

Modern Concepts of Intrauterine Infections in the Structure of Infectious Diseases

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The development of health care, which is one of the priority directions of the health care of Azerbaijan Republic, and the improvement of the quality of medical services provided to the population, remain relevant at all times. One of the most complex and important medical and social problems of neonatology and pediatrics is children born with congenital infectious pathology. This issue is very important from the point of view of the treatment of infectious pathologies in newborns. Bearing in mind the urgency of the problem, local and foreign melon data on the significance of intrauterine infections in the structure of infectious pathologies were analyzed.

Keywords: Intrauterine Infections; Ways of Infection; Specific Pathogens; Microorganisms; Pregnancy; Miscarriage

The development of health care, which is one of the priority directions of the health care of Azerbaijan Republic, and the development of the quality of medical services provided to the population, remain relevant at all times. One of the most complex and important medical and social problems of neonatology and pediatrics is children born with congenital infectious pathology. The frequency of occurrence of intrauterine infections is not precisely determined, but according to a number of authors, it can occur up to 10%. Intrauterine infection not only causes perinatal and postnatal losses, but also can develop serious changes in children's health at a later age, which can lead to a decrease in the child's quality of life and social maladaptation [8].

Intrauterine infection in different observations have different meanings. First of all, they can themselves lead to death. Along with this, intrauterine infection drastically disrupts the compensatory-adaptive mechanisms of the fetus - the child and, in this regard,

contribute to the onset of death from other causes. Among them, in the perinatal period, asphyxia is of the greatest importance. In addition, intrauterine infection often leads to preterm birth, which is essential as a background condition for the development of new infectious and non-infectious diseases in the neonatal period and even later. Finally, intrauterine infections, especially viral ones, may be of teratogenic significance. Most often, this indicates rubella, which is associated with the possibility of the formation of congenital malformations of the hearing organs, vision and heart. It is safe to say that intrauterine hepatitis is essential for the development of biliary atresia.

There are a significant number of publications that allow the connection of intrauterine infection with other viral and other infectious diseases, including those caused by respiratory viruses. The most likely teratogenic effect of those intrauterine infections, which are characterized by a chronic course. The possibility of

intrauterine infection of the fetus with maternal diseases has been known since very ancient times. It is now generally accepted that infection of the embryo can occur by ascending, hematogenous and descending routes, their frequency is different in various diseases. Obviously, with all variants of infection, certain structural changes should be observed in the placenta. To our surprise, in most of the modern studies on this question, for example, with such currently very relevant infections as HIV and hepatitis, the morphological study of the placenta is not carried out. There is practically no data on a differentiated virological study of various components of the mother-afterbirth-fetus system in different types of intrauterine infection [10].

Pregnancy loss through miscarriage or stillbirth can also be caused by infection. Nearly of 15-30% of all stillbirths have an infectious aetiology [3,5,7], although the low rates of diagnostic testing for infections in pregnancy might result in an underestimation of this value. The rate of pregnancy loss is variable with gestational age at infection and by specific pathogen [2].

Risk factors for intrauterine infections.

In the antenatal period:

- Burdened obstetric history - miscarriages, stillbirths, previous premature births, death of previous children in the neonatal period, abortions.
- Pathological course of pregnancy, threatened miscarriage, polyhydramnios, isthmic-cervical insufficiency and its surgical correction, anemia in pregnant, exacerbation of chronic infectious and somatic diseases.
- Genital pathology - urogenital infection, colpitis, endocervicitis.
- Pathology from the placenta.
- Transferred infectious diseases during pregnancy.

In the intrapartum period, risk factors for infection include:

- Complicated course of childbirth - infectious diseases during childbirth (urogenital infection, asymptomatic bacteriuria, cystitis, exacerbation of chronic foci of infection, SARS, pyelonephritis), fever, prenatal rupture of amniotic fluid (an anhydrous interval of more than 6 hours), multiple vaginal examinations, protracted childbirth.

- Birth of a child in asphyxia, with aspiration syndrome, resuscitation.
- Infectious process in the mother in the postpartum period.
- Hypothermia of the child.
- Violation of the sanitary and epidemic regime and rules of care.

Ways of infection. The dominant opinion that most often the fetus is infected by the ascending route (from the mother's genital tract), especially with bacterial vaginosis. The persistence of microorganisms in the amniotic fluid is due to the ability of most of them to disrupt the bactericidal properties of this substrate. Bacterial chemotaxins stimulate «migration» into the amniotic fluid neutrophils from the blood vessels of the umbilical cord and from the intervillous blood (through the chorionic plate). The neutrophils and bacteria contained in the amniotic fluid secrete phospholipase. The latter, in the process of fermentation, forms arachidonic acid from amnion cells, which subsequently turns into prostaglandins E2 (cervical dilatation) and F2a (inducing uterine contractions [11].

Several studies have shown a link between intrauterine infection and cerebral white matter lesions or cerebral palsy in preterm neonates. Inflammatory responses may directly affect the immature brain, in addition to neuronal damage after cerebral ischemia. It was shown that the incidence of immature babies, suffering from periventricular leukomalacia (PVL), was significantly increased after chorioamnionitis [4].

There are substantial consequences resulting from infections in pregnancy. The complexity and unique features of the maternal-fetal interface have led to the discovery of multiple pathways of host-pathogen interactions unique to this niche. Yet, the molecular mechanisms of pathogenesis remain largely uncharacterized, in part owing to the complexities of defining the interactions that occur between the pathogen and maternal and/or fetal hosts during the context of pregnancy. Moreover, modelling the unique tissue architecture and immunology of the maternal-fetal interface creates additional complexities in delineating microbial vertical transmission strategies. Although the use of mouse models has provided important insights into various aspects of pregnancy,

there are substantial differences in the placental architecture between human and mouse that limit direct correlates of these findings to humans. Although the placentae of primates and guinea pigs have a more similar architecture to that of humans, these models can be difficult to establish, and their lack of genetic tractability limits some mechanistic studies. Lastly, both clinical samples and primary tissues provide human-based models to study pathogenic mechanisms or vertical transmission of TORCH pathogens; however, there can be limited access to healthy placentae to generate these models. Recently, the development of stem cell-derived organoid models of both maternal and fetal cell types 220, 221 at the maternal-fetal interface has opened up exciting new avenues to model this interface. However, organoid models lack immune cell components and do not recapitulate the immunological crosstalk that undoubtedly alters antimicrobial defences [6].

From the research conducted in our country, it was found that the reduction of myeloperoxidase activity is noticeable in the neutrophils of the peripheral blood of pregnant women with asymptomatic bacterial carriage and bacterial vaginosis. The level of activity of alkaline phosphatase in neutrophils in all women with asymptomatic bacterial carriage, bacterial vaginosis and control group women did not differ from normal values and was 0.41 ± 0.06 on average. The obtained results confirm the reduction of phagocytic activity of neutrophils in pregnant women with asymptomatic bacterial carriage, bacterial vaginosis, which may be one of the pathogenetic mechanisms of the macroorganism and explain the absence of acute local leukocyte reaction during dysbiotic conditions in the uterus. It has been shown that timely complex therapy in pregnant women helped to more fully realize the compensatory-adaptive possibilities of the end. The algorithm of obstetric dispensation based on the application of step-by-step monitoring of a pregnant woman, prognostic criteria for assessing the condition of pregnant women and newborns (health coefficients), compared to the indicators obtained during standard dispensation, the frequency of gestational complications is 1.5-2 times, the act of childbirth - 2 times, the incidence of newborn morbidity is 1.9 allows to be released once. The results of the examinations made it possible to reveal the social epidemiological patterns of opportunistic bacterial infections of the uterus among pregnant women in Baku and to propose measures to reduce the level

of morbidity with them, as well as to develop tactics for the comprehensive treatment and prevention of this disease [9].

It is necessary to distinguish between such concepts as intrauterine infection and intraperitoneal infection. Intrauterine infection of the fetus is only the penetration of microorganisms to the fetus and its infection. However, there are no signs of a manifestation of an infectious disease of the fetus. The diagnosis of intrauterine infection in a newborn is established on the basis of the isolation of the pathogen from the body of the newborn, the detection of IgM antibodies and low-avid IgG antibodies to infectious agents at birth. Intrauterine infection of the fetus does not mean the inevitable development of an infectious disease with corresponding clinical manifestations. Intrauterine infection is understood as the implementation of intrauterine infection in the form of a clinical manifestation of an infectious disease that can be detected in a newborn and fetus. In the international statistical classification of diseases of the X revision, intrauterine infections belong to class XVI «certain conditions that occur in the perinatal period» block P35-P39 «Infectious diseases specific to the perinatal period» and P23 «Congenital pneumonia» [12].

Conclusion

Generalized literature data on the pathogenesis, clinic, treatment, diagnosis and prevention of intrauterine infections will reduce morbidity, mortality in the structure of infections specific to the early neonatal period - intrauterine infections, as well as disability among young children due to intrauterine infections. Any changes in homeostasis in the mother's body are reflected in the cellular and chemical parameters of the amniotic fluid, which very finely characterize the course of the pathological process, and therefore the amniotic fluid can serve as an important diagnostic material. Only the improvement of diagnostic approaches, the development of optimal algorithms and methods of examination, and the prevention of the spread of resistant strains through an adequate attitude to each patient individually (obligatory cultures to determine sensitivity to antibiotics before prescribing therapy) can change this situation.

Conflict of Interest

None.

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