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Identification of women at high risk for severe perineal lacerations



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ABSTRACT

Objectives: To evaluate the frequency and to identify the risk factors of severe perineal lacerations and the subgroup of women exposed to the highest risk for these complications.

Study design: We conducted a case-control study in a large cohort of women for which vaginal delivery management consisted in systematic perineal support and restrictive use of mediolateral episiotomy.

The case group comprised women with severe perineal lacerations while the control group comprised women without severe perineal lacerations. Maternal, labor, delivery and neonatal characteristics were analyzed in logistic regression models and a classification and regression tree (CART) was constructed. **Results:** Between 2000 and 2009, 19,442 women delivered vaginally in our centre, 88 of whom had severe perineal lacerations (0.5%). Instrumental delivery (aOR 4.17, 95% CI 2.51–6.90), nulliparity (aOR 2.58, 95% CI 1.55–4.29), persistent posterior orientation (aOR 2.24, 95% CI 1.02–4.94) and increased birth weight (aOR 1.28, 95% CI 1.03–1.60) were independent risk factors of severe perineal lacerations whereas mediolateral episiotomy had a protective effect (aOR 0.38, 95% CI 0.23–0.63). CART identified instrumental delivery of neonates smaller than 4500 g in persistent posterior orientation in nullipara without mediolateral episiotomy as the clinical situation associated with the highest risk of severe perineal lacerations (12.5%). Conversely, patients with the lowest risk (0.1%) were those delivering spontaneously, neonates larger than 3200 g after mediolateral episiotomy.

Conclusions: Instrumental delivery, nulliparity, persistent posterior orientation and increased birth weight are independently associated with severe perineal lacerations. Restrictive use of mediolateral episiotomy protects against severe perineal lacerations especially in case of instrumental delivery.

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Introduction

Third and fourth degree perineal lacerations, defined as tears involving respectively the anal sphincter and the anal sphincter and anal epithelium [1,2], are associated with 0.1% to 10.2% of vaginal deliveries [3]. They represent serious complications of vaginal delivery because they may lead to fecal incontinence [4,5], pelvic floor disorders [6], dyspareunia [7,8], chronic pain [9,10], and ultimately to severe psychological and social problems [11].

Various independent risk factors have been recognized to be associated with these severe perineal lacerations. Increased maternal age, nulliparity, induction of labor, epidural analgesia, prolonged duration of second stage of labor, fetal macrosomia, persistent occipitoposterior position and instrumental delivery are the most frequently reported [12–16]. Data regarding the effects of episiotomy on the occurrence of severe perineal tears are conflicting. Randomized trials and metaanalyses demonstrated that routine, particularly midline, episiotomy was associated with increased rates of severe perineal lacerations [17–19] whereas some retrospective cohort studies showed that mediolateral episiotomy might protect the anal sphincter, mostly in case of instrumental delivery [20,21].

However, opposing conclusions about the consequences of episiotomy have also been drawn in case of instrumental delivery. For example, a recent study analyzing data from Baltimore–Washington, DC corridor identified women delivering with forceps

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and episiotomy as having the highest risk (68.9%) of severe perineal lacerations [22] while a Dutch report found that mediolateral episiotomy in case of forceps extraction was associated with a 20 fold reduction in that risk (1.4%) [23]. Discrepancies in the reported rates of severe perineal lacerations and in the role of episiotomy in their occurrence in case of instrumental delivery might reflect differences in misreporting, importance given to this clinical situation in a particular setting, but mostly differences in clinical practices at delivery. Interpretation of the results of these multicentre retrospective cohort studies [22,23] is difficult because they suffer from the fact that information regarding clinical practices at delivery such as manual protection of the perineum, type of instrumental extraction and episiotomy, are often heterogeneous, incomplete or even lacking.

As their knowledge may help to reduce their occurrence by applying early preventive measures, we aimed at identifying first the effect of episiotomy, among other risk factors, on the risk of severe perineal lacerations by conducting a retrospective study in a large cohort of women for which we could provide detailed data on delivery management and secondly, the subgroup of women exposed to the highest risk for these complications in this population by using recursive partitioning methods.

Material and methods

This is a case-control study in a large cohort of women with a singleton pregnancy delivered vaginally in our university-hospital level III maternity unit (3000 deliveries per year) from January 1, 2000, through December 31, 2009. The case group comprised women with severe perineal lacerations while the control group comprised women without severe perineal lacerations. The Robert Debré Hospital Ethical Committee has examined this work and found it conformed to the ethical standards and to the scientific requirements applicable to medical research. We included all women delivering at or after 28 weeks of gestation and excluded only those women with non cephalic presentations, multiple pregnancies and intrauterine fetal death. Women whose delivery was complicated by shoulder dystocia were not excluded from the analysis. Gestational age was established by last menstrual date and first trimester ultrasound scan. The scan was preferred if the menstrual date was uncertain or if there was discrepancy of more than 5 days between the two estimates.

In our maternity, patients have large access to epidural analgesia. In case of persistent posterior orientation during the second stage of labor, a manual rotation of the fetal head is attempted. If oxytocin has been used during labor, its infusion flow is not modified during the pushing efforts. Women deliver in lithotomy position allowing visualization, massage, lubricant application and support of the perineum during pushing efforts. One hand of the accoucheur controls the speed of crowning through the vaginal introitus, while the other hand supports the perineum and take a grip on the neonate's chin [24]. The mother is then asked to stop pushing [24]. When most of the head is out, the perineal ring is pushed under the neonate's chin as described [24]. Episiotomies are always mediolateral and indicated only when the perineal ring starts tearing. All spontaneous deliveries are performed by midwives and instrumental deliveries by residents under the direct supervision of a senior obstetrician. Third and fourth degree perineal lacerations are sutured by the senior obstetrician. If no epidural analgesia was requested during labor, sutures of perineal tears and/or episiotomy are performed after local infiltration of lidocaine.

Maternal, obstetric and early neonatal data are collected prospectively daily and recorded in our computerized Access database by midwives during hospitalization and immediately after delivery. Data entered into the database are double-checked every morning for each delivery by the obstetrician in charge of the

daily staff meeting and by the midwife dedicated to the database maintenance. Twice a year, an external quality-control audit is performed using hospital information system data. Maternal (age, parity, previous cesarean delivery), labor (induction, oxytocin infusion, duration of labor, type of analgesia), delivery (orientation of the fetal head, episiotomy, instrumental extraction) and neonatal (gestational age and weight at birth, head circumference) characteristics were reviewed.

Qualitative variables are described as numbers (frequencies) and quantitative variables as mean (standard deviation, SD). Relationship between severe perineal lacerations and episiotomy adjusted on characteristics of women, labor, delivery and neonates were studied using the Poisson regression. We first entered all variables except those related to labor in the multivariable model. Selection was performed by backward elimination at alpha risk level 5%. CART analysis was performed to identify particular risk subgroups from found risk factors. All tests were bilateral and statistical analyses were realized with SAS 9.2 software for PC computer (SAS Institute Inc., Cary, NC) and R package v 2.10.1 (R Foundation for statistical computing).

Results

During the study period, 19 442 women delivered vaginally in our centre, 88 of whom had severe perineal lacerations (0.5%). In comparison with patients without severe perineal lacerations, women experiencing these complications were significantly more often nullipara and were more frequently treated with oxytocin during labor. They delivered at significantly older gestational age, larger neonates, in persistent posterior orientation, after instrumental extraction (Table 1).

After multivariate analysis controlling for potential confounding factors, instrumental delivery (aOR 4.17, 95% CI 2.51–6.90), nulliparity (aOR 2.58, 95% CI 1.55–4.29), persistent posterior orientation (aOR 2.24, 95% CI 1.02–4.94) and increased birth weight (aOR 1.28, 95% CI 1.03–1.60) were independent risk factors of severe perineal lacerations whereas mediolateral episiotomy had a protective effect (aOR 0.38, 95% CI 0.23–0.63) (Table 2).

CART analysis showed that instrumental delivery was the most discriminating factor associated with the occurrence of severe perineal lacerations (Fig. 1). Following the branch "instrumental delivery" down to the terminal leaves of the tree, the highest rate of severe perineal lacerations (12.5%) was associated with delivery of neonates smaller than 4500 g in persistent posterior orientation in nullipara without mediolateral episiotomy. Conversely, patients with the lowest risk (0.1%) were those delivering spontaneously, neonates larger than 3200 g after mediolateral episiotomy (Fig. 1).

Comment

The results of the present study confirm that (i) low severe perineal laceration rates are achievable, (ii) instrumental delivery is a major risk factor of severe perineal lacerations, together with nulliparity, increased birth weight and persistent posterior orientation and (iii) restrictive use of mediolateral episiotomy has a protective effect, especially in case of instrumental delivery.

Rate of severe perineal lacerations in our cohort was low (0.5%), in the range of the French national rate (0.8%) [25] and in accordance with the results from recent Israeli (0.25%) [16], Finnish (0.36%) [26] or Norwegian (1.2%) [24] studies. In these countries, visual control of the perineum during delivery, manual protection of the perineum and restrictive mediolateral episiotomy are now standard of care, which have been previously reported as protective measures for the anal sphincter [27–30]. Conversely, highest rates of severe perineal lacerations are observed in settings where midline episiotomies are performed [19,22].

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