

Preterm Birth in Nulliparous Women

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Abstract

The aim of this study was to assess the frequency and risk factors of Preterm birth (PB), depending on the mechanism of their occurrence in nulliparous women with singleton pregnancies.

Methods and Results: This retrospective, population-based cohort study included 327 nulliparous women who gave birth at 22-37 weeks gestation. Three groups of women were formed: Group 1 included 32 women with spontaneous PB, Group 2 included 115 women with preterm premature rupture of membranes (PROM), and Group 3 included 180 women with medical indication for PB. The average age of the mothers for the whole group was 29.3 ± 6.0 years. Depending on the gestational age, PB in 22-27 weeks occurred in 23(7.4%) cases, 28-33 weeks in 110(33.6%) cases, and 34-37 weeks in 194(59%) cases. In our cohort, the frequency of PB resulting from spontaneous PB, PROM or medical indication for PB was 9.8%, 35.2%, and 55%, respectively. The main risk factors for PB were preeclampsia of varying severity, placental abruption, placental insufficiency, and fetal growth retardation. The highest number of pregnancy complications was found in Group 3.

Conclusion: PB in nulliparous women occurs more often in the period of 34-37 weeks, the main reason being medical indications (maternal or fetal). Attempts to analyze, interpret, and reduce the level of PB should be considered separately, depending on the mechanism of their occurrence. (*International Journal of Biomedicine. 2021;11(1):39-41.*)

Key Words: preterm birth • nulliparity • risk factor • preterm premature rupture of membranes • preeclampsia

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Introduction

Preterm birth (PB) is one of the medical and social problems that are relevant for most countries.^(1,2) A nationwide retrospective study found that nulliparity was independently associated with an overall increased risk of spontaneous PB, compared to women during their second pregnancy.⁽³⁾

The effectiveness of PB prevention is low, despite a large number of scientific studies in this area. Early diagnosis and accurate prediction of PB and perinatal outcomes are not possible due to the large number of etiological factors and the lack of a specific diagnostic method.^(4,5) PB is a complex syndrome with several obstetric precursors, including spontaneous PB with intact membranes, preterm premature rupture of membranes (PROM) with subsequent PB, and indicated or iatrogenic PB.^(6,7)

The division of PB into different subtypes is important both from a clinical and epidemiological point of view, since the etiology and prevention strategies for each of them differ.

The aim of this study was to assess the frequency and risk factors of PB, depending on the mechanism of their occurrence in nulliparous women.

Materials and Methods

This retrospective, population-based cohort study included nulliparous women who gave birth in the Tula Regional Perinatal Center at 22-37 weeks gestation from January 1, 2014 to December 31, 2014. The study included 327 women.

Inclusion criteria were first birth, for which the date of the last menstruation is known, confirmed gestational age, and singleton pregnancy. Exclusion criteria were multiple pregnancies and repeated births.

This study was approved by the Ethics Committee of Tula State University.

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PB was classified into three clinical subtypes: spontaneous PB with intact fetal membranes, PROM before onset of labor, and indicated preterm birth. Thus, three groups of women were formed: Group 1 included 32 women with spontaneous PB, Group 2 included 115 women with PROM, and Group 3 included 180 women with medical indication for PB.⁽⁸⁾

The information relating to the PB subtypes was abstracted from the medical record.

Statistical analysis was performed using the *Statistica 6.1* software package (Stat-Soft Inc., USA). Group comparisons with respect to categorical variables were performed using chi-square test. A probability value of $P < 0.05$ was considered statistically significant.

Results and Discussion

The average age of the mothers for the whole group was 29.3 ± 6.0 years. Depending on the gestational age, PB in 22-27 weeks occurred in 23(7.4%) cases, 28-33 weeks in 110(33.6%) cases, and 34-37 weeks in 194(59%) cases. In our cohort, the frequency of PB resulting from spontaneous PB, PROM or medical indication for PB was 9.8%, 35.2%, and 55%, respectively.

The effect of diseases on the outcome of pregnancy is presented in Table 1. In Group 3, the leading risk factor for PB was pre-existing hypertension.

Table 1.

Diseases of pregnant women, n(%)

Variable	Ggroup 1 (n=32)	Group 2 (n=115)	Group 3 (n=180)	Statistics
Anemia	7 (21.8)	27 (23.5)	41 (22.8)	$\chi^2=0.042$ $P=0.9702$
Kidney diseases	3 (9.3)	11 (9.6)	30 (16.7)	$\chi^2=3.546$ $P=0.1698$
Pre-existing hypertension	1 (3.1)	9 (7.8)	41 (22.8)	$\chi^2=16.107$ $P=0.0003$
Diabetes mellitus	1 (3.1)	4 (3.5)	12 (6.7)	$\chi^2=1.757$ $P=0.4154$
Myopia	1 (3.1)	4 (3.5)	8 (4.4)	$\chi^2=0.239$ $P=0.8874$

The effect of pregnancy complications on the delivery period is presented in Table 2. The highest number of pregnancy complications was found in Group 3. The main risk factors for PB were preeclampsia of varying severity, placental abruption, placental insufficiency, and fetal growth retardation.

The method of delivery depended on the mechanism of PB. In Group 1, vaginal delivery prevailed; in Group 2, cesarean section was performed on every third woman; in Group 3, the operation was performed in more than half of the cases.

In the world today, there is an increase in the number of iatrogenic PBs with a simultaneous decrease in the frequency

of spontaneous PB.^(9,10) It was found that in nulliparous women, PB is more common in the period of 22-37 weeks; the main reason is medical indications.

Table 2.

Complications of pregnancy, n(%)

Characteristics	Group 1 (n=32)	Group 2 (n=115)	Group 3 (n=180)	Statistics
Polyhydramnios	-	6 (5.2)	21 (11.7)	$\chi^2=7.045$ $P=0.0296$
Placental insufficiency	2 (6.2)	5 (4.3)	56 (31.1)	$\chi^2=36.177$ $P=0.0000$
Fetal growth retardation	4 (12.5)	15 (13.0)	57 (31.7)	$\chi^2=15.936$ $P=0.0003$
Moderate preeclampsia	-	1 (0.87)	32 (17.8)	$\chi^2=26.091$ $P=0.0000$
Severe preeclampsia	-	-	36 (20)	$\chi^2=33.037$ $P=0.0000$
Urinary tract infections	3 (9.3)	11 (9.6)	30 (16.7)	$\chi^2=3.546$ $P=0.1698$
Placenta previa	-	4 (3.5)	7 (3.9)	$\chi^2=1.271$ $P=0.5297$
Placental abruption	-	2 (1.7)	22 (12.2)	$\chi^2=14.148$ $P=0.0008$
Rh-negative blood	1 (3.1)	11 (9.6)	28 (15.6)	$\chi^2=5.086$ $P=0.0786$
C-Section	1 (3.1)	35 (30.4)	110 (61.1)	$\chi^2=51.466$ $P=0$

The short cervix has been identified as a significant predictor of PB.⁽¹¹⁾ The risk of PB is inversely proportional to the length of the cervix: the shorter the cervix, the higher the risk of PB and vice versa. Transvaginal cervicometry is an effective method for assessing the risk of PB.⁽¹²⁻¹⁶⁾ For this group, treatment methods include the use of progesterone or mechanical intervention, such as cerclage.⁽¹⁷⁾

For the prevention of iatrogenic PB, methods developed primarily for preeclampsia should be used. Preeclampsia is a serious pregnancy complication that not only determines maternal mortality, but is also associated with PB and prematurity.^(18,19) For iatrogenic PB, which is largely mediated by preeclampsia, prophylactic low-dose aspirin reduces premature preeclampsia by 40% in women at higher risk.^(20,21)

In conclusion, PB in nulliparous women occurs more often in the period of 34-37 weeks, the main reason being medical indications (maternal or fetal).

While greater clarity is needed, efforts to coordinate the prevention of both PB and preeclampsia, even if they are imperfect, are critical as part of any program to maximize maternal safety. Attempts to analyze, interpret, and reduce the level of PB should be considered separately, depending on the mechanism of their occurrence. These data can serve as a basis for changing health policy and clinical decisions on

the prevention of PB and related adverse outcomes. Further research is needed to determine the most effective measures, and not just progesterone, to reduce PB.

Competing Interests

The authors declare that they have no competing interests.

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