Pregnancy And Delivery Outcomes In Pregnant Women Hospitalized For Threatened Preterm Labor

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Abstract

Background. The incidence of preterm labor in the world ranges between 5-18% depending on the region. This study is aimed at studying the risk factors, pregnancy and delivery outcomes in pregnant women with a diagnosis of threatened preterm labor.

Materials and Methods: 265 pregnant women were examined and depending on the gestational age, they were divided into 3 subgroups: 1 subgroup - 22-27 gestational weeks - 81 women; 2 subgroup -28-33 gestational weeks - 136 patients, and 3 subgroup - 34-37 gestational weeks - 48 women. Preterm delivery risk factors and pregnancy outcomes were studied in all the study groups.

Results. The vast majority of the women hospitalized for threatened preterm labor are pregnant women between 20-40 (64.1%), who are under the supervision of obstetrician-gynecologists in different primary care institutions (84.6%). Of pregnant women hospitalized with a diagnosis of threatened preterm labor, only 22% experience preterm delivery within the next 2 weeks; in other cases, the diagnosis is not confirmed upon admission.

Conclusion. The study has shown that the diagnosis of threatened preterm labor is often made groundlessly, which leads to unnecessary hospitalization, the appointment of tocolytic or hormone therapy, and in some cases, adverse outcomes for both the mother and the fetus.

Key words: preterm labor, pregnancy, gestational weeks, preterm baby

Introduction

The World Health Organization (WHO) defines deliveries between 22nd and 37th gestation weeks (154 to less than 259 days) as preterm labor. According to global estimates, 15 million, i.e., more than one in ten infants are born too early every year. About 1 million infants die annually due to complications associated with preterm labor [1].

Preterm Labor (PL) is currently a global problem. The incidence of preterm labor in the world ranges between 5-18% depending on the region. The countries with the highest preterm labor incidence are Brazil (14.7%), India (13.8%), USA (12.7%), and Nigeria (16.8%). The countries with the lowest preterm labor incidence are China (3.5%), Sweden (5.6%), Finland (5.2%), and Japan (5.4%) [2]. All countries experience an increase in preterm labor incidence over the past 20 years [3].

Preterm labor is a syndrome caused by many different etiological factors such as intrauterine infection, mother's extragenital and infectious diseases, vascular disorders, 'aging' of the placenta and membranes, immune disorders in the mother-fetus system, reduced progesterone activity, cervix diseases, maternal stress, etc. [4].

Possible reasons for the increased PL incidence are improved preterm labor recording, an increase in maternal age, health problems in pregnant women such as diabetes, obesity, and hypertension, and wider use of assisted reproductive technologies in infertility treatment and invasive therapeutic approach to obstetric complications [2].

Clinicians and researchers worldwide are concerned about the consistently high PL incidence over the past 50 years, regardless of the implemented new technologies for the prevention, diagnosis, and treatment of this pathology (tocolysis, cervical cerclage, pessaries, progesterone drugs). Premature delivery can be either spontaneous or medically indicated due to the mother's or fetus's conditions. About 75% of PLs occur spontaneously [4].

PLs are the major cause of perinatal mortality and require widely implementing measures for nursing premature babies. In the vast majority of infants born with low, very low, and extremely low birth weight, disorders of physical and neuropsychic development, hearing and vision of varying severity, motor function, intelligence, and cognitive skills develop by older age [5, 6]. Infants with low and extremely low body weight suffer from 3 or more diseases already at birth. Premature babies occupy a leading place in the structure of mortality, morbidity, and further disability, which imposes a serious social burden on the state [7]. In premature babies, the early death likelihood is higher than in mature ones [8].

To date, many studies have been performed to assess the preterm delivery incidence, causes, and risk factors both in our country and throughout the world [9]. They mostly occur during the 34th-37th gestational week - in 60-70% of cases. Preterm labor at earlier gestation ages, especially before 28 weeks,

requires prompt high-tech care for the newborn after the delivery.

Currently, correct preterm labor diagnostics is one of the key issues. According to some researchers, up to 33% of women are hospitalized with suspected preterm labor. However, about 85% of hospitalized patients fail to deliver within the next 7 days [10]. This leads to unnecessary and potentially harmful treatments, including corticosteroids, tocolytics, and antibiotics.

The most common indications for early delivery are preeclampsia, placental abruption, premature amniorrhea, and the fetus conditions such as intrauterine growth retardation, congenital malformations, etc. [11]. Spontaneous preterm labor may be caused by some pathologies. However, numerous multifactorial prognosis techniques [12] cannot reliably predict preterm labor; therefore, in most clinics, the common tactic is the hospitalization of pregnant women and treatment aimed at suppressing uterine activity. This approach does not reduce the PL incidence and often causes side effects in both the pregnant woman and the fetus.

Thus, there are no tests for predicting PLs, and preventive measures do not have an evidence base. PLs cannot be predicted based on clinical diagnostic tests (lower abdominal pain, contractions, shortened cervical length according to ultrasound cervicometry). Therefore, studies in this field are underway around the world.

This study is aimed at studying clinical and anamnestic risk factors and pregnancy and delivery outcomes in pregnant women hospitalized in an obstetric clinic with a diagnosis of threatened preterm labor.

Material and Research Methods

To achieve this goal, we examined pregnant women admitted to the Pathologic Pregnancy Department of the Scientific Research Institute of Obstetrics and Gynecology with a diagnosis of threatened preterm labor in 2022. Thematic maps of examined patients have been developed considering the preterm labor risk factors, gestational age, duration of treatment, and the pregnancy and delivery outcome assessment. 265 pregnant women were examined, who formed the test group of the study. Depending on the gestational age, they were divided into 3 subgroups:

1 subgroup - 22-27 gestational weeks - 81 women (30.6%)

2 subgroup -28-33 gestational weeks - 136 patients (51.3%)

3 subgroup - 34-37 gestational weeks - 48 women (18.1%).

The control group consisted of 50 pregnant women with a normal pregnancy at the same gestational age, who delivered in due time.

In all examined patients, the key clinical and anamnestic preterm labor risk factors were studied. Of them, a special focus was on social risk factors such as the pregnant women's age (under 18 and over 35), body mass index (less than 18 and over 25), bad habits (smoking, alcohol, drugs), a chronic stress factor in the family or at work, depression, low socioeconomic standard of living, etc. Herewith, the obstetric and gynecological anamnesis of these patients was assessed in detail. Indicators such as preterm labor history, a less than 6-month birth spacing, infertility, the use of assisted reproductive technologies (IVF, induction in pregnancy), a history of cervicovaginal infections, abortions, and other intrauterine manipulations (traumatic previous deliveries, curettage, cervical surgery), uterine fibroids, and congenital abnormal development of the uterus (bicornuate, unicornuate, or arcuate uterus, intrauterine septum, etc.) have been analyzed. Complications and specifics of the current pregnancy were also assessed - multifetation, untimely amniorrhea, polyhydramnios, oligohydramnios, bleeding in the first and second pregnancy trimesters, hypertensive disorders, and bacterial vaginosis. Along with obstetric and gynecological complications of pregnancy, we analyzed the somatic status of the examined women, in particular, kidney, urinary tract, and endocrine diseases, metabolic disorders, diseases of the cardiovascular and respiratory systems, thrombophilia, as well as various viral, parasitic, and bacterial diseases in the acute stage during gestation.

The pregnancy outcomes were studied in the examined patients (the delivery time and mode, indications for early delivery, and the structure of indications for surgical delivery).

All data obtained were statistically processed using statistical analysis methods. The digital study results were processed by the variation statistics techniques with the calculation of the arithmetic mean (M) of the study sample and the minimum (min) and maximum (max) values of the series. To assess the differences between the compared groups, the nonparametric White's test (W-test) was used. Pearson's χ^2 test was used to assess the relationship between qualitative characters.

Results and Discussion

The anamnestic data analysis has shown that in the test group, the patients' ages ranged from 17 to 54. The average age made up 32.5 while 16.2% or 43 of the examined pregnant women were under 20, 32.4% or 86 ones - from 20 to 30, 31.7% or 84 pregnant women - from 30 to 40, and 52 patients (19.6%) - over 40. Primigravidas and multigravidas accounted for, respectively, 37 and 63% of the

examined. The study of the territorial living conditions of the test group patients showed that the shares of the city (43%) and village (57%) residents among the examined women were approximately equal, and the percentage of those living in the lowland plains and highland regions of the Republic also did not differ much (59.3 and 40.7%, respectively). An analysis of the pregnant women coverage by medical supervision showed that 28% (76) of the examined patients were registered with the Scientific Research Institute of Obstetrics and Gynecology, 33% (88) with other obstetric and prenatal institutions of Baku, 23.7% (63) with primary obstetric care institutions in various regions of the Republic, and, finally, 15.4% (38) of thematic pregnant women were not registered with any institution.

An analysis of clinical and anamnestic preterm labor risk factors showed (Table 1) that 50.6% of the test group pregnant women had various preterm labor risk factors, among which a history of preterm delivery (more than 3 times as frequent as in the control group), multifetation (3 times as frequent as in the control group), untimely amniorrhea (5 times as frequent as in the control group), and vaginal bleeding in the 1st and 2nd pregnancy trimester and hypertensive disorders (4 times as frequent as in the control group) occupied the leading positions. Among the statistically significant preterm labor risk factors, a history of intrauterine interventions and birth cervical injuries (twice as frequent as in the control group), induction of pregnancy in various methods of infertility treatment (2,6 times as frequent as in the control group), high and low body mass index of a pregnant woman (2.5 times as frequent as in the control group) and the development of acute viral or bacterial infection during the current pregnancy (twice as frequent as in the control group) should also be noted. Moreover, it should be noted that the combination of more than 2 risk factors in pregnant women increases the preterm labor risk by about 2.5 times compared to healthy ones.

Table 1.The Occurrence of Clinical and Anamnestic Preterm Labor Risk Factors in the Examined Pregnant Women

Clinical and anamnestic preterm labor risk factors	Test Group n=265	Control Group n=50	P
	Abs. %	Abs. %	
History of preterm delivery	88 33.2	5 10	< 0.001
History of more than 2 intrauterine interventions. traumatic deliveries, and cervical surgeries	96 36.2	9 18	< 0.013
Less than 6-month birth spacing	46 17.4	6 12	> 0.350
Congenital uterus malformations	20 7.5	2 4	> 0.367
History of infertility (pregnancy induction, IVF)	70 26.4	5 10	<0.013
Pregnant woman's age under 18 and over 35	62 23.4	9 18	< 0.403
Body mass index > 35 or <18	82 30.9	6 12	< 0.007
Multifetation	48 18.1	3 6	< 0.033
Somatic diseases of the mother	56 21.1	5 10	< 0.068
Untimely amniorrhea, polyhydramnios, oligohydramnios	106 40	4 8	< 0.001
Current pregnancy complications (vaginal bleeding in the 1st and 2nd pregnancy trimester, hypertensive disorders, etc.)	66 24.9	3 6	< 0.004
Uterine fibroids	30 11.3	3 6	> 0.260
Uterine scars	54 20.4	8 16	> 0.476
Acute viral, parasitic, and/or bacterial infection during the current pregnancy	68 25.7	6 12	< 0.037
Combination of 2 or more risk factors	92 34.7	7 14	< 0.001
No risk factors	134 50.6	14 28	< 0.004

The study of obstetric and gynecological history has shown that short birth interval, mothers age, uterine scars and congenital uterus malformations also increase the preterm labor, however, these differences in the study groups were not statistically significant in our study.

The study of the somatic status of the examined pregnant women identified a high concomitant pathology incidence: in the test group, the mother's extragenital diseases were twice as frequent as in the group of healthy pregnant women. Moreover, the analysis of the structure of somatic diseases in pregnant women with threatened preterm labor showed kidney and urinary tract diseases in 9.3%, cardiovascular pathologies - 6.7%, endocrine diseases - 8.7%, gastrointestinal tract diseases - 4.7%, and other diseases - 6.7% of cases.

Thus, most of the examined women were multigravidas while every fifth of them had a burdened somatic status and every second pregnant woman, admitted to the hospital with a diagnosis of threatened preterm labor, had various preterm labor risk factors, i.e., was ab initio at high risk for preterm delivery. Herewith, it would be noted that in about half of the cases (50.6%, every second patient), pregnant women had no preterm labor risk factors and were not

at high risk for preterm delivery, although they were admitted to an obstetric clinic with threatened preterm labor.

The next stage of our research was studying the pregnancy and delivery outcomes in this contingent of pregnant women. To solve this problem, we analyzed the pregnancy prolongation terms and gestational ages as of the onset of labor in the examined patients. Table 2 provides the study results. It turned out that in the vast majority - 78% (207) of women, pregnancy was maintained, prolonged in the Pathologic Pregnancy Department, and they were discharged in 10 days under further supervision of an antenatal clinic physician. In the remaining 22% (58) of cases, during 14 days of hospital stay, the pregnancy ended in spontaneous preterm delivery. Moreover, only in 10 women, spontaneous labor occurred within the first 2 days after hospitalization, and in the other 48 cases, delivery occurred within the first 2 weeks from the moment of hospitalization in an obstetric clinic.

Table 2. Pregnancy Outcomes in Pregnant Women Hospitalized with Threatened Preterm Labor

Pregnancy outcomes of hospitalized pregnant women	n=265
	Abs. %
Discharged with maintained pregnancy	207 78
Delivery occurred, of which:	58 22
- Within the first 2 days	10 17.2
- Within the first week (7 days)	23 39.6
- Within 2 weeks (14 days)	25 43.1

The delivery mode analysis showed that of 58 patients, vaginal delivery occurred in 56.9% (33) of cases and operative delivery - in 43.3% of pregnant women. In most cases, indications for operative delivery were uterine scars, pelvic presentation, severe preeclampsia, and burdened obstetric and gynecological history (long-term infertility, IVF, past perinatal losses, etc.).

Studying the gestational age of pregnant women who failed to maintain the pregnancy, we found that most often, it was terminated at 28th-34th - 43.1% and 22nd-28th weeks - 36.2%; approximately every fifth patient had delivery at 34th-37th weeks (Table 3).

Table 3. Analysis of the Delivery Modes and Time in the Examined Pregnant Women

Examined women	n=58
	Abs. %
Delivery mode:	
- natural	33 56.9
- C-section	25 43.1
Delivery time:	
- 22-28 weeks	21 36.2
- 28-34 weeks	25 43.1
- 34-37 weeks	6 20.7

In the study, we tracked the pregnancy course and outcomes in patients discharged with a maintained pregnancy. It was found that of 207 pregnant women, the pregnancy further ended in term birth without complications in 166 ones (80.2%), preterm labor at 28th-34th gestation weeks in 24 patients (11.6%), and, finally, delivery at 34th-37th weeks in 17 women (8.2%).

Conclusion

Summarizing the data obtained allows for drawing the following conclusions:

- Pregnant women are most often hospitalized in an obstetric clinic with a diagnosis of threatened preterm labor at 28th-34th gestation weeks (51.3%, every second) and 22nd-28th ones (30.6%, every third).

- The vast majority of those hospitalized for threatened preterm labor are pregnant women between 20-40 (64.1%), who are under the supervision of obstetrician-gynecologists in different primary care institutions (84.6%).

- Every second pregnant woman (49.4%) admitted to an obstetric clinic with a diagnosis of threatened preterm labor has no clinical and anamnestic preterm labor risk factors and therefore, is not in the preterm delivery high-risk group. Conversely, clinical and anamnestic risk factors in patients do not always indicate threatened preterm labor, and in 50% of cases, their pregnancy ends in due time without complications.

- Of pregnant women hospitalized with a diagnosis of threatened preterm labor, only 22% experience preterm delivery within the next 2 weeks; in other cases, the diagnosis is not confirmed upon admission.

- In general, in patients admitted to a clinic with a diagnosis of threatened preterm labor, preterm delivery occurred in 37.7% (100) of cases, of which within the first two days after hospitalization - 10%,

within the first week - 23%, within the second week - 25%, within the longer period - 42% of pregnant women, and in every second of them, in the gestation age of 28-34 weeks.

Thus, the study has shown that the diagnosis of threatened preterm labor is often made groundlessly, which leads to unnecessary hospitalization, the appointment of tocolytic or hormone therapy, and in some cases, adverse outcomes for both the mother and the fetus. Therefore, the search for more prognostically reliable preterm labor markers, both clinical-and-anamnestic and investigational ones, should be expanded, which will ensure a more differentiated approach to correctly diagnosing at the prehospital stage. This will help to further avoid unnecessary hospitalization and therapy under the prepaid medical care conditions, which is of great not only medical but also socioeconomic significance for our country.

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