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Risk factors for mediolateral episiotomy at a tertiary hospital: a cross-sectional study

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SUMMARY

OBJECTIVE: The main aim of this study was to assess the associated factors for selective mediolateral episiotomy at a tertiary, academic hospital.

METHODS: A retrospective cohort analysis between 2017 and 2019 was performed. The primary outcome was the prevalence of selective mediolateral episiotomy. Independent variables were maternal, intrapartum, and neonatal characteristics. A significance level of 5% was established, and univariate and multivariate analyses with logistic regression models were performed.

RESULTS: From 2,761 vaginal deliveries eligible for inclusion during this period, the prevalence of selective mediolateral episiotomy was 18.7%. Univariate analysis has shown that non-white women were protective factors (OR=0.77 [0.63–0.96]; p=0.02) for episiotomy; primiparity (OR=2.61 [2.12–3.21]; p<0.01), number of vaginal examinations between 6–10 repetitions (OR=3.16 [2.48–4.01]; p<0.01) and 11–20 repetitions (OR=5.40 [3.69–7.90]; p<0.01), longer second stage duration (OR=1.01 [1.00–1.02]; p<0.01), and women with gestational age more than 37 weeks were risk factors. Multivariate analysis reported that second stage duration (AOR=1.01 [1.00–1.03]; p<0.01), primiparity (AOR=2.03 [1.34–3.06]; p<0.01), and number of vaginal examinations between 6–10 repetitions (AOR=2.36 [1.50–3.70]; p<0.01) and 11–20 repetitions (AOR=3.29 [1.74–6.20]; p<0.01) were remained as risk factors for selective mediolateral episiotomy.

CONCLUSION: A higher number of vaginal examinations during labor (over six repetitions), longer duration of second stage labor, and primiparity were risk factors associated with selective mediolateral episiotomy.

KEYWORDS: Episiotomy. Risk factors. Second stage labor. Childbirth. Cervical dilatation.

INTRODUCTION

Episiotomy is defined as an incision in the vagina and perineum carried out by a trained attendant to enlarge the vaginal opening[1]. Most of the current guidelines agree that episiotomy should not be performed routinely and that, when indicated, mediolateral episiotomy (MLE) should be the option of choice[2]. In cases where instrumental delivery is not planned, selective episiotomy results in fewer women with severe perineal trauma. Moreover, the World Health Organization (WHO) has recommended a 10% rate for episiotomy, and these suggestions have an impact on the rate of this procedure worldwide[3].

However, there is no consensus about evidence-based, specific clinical indications for performing selective episiotomy. Most commonly specified reasons are fetal distress, shoulder dystocia, and perineal trauma prevention[4]. An U.S. study has found that private attending, prolonged second stage deliveries, fetal macrosomia, and epidural analgesia were associated with episiotomy[5]. Despite decreasing episiotomy rates in several countries (the United States with 11.6% in 2012), several demographic characteristics were associated with the receipt of this technique, such as white women and commercial insurance; rural and academic hospitals were associated with less use[6]. In Canada, these rates have dropped to 6.5% for spontaneous vaginal deliveries[7]. It is possible that providing adequate knowledge on this topic will help in reducing these rates. In Brazil, less than one-third of obstetricians reported that they perform episiotomies in less than 20% of their cases[8]. It is important to understand the associated factors with selective episiotomy so that preventive measures can be implemented if higher rates are found. We sought to assess the factors associated with selective episiotomy in a tertiary, referral, and academic hospital.

METHODS

We performed a retrospective cohort analysis of 2,846 singleton vaginal births between April 2017 and February 2019. The study occurred in a tertiary maternity hospital and received the approval of the Institutional Review Board from Women's Hospital,

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University of Campinas – Brazil (CAAE 88954218.2.0000.5404 – June 6, 2018). Electronic medical records and printed medical charts from the maternity database were thoroughly analyzed. After this process, the data collected were organized into a spreadsheet for the assessment of incorrect typing and missing data. Women submitted to cesarean section and twin pregnancies were excluded from the present analysis. This study followed the STROBE (strengthening the reporting of observational studies in epidemiology) statement[9].

MLE is the standard technique for performing this procedure in our institution. No midline episiotomies were found in the retrieved records. We could not obtain more specific details of the technique (e.g., length, depth, and angle) as this was a retrospective chart review. However, the surgical technique is standardized, and careful attention is provided to all these topics. The procedure is generally performed under the supervision of the head of the obstetric ward and the chief resident. Local and/or regional anesthesia is provided. No specific instruments are used to perform an episiotomy (e.g., Epi-Scissors™). In cases of instrumental delivery and severe perineal trauma (third and fourth degree), prophylactic antibiotics are usually performed.

Diagnosis of perineal trauma was performed by trained obstetricians according to the Royal College of Obstetricians and Gynecologists guidelines. Details of the study methodology were recently published by our research group[10]. In this study, the primary outcome was the presence of selective MLE (yes/no). The secondary outcomes were defined as follows: maternal outcomes (i.e., age, ethnic, marital status, gravidity, parity, gestational age during labor, and amniotic fluid index); intrapartum outcomes (i.e., induced or spontaneous labor, forceps, number of vaginal examinations during labor, fetal presentation, and duration of the second stage), severe perineal trauma (i.e., third and fourth degree), and neonatal outcomes (i.e., birthweight, 1- and 5-mine Apgar, and head circumference).

Statistical analysis

For statistical analysis, we used Intercooled Stata version 13.0 software (StataCorp, LLC, College Station, TX, USA). Continuous and categorical variables were compared by the Student's t-test and chi-square or Fisher's test, respectively. Significance level was set at 5%. Logistic regression models for univariate and multivariate analysis were performed, and odds ratio (OR) with 95% confidence intervals (CI) were built. The cutoff point for including the variables at the multivariate analysis was every variable whose p-value was <0.05. Missing data from patients that were more than 50% were not included in the study. Imputation methods were not applied to missing data variables. Considering a study power of 90%, a 5% alpha level, and a suggested prevalence of 10% by WHO, we would need 1,046 women to study this variable (G.Power version 3.1.9.4, Germany).

RESULTS

Between April 2017 and February 2019, we selected 2,846 records of women who delivered in the maternity, 85 of whom were excluded due to incomplete electronic medical records (Figure 1). A total of 2,761 women were included for further analysis. In our study, the episiotomy rate was 18.7%. Maternal, intrapartum, and neonatal outcomes are presented in Table 1.

More than 88% of women were below 35 years of age, and 66.3% were classified as white. Most women presented a gestational age between 37 and 40 weeks (65.9%), followed by <37 weeks (25.7%) and >40 weeks (8.4%). Primiparity represented more than half of the evaluated cases (52.3%), and instrumental delivery was performed in 192 (6.95%) cases (all forceps-assisted deliveries). Obstetric and anal sphincter injuries (third- and fourth-degree perineal tear) were noted in 517 cases. Of these, 506 (18.32%) occurred in women who did not undergo an episiotomy and 11 (0.39) occurred in women who underwent an episiotomy. Head circumference was predominantly ≥33 cm (79.4%), and macrosomia was found in 65 (2.5%) newborns.

A higher duration of second stage was noted in the episiotomy group (p<0.01). In the univariate analysis, gestational age between 37–40 weeks (OR 1.75; 95%CI 1.32–2.33; p<0.01) and >40 weeks (OR 1.87; 95%CI 1.20–2.90; p<0.01) was associated with episiotomy. This trend was not observed in the multivariate analysis. However, the number of digital vaginal examinations was associated with episiotomy in univariate and multivariate analyses. Women who received 6–10 digital vaginal examinations increase the odds of undergoing an episiotomy by threefold (OR 3.16; 95%CI 2.48–4.01; p<0.01). When the number of digital vaginal examinations reached 11–20 repetitions, the odds of women being submitted to episiotomy increased by above fivefold (OR 5.40; 95%CI 3.69–7.90; p<0.01). After adjusting to maternal age, parity, gestational age, race, number of vaginal examinations, newborn sex and weight, head circumference, and the number of digital vaginal examinations in 6–10 and 11–20 repetitions remained associated with episiotomy (AOR 2.36; 95%CI 1.50–3.70; p<0.01 and AOR 3.29; 95%CI 1.74–6.20; p<0.01, respectively). A higher duration of the second stage also remained in the final analysis for episiotomy. Finally, primiparity increased the odds of undergoing episiotomy by twofold in both univariate and multivariate analyses (Table 2).

Figure 1. Flowchart describing the steps of the study.

DISCUSSION

This retrospective cohort analysis has found a prevalence of selective MLE of 18.7%. Significant differences were observed regarding race, gestational age more than 40 weeks, primiparity, and intrapartum outcomes (i.e., use of instrumental delivery, number of digital vaginal examinations, and the duration of the second stage of labor) between the presence and absence of episiotomy. In univariate analysis, gestational ages (37–40 weeks and >40 weeks), primiparity, duration of the second stage, and number of digital vaginal examinations

Table 1. Sociodemographic, maternal and neonatal variables according to the presence of mediolateral episiotomy.

Variables	No episiotomy	Episiotomy	p-value*
Age (years), n (%)			0.06
<35	1,964 (80.76)	468 (19.24)	
≥35	280 (85.11)	49 (14.89)	
Race, n (%)			**0.02**
White	1,466 (80.02)	366 (19.98)	
Non-white	778 (83.75)	151 (16.25)	
Marital status, n (%)			0.53
Without partner	865 (80.69)	207 (19.31)	
With partner	1,397 (81.65)	310 (18.35)	
Presentation, n (%)			0.07
Cephalic	2,215 (81.11)	516 (18.89)	
Pelvic	23 (95.83)	1 (4.17)	
Gestational age (weeks), n (%)			**<0.01**
<37	465 (87.08)	69 (12.92)	
37–40	1,090 (79.33)	284 (20.67)	
>40	137 (78.29)	38 (21.71)	
Parity, n (%)			**<0.01**
Primiparity	1,080 (74.69)	366 (25.31)	
2–3 Gestations	878 (86.76)	134 (13.24)	
≥4 Gestations	286 (94.39)	17 (5.61)	
Amniotic fluid index, n (%)			0.20
Oligohydramnios	44 (89.80)	5 (10.20)	
Normal	1,859 (81.18)	431 (18.82)	
Polyhydramnios	17 (89.47)	2 (10.53)	
Type of delivery, n (%)			0.44
Spontaneous	1,484 (82.22)	321 (17.78)	
Induced	607 (80.93)	143 (19.07)	
Instrumental delivery, n (%)			**<0.01**
No	2,237 (87.08)	332 (12.92)	
Yes	7 (3.65)	185 (96.35)	
Number of vaginal examinations, n (%)			**<0.01**
0–5	1,045 (90.87)	105 (9.13)	
6–10	936 (75.91)	297 (24.09)	
11+	105 (64.81)	57 (35.19)	
Fetal macrosomia, n (%)			0.36
No	2,044 (81.37)	468 (18.63)	
Yes	50 (76.92)	15 (23.08)	

Continue...

Table 1. Continuation.

Variables	No episiotomy	Episiotomy	p-value*
Duration of the second stage (min)	37.07±32.75	54.93±37.19	**<0.01**
Head circumference (cm), n (%)			0.06
<33	443 (84.06)	84 (15.94)	
≥33	1,640 (80.47)	398 (19.53)	
Newborn sex, n (%)			0.06
Male	1,015 (79.80)	257 (20.20)	
Female	1,077 (82.72)	225 (17.28)	
Apgar 1 min, n (%)			0.22
7–10	1,940 (81.48)	441 (18.52)	
0–6	144 (77.84)	41 (18.78)	
Apgar 5 min, n (%)			0.15
7–10	2,057 (81.11)	479 (18.89)	
0–6	30 (90.91)	3 (9.09)	
OASIS, n (%)			0.21
No	2,213 (98.62)	31 (1.38)	
Yes	506 (97.87)	11 (2.13)	

*Chi-square test for binomial variables and Student's t-test for continuous variables. OASIS: obstetric anal sphincter injuries. Bold indicates statistically significant values.

were associated with episiotomy. After multivariate analysis, higher number of digital vaginal examinations, higher length of second stage duration, and primiparity remained associated with selective MLE.

Episiotomy rates around the world varies considerably. There are low numbers such as 9.7% in Sweden and countries achieving as high as 100% in Taiwan[11]. This large differences in the rates of episiotomy is related to the episiotomy policies applied worldwide[2]. In our service, the performance of episiotomy is restricted to the selective episiotomy policy, in which the clinical judgment is applied to determine the need to perform it and to certify if the benefits outweigh the harms in critical situations[12].

The number of digital vaginal examinations increased the risk of performing episiotomy by twofold (6–10 examinations) and threefold (11–20 examinations) in the present multivariate analyses. The labor progress assessment is one of the main tools carried out in intrapartum care, combined with different assessments in the partograph including the dilatation of the cervix os, fetal descent, and fetal position[13]. Although fetal descent and position may be assessed externally, the digital vaginal examination is routinely used for the assessment of the cervix

Table 2. Univariate and multivariate analysis for obstetrical and neonatal variables associated with mediolateral episiotomy.

Variables	Crude OR (95%CI)	p-value	Adjusted OR (95%CI)	p-value
Age (>35)	0.73 (0.53–1.01)	0.06		
Non-white color	0.77 (0.63–0.96)	0.02		
Gestational age 37–40 weeks	1.75 (1.32–2.33)	**<0.01**	1.65 (0.93–2.93)	0.08
Gestational age 40+ weeks	1.87 (1.20–2.90)	**<0.01**	1.38 (0.59–3.21)	0.46
Aminiotic fluid index	1.30 (0.69–2.44)	0.42		
OASIS (Yes)	1.55 (0.77–3.11)	0.21		
Duration of second stage	1.01 (1.00–1.02)	**<0.01**	1.01 (1.00–1.03)	**<0.01**
Marital status (with partner)	0.94 (0.77-1.14)	0.53		
Type of delivery	1.09 (0.87–1.35)	0.44		
Fetal macrosomia (Yes)	1.31 (0.73–2.35)	0.37		
Female newborn sex	0.82 (0.68–1.01)	0.06		
Head circumference	1.27 (0.99–1.66)	0.06		
Apgar 1 min	0.95 (0.89–1.01)	0.12		
Apgar 5 min	1.02 (0.93–1.13)	0.63		
Number of vaginal examinations (6–10)	3.16 (2.48–4.01)	**<0.01**	2.36 (1.50–3.70)	**<0.01**
Number of vaginal examinations (11–20)	5.40 (3.69–7.90)	**<0.01**	3.29 (1.74–6.20)	**<0.01**
Primiparity	2.61 (2.12–3.21)	**<0.01**	2.03 (1.34–3.06)	**<0.01**

OR: odds ratio; CI: confidence interval; OASIS: obstetric and anal sphincter injuries; adjusted for: Maternal age, parity, second stage duration, gestational age, race, number of vaginal examinations, newborn sex and weight, head circumference; n=762. Bold indicates statistically significant values.

os. A vaginal examination is recommended in case of uncertainty whether the woman is in established labor[14]. In the first stage of delivery, vaginal examination is recommended every 4 h and hourly in the second active stage, or in response to the woman's wishes[15].

There is evidence that vaginal examination may interfere with labor progress in some women by causing pain and distress and raising their anxiety compared with less invasive tools for the assessment of labor progress, digital vaginal examination was found to cause negative experiences[16]. In a study comparing ultrasonography and digital vaginal examination, the latter consistently over-estimated cervical dilation when compared with ultrasonography[17].

Moreover, intrapartum digital vaginal examination presented a higher median pain score than intrapartum transtibial ultrasound (4.5 against 0), with no difference in pain scores obtained for digital vaginal examination by clinicians with different experiences[18].

To the best of our knowledge, only one study reported that the episiotomy rate was increased in the digital vaginal examination group. This randomized controlled trial showed that episiotomy was performed more frequently in the digital vaginal examination group (9.8%) than in the transperineal ultrasound group (7.1%); however, the difference between these two groups was not statistically significant (p=0.66)[19].

The rates of episiotomy and the frequency of advanced perineal trauma seem to be higher in primiparous women[20]. In the present study, primiparity increased the risk of performance of episiotomy by twofold in both univariate and multivariate analyses. Episiotomy was performed in 77.2% in the first delivery in a retrospective study.

Interestingly, the study reported that the risk of undergoing a spontaneous perineal tear or an episiotomy in the second delivery is increased by the performance of episiotomy in the first one (AOR 3.27, 95%CI 2.37–4.51)[21]. In contrast with our study, a systematic review found no clear evidence of a difference between primiparity–multiparity and episiotomy in a subanalysis[2]. Selective episiotomy also seems to have a protective effect in primiparous women, lowering the risk of severe perineal trauma[22].

Our results found, in univariate and multivariate analyses, an association between the duration of the second stage of labor and episiotomy. A prolonged second stage of labor increases the risk of perineal trauma[23]. The second stage of labor for more than 2 h increased the risk of perineal trauma by 1.42 (AOR 1.42; 95%CI 1.28–1.58)[24].

Gestational age between 37–40 weeks and above 40 weeks increased the risk of performance of episiotomy in 1.75 and 1.87 times, respectively, in univariate analysis. After adjusting for confounders in multivariate analysis, this trend could not be observed. Similar to our findings, a large retrospective cohort study found that gestational age was a risk factor for episiotomy in both nulliparous (AOR 1.07) and multiparous (AOR 1.06) women[25].

As a strength of this study, it was performed in a large tertiary hospital in the southeast region of Brazil with a considerable number of included women. This study also raised a critical discussion regarding the role of digital vaginal examination in the performance of episiotomy. Prospective, controlled studies are necessary to investigate whether vaginal examination should be performed with caution in the intrapartum scenario. Limitations concerning the study design of retrospective analysis should be taken into consideration. Finally, our analysis is related to one single-center practice, and it might have interfered in our results.

AUTHORS' CONTRIBUTIONS

GMVP: Conceptualization, Data curation, Formal Analysis, Investigation, Visualization, Writing – original draft. **RCA:** Conceptualization, Data curation, Formal Analysis, Investigation, Visualization. **AGL:** Conceptualization, Data curation. **MAN:** Conceptualization, Data curation. **GJL:** Conceptualization, Data curation. **LGOB:** Conceptualization, Data curation, Formal Analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, and Writing – review & editing.

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