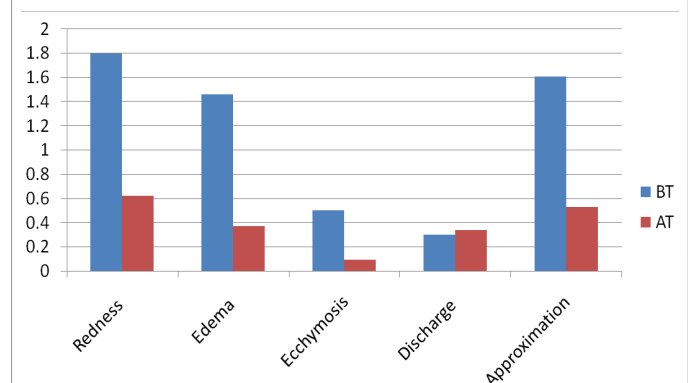


Figure 3: Statistical differences after three days of intervention in Experimental group.

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 therapeutic ultrasound 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 an alternative non invasive treatment for relieving perineal pain and promote healing following vaginal delivery with episiotomy to aid functional independence during the postnatal period.

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