



Can the delivery method influence lower urinary tract symptoms triggered by the first pregnancy?

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ABSTRACT

Introduction and Objectives: The increase of the intensity of urinary symptoms in late pregnancy and postpartum has been well documented by several authors, but their causes remain uncertain, partly because of its probable multifactor origin. There are also controversies whether the etiology of lower urinary tract symptoms during pregnancy is the same as postpartum and whether the method of delivery could influence the risk of onset of urinary symptoms. This study aimed to evaluate the urinary symptoms triggered during pregnancy and its evolution in the late puerperium, correlating them with the delivery method.

Materials and Methods: A longitudinal study was conducted, which included 75 primigravidae women, classified according to method of delivery as: (VD) vaginal delivery with right mediolateral episiotomy (n = 28); (CS) elective caesarean section (n = 26); and (EC) emergency caesarean section (n = 21). Urinary symptoms were assessed in the last trimester of pregnancy and at 45 days (± 10) of puerperium with validated versions for Portuguese language of the following questionnaires: International Consultation on Incontinence Questionnaire - Urinary Incontinence Short Form (ICIQ-UI SF) and the International Consultation on Incontinence Questionnaire Overactive Bladder (ICIQ-OAB).

Results: It was observed that frequency, urgency, nocturia and urge incontinence, triggered during pregnancy, decreased significantly in the postpartum period, regardless of the delivery method ($p = 0.0001$). However, symptoms related to urinary loss due to stress persisted after vaginal delivery ($p = 0.0001$).

Conclusions: Urgency, frequency and nocturia triggered during pregnancy tend to disappear in the late postpartum period, regardless of the delivery method, but the symptoms related to urinary loss due to stress tend to persist in late postpartum period after vaginal delivery.

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INTRODUCTION

Urinary incontinence (UI) is considered a clinical condition with multifactor etiology (1). Studies of UI during pregnancy have reported prevalence of 32% to 64% for all UI and 40% to 59% for stress UI, including mixed incontinence

(2), persisting after delivery in 6% to 29% of women (3). Estimating the post-partum prevalence of urinary incontinence is complex because the prevalence may depend upon the number of previous births, type of delivery, and history of previous in-

continence (2). Studies suggest that its incidence may increase with age (4,5), and multiparity (6-8), but the actual mechanisms remain unclear (2,5,9).

Vaginal birth has been recognized to be potentially traumatic to the pelvic floor (10-15). However, the pathophysiological effects of pregnancy and method of delivery on the lower urinary tract in general and the pelvic floor in particular remain uncertain, despite frequent references in obstetric literature (2,16).

Urinary continence is greatly committed to quality of life. Since 1997, the International Continence Society (ICS) recommends that the assessment of quality of life should be included in the studies, and it is consensual that the improved quality of life is important for the evaluation of the success of the proposed treatments as well as the impact and severity of the impairment (17,18).

This study aimed to evaluate the lower urinary tract symptoms (LUTS) triggered during pregnancy in primigravidae women, to assess their persistence in late puerperium and to correlate them with the different methods of delivery: vaginal, elective caesarean section and emergency caesarean section.

MATERIALS AND METHODS

We conducted a prospective, longitudinal, comparative clinical study which included 75 primigravidae women, aged between 14 and 39 years (mean 23.24 years), selected from health programs in Poços de Caldas (Minas Gerais, Brazil). All patients signed a consent form approved by the Ethics Committee in accordance with the Declaration of Helsinki (Clinical Trial Registration Number - Zip: 0207.0.213.146-05) and it was approved on 02/10/2006 (17:35:18).

Primigravidae women in the third trimester (average of 31.19 weeks of gestation), who presented some voiding complaints that had begun during the pregnancy, were included in the study. The patients had a mean body mass index (BMI) of 27.49 in the enrollment and 25.04 at reevaluation in the late puerperium.

Twenty five pregnant women were excluded from the study due to high-risk pregnancy; urinary tract infection; urinary incontinence and/

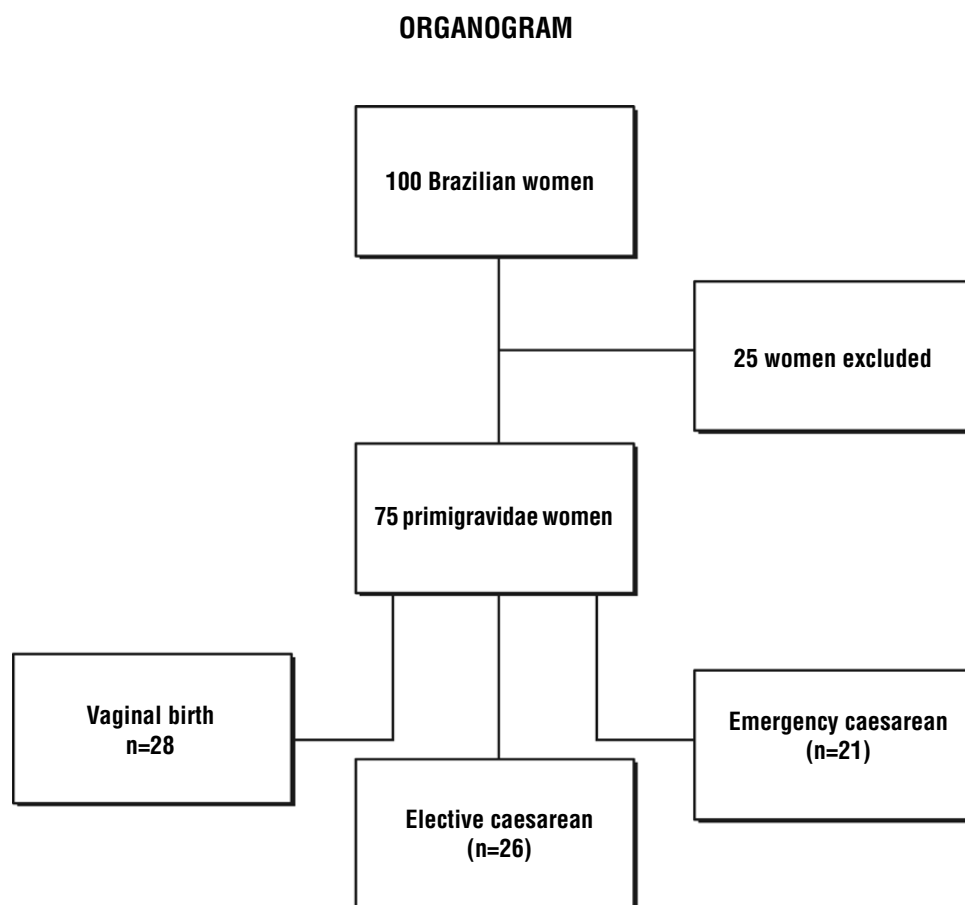
or prior pelvic organ prolapse; myopathies and diseases with known modification of collagen; neurological abnormalities; metabolic disorders (diabetes) or chronic lung diseases; history of abdomino-pelvic surgery; premature labor; and those who did not attend the two evaluations provided or who underwent instrumental vaginal delivery with forceps (Figure-1).

Patients were evaluated during the last trimester of pregnancy and reassessed 45 days (\pm 10 days) after delivery, through culturally adapted and validated versions of the questionnaires: International Consultation on Incontinence Questionnaire - Urinary Incontinence Short Form (ICIQ-UI SF) and the International Consultation on Incontinence Overactive Bladder Questionnaire (ICIQ-OAB) (19,20).

The ICIQ-UI SF has four questions that assess the frequency, volume and impact of urinary symptoms in the quality of life, and its score is calculated by the sum of the first three questions. The score can vary from zero to twenty-one points, the greater the total value the higher the commitment. The questionnaire also assesses the causes and situations that trigger the loss of urine (19). The ICIQ-OAB consists of four questions that assess overactive bladder symptoms - frequency, urgency, nocturia, with or without urge incontinence - with scores varying from zero to sixteen points. If the symptoms are more severe, the score increases (20). Both questionnaires are part of the ICIQ project modular questionnaire (www.iciq.net). The ICIQ provides clarity over the selection of questionnaires by recommending only those with evidence of high quality and robust psychometric validation including validity, reliability and sensitivity to change. This assurance provides the user confidence in the results obtained, which is important in clinical practice and research where treatment decisions or trial outcomes depend on these evidences. Increasing awareness of the ICIQ aims to promote increased use of standardized questionnaires, thereby facilitating communication between clinicians and researchers enabling more widespread comparisons between different treatments and patient groups worldwide (21,22).

Subsequently, patients were classified into three groups according to the delivery method

Figure 1 – Organogram representing the study population.



based on the patient's obstetrician's indication: (VD) vaginal delivery with right mediolateral episiotomy (n = 28); (CS) elective caesarean section (n = 26); (EC) emergency caesarean section (caesarean section during labor) i.e., women who went into labor, but for lack of progress, were submitted to a caesarean section (n = 21).

In each group, the following variables were analyzed: (a) demographic data (age, declared skin color, education level, marital status, occupation and family income); (b) puerperal and pregnancy history (change in weight during pregnancy, newborn's weight, length of labor, return to previous weight).

The statistical methods used were Fisher Exact Test and Analysis of Variance (ANOVA) with Rank Transformation.

RESULTS

It was shown that frequency, urgency, nocturia and urge incontinence, which have been observed during pregnancy, decreased significantly in the postpartum period, regardless of the delivery method (p = 0.0001). However, symptoms related to urinary loss due to stress persisted after vaginal delivery (p = 0.0001), compared to the two types of caesarean section (Table-1).

The demographic information as well as pregnancy and postpartum history were also analyzed, as shown in the Tables 2 and 3. There was a lower educational level (p = 0.0079) and family income (p = 0.0203) in the group that underwent vaginal delivery compared to caesarean groups.

Table 1 - Puerperal and gestational urinary symptoms evaluated through ICIQ-OAB and ICIQ-UI SF.

	Vaginal birth (n = 28)	Elective caesarean (n = 26)	Emergency caesarean (n = 21)	P-value		
				Groups	Time	Interaction group versus time
ICIQ-OAB Gestational**						
Mean	5.68	6.87	4.86			
S.D	3.75	3.55	2.73			
Minimum	0.00	0.00	0.00			
Medium	5.00	7.00	5.00			
Max	14.00	13.00	9.00			
ICIQ-OAB Puerperal**				0.1375	0.0001	0.1818
Mean	2.40	1.87	1.24			
S.D	3.00	2.30	1.95			
Minimum	0.00	0.00	0.00			
Medium	1.00	1.00	0.00			
Max	10.00	8.00	6.00			
ICIQ-UI SF Gestational**						
Mean	5.00	7.91	3.00			
S.D	4.65	6.52	4.39			
Minimum	0.00	0.00	0.00			
Medium	5.00	8.50	0.00			
Max	18.00	20.00	17.00			
ICIQ-UI SF Puerperal**				0.0801	0.0001	0.0186
Mean	3.81	1.05	0.67			
S.D	5.39	3.00	1.71			
Minimum	0.00	0.00	0.00			
Medium	0.00	0.00	0.00			
Max	15.00	12.00	7.00			

** ANOVA with ranks

ICIQ-OAB: score variation possibility-0 - 16 points, being as higher the score as severe the UI.

ICIQ-UI SF: score variation possibility 0 - 21 points, being as higher the score as severe the UI.

P-value: the table represents comparison among the studied groups (vaginal birth, elective and emergency cesarean); the comparison between the evaluation time (gestational evaluation and puerperal reevaluation); and interaction between both (groups versus time).

S.D: Standard Deviation

Table 2 - Demographic characteristics.

	Vaginal birth (n = 28)	Elective caesa- rean (n = 26)	Emergency cae- sarean (n = 21)	P-value
Age*(years)				
Mean	21.50	27.27	23.24	
S.D	5.51	5.99	5.71	0.0014
Skin color**				
White	78.57	76.92	76.19	
Black	7.14	19.23	4.76	0.3023
Other	14.29	3.85	19.05	
Educational level**				
Illiterate	0.00	0.00	9.52	
Elementary school	25.00	19.23	28.57	0.0079
High School	71.43	42.31	38.10	
Graduate School	3.57	38.46	23.81	
Marital Status**				
Single	42.86	19.23	42.86	
Married	53.57	80.77	57.14	0.1088
Other	3.57	0.00	0.00	
Occupation**				
Unemployed	64.29	34.62	38.10	
Employed	35.71	57.69	57.14	0.1129
Other	0.00	7.69	4.76	
Family income**				
1 to 2 minimum wages	46.43	34.62	38.10	
3 to 4 minimum wages	50.00	23.08	38.10	0.0203
Above 4 minimum wages	3.57	42.30	23.81	

* ANOVA with ranks

**Fischer's Exact Test

S.D: Standard Deviation

Table 3 - Gestational and puerperal history.

	Vaginal birth (n = 28)	Elective caesarean (n = 26)	Emergency caesarean (n = 21)	P-value
Weight increase during pregnancy** (KG)				
Mean	12.97	12.12	10.28	
S.D	5.89	4.21	5.89	0.1970
Newborn weight** (KG)				
Mean	3239.04	3337.65	3085.24	
S.D	475.51	332.19	435.75	0.1716
Labor duration** (Hours)				
Mean	11.05		9.86	0.2652
S.D	7.31	---	9.46	
Return to pre pregnancy weight** (weight %)				
Mean	10.65	11.77	8.24	
S.D	12.89	10.91	9.64	0.5559
Return to daily life activity* (%)				
Early puerperium	35.71	42.31	57.14	
Late Puerperium	64.29	57.69	42.86	0.3194

* Fischer's Exact Test

** ANOVA with ranks

S.D: Standard Deviation

The group that underwent vaginal delivery had a mean age significantly lower than the elective caesarean section group ($p = 0.0014$), and there was no statistical difference from the emergency caesarean group.

No significant differences were found among groups in the other examined criteria, like body mass index, newborn's weight, weight gain during pregnancy and labor time.

DISCUSSION

There is evidence in the literature that pelvic floor disorders are at least partially determined by changes resulting from pregnancy and childbirth, and can be responsible for the onset of LUTS (15,16).

During pregnancy, urinary complaints tend to widen with increasing gestational age (8,23,24).

Symptoms of overactive bladder - frequency, urgency, nocturia, with or without urge incontinence - are common in the third trimester and may be related to the pressure exerted by the fetal head on the bladder (17,24-26).

However, this study demonstrated that such symptoms tend to decrease in the late postpartum period, regardless of the delivery method ($p = 0.0001$). Other authors confirm these findings, concluding that overactive bladder symptoms are more transient, compared to symptoms related to urinary loss due to stress (27-32).

Van Brummen et al. (2007) compared LUTS three months and one year after both vaginal delivery and caesarean section. Their results showed a lower prevalence of overactive bladder symptoms in the group submitted to caesarean section, but without any significant difference after one year of follow-up (25). Scarpa et al. (2008) assessed the frequency of LUTS three years after childbirth in women previously interviewed in the third trimester and concluded that pregnancy, rather than delivery, was associated with the appearance of stress urinary incontinence (SUI) and nocturia, while the urge incontinence was significantly higher after delivery. Most women stated further that the presence of SUI triggered social problems (26).

The high prevalence of urinary complaints during pregnancy are expected in obstetrical practice. In contrast, there is a growing concern about the persistence of these symptoms, such as complaints associated with defecation symptoms, sex and presence of genital prolapse (2,3,5,6,16,19,28,29).

Urinary incontinence is usually experienced by women during the first pregnancy (29). Thomason et al. (2007) found 51% of incontinence after six and nine months of delivery in primiparous women with a history of urinary leakage, compared to 60% of women without this history who developed urinary incontinence in the first pregnancy (33). A study of Brazilian women revealed the presence of LUTS in 63% of the 500 women who had been interviewed (8).

Wesner et al. (2009) (34) and Arrue et al. (2010) (11) observed that women who developed incontinence during pregnancy had a higher prevalence of incontinence six months after delivery, with

a risk of 3.2 (confidence interval = 95%; 2.2 to 4.7) for spontaneous vaginal delivery and 2.9 (confidence interval = 95%; 2.3 to 3.4) for elective caesarean delivery (34). Another study in our department showed that urinary symptoms remained present six months after delivery; however, women did not correlate them with a worsening of quality of life (35).

Thus, the UI after delivery may be transient or not, but its persistence may be considered a predictor for reduced quality of life of women later on (36-38).

This study showed that stress urinary incontinence symptoms persisted after vaginal delivery ($p = 0.0001$), compared to two types of caesarean section - elective caesarean delivery and emergency caesarean.

Other research confirms a higher prevalence of SUI after vaginal delivery. Ekström et al. (2008) reported that the relative risk of SUI nine months after vaginal delivery is 8.9%, while for urge incontinence is 7.3% (confidence interval = 95%). These authors confirm that the presence of SUI during pregnancy until the third month after birth is a predictor for the maintenance of the symptoms for longer periods (32).

According to the study by Rortveit et al. (2003) the risk of urinary incontinence is higher among women who had caesarean delivery than among nulliparous women and is even higher among women who had vaginal deliveries. However, these results should not be used to justify an increased rate of recommendation of caesarean sections (10).

There is no doubt that vaginal delivery is associated with urinary incontinence after childbirth and that the presence of UI during pregnancy can predispose to UI in the postpartum period (13). However, Huebner et al. (2010) related that showed that the effects of pregnancy on the pelvic floor are different from those triggered after vaginal delivery (12). Brown et al. (2010) studied the risk factors for UI in pregnancy, and concluded that there are probably different mechanisms on the onset of symptoms at each stage of life of women and on their recurrences. Thus, it is important to consider the interaction of the effects of pregnancy and delivery (9).

The body weight gain during pregnancy, multiparity, vaginal delivery, forceps delivery, epi-

dural anesthesia, newborn's weight above 3.5 kilograms, and prolonged labor are factors that must be considered when investigating urogynecologic complaints (30). However, in several studies no significant relationship among them was observed (2).

Burgio et al. (2003) associated the UI in first six months and then one year after delivery with the presence of incontinence during pregnancy, vaginal delivery and use of forceps. However, these authors found no significant relationship between age, race, education, episiotomy and number of vaginal deliveries (39). In the present study, we assessed the demographic and obstetric history. There were no significant influences of the variables: weight gain during pregnancy; constipation; newborn's weight and duration of labor as well as the evolution of lower urinary tract symptoms.

Although no significant differences were observed among groups, patients who joined the vaginal delivery group had lower BMI than the others, demonstrating that increasing maternal weight did not influence the results.

Our findings also show that the group submitted to elective caesarean section showed age, education level and family income higher than other groups. Possibly, these findings are related to the mother's and obstetrician's preference of a more selective group of women. This characteristic of the studied subjects reflects the Brazilian reality, since it is observed that the higher the socioeconomic level, the greater the prevalence of elective cesarean section.

To Bruschini (2005) (40) and Leijonhufvud et al. (2011) (14) vaginal delivery is strongly associated with late need of SUI correction surgery. The maternal mortality reduction and the increase of life expectancy have contributed to highlight late sequelae related to childbirth. This probably justifies the preference for caesarean section in the occidental world (16,40).

Although many studies have demonstrated the protective effect of caesarean section (7,10,14,15,34), McLennan et al. (2006) (38) suggest that information regarding the route of delivery should be offered as a routine in obstetric consultations, emphasizing the real indications, contraindications, complications and sequelae, which would

help educate women about the risks, helping them choosing the method of delivery (14,38).

By comparing the two types of caesarean section - elective and emergency, no significant differences between the two groups were found. However, Chin et al. (2006) found a higher frequency of urinary incontinence in women submitted to vaginal delivery and emergency caesarean delivery compared to elective caesarean section (41).

Van Brummen et al. (2007), assessing the bladder symptoms after three months of postpartum, found a significant reduction in urgency and urge incontinence after caesarian section; however, no significant alterations were found a year after delivery. On the other hand, SUI was significantly higher in the vaginal delivery group, both after three and twelve months. The authors confirmed that SUI during pregnancy was a predictive factor of its persistence after delivery. The presence of SUI during pregnancy increased the risk of SUI by 18 times one year after delivery (25).

Thus, the concern with the prevention and treatment of urinary incontinence is imminent. The implementation of awareness and prevention programs must be emphasized (15,19,42,43).

CONCLUSIONS

Urgency, frequency and nocturia triggered during pregnancy tend to disappear in the late postpartum period, regardless of the delivery method, but the symptoms related to urinary loss due to stress tend to persist in late postpartum period after vaginal delivery.

ABBREVIATIONS

BMI: body mass index;
 ICIQ-OAB: International Consultation on Incontinence Questionnaire Overactive Bladder;
 ICIQ-UI SF: International Consultation on Incontinence Questionnaire - Urinary Incontinence Short Form;
 ICS: International Continence Society;
 LUTS: lower urinary tract symptoms;
 SD: standard deviation;
 SUI: stress urinary incontinence;
 UI: urinary incontinence.

CONFLICT OF INTEREST

None declared.

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