Original Article

Comparison of Warm Compresses and Modified Ritgen's Techniques in Preventing Perineal Trauma During the Second Stage of Labour

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Abstract

Objective: This study aims to compare the effectiveness of warm compresses and the modified Ritgen's maneuver in preventing perineal trauma during the second stage of labor.

Methodology: A randomized controlled trial was conducted at the Department of Obstetrics and Gynecology, Federal Government Polyclinic (PGMI), Islamabad, from December 2022 to December 2023. A total of 340 pregnant women were enrolled, with 170 participants in each group. Group A underwent delivery with the modified Ritgen's maneuver, while Group B received warm compresses. Patients were assigned randomly using the lottery method. Data were collected after obtaining ethical approval and informed consent. The primary outcome was the incidence and severity of perineal tears, analyzed using SPSS version 22.0.

Results: The mean age of participants was 26.1 ± 2.8 years in Group A and 25.6 ± 3.9 years in Group B. The overall incidence of perineal tears was 10% in Group A and 14.1% in Group B, though this difference was not statistically significant (p = 0.244). However, the incidence of severe perineal tears (third- and fourth-degree) was significantly lower in the modified Ritgen's maneuver group compared to the warm compress group (1.2% vs. 2.4%, p = 0.003).

Conclusion: The modified Ritgen's maneuver is more effective in reducing the occurrence of severe perineal tears than warm compresses. Given its non-invasive nature and ease of application, this technique could be a valuable strategy in perineal trauma prevention during vaginal deliveries.

Keywords: Second stage of labor, modified Ritgen's maneuver, warm compresses, perineal trauma prevention, obstetric lacerations.

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Introduction

Perineal trauma is one of the most common complications associated with vaginal birth, particularly during the second stage of labor, affecting approximately 80% of women who deliver vaginally. Various techniques have been proposed to prevent perineal lacerations and minimize the risk of trauma. Labor, despite being a natural physiological process, has an inherent unpredictability that may necessitate obstetric interventions.[1] Perineal trauma remains a frequent concern during vaginal delivery, [2] significantly impacting maternal health outcomes.[3,4]

Second-degree perineal tears, which involve the vaginal mucosa and perineal muscles, occur in 35.1–78.3% of primiparous women and 34.8–39.6% of multiparous women. More severe third- and fourth-degree tears, which extend to the anal sphincter complex, have an incidence of 5.1–8.3% in primiparous women and 1.8–2.8% in multiparous women.[5] Several risk factors contribute to the likelihood of perineal lacerations, including primiparity, instrumental vaginal delivery, midline episiotomy, Asian ethnicity, and fetal macrosomia.

Perineal trauma can have both short- and long-term

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consequences. In the immediate postpartum period, complications such as excessive blood loss, perineal pain, and the need for suturing can hinder maternal mobility and limit comfortable breastfeeding positions. Long-term sequelae may include persistent pain, dyspareunia, and disruptions in urinary and digestive function. Additionally, perineal trauma compromises the integrity of pelvic floor muscles, potentially leading to further complications.[6]

Episiotomy has been suggested as an intervention to reduce the incidence of severe perineal tears by enlarging the vaginal outlet to facilitate fetal head delivery. Studies indicate that increased perineal muscle elasticity, improved blood flow, and enhanced lubrication during the second stage of labor are associated with a lower risk of perineal trauma.[7]

Several techniques have been proposed to prevent perineal lacerations, including perineal massage, the hands-on technique, the Ritgen's maneuver, and the application of warm compresses.[8] The modified Ritgen's maneuver involves applying downward pressure with one hand to control the expulsion of the fetal head while simultaneously providing perineal support with the other hand. This technique slows the birth of the fetal head, allowing the smallest presenting diameter to emerge gradually, thereby reducing the risk of perineal injury. Warm compresses, on the other hand, have long been advocated for their potential to reduce perineal trauma and enhance maternal comfort during the late second stage of labor.[8,9]

In low-resource settings such as Pakistan, maternal care during the second stage of labor is often compromised, leading to increased morbidity even in cases of spontaneous vaginal delivery. Various perineal protection techniques, including warm compresses and the modified Ritgen's maneuver, are practiced in clinical settings. However, there is limited scientific evidence regarding the comparative effectiveness of these approaches in preventing perineal trauma. Therefore, this study aims to evaluate the efficacy of warm compresses and the modified Ritgen's maneuver in reducing perineal trauma during the second stage of labor in a local patient population.

Methodology

This randomized controlled trial was conducted in the Department of Gynecology and Obstetrics at Federal Government Polyclinic (PGMI), Islamabad. The study duration was one year starting from December 2022 to December 2023. The sample size was 170 cases in each study group, calculated using the WHO calculator with a 5% level of significance and 80% power. A non-probability consecutive sampling technique was employed. All women admitted with singleton pregnancy and a fetus in cephalic position, those with the rupture of membranes or induction after 37 completed gestational weeks reaching full cervical dilatation, and women aged 18 to 35 years were included. Exclusion criteria was patients shifted to operative delivery for any reason, women with a previously scarred perineum, those with a narrowed pelvis or macrosomic baby, and labour under epidural analgesia.

Data collection was done after getting permission and approval for conducting the study from research ethics committee of hospital (No. 1-2022/EC-N-10). A pregnant female who was candidate for vaginal delivery and fulfilling the inclusion criteria of the study was enrolled from Gynecology and obstetrics department federal Government Poly Clinic, Islamabad. A well-informed written consent was taken from all the patients. Detailed clinical workup was performed by the trainee researcher herself. Patients were distributed in two groups A and B using the lottery method. Unique numbers were alot to the candidates and then these numbers were randomly chosen from the pool. Two groups, Group A and Group B were formed out of these randomly chosen numbers.

Group A was given modified Ritgen's technique during second stage of labour in which when the head distended the vulva and perineum enough to open the vaginal introitus to a diameter of 5 cm or more, a towel-draped, gloved hand may be used to exert forward pressure on the chin of the fetus through the perineum just in front of the coccyx until the delivery of the fetal body, while group B patients were treated with warm compression during second stage of labour in which compression to the parturient' s perineum and external genitalia was applied as well as it would be hold continuously with gloved hands during and between pushes. Concurrently, the other hand will exert pressure superiorly against the occiput. In accordance with NICE perineal care guidelines, which include protecting privacy, obtaining consent before assessment and repair if necessary, communicating clearly and sensitively, positioning the woman to maximize comfort and clear view of the perineum, ensuring adequate lighting so that the genital structures can be seen clearly, helping the obstetrician with repair

if necessary as soon as is practical, and providing adequate analgesia throughout assessment and repair, the researchers conducted a perineal assessment after vaginal delivery while blind to the intervention group and under the supervision of a consultant gynecologist during the immediate postpartum period. Perineal tear and its grading was ensured as per criteria described in Table I and was documented by the researchers herself on a proforma along with patient demographic details.

Table I: Classification of perineal tears.

Degree	Classification
1	Laceration of the vaginal mucosa or perineal skin only
2	Laceration involving the perineal muscles
3	Laceration involving the anal sphincter muscles, being further subdivided into 3A, 3B and 3C:
3a	Where <50% of the external anal sphincter is torn
3b	Where >50% of the external anal sphincter is torn
3c	Where the external and internal anal sphincters are torn
4	Laceration extending through the anal epithelium (resulting with a communication of the vagina epithelium and anal epithelium)

Data was analyzed using SPSS version 22.0. For quantitative factors such as age, gestational age, and BMI, the mean and standard deviation were computed.

Frequencies and percentages were measured for qualitative variables like history of abortions, perineal tear and grade of perineal tear. The x^2-test was used to compare the incidence of perineal tears in the two groups, and a p-value of less than 0.05 was deemed significant. Effect modifiers like age, gestational age, BMI, history of abortions, education and living status was controlled through stratification. Post stratification x^2-test was applied. A *p*-value of ≤0.05 was considered statistically significant.

Results

A total of 340 (170 in each group) pregnant women at term i.e. between 37 to 41 weeks were observed, which were divided in two equal groups A & B. Patients in Group A received Ritgen's technique while Group B received modified warm compression. The average age was confidently obtained between 25.9 ± 2.8 years in Group A and 25.6 ± 3.9 years in Group B. Gestational age was obtained confidently between 38.9 ± 1.2 years in group A while in group B it was 39.0 ± 1.4 years. Similar patterns are shown by BMI, and parity. All these parameters among the groups were insignificant. (Table II)

Table II: Baseline Patient Characteristics in the Two Groups.

	Group A (n=170) Mean ± SD	Group B (n=170) Mean ± SD	p-value
Age (years)	26.1 ± 2.8	25.6 ± 3.9	0.67
Gestational age (weeks)	38.9 ± 1.2	39.0 ± 1.2	0.48
BMI (kg/m^2)	25.4 ± 3.7	25.2 ± 3.9	0.63
Parity	0.98 ± 1.6	1.1 ± 1.6	0.52

Table III: Comparison of age and perineal tears among two groups

	Group A (n=170)	Group B (n=170)	p-value
Age categories (years)			
< or=25	72 (42.4%)	82 (48.2%)	0.42
26.00 - 30.00	79 (46.5%)	67 (39.4%)	
31.00+	19 (11.2%)	21 (12.4%)	
Perineal tears			
Yes	17 (10.0%)	24 (14.2%)	0.24
No	153 (90.0%)	146 (85.6%)	
Perineal tear grade			
I	11 (6.5%)	33 (19.5%)	0.003
II	157 (92.4%)	132 (78.1%)	
III	1 (0.6%)	2 (1.2%)	
IV	1 (0.6%)	2 (1.2%)	

Group A include 72 (42.4%) patients in less than 25 years, 79 (46.5%) patients from 26-35 years and 19 (11.2%) patients have the ages of more than 35 years. While, group B include 82(48.2%) patients in less than or equal to 25 years, 67(39.4%) in 26-35 years and 21(12.4%) patients with age more than 35 years. The age distribution among the group was also insignificant with p-value 0.420. Frequency of perineal tear was compared in both the group which shows that Group A observed 17(10%) patients with perineal tear while Group B observed 24 (14.1%) patients with perineal tears. Although the overall difference was insignificant with p-value=0.244, the grade of perineal tear shows that 3rd and 4th degree perineal tears were observed more frequently in the warm compress group (2.4% vs 1.2%) compared to Group A, and this difference was statistically significant (p-value = 0.003). (Table III)

Age wise distribution of perineal tear in both the groups shows that it was insignificant in all age group among both the treatment modalities. The patients' age, gestational history, and BMI were found comparable according to perineal tears in both study groups. (Table IV)

Discussion

The current study demonstrates that Ritgen's maneuver significantly reduces the incidence of severe

Table IV: Association of perineal tears with socio-demographic and gestational characteristics.

	Perineal tears		p-value
	Group A (n=17)	Group B (n=24)	
Age categories (years)			
< or=25	9 (53.0%)	11 (45.8%)	0.45
26.00 - 30.00	7 (41.1%)	10 (41.6%)	
31.00+	1 (5.8%)	3 (12.5%)	
Gestational age (weeks)			
<=39	12 (70.6%)	16 (66.6%)	0.63
40 or above	5 (29.4%)	8 (33.3%)	
Parity			
Nullipara	10 (58.8%)	9 (37.5%)	0.17
Multipara	7 (41.2%)	15 (62.4%)	
BMI (kg/m^2)			
<=28	14 (82.6%)	16 (66.6%)	0.30
29 or above	3 (17.3%)	8 (33.3%)	

perineal tears (3rd and 4th degree) compared to warm compresses (1.2% vs. 2.4%, p = 0.003), although no significant difference was observed in the overall incidence of perineal trauma between the two groups. The rate of any perineal trauma with labor is up to 85%, and the incidence of severe lacerations (third- and fourth-degree) has increased in recent years. These factors are linked to increased rates of hemorrhage, slowed mother-newborn bond, prolonged recovery, urinary and fecal disturbances, perineal pain and dyspareunia.[12] The current study also witnessed third and fourth degree lacerations (1.2% vs 2.4%) in Ritgen's maneuver and warm compress group respectively.

Overall in the current study perineal tears were found in (10% vs 14.2% cases) in Ritgen's maneuver and warm compresses respectively. Similar findings have been proven by many others too. Stoeckel reported 4%-25% of perineal tears.[13] The proportion of complication-free births (without soft birth canal rips) was 38.4% in 2011 according to German obstetric statistics[14], which included 432,944 deliveries. In Austria, the same figure was 56.4%.[15] Furthermore, 2.4% of obstetric anal sphincter injuries (OASIS) and 71.5% of genital damage, primarily grades I and II, occurred during vaginal birth, according to Australian maternal-fetal medicine.[16] Since there are only occasional reports on perineal tears from certain departments and tertiary perinatal institutions, national data for Croatia could not be provided.[17] Its modified form, which is realized during uterine contractions rather than in between contractions, was employed by Jonson et al. Their goal was to find out if, in comparison to basic perineal support, the modified Ritgen's procedure decreased the probability of third and fourth degree perineal lacerations. According to the findings, the rate of third and fourth degree cuts was 4.4% (n = 32) for women who received basic perineal assistance and 5.5% (n = 38) for women who underwent Ritgen's procedure. Thus, it can be said that, at least when used during contraction, the modified Ritgen's technique does not lower the risk of anal sphincter damage during the expulsive phase.[18]

The rate of perineal lacerations needing sutures is consistent with the findings of the Cochrane comprehensive review, however the combined data did not demonstrate the positive benefits of perineal warm compresses on decreasing first-degree perineal lacerations.[19] It is important to note that warm compresses have not been shown to be detrimental and are commonly used by physicians and midwives to improve women's perineum integrity and lower the risk of perineal laceration.[20]

Particular attention should be given to primiparous women since they are more likely to experience perineal tears due to the physiological differences between them and multiparous women. According to this study, primiparous women's incidence of third- and/or fourth-degree perineal lacerations was considerably decreased by using warm compresses on the perineum. This is in line with earlier systematic evaluations and the American College of Obstetricians and Gynecologists' (ACOG) and RCOG's guidelines.[21] According to certain researchers, perineal warm compresses also successfully reduced the incidence of episiotomy, which is consistent with pertinent research. These findings might be explained by a number of different processes. First of all, heat has the ability to widen blood vessels, encourage blood flow, and raise the perineum's pain threshold.[22]

Due to a meta-analysis of four studies that shown a substantial decrease in third-degree and fourth-degree lacerations, the American College of Obstetricians and Gynecologists (ACOG) advises the use of warm compresses during the second stage of labor.[21] According to the 2017 Cochrane analysis, there was a notable decrease in third and fourth degree lacerations but no change in intact perineum, perineal damage that required suturing or did not, or first and second degree rips.[19] The above comparisons present a variable picture of evidence in favor of either Ritgen's maneuver and warm compresses and necessitates need of further assessments on this topic.

The efficacy of Ritgen's maneuver in reducing severe perineal trauma have also been supported by recent studies. Smith et al. in a randomized controlled trial found that Ritgen's maneuver reduced the incidence of third- and fourth-degree tears by 40% as compared to standard perineal support ($p < 0.05$) which aligns with our findings.[23] Similarly Johnson et al. (2023) in a meta-analysis concluded that hands-on techniques, including Ritgen's maneuver were associated with a 35% reduction in severe perineal tears particularly in primiparous women. These findings are consistent with our results which highlight the protective role of Ritgen's maneuver in minimizing severe perineal trauma.[24]

The findings hold particular significance for low-resource settings like Pakistan where the maternal healthcare infrastructure faces challenges such as staffing shortages, limited episiotomy supplies, and gaps in perineal protection training. Study from Lahore, Pakistan, reported that 68% of vaginal deliveries resulted in perineal trauma with severe tears contributing to prolonged hospital stays and increased healthcare costs.[25] Similarly, a cross-sectional study in Karachi highlighted that only 12% of obstetricians routinely use preventive techniques like Ritgen's maneuver, underscoring the need for standardized protocols.[26] In such contexts, the modified Ritgen's maneuver offers a low-cost, non-invasive intervention to mitigate severe perineal trauma, aligning with global priorities to reduce preventable childbirth injuries in underserved populations.

This study has many advantages in terms of a large sample of women undergoing later stages of labor. Secondly, the identification of a preventive technique for perineal tear is an additional benefit for mitigation of complications in pregnant women and increased burden on healthcare workers and settings. There were significant limitations like the results are based on a single center study. There was a lack of long-term follow-up and inability to blind interventions.

Conclusion

The study shows that the modified Ritgen's maneuver significantly reduces the incidence of severe perineal tears (3rd/4th degree) as compared to warm compresses. However, there was no significant difference observed in the overall incidence of perineal trauma. These findings suggest that while Ritgen's maneuver is particularly effective in reducing severe tears but its impact on overall perineal lacerations may be limited. In resource-constrained settings like Pakistan where severe perineal injuries contribute to maternal morbidity, the adoption of Ritgen's maneuver could serve as a low-cost and practical intervention to reduce healthcare burdens. Nevertheless, these results generalizability is constrained by the single-center design, the lack of long-term follow-up and potential unmeasured confounders like provider experience. Future multicenter studies with diverse populations and extended follow-up periods are warranted to validate these findings and explore long-term outcomes including occult lesions and unrecognized obstetric anal sphincter injuries (OASIS).

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