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Source / Izvornik: **Menopausal Review, 2021, 20, 163 - 169**

Journal article, Published version
Rad u časopisu, Objavljena verzija rada (izdavačev PDF)

https://doi.org/10.5114/pm.2021.110956

Permanent link / Trajna poveznica: https://urn.nsk.hr/urn:nbn:hr:105:402558

DOI: https://doi.org/10.5114/pm.2021.110956

Menopause Rev 2021; 20(4): 163-169

ORIGINAL PAPER

Effects of lateral episiotomy on the emergence of urinary incontinence during the first postpartum year in primiparas: prospective cohort study

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Abstract

Aim of the study: Lateral episiotomy is a widely used procedure, although it is rarely mentioned in the literature and its effects on the pelvic floor are largely unexplored. The purpose of this study is to evaluate the impact of lateral episiotomy on the incidence of urinary incontinence (UI) after vaginal delivery in primiparas.

Material and methods: The study design is a prospective cohort study. The primiparas were divided into two groups. The first group consisted of women who gave birth with lateral episiotomy, while the second group included women who gave birth with an intact perineum or with perineal tears of first and second degree. Assessments of UI were performed at 5 and 8 months after childbirth using the International Consultation on Incontinence Questionnaire – Short Form (ICIQ-SF) questionnaire followed by the stress test.

Results: The results revealed no significant differences ($p > 0.05$) in emergence of stress urinary incontinence (SUI) between the groups at the two time points. There were no statistically significant differences in overall rate of UI, urge urinary incontinence (UUI), or mixed urinary incontinence according to the ICIQ-SF questionnaire. The overall incontinence rate on the first examination was 24% in the episiotomy group and 36% in the perineal laceration group, although the difference was not statistically significant ($p = 0.064$). On the second examination, rates were similar and without a statistically significant difference.

Conclusions: Lateral episiotomy has a neutral effect on the onset of UI in primiparous women in the first year after delivery.

Key words: episiotomy, urinary incontinence, primiparas.

Introduction

Episiotomy is an obstetrical procedure that extends the vaginal vestibule during fetal expulsion. It is done to avoid severe perineal trauma and to decrease the risk of traumatic delivery for the fetus [1]. Episiotomy was widely used for many years in a routine manner and was considered safe and reliable. The first report that challenged these beliefs was published in the 1980s, claiming that episiotomy had no benefits for the pelvic floor [2]. Moreover, large studies suggested that routine implementation of episiotomy should be abandoned [3–7]. In addition, available data largely supported the theory of the negative [8, 9], or neutral effect [10, 11] of different types of episiotomies on the onset of urinary incontinence (UI). Since the effects of episiotomy on women's wellbeing remain controversial, it is important to use this operative procedure with great attention and with indication. Nowadays, the use of a restrictive approach of episiotomy, according to the obstetric indication, is recommended [6, 7]. Lateral episiotomy is a widely used technique but is rarely mentioned in the literature and its effect on the pelvic floor is largely unexplored. This type of episiotomy is characterized by an incision, starting 1–2 cm from the posterior vaginal joint in the direction of the ischial tuberosity [11–13]. Most of the scientific papers deal with median and mediolateral episiotomies.

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Submitted: 28.06.2021
Accepted: 20.08.2021

The etiology of UI is multifactorial and not completely understood, although it is known that obesity, aging, and obstetric trauma are probably the most important risk factors [14]. Thom *et al*. reported a range of relative risk (RR) from 1.3 to 4.6 for the occurrence of UI in parous women as compared to nulliparous women [15, 16]. It has been shown that most UI with onset in pregnancy or in the puerperium will spontaneously withdraw through several months after delivery due to functional recovery occurring in younger women [16]. On the other hand, in some patients, familial tendency for connective tissue weakness is an additional causal factor for stress urinary incontinence (SUI) onset [17]. It is well known that UI is often associated with vaginal birth. The situation of delivering a hypertrophic newborn, especially in combination with prolonged time at the pelvic outlet, could result in severe stretching or damage to the levator ani muscles and parts of the endopelvic fascia, as well as injury to the pudendal nerve [18, 19]. The prevalence of urinary continence disorders increases with age. Rates rise from 20 to 30% in young woman to 30 to 40% in middle age and 30 to 50% in the third age [20]. Stress urinary incontinence is the most common type of incontinence in younger women with an incidence peak between years 45 and 49 [21, 22].

The aim of our study is to evaluate the impact of lateral episiotomy on UI frequency after vaginal delivery in primiparas during the first postpartum year.

Material and methods

Study design and inclusion/exclusion criteria

We conducted a prospective cohort study at the Department of Obstetrics and Gynecology, "Sveti Duh" University Hospital, Zagreb from February 2016 to October 2017 as part of the clinical trial "Effects of lateral episiotomy on the function of pelvic floor and sexual function after vaginal delivery in primiparas", which was previously registered on Australian New Zealand Clinical Trials Registry (ANZCTR). The research was approved by the Ethics Committee of the "Sveti Duh" University Hospital. All patients signed a document approved by our institution for the anonymous use of their clinical data for scientific purposes according to the European privacy law.

The puerperas were divided into two groups:

- women who gave birth with lateral episiotomy,
- women who gave birth with an intact perineum or with perineal tears of first and second degree.

The inclusion criteria were as follows: primiparity, singleton pregnancies and spontaneous onset of delivery. Restrictive lateral episiotomy was used with indication. Exclusion criteria were: cesarean delivery, third- and fourth-degree perineal tears, preterm delivery, breech presentation, instrumental delivery, multiparity, multiple pregnancies, fetal head rotation abnormalities during delivery, deflection of the fetal head, pre-existing dyspareunia, incontinence of urine and stool during pregnancy, positive personal and family history of pelvic floor dysfunction and any surgery performed in the pelvis before the current pregnancy. Participants who became pregnant during the study or were doing exercises of pelvic floor muscles after delivery until the first pelvic examination were excluded from further research. Out of a total of 400 informed female respondents, sampling of female respondents was conducted and 100 women ($n1 = 100$, $n2 = 100$) were included in each group according to the results of the test power analysis.

Data collection

The participants were called 5 and 8 months after the delivery for a pelvic floor function evaluation. The collected data were entered in the appropriate form and were related to childbirth and general characteristics of the population in both groups. The Questionnaire International Consultation on Incontinence Questionnaire – Urinary Incontinence – Short Form (ICIQ-UI-SF) was used to assess the degree of UI and its impact on daily life [23]. The questionnaires included a retrograde period of 4 weeks prior to arrival for evaluation (5 and 8 months after birth). The presence and type of symptomatic UI were defined according to the answer to question number 6 from ICIQ-UI-SF. The cough stress test was used for more precise investigation of SUI. Since the investigation included a younger population of women with recent delivery, the test was performed by a modified method. The bladder itself was not filled with 200–250 ml of saline by a catheter, but the subjects were told to drink up to 1 liter of water 1 hour before the examination and not to empty the bladder before the examination. Before the stress test was performed, the bladder volume was assessed using 2D ellipse ultrasound (volume = length x width x height x 0.52), and the test was only performed at measured volumes of more than 200 ml.

Statistical analysis

The statistical analysis was performed with the SPSS version 25.0 software (www.ibm.com) An analysis of the normality of data distribution was made. Quantitative data are presented through median and interquartile ranges. The categorical data are presented through absolute frequencies and associated proportions. Differences in quantitative values between groups were evaluated by the Mann-Whitney U test. Differences in categorical variables between the studied groups were analyzed by the χ^2 test. All p-values less than 0.05 were considered as significant.

Table 1. Characteristics of study population: categorical variables

Characteristics		Group		Statistical analysis
		Episiotomy	Perineal tears	
		n (%)	*n* (%)	*p*
Marital status	Married	77 (77)	85 (85)	0.149
	Unmarried	23 (23)	15 (15)	
Mother's education	High school education	25 (25)	27 (27)	0.774
	College education	12 (12)	9 (9)	
	University education	63 (63)	64 (64)	
Oxytocin	Yes	86 (86)	76 (76)	0.071
	No	14 (14)	24 (24)	
Epidural analgesia	Yes	59 (59)	55 (55)	0.568
	No	41 (41)	45 (45)	

n – number of participants, *p* – level of significance

Table 2. Characteristics of study population: quantita

	Group	Percentiles			*u*	*z*	*p*
		25th	Median	75th			
Age (years)	Episiotomy	29.0	31.0	34.0	4980.5	–0.048	0.962
	Perineal tears	28.3	31.0	34.0			
BMI prior delivery (kg/m^2)	Episiotomy	25.8	27.9	29.4	4796.0	–0.498	0.618
	Perineal tears	24.8	26.9	29.8			
Body weight prior pregnancy (kg)	Episiotomy	58.3	63.0	65.0	4612.0	–0.950	0.342
	Perineal tears	58.0	61.0	67.8			
Body weight prior delivery (kg)	Episiotomy	72.3	77.0	82.8	4792.5	–0.508	0.612
	Perineal tears	70.0	75.0	85.0			
Mother body height (cm)	Episiotomy	164.0	168.0	172.0	4968.0	–0.078	0.937
	Perineal tears	165.0	168.0	172.0			
Newborn weight (g)	Episiotomy	3252.5	3530.0	3697.5	4587.0	–1.009	0.313
	Perineal tears	3215.0	3490.0	3692.5			
Newborn head circumference (cm)	Episiotomy	34.0	34.5	36.0	4520.0	–1.192	0.233
	Perineal tears	34.0	34.5	35.0			
Duration of second stage of delivery (min)	Episiotomy	58.0	83.5	120.0	4656.0	–0.842	0.400
	Perineal tears	50.0	80.0	110.0			
Gestational age (weeks)	Episiotomy	39.04	40.07	40.57	4182.5	–2.000	0.046
	Perineal tears	39.14	39.86	40.29			

Results

The general, anthropometric and obstetric characteristics of the participants by groups are shown in Tables 1 and 2. There were no statistically significant differences between groups except for the gestational age variable, where there was a significant difference (40.07 weeks of gestation vs. 39.86, $p = 0.046$). In the episiotomy group after 5 months, 46 women breastfed (46%), and in the comparative group of perineal ruptures, 47 women (47%) breastfed, which was a statistically insignificant difference ($\chi^2 = 0.020$, $p = 0.887$).

The initial test for assessment of SUI in both groups was a stress test. That showed no differences between the groups. In the episiotomy group, 16% of examinees had a positive result of the stress test at the first examination (5 months after delivery), which is comparable to 20% in the perineal tears group ($\chi^2 = 0.542$, $p = 0.462$). At the second examination, which took place 3 months after the first evaluation, there were 13.5% positive findings in the episiotomy group and 14.9% in the perineal tears group ($\chi^2 = 0.071$, $p = 0.790$) (Table 3).

Symptomatic incontinence was classified into specific types of incontinence by the groups studied, based on the answer to question 6 from the ICIQ-UI-SF. The first examination revealed that symptomatic SUI was present in 7% of examinees in the episiotomy group

Table 3. Stress urinary incontinence testing – stress test

Stress test		Group				Statistical analysis	
		Episiotomy		Perineal ruptures			
		n	%	*n*	%	χ^2 test	*p*
Stress test 0	Positive	16	16	20	20	0.542	0.462
	Negative	84	84	80	80		
Stress test 1	Positive	13	13.5	14	14.9	0.071	0.790
	Negative	83	86.5	80	85.1		

0 – first examination, 1 – second examination, *n* – number of participants, *p* – level of significance

and in 16% of women in the perineal tears group (χ^2 = 3.9, *p* = 0.05). Urge urinary incontinence (UUI) symptoms were present in 10% of examinees in the episiotomy group as compared to 16% in the perineal tears group (χ^2 = 1.592, *p* = 0.207). Symptoms of mixed UI were present in both groups with a similar rate of 2%. On the other hand, other non-specific incontinence symptoms were present in the episiotomy group with 5%, as compared to 2% in the perineal tears group (χ^2 = 1.322, *p* = 0.248). The overall incontinence rate was 24% in the episiotomy group and 36% in the perineal tears group (χ^2 = 3,429, *p* = 0.064) (Table 4).

At the second examination, all symptoms of different types of incontinence were found in both groups with similar prevalence (Table 4). Symptoms of SUI were found in 9.4% of women in the episiotomy group and 18.1% in the perineal tears group (χ^2 = 3.051, *p* = 0.081). Symptoms of UUI were found with comparable prevalence in both groups as well (9.4% vs. 8.5%).

The overall incontinence rate evaluated at the second examination was 26% in the episiotomy group and 29.8% in the perineal tears group (χ^2 = 0.331, *p* = 0.565) (Table 4). The values of the median of total sum of ICIQ-UI-SF in the episiotomy group as well as in the perineal tears group were not statistically significantly different at the first (U = 4508.5, *p* = 0.138) or second examination (U = 4420.0, *p* = 0.759).

Discussion

According to the results of this study, lateral episiotomy in childbirth of the primiparous women does not have a protective effect on the possible occurrence of urinary continence during the first year after childbirth. There is also no adverse effect of lateral episiotomy on the investigated pelvic floor function [24, 25].

The incidence of SUI as well as other types of UI was the same in the lateral episiotomy group as in the peri-

Table 4. Symptoms of different types of incontinence by group

Symptoms of incontinence	No/Yes	Group				Statistical analysis	
		Episiotomy		Perineal ruptures			
		n	%	*n*	%	χ^2 test	*p*
SUI 0	No	93	93	84	84	3.897	0.050
	Yes	7	7	16	16		
UUI 0	No	90	90	84	84	1.592	0.207
	Yes	10	100	16	16		
MUI 0	No	98	98	98	98	0.000	1
	Yes	2	2	2	2		
Other symptoms of incontinence 0	No	95	95	98	98	1.332	0.248
	Yes	5	5	2	2		
Total 0	No	76	76	64	64	3.429	0.064
	Yes	24	24	36	36		
SUI 1	No	87	90	77	81.9	3.051	0.081
	Yes	9	9	17	18.1		
UUI 1	No	87	90	86	91.5	0.044	0.835
	Yes	9	9.4	8	8.5		
MUI 1	No	94	97.9	92	97.9	0.000	0.983
	Yes	2	2.1	2	2.1		
Other symptoms of incontinence1	No	91	94.8	93	98.9	2.668	0.102
	Yes	5	5.2	1	1.1		
Total 1	No	71	74	66	70.2	0.331	0.565
	Yes	25	26	28	29.8		

SUI – stress urinary incontinence, UUI – urge urinary incontinence, MUI – mixed urinary incontinence1, 0 – first examination, 1 – second examination, *n* – number of participants, *p* – level of significance

neal tears group. Lateral episiotomy did not increase the risk of developing SUI at 5 and 8 months postpartum. The frequency of UI was the same in the lateral episiotomy group as in the lesser perineal lacerations and intact perineum group. No substantial associations between episiotomy and UI were found, which is in accordance with the majority of research on other types of episiotomy. Pelvic floor dysfunction is related to childbirth to a certain extent, although childbirth itself does not appear to be the only influencing factor [9, 26, 27]. It has not been proven that collagen weakness is the most important factor in pathogenesis of postpartum UI [28]. Although pelvic floor muscle denervation could be an etiological factor in the development of SUI, which is recorded in more than half of women after vaginal delivery, it has been shown to recover in the first year after delivery in most cases [29, 30].

A study by Wesnes *et al*. indicated that being incontinent during pregnancy increases the odds ratio of being incontinent six months after delivery by 3.5 times in a population of primiparous women [31]. In order to better explore the effect of delivery on pelvic floor dysfunctions, in our study we enrolled only primiparous women who had been continent through their pregnancy. We already knew that midline and mediolateral episiotomy does not protect against the onset of UI [3, 5], but a similar level of evidence on the use of lateral episiotomy was not published. Nevertheless, there are no studies of the mid-term effects of lateral episiotomy on the incidence of UI in the available databases. Therefore, we tried to interpret our results in comparison with other types of episiotomy.

Sartore *et al*. found that mediolateral episiotomy was related to lower pelvic muscle strength 3 months after vaginal delivery [11], which may be associated with emergence of SUI. Our results showed similar incidence of SUI in both study groups, suggesting that the time period of 5 and 8 months postpartum could be the optimal period for evaluation of the postpartum pelvic floor when restoration of functions is expected to be completed. This is important to note, since certain studies indicate that the symptoms will be present long term if there is no improvement in SUI 3 months after the delivery [9].

On the one hand, our results indicated high percentages of UI during the first postpartum year, confirming some previous reports on high rates of postpartum UI [28]. On the other hand, our results also revealed that women with an episiotomy had similar UI rates and scores at 5 and 8 months postpartum as well as women with no episiotomy, i.e., with perineal tears of lesser degree, suggesting that lateral episiotomy could not be a risk factor for UI occurrence after delivery. Similar results were reported by Sartore and Karacam, who found no significant difference in UI rates 3 months after delivery between women who had mediolateral episiotomy and those who delivered their babies without episiotomy [11, 32].

The percentage of women with SUI was, according to the diagnostic test (symptoms or stress test), in the episiotomy group 7 (16%), and in the perineal rupture group 16 (20%) after 5 months. In a similar study by Sartore *et al*., 3 months postpartum, SUI rates of 12.9% for episiotomy and 12.1% for intact perineum and lesser perineal tears were noted, but the study was performed within the framework of mediolateral episiotomy [11]. Our results showed similar incidence of UI in general and SUI in the primiparous women after vaginal delivery as compared to other published results [11, 33]. Incidence of UUI is comparable to certain prevalence studies as well (4 months postpartum – 12% in all vaginal births regardless of parity and mode of delivery) [34, 35]. The study by Baydock showed that the risk of UUI is significantly higher in women with episiotomy (RR 1.9; 95% CI: 1.2–2.9, $p < 0.01$), which was not confirmed in our study, since the incidence of UUI was similar regardless of performed episiotomy. Arrue *et al*. reported a general rate of SUI of 15.1% 6 months after the vaginal birth in the primiparas, although the study was not detailed about the mode of vaginal delivery and with restrictive use of mediolateral episiotomy [36]. Episiotomy itself was not a risk factor for UI, while the most important risk factor for postpartum SUI was the occurrence of UI in pregnancy. Epidural analgesia did not affect the onset of UI in medium term, regardless of the mode of delivery [37, 38].

The main strength of the present study is exclusion of women with prior UI during pregnancy, which enabled us to perform more precise analysis of the effect of lateral episiotomy on the occurrence of postpartum UI. It has been previously reported that the prevalence of UI and SUI 6 months after delivery was similar regardless of the performance of mediolateral and lateral episiotomy [37]. Although we used different time points for investigations, our results are comparable to previously mentioned ones, with the conclusion that lateral episiotomy has no impact on the occurrence of UI and SUI in the first postpartum year. Compared to other results in one major observational study in primiparas, after 3, 6 and 9 months, UI rates were approximately 16, 24, and 20%, respectively, which is to a certain extent a similar trend. At the same time intervals, the proportions of SUI were about 10, 18, and 12%, respectively [39, 40].

To our knowledge, this is the largest study carried out in Croatia dealing with the effect of episiotomy and vaginal birth itself on the occurrence of UI in primiparous women in the first year after vaginal delivery. Although it is well known that vaginal delivery represents a significant risk factor for the emergence of UI, lateral episiotomy has not shown any protective effect on different types of UI. A great effort was made to exclude

any possible external factors that could affect the results of the comparison between the groups.

It is important to investigate pelvic floor dysfunction in the primiparous population as it eliminates the impact of a second birth that may exacerbate existing intrapartum injury. The first childbirth appears to have the greatest and most significant impact on the development of pelvic floor dysfunction [9]. Given that the use of lateral episiotomy in the study population was restrictive, the results of this study are even better and another reason to promote the use of restrictive lateral episiotomy.

Despite these strengths, our results have some limitations deriving from the retrospective nature of the study and the small sample size. The short time (one year) of follow-up seems to be a limitation of our study.

We recommend that postpartum pelvic floor dysfunction could be medically evaluated and treated one year after childbirth.

Conclusions

We concluded that lateral episiotomy in restrictive settings:

– represents a very good incision of the perineum with acceptable comorbidities respecting the pelvic floor functions,
– does not cause different changes of the pelvic floor in terms of emergence of UI and SUI than vaginal delivery with spontaneous minor perineal lacerations during the first year after delivery,
– has a neutral effect on the onset of UI in primiparas during the first year after delivery,
– is a safe obstetric operation when indicated.

Acknowledgement

The study was approved by the Institutional Review Board.

Disclosure

The authors report no conflict of interest.

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