Language barrier as a risk factor for obstetric anal sphincter injury – A case-control study

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Short title: Obstetric anal sphincter injury

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ABSTRACT:

Introduction

The incidence of grade 3-4 perineal tears, also known as obstetric anal sphincter injury (OASI), is reported to be between 0.5 and 2.5%. Beyond the medico-economic burden, the consequences of OASI on a woman's emotional, psychological, sexual, and physical wellbeing are considerable. Among the various risk factors of OASI, few data are available about the impact of a language barrier on its incidence.

Material and Methods

We conducted a case-control study to evaluate the effect of language barriers on the risk of OASI comparing 171 women with OASI and 163 matched controls. The matched criteria included ethnicity, age, previous vaginal delivery, delivery mode, prophylactic episiotomy and birthweight. Patients' characteristics were compared and crude ORs and 95% CIs estimated using unadjusted logistic models. Multivariate analysis was performed with recognized potential confounders.

Results

All of the cases had grade 3 tears. Language barrier was a determinant factor of OASI with an OR of 3.32 [1.36-8.90], p=0.01. Other risk factors were occipito-posterior delivery, African origin and prolonged labor duration (OR 6.33, 95% CI: 2.04-27.78, p=0.004, OR 1.85, 95% CI: 1.08-3.19, p=0.03 and OR 1.03, 95% CI: 1.01-1.05, p=0.004, respectively).

Conclusion

Our data suggest that language barrier is an independent risk factor of OASI. Physicians and midwives should attempt to identify patients with a language barrier during prenatal visits. Education about simple terms used during delivery could decrease the incidence of this complication.

KEY WORDS: obstetric anal sphincter injury; perineal tears; language barrier; risk factors

INTRODUCTION

Spontaneous perineal tears during vaginal birth occur in up to 85% of women during exiting of the baby's head [1,2]. Higher rates of perineal tears are reported after first vaginal deliveries especially if the delivery is assisted [3]. Both the anterior and posterior perineum can be involved and the tears are classified according to the depth of the injury: from grade 1 (least serious) to grade 4 (most serious) [2,4]. The incidence of grades 3-4, also known as obstetric anal sphincter injury (OASI), is reported to be between 0.5 and 2.5% after a spontaneous delivery and may be higher for instrumental births [5,6]. In France, the incidence of OASI is estimated at 0.8% [7]. The differences in incidence of perineal tears from one country to another are partly due to various definitions and practices [5,6].

The most common consequence of perineal tears in the immediate postpartum period is severe perineal pain [8], followed by wound infection and suture breakdown [9]. Pain is still reported by one third of women 2 weeks after delivery and, while it usually resolves within 2 months, up to 7% still experience pain at 3 months [1,9]. A relation between pain and tear grade has been demonstrated [10]. Other long term consequences of perineal injury are dyspareunia [11] and anal incontinence [12] which can affect women in their daily tasks and their sexuality, and has a major psychological impact [13].

After OASI, 8% of women experience fecal and 45% flatus incontinence [14]. These complications depend on the experience of the operator and the type of suture [15,16], but not on the extent of the anal sphincter injury [17]. Half of obstetric recto-vaginal fistulae are related to OASI [18]. Finally, in addition to the medico-economic burden, the consequences of perineal tear on women's emotional, psychological, sexual and physical wellbeing, especially when the anal sphincter is injured, must be considered [13,19].

Some risk factors for OASI, such as assisted deliveries, primiparity, birth weight and ethnicity, are well identified [20–22]. Additional risk factors, such as episiotomy, gestational or maternal age, are more debatable [23,24]. In contrast, some protective factors, including perineal massage before delivery and other perineum management techniques during delivery, have been suggested but their impact on perineal tears is debatable [6,25]. Language barriers could negatively impact perineal injuries, since the collaboration between the obstetrician, midwife and the parturient herself is important during the delivery [26] and lack of communication could be a risk factor for grade 3 tears [27]. In contrast to anatomical conditions and obstetrical procedures, few data are available about the impact of a language barrier on the occurrence of perineal tears.

Therefore, the aim of the present retrospective study was to evaluate the impact of language barrier on the risk of OASI in a secondary university maternity unit.

MATERIALS AND METHODS

Data collection and variable definition

This retrospective study was conducted in Tenon University Hospital in Paris. Among 35 912 women aged 18 years or more who underwent vaginal delivery between January 2001 and March 2016, women with grade 3-4 tears were identified using procedure codes from our prospective database. The control group was established on the basis of the antichronological list of deliveries between January 2001 and March 2016. The controls were matched on available known risk factors identified in the literature: ethnicity (Asian/others), age (+/- 3 years), previous vaginal delivery (yes/no), delivery mode (assisted or not), prophylactic episiotomy (yes/no) and birth weight (+/-150 g) in order to include 140 women, that is 1:1 ratio of case and controls. Women with the history of grade 3-4 tears were excluded from the analysis. Further data were extracted from hospital records for each patient: language difficulties, labor duration, ethnicity (defined as maternal birthplace), occipito-posterior delivery, and newborn outcomes.

Perineal tears were classified according to the depth of the injury [4] (grade 1 – vaginal mucosa injury, grade 2 – perineal muscle injury, grade 3 – external anal sphincter rupture (3a: <50% of fibers torn or involved, 3b: ≥50% of fibers torn, 3c: injury of internal sphincter), grade 4 – rectal mucosa injury) [2,4]. As no consensus exists on the definition of language difficulties and barriers, we defined a language barrier as being present if it was impossible to dialogue with the patient without a translator during prenatal visits, and if the woman could not understand important words such as "push" and "breath" or simple anatomical terms or instructions for body positions. This information is systematically reported in the patient's file during the first prenatal visit and is defined as the necessity of translator during prenatal visits and the labor. The incidence of women with a language

barrier in our department is estimated at 5% due to the multiple ethnic origins of our population. Language difficulties are clearly identified during prenatal visits by the midwife, obstetrician and/or anesthesiologist and reported in the hospital records.

According to the birth policy in our department, uncomplicated vaginal deliveries are usually performed by midwives and assisted deliveries by obstetricians. During the study period, epidural anesthesia was performed in 81% of the patients. Mediolateral episiotomy is not systematic for either assisted or non-assisted deliveries. OASI is systematically managed by an obstetrician. The procedures used in this retrospective study were in accordance with the guidelines of the Helsinki Declaration on Human Experimentation and the Good Clinical Practice (CGP) and approved by the IRB (CEROG 020-GYN-1102).

Statistical analysis

The primary objective of the study was to analyze the incidence of OASI in women presenting a language barrier. A sample size of 140 pairs was calculated for a language difficulty prevalence expected to be 5% for controls and 15% for cases with a power (β) of 0.80 and α 0.05 with one control for one case. To provide for potential missing values, we decided to include 200 pairs. In this study, 66 patients (37 controls and 29 cases) lacked primary outcome or matching data and were excluded from the analysis (Figure 1).

First, a descriptive analysis of all the patients was performed. Patients' characteristics were compared using the Chi square or Fisher's exact tests for categorical values, and Wilcoxon's tests for numerical data. Crude ORs and 95%CIs were estimated using unadjusted logistic models. Multivariate analysis was performed with all known potential confounders (match variables and others including ethnicity, labor duration, and occipito-posterior delivery). All non-contributive variables ($p<0.05$) were stepwise excluded. Bilateral tests

were computed and the significance level was set at 0.05; OR and 95%IC were calculated. We used R 3.3.0 to perform statistical analysis.

RESULTS

Epidemiological characteristics of the population

The matching criteria of the 334 women included in the study (171 women with OASI and 163 controls without OASI) are summarized in Table 1. All the women in the OASI group had grade 3 perineal laceration. The most commonly reported maternal ethnic groups were African (47.6%), Caucasian (27.5%) and Asian (20.4%), with similar rates between the two groups (p=0.15). Previous vaginal delivery was reported for 35.6% of the women without difference between the groups. There was no statistical difference in any of the matching variables (Table 1).

Univariate and multivariate analysis

Univariate analysis (Table 2) identified a significant difference between the groups in the proportion of women with language barrier (12.3% in the OASI group versus 4.9% in the control group, p=0.03). Labor induction and gestational age at delivery were not different between the groups (p=0.22 and p=0.96, respectively). Labor duration was longer and occipito-posterior delivery was more frequent in the women with OASI compared to the controls (17.0 (11.0-26.0) versus 22.0 (13.0-31.0), p=0.01 and 1.8% versus 11.1%, p<0.001, respectively). These variables affected the rate of OASI in the final multivariate analysis model (OR 1.03, 95%CI: 1.01-1.05, p=0.004 and OR 6.33, 95%CI: 2.04-27.78, p=0.004, respectively). Concerning major indicators of the newborn status, an Apgar score under 7 at 5 minutes and cord arterial pH were comparable between the groups (p=0.17 and p=0.83, respectively).

Age, previous vaginal delivery, delivery mode, prophylactic episiotomy and birth weight had no impact on the model construction and were stepwise excluded from the multivariate analysis. Even if the ethnic origin was not different between both groups, it was

retained in the model. Labor duration and occipito-posterior delivery had a major impact on the risk of OASI and were included in the analysis.

The results of the multivariate analysis are reported in Table 3. Occipito-posterior delivery was the most important risk factor of OASI (OR 6.33, 95%CI: 2.04-27.78, p=0.004). African origin and prolonged labor duration remained risk factors of OASI (OR 1.85, 95%CI: 1.08-3.19, p=0.03 and OR 1.03, 95%CI: 1.01-1.05, p=0.004, respectively). Language difficulties also remained significant with an OR of 3.32 [1.36 - 8.90], p=0.01.

DISCUSSION

The present study, using both uni- and multivariable analyses, showed that a language barrier was a significant factor of OASI with an OR of 3.32. Our results are in agreement with those of Esscher et al demonstrating that foreign-born women in Sweden were at a higher risk of maternal, fetal and newborn morbidity and mortality during the various steps of pregnancy and delivery than Swedish-born women [28]. This was essentially related to language barriers which increased the time it took to report to the right medical department, to explain their health concerns, and to be correctly understood [28]. During delivery, language barrier negatively impacted perineal injuries, since communication between the midwife and the parturient woman is essential as the fetal head stretches the pelvic floor [26]. In 2007, Dahlen et al. reported that "a lack of communication" mentioned by midwives was a risk factor for grade 3 tears [27]. However, no objective data were available to support this conclusion. In the presence of communication difficulties, the contribution of an interpreter could be precious [29,30]. However, the availability of an interpreter is limited, especially when the delivery occurs at night or during the week-end [29]. Similarly, the contribution of relatives is not always possible, especially if their knowledge of French is insufficient which limits their contribution in a stressful situation. No study has evaluated the impact of motivating patients during pregnancy to learn simple instructions such as "push" and "stop pushing". Beyond the linguistic issues, the increased maternal morbidity and mortality in women with OASI might be associated with a less favorable economic and social status which hampers optimal prenatal and obstetrical management [31]. Moreover, language barrier might reflect other communication barriers connected to health literacy and the vision of the body anatomy, which could represent an interesting research perspective. The differentiated care could play important role in avoiding this severe obstetrical complication if the language barrier could be identified during the first stages of the pregnancy follow-up.

Multivariate analysis found that an occipito-posterior fetal presentation was a major risk factor of OASI in our study (adjusted OR 6.33 [2.04-27.78], p=0.004), even if it was observed in only 6.6% of the births. This fetal head malposition has already been reported as a major risk factor for OASI with an OR between 5.64 and 13.7 [32,33], especially for primiparous women [34].

In our study, African ethnicity was a risk factor of OASI compared to Caucasian women (OR 1.85 [1.08-3.19], p=0.03). This observation has already been reported in previous studies and can partly be explained by the perineal status of immigrant women from eastern African counties who have undergone female genital mutilation [21,35]. Women of Asian origin, as well as other ethnical origins, were not at higher risk in our study. Asian origin has been largely studied showing an OR of between 1.8 and 8.9 for OASI [27,36,37], but literature data concerning other origins are scarce [21,38]. Other risk factors of OASI, such as labor characteristics, have also been identified: labor duration emerged as a minor risk factor in our multivariate analysis (OR 1.03, 95%CI: 1.01-1.05, p=0.004) although its impact on OASI is debatable [34,39,40].

The matching variables were chosen based on data from the literature. Among major risk factors of OASI, a first vaginal delivery is well recognized with an OR between 2.4 and 7.55 compared to multiparous women [21,36,41]. Assisted delivery has also been well described in large studies and remains a significant risk factor with an OR between 1.9 and 10.2 [21,32,37,42]. The particular risk of each instrument is more debatable: use of a ventouse seems to have a lower OR than forceps use (1.9-2.7 vs 3.9-10.2) but remains a significant risk factor compared to non-assisted delivery [20,23,25]. The risk of sphincter injury related to spatulas, which are often used in France, does not seem to be higher than a forceps delivery and not less than a ventouse delivery [43–45]. Fetal birth weight is a risk factor for grade 3 perineal tear [46,47], especially if the fetal birth weight exceeds 4000g (OR between 1.86 and

3.01) [33,34,38]. Correlated variables such as a head circumference greater than 35 cm [21], shoulder dystocia [37,38,47], gestational age at delivery [21,48] or diabetes [21,34] are also reported as risk factors.

As the advantage of episiotomy in the prevention of OASI is debatable, we decided to match this variable. In the literature prophylactic episiotomy was considered a risk factor in one study [20], a protective factor in two studies [34,49] and without significant effect in others [24,39,47,50]. These contradictory results could be explained by the existence of associated confounding factors [51], such as the length and the angle of the episiotomy [52], with a maximum risk for a vertical cut (median episiotomy) [41,42,53]. A recent meta-analysis performed by Verghese et al showed a low overall protective effect and no effect in the nulliparous group [23]. The authors claim that performing 65 episiotomies could spare one sphincter injury. Some other factors are more debatable, and seem to be minor risk factors, such as maternal age [21,38,39,47], some specific maternal positions during delivery, or giving birth at night (from 3 to 6 a.m.) [41]. Some authors have studied other factors which do not seem to impact the risk of OASI, such as epidural anesthesia [34,39,41], use of oxytocin [39], or pushing duration [32]. On the contrary, antenatal perineal massage or the use of warm compresses during delivery could reduce by half the risk of sphincter laceration [6].

Some limits of the present study need to be underlined. First, the incidence of OASI varies from hospital to hospital. However, during the study period, the incidence of sphincter injury in our department was 0.5% which is in accordance with a study reporting an estimated incidence of around 0.8% in France and 0.1-4% in Europe [7]. Second, despite the case-control study design, the retrospective nature of the current analysis cannot exclude all possible biases. Third, the relatively long study period could be a potential cause of bias: the guidelines on management of low-risk delivery patients changed during this period to reduce the indications of systematic prophylactic episiotomy. However, as previously mentioned, the

protective effect of episiotomy on perineal tears is debatable [24,28,38,39,47,49,50]. Fourth, the absence of patients with grade 4 tears in our population means that we are unable to draw a definitive conclusion as to whether a language barrier is a risk factor of this severe complication which exposes patients to the risk of rectovaginal fistula. However, the low incidence of OASI, estimated at 0.8% in the French population, would require a multicenter study. Fifth, about half of the population of the present study was composed of African women but without clear information on excision and infidibulation that could impact on the incidence OASI representing a limit in the interpretation of our results. However, as previously mentioned, no difference in ethnicity was noted between the groups. Finally, it was not possible to exclude additional confounding factors of perineal tears, such as malnutrition, diabetes and obesity that are often associated with low economic conditions and that are well recognized as a source of inequality for access to health care.

CONCLUSION

Despite some limits of the present study, our data support the fact that, in addition to well-recognized factors of high-grade perineal tears, a language barrier is an independent risk factor. Physicians and midwives should try to identify patients who have language difficulties during the prenatal visits. The education of simple terms that are used during delivery and the implication of education care providers could decrease the incidence of this complication.

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Figure 1. Flow chart.

Table 1. Matching criteria of the two study groups.

	Women without OASI (n=163)	Women with OASI (n=171)	p-value
Age (years), median (IQR)	29.0 (26.0-34.0)	30.0 (25.5-34.0)	0.85
History of previous vaginal delivery, n (%)	63 (38.7)	56 (32.7)	0.28
Ethnicity			
Caucasian, n (%)	53 (32.5)	39 (22.8)	
African, n (%)	68 (41.7)	91(53.2)	0.15
Asian, n (%)	35 (21.5)	33 (19.3)	
Other, n (%)	7 (4.3)	7 (4.1)	
Delivery mode			
Spontaneous, n (%)	63 (38.7)	69 (40.4)	
Ventouse, n (%)	20 (12.3)	12 (7.0)	0.75
Spatulas, n (%)	59 (36.2)	57 (33.3)	
Forceps, n (%)	18 (11.0)	26 (15.2)	
Prophylactic episiotomy, n (%)	73 (44.8)	79 (46.2)	0.80
Birth weight (g), median (IQR)	3400 (3090-3780)	3380 (3100-3780)	0.82

IQR – interquartile range
OASI – obstetric anal sphincter injury

Table 2. Univariate analysis

	Women without OASI (n=163)	Women with OASI (n=171)	p-value
Language barrier, n (%)	8 (4.9)	20 (11.7)	**0.03**
Labor induction, n (%)	115 (70.6)	130 (76.0)	0.22
Labor duration (h), median (IQR)	17.0 (11.0-26.0)	22.0 (13.0-31.0)	**0.01**
Gestational age at delivery, median (IQR)	40.0 (39.4-40.7)	40.1 (39.1-40.7)	0.96
Occipito-posterior delivery, n (%)	3 (1.8)	19 (11.1)	**< 0.001**
Apgar <7 at 5 min, n (%)	4 (2.5)	1 (0.6)	0.17
Cord arterial pH, median (IQR)	7.23 (7.19-7.28)	7.24 (7.19-7.28)	0.83

IQR – interquartile range
OASI – obstetric anal sphincter injury

Table 3. Multivariate analysis

	Univariate analysis			Multivariate analysis		
	OR	95% CI	p-value	OR	95% CI	p-value
Language barrier	2.57	1.14-6.36	0.03	3.32	1.36-8.90	0.01
Labor duration	1.03	1.01-1.05	0.001	1.03	1.01-1.05	0.004
Ethnicity						
Caucasian	ref.	-	-	ref.	-	-
African	1.82	1.08-3.07	0.02	1.85	1.08-3.19	0.03
Asian	1.28	0.68-2.41	0.44	0.95	0.47-1.92	0.89
Others	1.36	0.43-4.28	0.59	1.28	0.37-4.29	0.69
Occipito-posterior delivery	6.62	2.20-28.60	0.003	6.33	2.04-27.78	0.004

CI – confidence interval
OR – odd ratio