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Original Research Article

Routine vs no episiotomy in primigravida: a pilot RCT on perineal injury and pelvic floor dysfunction

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ABSTRACT

Background: The present study compared the effect of 'routine-episiotomy' vs 'no-episiotomy' on perineal injury and pelvic floor function during normal vaginal delivery in primigravida.
Methods: This open-label RCT allocated women in the second stage of labour to routine mediolateral episiotomy or no-episiotomy (1:1) using concealed computer-generated randomisation. Episiotomy was avoided in the no-episiotomy group unless instrumental delivery was required for maternal or foetal reasons. Perineal trauma, suturing characteristics, pain, pelvic-floor function, urinary and anal incontinence were assessed at 24 hours, 36 hours, and 3 months postpartum. Pre and post-episiotomy biomarkers assessed the tissue-level injury. Analyses were conducted in STATA with significance at $p<0.05$.
Results: Out of 125 women screened initially, n=42 were randomised to episiotomy and no-episiotomy groups, while n=83 were excluded due to caesarean section or instrumental delivery. The episiotomy group had a shorter second stage of labour (p=0.034) and longer tears (p=0.047). More women in the no-episiotomy group used analgesics within 24 hours (p=0.048), but none after 36 hours. There was no significant difference in perineal pain, subjective tear grading, or pelvic-floor dysfunction, anal and urinary incontinence in both groups. Furthermore, biomarkers showed a significant increase in MDA (p=0.005) in the no-episiotomy group and increased TNF-α (p=0.042) in the episiotomy group, while CK and IL-6 changes were not significant.
Conclusions: Considering no additional clinical benefits of episiotomy compared to no-episiotomy in terms of perineal pain, pelvic-floor dysfunction, or most biomarkers, routine episiotomy should be discouraged in clinical practice.

Keywords: Perineal injury, Routine episiotomy, Selective episiotomy, Vaginal delivery

INTRODUCTION

Episiotomy is one of the most common surgical procedures performed in the labour room, ranging in frequency from <10% to 75% of vaginal delivery.[1] It was introduced to prevent advanced perineal tears, easier suturing, expediting labour in case of foetal distress or shoulder dystocia and decreased postpartum pelvic organ injury.[2,3] However, recent studies suggest that routine episiotomy may exacerbate maternal morbidity in terms of increased risk of severe perineal tears, postpartum bleeding, pain and urinary incontinence.[4,5] Thus, selective episiotomy is the current recommendation.[6] However, selective episiotomy remains a controversial method for the prevention of perineal trauma. A recent review has demonstrated that restrictive mediolateral episiotomy is effective in reducing Obstetric Anal Sphincter Injuries (OASIS), but this has not been confirmed among nulliparous women.[7] Another review focusing on vacuum-assisted delivery has demonstrated similar results, but the majority of studies are observational.[8] With accumulating evidence in favour of restrictive use of episiotomy rather than its routine use, action needs to be exercised in an

attempt to decrease the rate of unindicated episiotomies with their short-term and long-term complication potential.[9,10] Some professionals have even opted to refrain from performing episiotomies because there is potential for other complications, such as postpartum haemorrhage and dyspareunia, following this surgical procedure.[11-13] Thus, there are inadequate data as to whether not performing an episiotomy may be useful in reducing the incidence of OASIS. Hence, in accordance with the systematic reviews and meta-analyses across the literature, we hypothesise that avoiding episiotomy may be related to decreased risk of advanced perineal tears and would be better for pelvic floor function.[14,15] Consequently, we aimed to assess whether not performing episiotomy (non-episiotomy) or performing episiotomy would modify the incidence of perineal trauma and affect the postpartum pelvic floor outcomes like urinary and anal incontinence and perineal pain in nulliparous women.

METHODS

This pilot randomised controlled trial was conducted to compare the effects of routine episiotomy with no episiotomy on maternal outcomes during normal vaginal delivery. The study was carried out in the Department of Obstetrics and Gynaecology in collaboration with the Department of Biochemistry at a tertiary care hospital in Delhi. The ethical clearance was obtained from the Institutional Ethics Committee (before the commencement of the study, and written informed consent was taken from all participants. The protocol for the control trial was also registered with Clinical Trials Registry - India (CTRI) (Ref no.: CTRI/2024/03/064111).

Study subjects

Antenatal primigravida women admitted in the third trimester with a singleton pregnancy in cephalic presentation at more than 34 weeks of gestation, and expected to undergo normal vaginal delivery, were recruited for the study. Women with contraindications to vaginal delivery, multiple gestations, or an estimated foetal weight greater than 3 kg were excluded. Additional exclusion criteria included a history of previous surgery for incontinence or prolapse, presence of bleeding disorders or use of anticoagulation therapy, and occipito-posterior foetal position.

Baseline evaluation

At admission, a 5 mL blood sample was drawn from all participants for four biomarker assays: CPK, malondialdehyde, IL-6, and TNF-α. Women who required emergency caesarean or instrumental delivery after randomisation were excluded.

Randomisation

Women were randomised to the routine episiotomy vs the no episiotomy groups in the second stage of labour. Randomisation was performed by a computer program using a randomisation sequence generated by a statistician unconnected with the study, with 1:1 allocation and random block sizes of six.

No episiotomy group

For women allocated to 'no episiotomy', the resident conducting the delivery was instructed to perform an episiotomy only if severe fetal distress was suspected/or if instrumental delivery was required. All women received perineal protection using verbal guidance and manual support of the perineum during the delivery of the fetal head and body, irrespective of the group allocated.

Episiotomy group (mediolateral episiotomy)

Mediolateral episiotomy was performed with episiotomy scissors at crowning during the second stage of labour. Local anaesthesia (lidocaine) was given in the hymenal plane 1 mL subcutaneously at the incision point and 9 mL in a fan-like fashion. The incision point lay 1-3 cm from the posterior fourchette, angled 60° (45°-80°) from the sagittal/parasagittal plane towards the ischial tuberosity. The incision measured 4 cm (3-5 cm), with perineal thickness assessed using a scale just before delivery

Completion of delivery

Labour management followed standard protocols. After vaginal delivery, the perineum was inspected and palpated. Per rectal examination was performed, and tears were classified per RCOG 2007 criteria.[16] Defects were repaired with Vicryl Rapide 0 by a senior resident. Delivery details were recorded in case sheets.

Assessments at 36 hours post-delivery

Review history for symptoms suggestive of pelvic floor dysfunction, like urinary incontinence, anal incontinence and pelvic floor prolapse, were recorded using validated tools. Recruited women were also assessed for perineal pain using an 11-point verbal numeric scale. The depth of the damage was also measured and classified according to Sultan's classification.[17] A 5ml blood sample was again taken from the antecubital vein of all women who successfully completed the vaginal delivery for measurement of serum biomarkers like CPK, malondialdehyde, IL-6 and TNF-α. The change in the level of serum biomarkers was correlated with the degree of tear.

Assessments at 3 months after delivery

Participants were followed up with validated questionnaires. Anal incontinence was assessed using the St Mark's score, a validated tool with seven items to assess bowel-related issues, ranging from 0, indicating no bowel continence, to 24, suggesting severe incontinence.[18] Urinary incontinence and pelvic floor impact was assessed

with validated questionnaires including ICIQ-SF, and PFIQ-7.[19,20] Women were also asked about resumption of sexual activity.

Statistical analysis

Data were analysed using STATA version 14.0. Normality of continuous variables was tested with the Kolmogorov–Smirnov test. Descriptive measures such as mean, SD, and range were calculated. Comparisons of mean values were performed using an independent Student's t-test. Categorical variables were presented as numbers and percentages and compared with the χ^2 test or Fisher's exact test. Dichotomous data, focusing on advanced perineal tears, were analysed in 2×2 tables with odds ratios and 95% confidence intervals. Continuous variables were expressed as mean ± SD and analysed with Student's t-test, while ordinal variables were reported as median (25^{th}-75th percentile) and analysed using the Wilcoxon Mann-Whitney U test. Subgroup analyses were performed to assess maternal outcomes according to episiotomy use. Changes in biomarker levels from baseline to endpoint were compared using a paired Student's t-test. A two-sided probability value of $p<0.05$ was considered statistically significant.

RESULTS

A total of 125 women in the third trimester with singleton pregnancies and cephalic presentation at >34 weeks, who were expected to undergo normal vaginal delivery, were initially recruited. Of these, 83 women were excluded as 58 required lower segment caesarean section (LSCS) and 25 required instrumental delivery following randomisation. The final study population thus consisted of 42 women, with 21 undergoing episiotomy and 21 delivering without episiotomy.

Sociodemographic characteristics

The mean age of participants was 28.9 years (Table 1). Educational status revealed that 40.4% (n=17) were postgraduates, 28.6% (n=12) were graduates, while 4.8% (n=2) each had attained only secondary and primary education. With respect to occupation, the majority were homemakers (83.3%, n=35), and only 16.7% (n=7) were employed. Regarding place of residence, 73.8% (n=31) belonged to metropolitan areas, 14.3% (n=6) to cities, and 11.9% (n=5) to rural settings. Statistical analysis showed no significant difference in the sociodemographic distribution between the routine episiotomy and no-episiotomy groups.

Obstetric factors and neonatal outcomes

Spontaneous conception was reported in 75% of women in the No-episiotomy group and 90% in the episiotomy group (Table 2). The median duration of the second stage of labour was significantly shorter in the episiotomy group (30 minutes) compared to women without episiotomy (60 minutes) ($p = 0.034$). There was, however, no statistically significant difference between the groups in terms of neonatal birth weight.

Table 1: Sociodemographic characteristics of the participants (n=42).

Variables	Frequency (%)	P value
Age	28.9±4.2	
Education		
Post graduate	17 (40.4)	0.687
Graduate	12 (28.6)	
Intermediate	9 (21.4)	
Secondary	2 (4.8)	
Primary	2 (4.8)	
Occupation		
Homemaker	35 (83.3)	0.852
Working	7 (16.7)	
Residence		
Metropolitan	31 (73.8)	0.890
City	6 (14.3)	
Rural	5 (11.9)	

Table 2: Obstetric factors and neonatal outcomes (n=42).

Variables	No episiotomy (n=21)	Episiotomy (n=21)	P value
Type of conception			
Spontaneous	16 (76.2)	19 (90.5)	0.214
Assisted	5 (23.8)	2 (9.5)	
Duration of second labour pain (mins)	60 (12, 180)	30 (15, 60)	0.034
baby weight	2720.9±321.3	2855.6±311.6	0.279

Tear characteristics and postpartum outcomes

The mean length of tears in the episiotomy group was 3 cm, whereas in the No-episiotomy group, the tear length was more variably distributed. However, none was more than 3cm (Table 3). This difference was statistically significant ($p=0.047$). The requirement for painkillers within the first 24 hours postpartum was significantly higher in the non-episiotomy group compared to the episiotomy group ($p = 0.048$). However, by 36 hours post-delivery, none of the women in either group reported analgesic use.

There was no statistically significant difference between the two groups with respect to subjective grading of tears, perineal pain, or pelvic floor dysfunction. Similarly, symptoms suggestive of pelvic dysfunction did not differ significantly between the groups.

Table 3: Clinical outcomes after delivery.

Variables	No episiotomy (n=21)	Episiotomy (n=21)	P value
Clinical outcomes after delivery			
Number of tears	21 (100)	21 (100)	-
Length of tears along the depth			
1	4 (19.0)	1 (4.8)	0.047
2	3 (14.3)	0	
2.5	1 (4.8)	0	
3	13 (61.9)	20 (95.2)	
Within 24 hours of delivery			
Grade of perineal injury (digital examination)			
Grade 1	8 (38.1)	6 (28.6)	0.513
Grade 2	13 (61.9)	15 (71.4)	
Characteristics of suturing			
Duration of suturing (mean ± SD)	9.8±2.5	10.5±2.2	0.325
Subjective grading of suturing (scale of 10)			
Score 1	11	6	0.208
Score 2	10	15	
Need for extended suturing in OT			
No	21 (100)	21 (100)	-
Perineal pain & childbirth experience (VAS)			
Paraurethral tears	8 (2.9)	8 (3.8)	0.041
No	21 (100)	21 (100)	
Need for pain killers			
No need	16	21	0.048
Once a day	5	0	
Three times/day	0	0	
After 36 hours			
Need for pain killers after 36 hours			
No need	21 (100)	21 (100)	-
Symptoms suggestive of pelvic dysfunction			
No	19	21	0.147
Yes	2	0	
Pelvic floor muscle function			
No contraction	0	0	0.549
Flicker	0	0	
Weak	0	0	
Moderate	0	0	
Good (with lift)	2	1	
Strong	19	20	
Perineal pain score			
Score 1	1	0	0.368
Score 2	20	20	
Score 3	0	1	
No urinary retention (>6 hours after delivery/catheter removal)	21 (100)	21 (100)	-
Complications of perineal suturing (infection, edema, hyperemia, hematoma)	0	0	-

Biochemical markers

Changes in biochemical markers such as Creatine kinase (CK), Malondialdehyde (MDA), TNF-α and IL6 were evaluated pre- and post-intervention in both groups in Table 4. No significant changes were observed in either group ($p = 0.9078$ in the no-episiotomy group; $p = 0.6320$ in the episiotomy group) in the CK activity levels. Malondialdehyde (MDA) levels remained stable in the episiotomy group ($p = 0.3352$), whereas a significant increase was observed in the "no episiotomy group" ($p = 0.0053$). TNF-α levels did not differ significantly in the no-

episiotomy group (p = 0.9244), but the episiotomy group demonstrated a significant post-intervention increase (p=0.0421). IL-6 levels showed no statistically significant difference in either group; however, a decreasing trend was noted in the episiotomy group (p=0.067).

Table 4: Biochemical parameters in control and intervention arm (n=42).

Biochemical parameters	No episiotomy (n=21)			Episiotomy (n=21)		
	Pre	Post	P value	Pre	Post	P value
CK activity	9.268±7.18	8.983±10.79	0.9078	10.89±9.975	9.963±9.968	0.6320
MDA calculation	46.59±11.43	120.6±107.5	0.0053	31.2±8.841	29.51±8.177	0.3352
TNF Alpha	15.64± 19.21	15.14±17.13	0.9244	14.08±18.28	18.15±13.3	0.0421
IL-6	4.41±4.60	5.15±6.59	0.69	7.83±11.93	3.19±2.72	0.067

Table 5: Pelvic floor function and anal incontinence.

Variables	No episioton (n=21)	Episiotomy (n=21)
Ability to do household chores (cooking, laundry, housecleaning)		
Not at all	21 (100%)	21 (100%)
Somewhat	0	0
Moderately	0	0
Quite a bit	0	0
Ability to do physical activities (walking, swimming, exercise)		
Not at all	21 (100%)	21 (100%)
Somewhat	0	0
Moderately	0	0
Quite a bit	0	0
Entertainment activities (movies, concerts, etc.)		
Not at all	21 (100%)	21 (100%)
Somewhat	0	0
Moderately	0	0
Quite a bit	0	0
Ability to travel by car/bus (>30 min. from home)		
Not at all	21 (100%)	21 (100%)
Somewhat	0	0
Moderately	0	0
Quite a bit	0	0
Participation in social activities outside home		
Not at all	21 (100%)	21 (100%)
Somewhat	0	0
Moderately	0	0
Quite a bit	0	0
Emotional health (nervousness, depression, etc.)		
Not at all	21 (100%)	21 (100%)
Somewhat	0	0
Moderately	0	0
Quite a bit	0	0
Feeling frustrated		
Not at all	21 (100%)	21 (100%)
Somewhat	0	0
Moderately	0	0
Quite a bit	0	0

Anal incontinence

Assessment of anal incontinence revealed no reported cases in either group (Table 5). All participants (100%) in both the episiotomy and no-episiotomy arms denied involuntary stool leakage, urgency, use of pads or tissue plugs, or the need for medications such as loperamide or codeine. Similarly, none of the women reported any lifestyle restrictions due to stool loss or fear of incontinence.

Urinary incontinence

Urinary incontinence, summarised in Table 6, was assessed using the ICIQ questionnaire. More than 60% of women in both groups reported never experiencing urine leakage (66.7% in the no-episiotomy group vs. 61.9% in the episiotomy group). About 15% in the episiotomy and 10% in the no-episiotomy group reported leakage two or three times a week. Two-thirds of women in both groups reported no leakage at all (66.7% vs. 61.9%), while almost 40% of the women in the episiotomy vs 33% in the no-episiotomy group reported leaking a small amount (p=0.747). Similar patterns of leakage with coughing, sneezing, physical exertion, or sleep were observed in both groups, with no statistically significant difference (p = 0.914). Regarding the impact of urinary incontinence on daily life, 66.7% (n = 14) of women in the no-episiotomy group and 61.9% (n = 13) in the episiotomy group reported "no interference," while 33.3% (n = 7) and 38.1% (n = 8), respectively, reported minimal interference. The difference was not statistically significant (p = 0.747).

Resumption of sexual activity

Sexual function was evaluated across domains of desire, arousal, lubrication, orgasm, and satisfaction during the preceding four weeks (Table 6).

Most participants in both groups reported low or very low desire, with 23.8% in the no-episiotomy group reporting desire "sometimes," compared to 76.2% in the episiotomy group who reported "almost never or never." Although some women in both groups experienced difficulties with

arousal, lubrication, or orgasm, these differences were not statistically significant (p values 0.155-0.368).

Overall satisfaction with sexual activity was also comparable between the two groups (p=0.178).

Table 6: Urinary incontinence and resumption of sexual activity.

Variables	No episiotomy (n=21)	Episiotomy (n=21)	P value
Urinary incontinence			
1. How often do you leak urine?			
Never	14 (66.7)	13 (61.9)	0.971
About once a week or less often	4 (19)	4 (19)	
Two or three times a week	2 (9.5)	3 (14.3)	
About once a day	1 (4.8)	1 (4.8)	
Several times a day	0	0	
All the time	0	0	
2. How much urine you think leaks. How much urine do you usually leak (whether you wear protection or not)?			
None	14 (66.7)	13 (61.9)	0.747
A small amount	7 (33.3)	8 (38.1)	
A moderate amount	0	0	
A large amount	0	0	
3. Overall, how much does leaking urine interfere with your everyday life?			
0	14 (66.7)	13 (61.9)	0.747
1	7 (33.3)	8 (38.1)	
4. When does urine leak?			
Never-urine does not leak	13 (100)	14 (100)	0.914
Leaks before you can get to the toilet	4 (19)	3 (14.3)	
Leaks when you cough or sneeze	4 (19)	4 (19)	
Leaks when you are asleep	0	0	
Leaks when you are physically active/exercising	0	0	
Leaks when you have finished urinating and are dressed	0	0	
Leaks for no obvious reason	0	0	
Leaks all the time	0	0	
Resumption of sexual activity			
1. Over the past 4 weeks, how often did you feel sexual desire or interest?			
Almost always or always	0	0	0.350
Most times (more than half the time)	1 (4.8)	0	
Sometimes (about half the time)	5 (23.8)	1 (4.8)	
A few times (less than half the time)	4 (19.1)	4 (19.1)	
Almost never or never	11 (52.4)	15 (76.2)	
2. Over the past 4 weeks, how would you rate your level (degree) of sexual desire or interest?			
Very high	0	0	0.300
High	2 (9.5)	0	
Moderate	7 (33.3)	6 (28.6)	
Low	12 (57.1)	15 (71.4)	
Very low or none at all	0	0	
3. Over the past 4 weeks, how often did you feel sexually aroused ("turned on") during sexual activity or intercourse?			
No sexual activity	4 (19.1)	10 (47.6)	0.233
Almost always or always	1 (4.8)	0	
Most times (more than half the time)	4 (19.1)	7 (33.3)	
Sometimes (about half the time)	4 (19.1)	1 (4.8)	
A few times (less than half the time)	4 (19.1)	3 (14.3)	
Almost never or never	8 (38.1)	7 (33.3)	
4. Over the past 4 weeks, how would you rate your level of sexual arousal ("turn on") during sexual activity or intercourse?			
No sexual activity	3 (14.3)	9 (42.9)	0.145

Continued.

Variables	No episiotomy (n=21)	Episiotomy (n=21)	P value
Very high	1 (4.8)	0	
High	1 (4.8)	0	
Moderate	8 (38.1)	4 (19.1)	
Low	4 (19.1)	0	
Very low or none at all	4 (19.1)	8 (38.1)	
5. Over the past 4 weeks, how confident were you about becoming sexually aroused during sexual activity or intercourse?			
No sexual activity	4 (19.1)	6 (28.6)	0.210
Very high confidence	1 (4.8)	0	
High confidence	0	0	
Moderate confidence	6 (28.6)	4 (19.1)	
Low confidence	2 (9.5)	1 (4.8)	
Very low or no confidence	8 (38.1)	10 (47.6)	
Over the past 4 weeks, how often have you been satisfied with your arousal (excitement) during sexual activity or intercourse?			
No sexual activity	4 (19.1)	10 (47.6)	0.178
Almost always or always	1 (4.8)	0	
Most times (more than half the time)	5 (23.8)	1 (4.8)	
Sometimes (about half the time)	3 (14.3)	4 (19.1)	
A few times (less than half the time)	3 (14.3)	3 (14.3)	
Almost never or never	8 (38.1)	7 (33.3)	
Over the past 4 weeks, how often did you become lubricated ("wet") during sexual activity or intercourse?			
No sexual activity	4 (19.1)	10 (47.6)	0.178
Almost always or always	1 (4.8)	0	
Most times (more than half the time)	5 (23.8)	1 (4.8)	
Sometimes (about half the time)	3 (14.3)	4 (19.1)	
A few times (less than half the time)	3 (14.3)	3 (14.3)	
Almost never or never	8 (38.1)	7 (33.3)	
Over the past 4 weeks, how difficult was it to become lubricated ("wet") during sexual activity or intercourse?			
No sexual activity	5 (23.8)	11 (52.4)	0.226
Extremely difficult or impossible	1 (4.8)	0	
Very difficult	7 (33.3)	4 (19.1)	
Difficult	0	0	
Slightly difficult	0	0	
Not difficult	8 (38.1)	6 (28.6)	
Over the past 4 weeks, how often did you maintain your lubrication ("wetness") until completion of sexual activity or intercourse?			
No sexual activity	4 (19.1)	10	0.155
Almost always or always	1 (4.8)	0	
Most times (more than half the time)	5 (23.8)	1 (4.8)	
Sometimes (about half the time)	3 (14.3)	4 (19.1)	
A few times (less than half the time)	3 (14.3)	4 (19.1)	
Almost never or never	8 (38.1)	6 (28.6)	
Over the past 4 weeks, how difficult was it to maintain your lubrication ("wetness") until completion of sexual activity or intercourse?			
No sexual activity	6 (28.6)	11 (52.4)	0.368
Extremely difficult or impossible	0	0	
Very difficult	1 (4.8)	0	
Difficult	7 (33.3)	4 (19.1)	
Slightly difficult	1 (4.8)	0	
Not difficult	6 (28.6)	6 (28.6)	
Over the past 4 weeks, when you had sexual stimulation or intercourse, how often did you reach orgasm (climax)?			
No sexual activity	5 (23.8)	11 (52.4)	0.200
Almost always or always	1 (4.8)	0	

Continued.

Variables	No episiotomy (n=21)	Episiotomy (n=21)	P value
Most times (more than half the time)	5 (23.8)	1 (4.8)	
Sometimes (about half the time)	3 (14.3)	4 (19.1)	
A few times (less than half the time)	3 (14.3)	3 (14.3)	
Almost never or never	7 (33.3)	6 (28.6)	
Over the past 4 weeks, when you had sexual stimulation or intercourse, how difficult was it for you to reach orgasm (climax)?			
No sexual activity	6 (28.6)	11 (52.4)	0.368
Extremely difficult or impossible	1 (4.8)	0	
Very difficult	7 (33.3)	4 (19.1)	
Difficult	1 (4.8)	0	
Slightly difficult	0	0	
Not difficult	6 (28.6)	6 (28.6)	

DISCUSSION

This trial aimed to compare 'routine episiotomy' versus 'no episiotomy' in primigravida women, with outcomes focused on perineal injury and pelvic floor function. Out of 125 recruited women, 83 were excluded due to emergency caesarean or instrumental delivery, leaving 42 randomised into the two groups. These participants were assessed for perineal injury and pain, postpartum pelvic floor dysfunction, urinary and anal incontinence, and perineal pain using validated tools. The findings demonstrated that the episiotomy group had a significantly shorter second stage of labour and more uniform perineal tears compared to the no-episiotomy group. Additionally, the no-episiotomy group required more analgesia in the immediate postpartum period. However, there were no significant differences in perineal pain at later points, pelvic floor dysfunction, urinary or anal incontinence, or sexual function.

Recent literature suggests that routine episiotomy is associated with perineal lacerations, excess blood loss, infections and maternal morbidity compared to restrictive episiotomy.[15,21] With limited evidence supporting the beneficial impact of routine over selective episiotomy, its practice is now considered a form of obstetric violence. Despite this, episiotomy continues to be used as a routine procedure in many centres. For instance, a prospective population-based registry from Central India reported more than a twofold increase in episiotomy use from 13% to 31% of vaginal births over a 5-year period.[22] Similarly, a study from New Delhi reported rates as high as 63.4% in vaginal deliveries.[23]

In our study, the significant reduction in second-stage duration in the episiotomy group (30 minutes vs 60 minutes, $p = 0.034$) suggests that episiotomy facilitated delivery in the short term. However, these findings contrast with previous studies, such as Mahendru et al. (2010), which reported no association between episiotomy and shorter second stage duration.[24] Similarly, the reduced need for analgesics in the episiotomy group within the first 24 hours postpartum indicates some immediate benefit, but this did not translate into long-term functional improvements. In line with our observations, Giri et al reported no differences between groups in APGAR scores, severity of perineal pain, analgesic use by day 2, anal and urinary incontinence, dyspareunia, or NICU admission.[25] On the other hand, literature highlights long-term complications of routine episiotomy, including perineal pain, dyspareunia, and reduced sexual function.[26]

Findings from this study highlighted significantly raised MDA levels in the no-episiotomy group but remained stable in the episiotomy group; TNF-α levels increased significantly post-delivery only in the episiotomy group. The increase in MDA (a marker of lipid peroxidation and oxidative stress) in the no-episiotomy group suggests that spontaneous perineal tearing may undergo more oxidative damage than a clean surgical incision, possibly due to uncontrolled tissue tearing, crush injury, or irregular disruption of tissue planes. On the other hand, the increase in TNF-α following episiotomy likely reflects the inflammatory response to the surgical incision and subsequent tissue repair. The lack of significant change in CK in both groups implies that muscle cell breakdown may be limited or similar in both types of injury in this time frame (baseline to 36 h), and the non-significant but downward trend in IL-6 in the episiotomy group might indicate differential patterns of cytokine release or resolution that need further study.

These results can be interpreted in light of several related studies. First, there is no literature directly comparing biochemical markers of oxidative stress and inflammation in episiotomy vs spontaneous tears. Most of the published work focuses on outcomes like perineal pain, healing, urinary incontinence, or long-term pelvic floor dysfunction rather than on molecular biomarkers.[4,27] However, there are a few caveats. The small sample size may have limited power to detect smaller changes, especially for IL-6 and CK. The wide variation in individual inflammatory responses and the timing of assessment (baseline and 36 h) may have missed peak changes for some markers. Have been listed as limitation in this study Additionally, heterogeneity in the severity of spontaneous tears could influence the extent of tissue damage and subsequent biomarker release.

Besides, objective and biochemical assessment of inflammatory markers, other strengths include a comprehensive assessment of the episiotomy vs no episiotomy process using validated tools and robust methodology. However, the small sample size and single-centre study limit the statistical power and generalizability of the findings. Therefore, future studies with a large sample and multi-centre studies with a longer follow-up duration can be planned to validate these findings.

Considering no additional long-term clinical advances of routine episiotomy compared to no episiotomy, it is also important to create awareness among clinicians about the limited long-term benefits associated with routine episiotomy. Strengthening training programs, improving awareness, and implementing evidence-based restrictive policies could help reduce unnecessary episiotomies and improve maternal outcomes.

CONCLUSION

Routine episiotomy did not confer significant long-term maternal benefits compared to no episiotomy, despite shortening the second stage of labour and reducing immediate analgesic needs. Biochemical evidence suggests greater inflammatory and oxidative stress with episiotomy. Larger multicentric trials are warranted to validate these findings and further explore biomarker-based assessments of genital injury.

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