STRESS URINARY INCONTINENCE SIX MONTHS AFTER FIRST VAGINAL DELIVERY

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Condensation

Pregnant women who report stress urinary incontinence at the end of pregnancy are more at risk to present this type of incontinence six months after delivery.

Stress urinary incontinence six months after first vaginal delivery

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ABSTRACT

Objective: to determine the prevalence, severity and impact on quality of life of stress urinary incontinence (SUI) six months after the first vaginal delivery, as well as to investigate the risk factors associated with it.

Study Design: we designed a prospective study that included 396 women who had their first vaginal delivery in the Hospital Donostia. Diagnosis and identification of the type of urinary incontinence were carried out considering the 2002 ICS definitions. Women were interviewed and examined twice, at term and six months after delivery. The severity of the symptoms was evaluated with the Incontinence Severity Index (ISI) and the impact on quality of life was evaluated with the International Consultation on Incontinence Questionnaire - Urinary Incontinence - Short Form. The statistical analysis included comparison of means (Student's t test or analysis of variance) and proportions (Chi square and Fisher's exact tests). Multiple logistic regression analysis was performed using variables that were close to statistical significance.

Results: 15.1% of the women reported SUI six months after their first vaginal delivery. The ISI was slight or moderate in the majority of the cases and the impact on quality of life was low. The presence of SUI in pregnant women at term was the only independent risk factor associated with SUI after delivery (OR: 3.71; 95% IC: 1.95-7.06). The type of vaginal delivery did not influence in SUI six months after the birth, not even in women who were continent during pregnancy.

Conclusions: Slight or moderate SUI was common after the first vaginal delivery and the impact on quality of life was low. Urinary incontinence during pregnancy was the only risk factor independently associated with the presence of SUI six months after the first vaginal delivery.

Key words: primiparas; stress urinary incontinence; severity; post-partum; risk factors.

INTRODUCTION

Pregnancy and delivery are established risk factors for urinary incontinence (UI). The EPICONT study (1) showed that parity was associated with incontinence and moreover, it indicated that the first delivery was the most significant event related to its appearance.

Stress urinary incontinence (SUI) often appears for the first time during pregnancy, with a raging prevalence from 16% to 67% (2-5). The changes that occur in the pelvic floor that cause incontinence in pregnant women remain unknown. However, it has been suggested that it could be related to hormonal and mechanical characteristic changes that occur during this period. After pregnancy, incontinence is resolved in the vast majority of the cases, but in a significant percentage of women it can persist in subsequent stages of life (6). The delivery, itself, is also a cause of urinary incontinence. Rates of first appearance of UI have been published, ranging between 6% and 19% (7-9). The passage of the newborn through the birth canal can cause stretching of the muscles (10) and tearing of connective tissue. There is also a compression and stretching of nerves that could lead to partial denervation of the pelvic floor structures (11-12).

Without any doubt, injury of the pelvic floor is involved in the association between parity and stress urinary incontinence, but the specific mechanism of this damage still remains unknown. Besides, it is not clear which variables of pregnancy and delivery are involved in this process. It has been pointed out the influence of being incontinent during pregnancy in the persistence or worsening of this symptom after delivery, but in many cases the authors do not make any distinction between the different types of urinary incontinence (13-15). Studies focused on analyzing the effect of delivery on the appearance of SUI have shown contradictory results, especially regarding the association of assisted delivery with forceps and urinary incontinence (8,9,14,16-18).

The aim of this study was to evaluate the prevalence of stress urinary incontinence six months after the first vaginal delivery, as well as the degree of severity, the impact on the quality of life and the risk factors associated with it. Our hypothesis was that the changes that take place during pregnancy and may be reflected in the presence of SUI in this period play an important role in the prevalence of SUI after giving birth.

MATERIALS AND METHODS

A prospective and observational study was designed to evaluate the impact of the first pregnancy and delivery on postpartum stress urinary incontinence. The sample was taken from the primigravid women who gave birth in the Hospital Donostia between April and October 2007. In order to study only the cases of new appearance of SUI, women who reported any kind of urinary incontinence symptoms prior to pregnancy were excluded from the study. Other exclusion criteria were: multiple pregnancy, gestational age below 37 weeks, neurological disorders of the mother, and history of surgery and urogynaecological malformations**.** Those women whose delivery was completed by caesarean section were also excluded.

Women were included in the study during their admission for labour. An anamnesis focussed on urinary incontinence was carried out according to the definitions of the International Continence Society (ICS) in 2002 (19). The diagnosis and type of incontinence were based on the symptoms described by the women. The SUI was diagnosed when the patient answered, "yes" to the question referring to urinary leakage on effort. In the first visit, the following variables were recorded: age, height, weight, weight gain of the mother by the end of pregnancy, and gestational age. Information on the delivery and the newborn was collected from the corresponding charts. The second stage of labour was defined as the time elapsing between complete dilation and the delivery of the newborn; "pushing time" was defined as the total time during which the woman had been pushing during the second stage of labour. The episiotomy was always mediolateral and used in a restrictive manner.

Six months after delivery, a follow-up appointment was carried out. An interview focussed on urinary incontinence, in a similar way to the first one, was performed. The interviewers were blinded to the results and the group assignment from the first visit. Women who reported SUI were asked about the frequency and quantity of urinary leakage in order to assess the Incontinence Severity Index (ISI) formulated by Sandvick et al. (20) that has been validated in Spanish (21). Patients who reported stress incontinence were also asked to complete the validated version in Spanish of the International Consultation on Incontinence Questionnaire - Urinary Incontinence - Short Form (ICIQ-UI-SF) (22). During this visit, we evaluated the contractibility of the musculature of the pelvic floor using a vaginal probe connected to a digital

perineometer (Peritron, ref. PFX1, Australia). The maximum value from three contractions was recorded.

The statistical analysis was performed with the Statistical Package for the Social Sciences (SPSS) (version 15.0 for Windows) software. The description of the continuous variables was done by the mean followed by the standard deviation (SD) or the range. The categorical variables were described using proportions. The analysis of the association of the variables with SUI was performed by mean comparison using Student's t test or analysis of variances, and proportion comparison using Chi-square test and Fisher's test. A multiple logistic regression model was built using the variables with values of $p \leq 0.25$, in order to identify the risk factors that were independently associated with SUI.

All patients who participated in the study were informed and gave consent prior to inclusion in the study. The protocol of study was approved by the Ethics Committee of Hospital Donostia.

RESULTS

A total of 396 women who had a vaginal delivery and did not present any kind of UI prior to pregnancy were included in the study. Of those, 330 (83.3%) attended the follow-up visit 6 month after giving birth and comprise the study group. The mean age of the women was 30.9 years (range: 18- 43), mean BMI was 23.1 (SD: 3.6), the mean weight gain was 12.4 kg (SD: 4.4) and the mean gestational age was 279 days (range: 259-298). The anamnesis of pregnant women at term revealed that 103 women (31.2%) experienced stress urinary incontinence at that time. The birth was by spontaneous vaginal delivery in 227 women (68.8%), forceps were used for 57 (17.3%), spatula in 29 cases (8.8%) and vacuum in 17 (5.2%). Episiotomy was performed in 261 (79.1%) and epidural anaesthesia was given to 313 (94.8%).

Six months after delivery, 50 women (15.1%) reported stress urinary incontinence, of whom 10 cases showed mixed UI symptoms. SUI at the end of pregnancy was already present in 30 out of 50 women with postpartum SUI. Hence, in 20 cases SUI was new after delivery, corresponding to an incidence of postpartum SUI of 8.8%. The Incontinence Severity Index values for the patients with SUI and those with mixed clinical symptoms are shown in table 1. None of the patients suffered from very severe incontinence. The mean value of ICIQ-UI-SF was 8.19 (range 3-16) for women presenting stress incontinence and 10 (range 6-14) for those showing mixed UI symptoms.

The univariate analysis of the potential risk factors for SUI six months after delivery is shown in table 2. In order to evaluate the effect of the type of delivery, 3 groups were considered: spontaneous delivery, forceps/spatula-assisted delivery, and vacuum-assisted delivery. The length of the second stage of labour was categorized as less than (<) and equal or greater than (≥) 2 hours, and the “pushing time”, in its turn, as less than (<) and equal or greater than (≥) 1 hour. The univariate analysis showed that patients who had been incontinent during pregnancy had a higher risk of suffering from incontinence six months after delivery. Some relationship was found with gestational age, the BMI and extended 2^{nd} stage of labour, but these were not statistically significant. No statistical association was found for the other variables analysed. A multiple logistic regression model was built including: gestational age, BMI, SUI during pregnancy, and 2^{nd} stage of labour ≥ 2 hours. This analysis showed that the occurrence

of SUI at the end of pregnancy increased the risk of incontinence six months after vaginal delivery by a factor of 3.7 (OR: 3.71; 95% CI: 1.95-7.06). No other independent association with the other factors analysed was found.

As stated earlier, 20 primiparas women who reported SUI six months after delivery were continent during pregnancy. This subgroup of patients was used to analyse the risk factors that could be related to the development of SUI after delivery. Results of this analysis are shown in table 3. We observed that the primiparas women who had gained more weight during pregnancy and had longer pushing time during labour, had a higher risk of developing SUI after giving birth. We did not find any significant association with the type of delivery, nor with the other variables included in the analysis. The multiple regression model, that included those variables with p values below (≤) 0.25 (weight gain, gestational age, pushing time ≥ 1 hour) showed that weight gain (OR:1.15; 95% CI:1.03-1.30) and extended pushing time (OR:6.04; 95% CI: 1.66-22.01) were independently associated with the appearance of SUI after delivery.

COMMENT

In our study we have observed that 15.1% of women continent before pregnancy reported SUI six months after giving birth. Prevalence and Incidence figures for SUI after delivery vary considerably between different studies. These parameters seem to vary depending on the method used for establishing the SUI diagnosis, the time elapsed since giving birth and type of delivery. Authors, who based the diagnosis only on symptoms, publish incidence rates close to ours. Glazener et al. (8) showed that 13.5% of primigravid women included in their study had SUI three months after delivery, while Wesnes et al. (15) published rates of around 14% six months after delivery. Grouzt et al. (23) showed a prevalence of SUI of 10.3% one year after the first spontaneous vaginal delivery.

The severity of urinary incontinence postpartum and its impact on quality of life has been less well studied. Handa et al. (24) concluded that being incontinent had a negative effect on women's general health six months after their first vaginal delivery. Dolan et al. (25) concluded that the King's Health Questionnaire showed a worsening in the quality of life in incontinent women, but that this worsening could be due to the coexistence of other factors related to the postpartum. We used the ICIQ-UI-SF questionnaire to evaluate the degree of affect of the UI on daily life and we observed that in the majority of cases there was a mild degree of compromise.

The evaluation of risk factors associated with SUI six months after delivery showed that the presence of SUI during pregnancy increases the risk of incontinence six months after delivery 3.7 times. The association between incontinence during pregnancy and the presence of the symptoms after delivery has already been suggested. Eason et al. (13) showed that urinary incontinence during pregnancy increased by a factor of 1.9 the risk of presenting symptoms of UI three months after delivery. Burgio et al. (14) published similar results with a two-fold increase in risk. These authors included multiparas women in their study, which could be why they found a smaller increase compared to our study (OR: 3.7). The effect of earlier pregnancies and deliveries on the mechanism of continence is difficult to determine. We believe that the best model to evaluate the association between the different factors of pregnancy and delivery and urinary incontinence is that which includes only primigravid women, who have suffered the consequences of only the pregnancy and delivery under evaluation. Wesnes et al. (15)

included only primiparas women in their study, and indicated that being incontinent during pregnancy increased the risk of being incontinent six months after delivery 3.5 times. This result is very similar to ours. The main difference between our study and the aforementioned ones is that it is only focused on SUI instead of UI in general. We strongly believe that the physiopathological differences between the different types of incontinence justify this analysis.

When we analyzed the risk factors involved in SUI among women that had been continent during pregnancy, we observed that those with higher weight gain and extended pushing time were more at risk to present SUI after delivery. Wesnes et al. (15) also pointed out an association between increased BMI and new onset of incontinence in the postpartum period. Besides, the extended pushing time, as increased duration of the second stage of labour, has been considered to be an important factor leading to pudendal nerve damage and subsequent urinary incontinence (26). In both cases, the mechanisms involved are still unknown and further studies are needed to evaluate them.

Another interesting aspect of our study is that we did not find significant association between the type of vaginal delivery and SUI. Initially, the analysis was performed using all the women in the study. Then, in order to better define the effect of delivery, we used only women who had been continent through their pregnancy. In both cases, we did not find any association between the type of delivery and stress urinary incontinence six months after the birth. Data published on this matter are contradictory. Arya et al. (16) concluded that forceps-assisted delivery was a risk factor for the persistence of SUI after one year on. However, other authors did not find any significant association between forceps-assisted delivery and UI (8,9,13) or with SUI (18). In general there seem to be more data in favour of the assertion that forceps-assisted delivery is not associated with a higher rate of incontinence with respect to spontaneous delivery. Our data support this view in the specific group of women who suffer from stress urinary incontinence.

Finally, we also evaluated the effect of episiotomy use in postpartum SUI. Although we have a relative high rate of episiotomies, probably due in part to our rate of instrumental vaginal deliveries, we did not find any association between this variable and SUI six months after delivery.

The results of our study may have limitations given the method used to diagnose incontinence. Our diagnosis was based exclusively on the symptoms described because the study design did not allow an adequate stress test to be performed on the first visit. Nor did the design enable the influence of variables existing prior to the pregnancy, such as increased bladder neck mobility, to be evaluated. King et al. (27) found that the women who suffered postpartum SUI showed higher bladder neck mobility at the beginning of the pregnancy compared to those who were continent after giving birth. Finally, we have not been able to evaluate adequately other factors involved in the development of SUI, such as maternal age. The use of primigravid women exclusively, limited the age range and therefore the analysis of this variable.

Despite these limitations, our study shows that 15% of asymptomatic women before pregnancy reported SUI six months after their first vaginal delivery. The severity of the majority of cases was slight or moderate and the degree of compromise of quality of life was low. We also observed that the only factor independently associated with SUI six months after vaginal delivery was the presence of incontinence at the end of gestation. This result suggests that the mechanism causing the association between parity and stress urinary incontinence may be related to changes occurring during gestation. Finally, we have not found any statistically significant association between the type of vaginal delivery and the occurrence of SUI six months after delivery, not even in women who were continent during pregnancy. It seems that in this subgroup of patients, the excess of weight gain during pregnancy and the increased pushing time (≥1h) may influence the appearance of stress urinary incontinence after delivery.

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Table 1 Incontinence Severity Index in patients with stress urinary incontinence and mixed urinary incontinence six months after vaginal delivery.

Incontinence severity index		SUI n=50	Mixed IU n=10
Slight (1-2)	n, %	20 (40)	2 (20)
Moderate (3-6)	n, %	28 (56)	7 (70)
Severe (8-9)	n, %	2 (4)	1 (10)
Very severe (12)	n, %	0 (0)	0 (0)

Table 2. Results of the univariate analysis performed to associate six months post-partum SUI with different variables

Risk factors		**Post-partum SUI**		
		No (n=280)	Yes (n=50)	*p* value
Maternal age (years)	mean, SD	30.9 ± 3.5	31.0 ± 4.3	0.9
Gestational age (days)	mean, SD	278.7 ± 9.4	281.3 ± 9.5	0.07
Maternal BMI	mean, SD	22.9 ± 3.5	23.9 ± 4.4	0.09
Weight gain during pregnancy (kg)	mean, SD	12.4 ± 4.3	13.0 ± 3.6	0.4
Pregnancy SUI	n, %	73 (26.1)	30 (60.0)	0.000
Type of vaginal delivery				
Spontaneous	n, %	191 (68.2)	36 (72.0)	0.7
Forceps or spatula	n, %	75 (26.8)	11 (22.0)	
Vacuum	n, %	14 (5.0)	3 (6.0)	
2^{nd} stage of labour ≥ 2 hrs	n, %	87 (31.1)	17 (34.0)	0.12
Pushing time ≥ 1 hrs	n, %	17 (6.1)	6 (12)	0.34
Use of oxytocin	n, %	221 (78.9)	43 (86.0)	0.25
Epidural anaesthesia	n, %	265 (94.6)	48 (96.0)	0.6
Episiotomy	n, %	223 (79.6)	38 (76.0)	0.5
III-IV degree tear	n, %	6 (2.2)	1 (2.0)	0.7*
Weight of the newborn (g)	mean, SD	3302 ± 440	3355 ± 420	0.4
Newborn's cephalic perimeter (cm)	mean, SD	34.4 ± 1.4	34.4 ± 1.3	0.7
Pelvic floor contraction strength (cm H_2O)	mean, SD	36.7 ± 20.4	34.7 ± 19.5	0.5

(*) Fisher's test
BMI: Body Mass Index; SD: standard deviation

Table 3. Results of the univariate analysis performed to associate six months post-partum SUI with different variables in women who had been continent in pregnancy

Risk Factors		**Post-partum SUI**		*p value*
		No (n=207)	Yes (n=20)	
Maternal age (years)	mean, SD	30.9 ± 3.4	31.5 ± 3.9	0.44
Gestational age (days)	mean, SD	278.5 ± 9.2	281.4 ± 8.9	0.19
Maternal BMI	mean, SD	22.7 ± 3.5	22.8 ± 4.0	0.93
Weight gain during pregnancy (kg)	mean, SD	12.2 ± 4.0	14.4 ± 4.0	0.02
Type of vaginal delivery				
Spontaneous	n, %	141 (68.1)	12 (60.0)	0.41
Forceps or spatula	n, %	58 (28.0)	6 (30.0)	
Vacuum	n, %	8 (3.9)	2 (10)	
2^{nd} stage of labour ≥ 2 hrs	n, %	66 (31.9)	7 (35.0)	0.77
Pushing time ≥ 1 hr	n, %	13 (6.3)	5 (25)	0.003
Use of oxytocin	n, %	167 (80.7)	16 (80.0)	0.94
Epidural anaesthesia	n, %	197 (95.2)	20 (100.0)	0.31
Episiotomy	n, %	170 (82.1)	17 (85.0)	0.74
3^{rd} and 4^{th} degree tear	n, %	4 (1.9)	1 (5.0)	0.37*
Weight of the new born (gm)	mean, SD	3285 ± 432	3374 ± 401	0.38
Newborn's cephalic perimeter (cm)	mean, SD	34.4 ± 1.4	34.3 ± 1.5	0.76
Pelvic floor contraction strength (cm H_2O)	mean, SD	37.1 ± 21.4	31.5 ± 16.9	0.26

(*) Fisher's test
BMI: Body Mass Index; SD: standard deviation