

Research Article

Management of Premature Membrane Rupture: Modern Strategies for Extending Gestation

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Abstract

In recent years, the incidence of miscarriage among women of reproductive age has risen globally. This condition is associated with a decline in women's quality of life and a higher risk of mortality. The World Health Organization reports that premature rupture of membranes results in preterm delivery in 25-54% of cases, significantly contributing to increased perinatal mortality.

Keywords: premature rupture of membranes (PROM); nitrazine test strips; probiotics.

Introduction

Stillbirth with premature birth is observed 8-13 times more often than with timely birth. New advances in medical and pharmacological sciences have had almost no effect on the number of premature births. The number of premature births, according to various researchers, ranges from 4 to 15% [3,9]. Prematurity is an important social problem due to the high material costs associated with caring for newborns, as well as a significant proportion of these children among the disabled and children with chronic pathologies [5]. PROM represents one of the most significant tasks in obstetrics. The main reasons for early rupture of amniotic fluid are isthmic-cervical insufficiency, premature placental rupture, intrauterine infection (chorioamnionitis) [5,10]. It is generally believed that the leading factor in premature rupture of membranes is infection; the etiopathogenesis of prenatal rupture of amniotic fluid remains poorly understood. In the United States, PROM is responsible for 18-20% of perinatal mortality [1,3]. The latest scientific advances prove the presence of various pathogenetic pathways in the development of premature birth and that PROM is caused by the action of bioactive substances contained in the amniotic fluid. In connection with the peculiarities of obstetric tactics for children born at different gestational ages, V. M. Sidelnikova [2016], R. A. Holmgren [2021], consider it appropriate to distinguish the following intervals: premature birth at 22-27 weeks; premature birth at 28-33 weeks; premature birth at 34-36 weeks of gestation [10]. V. M. Sidelnikova found that premature birth at 22-27 weeks is most often caused by isthmic-cervical insufficiency, infection of the lower pole of the membranes and its premature rupture [7]. V.M. Sidelnikova [2008] in her research showed that premature birth at a gestational age of 34-37 weeks is caused by even more diverse reasons, the percentage of infected women is much lower than in previous groups. For most women in this group, expectant management of labour is possible. However, due to the fact that the fetal lungs are practically mature, the introduction of agents to stimulate the maturation of surfactant is not required, and prolongation of pregnancy does not significantly change perinatal mortality rates. The causes of PROM are varied and numerous. One of the hypotheses for the development of this complication is based on the insufficiency of the connective tissue elements of the membranes, which determine their ability and strength. From this point of view, the role of undifferentiated connective tissue dysplasia and lack of microelements affecting the condition of the membranes is undeniable [4]. A number of modern researchers believe that infection is the main cause of progressive disorganization of amnion components, which is realized through the activation of specific Toll receptors [8,10]. Some studies indicate the role of the vaginal biocenosis in the genesis of early rupture of amniotic fluid and consider it as a manifestation of bacterial and viral infections that persist during pregnancy. In this case, the systemic inflammatory response in pregnant women with PROM is usually realized through the activation of IL-1, IL-6, IL-8 and TNF, which are early predictors of inflammatory complications. At the same time, existing ideas about the polyetiopathogenesis of PROM do not reveal all the main mechanisms this pathology, and there are still no modern reliable methods for its prediction and prevention, which contributes to an increase in the incidence of obstetric and perinatal complications during premature birth with PROM, which significantly worsen the condition of the

premature fetus and newborn. It has been noted that placental abruption occurs in 4–12% of premature pregnancies complicated by PROM, more often with a gestation period of less than 28 weeks [9]. However, whether this is a cause of PROM or a consequence of acute uterine decompression is unknown. Physical factors are also important. During full-term pregnancy This PROM occurs when a zone of contact does not form between the presenting part of the fetus at the entrance to the pelvis and the amniotic fluid is not divided into anterior and posterior. This happens with a clinically narrow pelvis, breech presentation, transverse or oblique positions, and pronounced extension of the fetal head. Under such conditions, amniotic fluid moves to the lower parts of the amniotic sac, which first leads to stretching of the membranes and then to their rupture.

Research Objectives

- To analyse the clinical and epidemiological characteristics of pregnant women with PROM depending on gestational age and duration of the anhydrous interval.
- To investigate the role of intestinal and vaginal microbiota in the development of PROM.
- To assess the diagnostic value of modern tests for confirming PROM (e.g., nitrazine test strips, Amni Sure).

Material and Research Methods

This study is based on a clinical and laboratory examination of 203 pregnant women with PROM (main group) admitted to the obstetric departments of the Andijan Regional Perinatal Centre from 2009 to 2015 with leakage of amniotic fluid. Along with pregnant women with PROM, 40 healthy volunteer pregnant women with a physiological course of pregnancy of the corresponding gestational age (control group) were examined. 203 women with PROM of the main group were divided into 3 groups according to the duration of the anhydrous interval: - Group 1 consisted of 75 (33.1%) pregnant women with PROM, with an anhydrous interval lasting up to 24 hours, of which with a gestational age of 22-27 - 29 (39.0%) and with a gestational age of 28-33 - 46 (61.0%); - Group 2-69 (34.7%) pregnant women with PROM, the duration of the water-free interval was up to 72 hours with a gestational age of 22-27 - 29 (41.9%) and with a gestational age of 28-33 - 40 (67.5%); - Group 3-19 (32.5%) pregnant women with PROM with a water-free interval of more than 72 hours, of which 19 (32.5%) with a gestational age of 22-27 and 40 (67.5%). The majority of pregnant women in all 3 groups (68.3%, 53.5% and 65.0%), respectively, by group) in whom PROM was detected were aged 20-25 years. When analysing the obstetric history, we revealed the dependence of the time of the anhydrous interval on the aggravated obstetric history, the less complicated the obstetric history, the shorter the water-free interval. When a pregnant woman is admitted with leakage of water, she is carefully examined, a general blood and urine analysis is performed over time, and thermometry is performed. Vaginal discharge is examined for the presence of amniotic fluid. Determination of pH of vaginal contents (nitrazine test). Amniotic fluid is normal or slightly alkaline (pH 7.0-7.7), while vaginal fluid is acidic (pH 3.8-4.2). When amniotic fluid enters the vagina, the pH decreases, which is checked using a nitrazine test strip. Amni Sure Test (Amni Sure® International LLC, Cambridge, MA). The Amni Sure test does not require special laboratory conditions. It is carried out in maternity institutions, directly during the examination of the patient. The principle of the study is to detect a substance that is normally practically absent from the contents of vaginal secretions, but is abundant in amniotic fluid - placental alpha-1-microglobulin. A special tampon is inserted into the vagina, absorbing secretions, which is lowered into a test tube with a substance that removes secretions from the tampon into solution. After this, a test strip is dropped into the test tube. If a control line appears, it means that placental alpha-1-microglobulin is present in the test material. This is evidence of a violation of the integrity of the membranes.

Results

Miscarriage was observed in 5 (6.7%) pregnant women in group 1, in 5 (7.2%) in group 2 and in 4 (6.8%). It should be noted that in this case there is no connection between the frequency of past diseases and the duration of the anhydrous interval. In pregnant women of group 3, the frequency of gynaecological diseases in the anamnesis is approximately the same as in all other examined pregnant women. A study of the obstetric anamnesis showed the following: PROM was more observed in women who had a history of threatened miscarriage (the risk of "relapse" is 16-32%, which 4-8 times higher than in women without a history of PROM - 4%); mild premature abruption of a normally located placenta during a current pregnancy-18(24.0%), 6(8.7%) and 0, respectively, by group; systemic connective tissue diseases-2 (2.7%), 2(2.9%) and 1(2.5%), respectively, by group; blunt abdominal trauma-1(1.3%), 1(1.4%) and 0; premature birth-6(8.0%), 3(4.3%) and 2(5.0%); bad habits: smoking; drug addiction (cocaine use)-3(4.0%), 1(1.4%) and 0; anaemia-38(50.7%), 40(58.0%) and 39(97.5%); underweight before pregnancy (BMI<18.1 kg/m²) 2(2.7%), 0 and 0; in addition, low socio-economic status.

Conclusion

PROM in pregnant women at 22-27 weeks, prevailed in women with a history of frequent acute respiratory viral infections, and in Mult pregnant women, PROM in a previous pregnancy with a long anhydrous interval; PROM in pregnant women at 28-33 weeks was more common in women with painful and scanty menstruation. The micropinocytosis of vaginal contents and the sensitivity of identified microorganisms to antibiotics in pregnant women with PROM are represented by three families, Enterobacteriaceae, Streptococcic and Micrococcus, with a predominance of Enterobacteriaceae. With a decrease in the frequency of sown microflora, the latent period of PROM lengthens, with the identification of an inverse average correlation ($r = -0.56$) and a positive strong correlation ($r = 0.76$) ($P < 0.05$) between the pathological growth of conditionally pathogenic microflora and the incidence of chorioamnionitis. In order to prevent PPROM, we have developed a treatment algorithm that is based on early diagnosis of disturbances in the intestinal and vaginal microbiota. The administration of probiotics, both oral and vaginal, improves the outcome of childbirth.

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