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Original Article

Prevalence and contributing factors of severe perineal damage following episiotomy-assisted vaginal delivery

Wu-Chiao Hsieh [a], Ching-Chung Liang [a, b, *], Dennis Wu [a], Shuenn-Dhy Chang [a, b], Ho-Yen Chueh [a, b], An-Shine Chao [a, b]

[a] Department of Obstetrics and Gynecology, Chang Gung Memorial Hospital, Linkou Medical Center, Taoyuan, Taiwan
[b] College of Medicine, Chang Gung University, Taoyuan, Taiwan

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ABSTRACT

Objective: This study was conducted to investigate the risk factors of third- and fourth-degree lacerations following vaginal deliveries in Taiwanese women, and to offer clinical guidance for the reduction of severe perineal lacerations.
Materials and methods: A total of 1879 women who underwent vaginal deliveries assisted by midline episiotomy at a tertiary hospital were included. Obstetric risk factors were analyzed for women with and without third- and fourth-degree lacerations.
Results: Two hundred and five deliveries (10.9%) resulted in third- or fourth-degree lacerations. Parity, duration of first and second stages of labor, rate of instrument-assisted vaginal deliveries, the newborn's birth weight and head circumference, and the ratio of the newborn's birth weight to maternal body mass index were significantly different between women with and without severe perineal lacerations. Logistic regression demonstrated that nulliparity (odds ratio = 3.626, $p < 0.001$), duration of second stage of labor (odds ratio = 1.102, $p = 0.044$), instrument-assisted vaginal delivery (odds ratio = 4.102, $p < 0.001$), and newborn's head circumference (odds ratio = 1.323, $p < 0.001$) were independent risk factors of severe perineal lacerations. Instrument-assisted vaginal delivery was a common independent risk factor for severe lacerations shared between primiparous and multiparous women.
Conclusions: With regard to severe perineal lacerations during vaginal delivery, there are multiple obstetric contributory factors despite routine episiotomy, among them, nulliparity, longer labor duration, greater newborn head circumference, and instrument-assisted vaginal delivery. The latter should only be performed after careful evaluation.

Introduction

A third- or fourth-degree laceration is a serious adverse outcome of vaginal delivery. Symptoms associated with severe perineal injuries include flatus and stool incontinence, urinary and sexual dysfunction, perineal pain, and recto-vaginal fistula [1,2]. The prevalence of severe perineal lacerations following vaginal delivery varies amongst different ethnicities, locations of childbirth, and age when performed [3–7]. A global survey from 24 countries on maternal and perinatal health reported that the prevalence of third- and fourth-degree lacerations ranged from 0.1% to 15% [7]. Among various obstetric parameters, primiparity, instrument-assisted vaginal delivery and heavy newborn birth weight were previously identified to be significantly associated with severe perineal lacerations [8–12]. Other risk factors include advanced maternal age, postterm pregnancies, induction of labor, prolonged second stage of labor, epidural anesthesia, Asian ethnicity, and episiotomy [3,4,13–15].

Episiotomy itself poses a risk of severe perineal lacerations following vaginal delivery according to previous reports [14,15]; however, in our country, routine episiotomy is still being performed during vaginal deliveries because many obstetricians still believe this technique may facilitate the delivery process. The purposes of this study were to investigate the risk factors of third- and fourth-degree lacerations following vaginal delivery in Taiwanese women and to offer clinical guidance to reduce the rate of severe perineal lacerations.

* Corresponding author. Department of Obstetrics and Gynecology, Chang Gung Memorial Hospital, Linkou Medical Center, 5, Fu-Shin Street, Gueishan, Taoyuan 333, Taiwan.
E-mail address: ccjoliang@cgmh.org.tw (C.-C. Liang).

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Materials and methods

This observational cohort study included 1879 consecutive parturients who received vaginal deliveries assisted by midline episiotomy at 36 weeks of gestation or more in our institution, a tertiary hospital, from November 2004 to August 2005. Demographic, medical, and obstetric data were documented and stored in a computerized database. Those with nonvertex fetal presentations, multiple gestations, cesarean deliveries, and those who were delivered before 36 gestational weeks were excluded from this study. The study has been approved by the ethics committee of our institution.

Under local anesthesia with lidocaine, the episiotomy performed in our institution consisted of an incision of approximately 3 cm over the midline of the perineum from the introitus to just above the anus, prior to fetal head crowning. Routine vaginal delivery management included active manual protection of the perineum and the fetal head when the latter was crowning through the vagina. Fundal pressure was banned during entire delivery. Women with prolonged second stage of labor underwent instrument-assisted deliveries. Prolonged second stage was defined as lasting more than 2 h or 3 h depending on parity and if epidural anesthesia was used, as proposed by the American College of Obstetricians and Gynecologists [16]. All perineal or vaginal injury repairs and instrument deliveries were performed by experienced obstetricians. The perineal status was examined by the delivery doctor and recorded into the delivery log at the time of delivery. These data were then entered into a computerized database. A third-degree laceration was defined as an injury to the perineum involving the anal sphincter muscles, whereas a fourth-degree laceration referred to an injury to the perineum extending to the rectal mucosa [17]. Both types of lacerations were considered as severe perineal lacerations.

The computerized database was analyzed to compare various obstetric parameters between women with and without third- and fourth-degree lacerations. These parameters included maternal age, parity, education level, previous miscarriages, maternal height, maternal weight (prepregnancy and at delivery), body mass index (prepregnancy and at delivery), labor courses (first and second stages of labor), the use of intrapartum epidural anesthesia, instrument-assisted vaginal delivery, and the newborn's birth weight and head circumference. Continuous data were analyzed using the Student t test, and the relative proportions were compared using the Chi-square test. The variables that were found to be statistically significant in by univariate analysis were retested using the multivariate logistic regression model to identify the independent risk factors. Data were analyzed using the SPSS version 20.0 for Windows (SPSS, Inc., Chicago, IL, USA). Probability values less than 0.05 were considered statistically significant.

Results

Of the 1879 parturients, 1039 (55.3%) were primiparae and 840 (44.7%) were multiparae. The mean maternal age was 29.9 years (range 23–38) and the mean parity was 1.6 (range 1–6). Epidural analgesia was administered to 601 (32.0%) of the women. The number of instrument-assisted deliveries was 151 (8.0%), all of which were carried out by vacuum extraction. A total of 205 women (10.9%) acquired a third- or fourth-degree laceration, including 16.4% in nulliparous ($n = 170$) and 4.2% in multiparous ($n = 35$). Comparisons of demographic and obstetric characteristics between patients with severe and nonsevere perineal lacerations are shown in Table 1. The number of nulliparous women, the duration of first and second stages of labor, the frequency of instrument-assisted vaginal deliveries, newborn's birth weight and head circumference, and the ratio of the newborn's birth weight to maternal body mass index were significantly different between the two groups. In Table 2, logistic regression demonstrates that nulliparity (odds ratio = 3.626, 95% confidence interval: 2.393–5.497, $p < 0.001$), the duration of second stage of labor (odds ratio = 1.002, 95% confidence interval: 1.000–1.104, $p = 0.049$), instrument-assisted vaginal delivery (odds ratio = 4.102, 95% confidence interval: 2.749–6.120, $p < 0.001$), and newborn's head circumference (odds ratio = 1.323, 95% confidence interval: 1.172–1.492, $p < 0.001$) were independent risk factors of severe perineal lacerations.

Tables 3 and 4 illustrate the discrimination of risk factors for severe perineal laceration between primiparous and multiparous women. As revealed in Table 3, the duration of second stage of labor, the frequency of instrument-assisted vaginal delivery and epidural analgesia, newborn's birth weight and head circumference, and the ratio of the newborn's birth weight to maternal body mass index were significantly different between severe and nonsevere perineal lacerations in primiparous women. Table 4 shows that multiparous women have a longer duration of first and second stages of labor, and higher frequency of instrument-assisted vaginal

Table 1
Comparison of various obstetric characteristics between severe and nonsevere perineal laceration groups.

Variable	Laceration ($n = 205$)	No laceration ($n = 1674$)	Total ($N = 1879$)	p
Maternal age (y)	29.7 ± 4.3	29.9 ± 4.3	29.9 ± 4.2	0.529
Parity	1.5 ± 0.4	1.6 ± 0.7	1.6 ± 0.7	0.176
Previous miscarriages	27.3%	25.3%	25.5%	0.540
Completed college	67.8%	64.3%	64.7%	0.474
Maternal height (cm)	159.3 ± 5.2	159.7 ± 5.0	159.6 ± 5.0	0.140
Prepregnancy BW (kg)	55.6 ± 29.1	54.1 ± 8.9	54.2 ± 12.7	0.876
BW at delivery (kg)	67.9 ± 9.1	68.1 ± 16.5	68.1 ± 15.9	0.242
Prepregnancy BMI (kg/m^2)	21.0 ± 3.3	21.2 ± 3.3	21.2 ± 3.3	0.964
BMI at delivery (kg/m^2)	26.9 ± 3.2	26.6 ± 3.4	26.6 ± 3.6	0.080
Nulliparity	170 (82.9%)	869 (51.9%)	1039 (55.3%)	<0.001
First stage (min)	381.9 ± 463.2	270.0 ± 283.4	282.1 ± 304.8	<0.001
Second stage (min)	79.3 ± 81.4	43.5 ± 62.7	47.4 ± 65.9	<0.001
Instrument delivery	56 (27.3%)	95 (5.7%)	151 (8.0%)	<0.001
Epidural analgesia	73 (35.6%)	528 (31.5%)	601 (32.0%)	0.238
Newborn birth weight (g)	3290.3 ± 380.1	3168.2 ± 740.3	3181.4 ± 710.4	<0.001
HC of newborn (cm)	33.8 ± 1.3	33.3 ± 1.4	33.4 ± 1.5	<0.001
Newborn birth weight/Prepregnancy BMI	163.2 ± 73.7	152.4 ± 48.2	153.6 ± 51.5	<0.001

Data are presented as mean ± standard deviation or n (%).
BMI = body mass index; BW = body weight; HC = head circumference.