SCHOLASTIC:
Journal of Natural and Medical Education
Volume 2 Issue 6, Year 2023 ISSN: 2835-303X
https://univerpubl.com/index.php/scholastic

Congenital and Perinatal Infections: Problems and Solutions

Keldiyorova Zilola Doniyorovna
Bukhara State Medical Institute named after Abu Ali ibn Sino

Article Information

Received: April 15, 2023
Accepted: May 16, 2023
Published: June 17, 2023

Keywords: *perinatal infections; congenital infections; diagnostics; treatment.*

ABSTRACT

The article discusses the main problems of diagnosis and treatment of perinatal infections and discusses ways to solve them. The need for standardization of approaches to the management of pregnant women with infections potentially dangerous to the fetus and newborn is emphasized through the development and implementation of national guidelines for the diagnosis and treatment of perinatal infections.

The question of infectious diseases that occur in pregnant women has long occupied the minds of not only specialists in the field of obstetrics and gynecology, but also physiologists, embryologists and infectious disease specialists. The undoubted harm of infections during pregnancy, both for the woman's body and for the developing fetus, made the issue highly significant and especially attractive for in-depth study, when it turned out that a frequent combination of an infectious lesion of the fetus with the formation of malformations in it. Violations of the normal development of the embryo are more pronounced at a low gestational age. This feature is especially clearly manifested in viral infections, in particular rubella, cytomegaly, but also some protozoal invasions, such as toxoplasmosis. However, even in cases where the disease of the mother is not accompanied by the penetration of the pathogen into the body of the fetus, the toxic effect of the waste products of the pathogens of the infectious disease is manifested. A detailed study of the characteristics of infectious diseases in pregnant women revealed such lesions of the embryo and fetus that do not appear immediately after birth and not even in childhood, for example, hearing or vision impairments, mental development abnormalities that can be noticed already in adulthood.

It is believed that intrauterine infections are transmitted through the placenta, a special organ that occurs during the development of pregnancy and in the study of which so much has been done by N. L. Garmashova. In the vast majority of cases, if not always, congenital infections begin with placental involvement. The infectious-inflammatory process in the placenta and in the membranes of the fetus adversely affects the life of the fetus, in particular, it disrupts the transplacental metabolism that meets the needs of the embryo or fetus. The placental membrane is permeable to antibodies, and even more so to microorganisms, including bacteria, protozoa, viruses, so pathogenic microorganisms enter the chorionic villi of the placenta through the bloodstream, are fixed in them and cause inflammation. Infectious agents that can be transmitted

transplacentalally and cause serious congenital infections of the fetus and newborn include human immunodeficiency viruses (HIV), hepatitis B and C (HBV and HCV), cytomegalovirus (CMV), herpes (HSV), rubella (Rubella virus), parvovirus B19 (Parvovirus B19), varicella zoster virus (Varicella zoster virus), as well as causative agents of syphilis (Treponema pallidum), toxoplasmosis (Toxoplasma gondii) and listeriosis (Listeria monocytogenes). Since 1944, after Gregg's observations on the relationship of congenital heart defects, cataracts, and a number of other lesions with rubella during pregnancy, a series of works followed that quite clearly characterized the full extent of damage to the placenta and fetus with rubella in the mother.

Periodically there was an increased interest in the so-called teratogenic effect of toxoplasma, rubella viruses, cytomegaly, herpes. The term TORCH arose, which denoted a syndrome in newborns that is clinically similar for all of the listed agents: T - toxoplasmosis, R - rubella (rubella), C - cytomegalia (cytomegaly), H - herpes (herpes). In recent years, new diseases have appeared that mankind did not know before: AIDS, diseases caused by parvovirus B19, hepatitis other than types A and B and indicated by the following letters of the alphabet - C, D, E, G. In addition, every year there is an increase in sexually transmitted infections. Congenital syphilis, a congenital infection caused by the human immunodeficiency virus, began to be recorded. Syphilis was, however, one of the first congenital infections that attracted the attention of not only doctors, but also the general population, mainly because it has a very vivid clinical picture. Intranatal infections are transmitted through infected anogenital secretions and/or maternal blood during passage through the birth canal. Postnatal infections occur through direct contact with an infected mother or with milk during breastfeeding. Group B streptococci (GBS) and pathogens of urogenital infections, including sexually transmitted infections (HSV, Chlamydia trachomatis, Neisseria gonorrhoeae, Candida albicans) pose the greatest risk in terms of transmission to the child during childbirth and the development of a clinically significant disease in him. The division of pathogens of perinatal infections into categories according to modes of transmission is somewhat arbitrary, since some pathogens can be transmitted in different ways.

However, the identification of the causative agent of a particular infection in a pregnant woman does not always indicate its transmission to the fetus. According to different authors, the risk of transmission to the fetus of chlamydia is 50–70% [1], group B streptococci — 37% [3, 7], parvovirus B19 — 50% [13], cytomegaly and herpes viruses — 30–50% in primary infections during pregnancy [9, 11]. Almost all infections in pregnant women are asymptomatic. Diagnosis of asymptomatic diseases requires specially developed techniques to identify the microorganism of the causative agent of the disease or the specific response of the body to its presence. Screening programs based on laboratory tests have been developed and continue to be developed to detect an asymptomatic infectious disease [1, 5].

To date, in our country there are no standards for the diagnosis and prevention of perinatal infections, algorithms for the diagnosis and prevention of intrauterine infections have not been established both at the stage of preconception preparation and at an early stage of pregnancy. Screening for infections in pregnant women is not always justified; there is not always mutual understanding between obstetrician-gynecologists, neonatologists, and laboratory doctors on the issues of diagnosing and preventing intrauterine infections. In world practice, there are recommendations for the management of women with a particular infectious pathology, but we could not find a sufficiently complete guide for the management of patients with perinatal infections. The guidelines provide criteria for the appropriateness of screening pregnant women for overt and occult infectious diseases. Screening should be performed if it is proven that maternal infection can be transmitted to the fetus and cause damage to it, if there is a reliable screening test for their detection, if safe and effective measures have been developed to minimize the risk of transmission of infection to the fetus and infection (prevention measures). Screening without these provisions is a waste of time, effort and money. There are screening programs

based on the detection of antibodies to common microorganisms that cause intrauterine infections. Not only the presence of antibodies is taken into account, but also the class of immunoglobulins and the avidity of antibodies. To a large extent, this refers to the determination of immunoglobulins to pathogens that make up the so-called TORCH syndrome in newborns [8, 13,10, 12].

It is known that the primary infection in the mother is dangerous for the fetus, i.e., the infection that first occurred during this pregnancy [9]. Determining the class of immunoglobulins G or M, as well as the avidity of immunoglobulins G, allows you to decide on the time of infection of the mother. The presence of immunoglobulins M or both M and G indicates a recent infection of the mother with this microorganism. The presence of only immunoglobulins M in the mother's blood indicates the acute phase of the disease, and the presence of only immunoglobulins G indicates a disease in the past, which also indicates the state of immunity. The risk group is made up of pregnant women who lack both immunoglobulins G and immunoglobulins M. It is in these women that primary infection is possible due to the lack of specific immunity. It should be emphasized that during pregnancy, the presence of class M antibodies may be a false positive result due to cross-reactivity with various blood proteins of pregnant women. Therefore, when identifying specific antibodies of class M, it is necessary to conduct a second study with an interval of 2 weeks.

Fluctuations in the number of antibodies, the possibility of obtaining false positive and false negative reactions, especially those showing the presence of M-antibodies, prompted a search for more reliable ways to confidently diagnose primary infection during pregnancy and possible transmission of the pathogen to the fetus. The universal method proposed in 1993 was the determination of IgG avidity, i.e., the degree of affinity of antibodies for an antigen and the strength of the resulting antigen-antibody complex. Based on a single blood sample, it became possible to confirm an acute infection with the presence of low-avid antibodies (avidity index less than 32%) or to state an infection in anamnesis by the presence of highly avid antibodies (avidity index more than 42%). The presence of highly avid antibodies indicates that the pregnant woman has had contact with this infectious agent in the past and, therefore, during this pregnancy there is no reason to assume a primary infection dangerous for the fetus. Considering that it is during primary infection that transplacental transmission of a pathogenic agent is possible, the benefit of the G-antibody avidity test in screening pregnant women becomes obvious. The risk group for infection of the fetus is women who do not have immunoglobulins to the pathogens that make up the TORCH syndrome. For such pregnant women, repeated serological studies are indicated to trace the possible occurrence of a primary infection, especially dangerous to the fetus. In addition, to identify a risk group, it is very important to conduct a survey of women planning a pregnancy. Today, test systems are being produced that allow you to determine the avidity index of antibodies. Now it has become possible to determine the infection of the fetus by examining amniotic fluid and fetal blood using nucleic acid amplification methods, in particular, the diagnosis of congenital cytomegaly, toxoplasmosis. As for urogenital infections and sexually transmitted infections, when registering for pregnancy, or better when planning a pregnancy, it is necessary to conduct a mandatory examination of women for syphilis (treponemal or non-treponemal test), for HIV, for hepatitis B and C, as well as gonorrhea, trichomoniasis [2].

- According to certain indications (if there are complaints about vaginal discharge, symptoms of vaginosis, vaginitis, cervicitis, infections in the sexual partner), women are examined for the presence of chlamydia, mycoplasmas, ureaplasmas, yeast-like fungi, herpes virus types 1 and 2 , aerobic and anaerobic bacteria, as well as an assessment of the microbiocenosis of the vagina. In the presence of warts of the vulva, vagina, cervix, erosion of the cervix, dysplasia of the cervix of varying severity, it is necessary to conduct research to identify and type the

human papillomavirus. Our institute has been conducting research for many years that may recommend changing the strategy for screening pregnant women for dangerous infections:

- developed and put into practice a method for diagnosing acute and chronic infections that make up the TORCH-syndrome, based on the determination of the specific IgG avidity index, which makes it possible to differentiate between acute (first-time) and chronic infections;
- it has been shown that the sensitivity of the microscopic method for diagnosing gonococcal infection is 30%, i.e. in 70% of women, the detection of gonococcal infection by this method is not always effective, and it is necessary to use other methods, such as nucleic acid amplification methods [10];
- the factors of pathogenicity of group B streptococci, which are determined by studying the isolated strains, have been established, and the obligatory examination of pregnant women for the presence of these microorganisms has been shown [3, 7, 9];

as a result of many years of international cooperation with the University of Uppsala (Sweden), standards for diagnosing chlamydial infection have been created, including nucleic acid amplification methods as the main methods and proving the insufficient effectiveness of other methods, including methods widely used in our country, such as ELISA and PIF to determine how antigen and antibodies to C. trachimatis.

Currently, there are problems in the screening strategy that need to be addressed. For the diagnosis of gonococcal and chlamydial infections, it is necessary to introduce nucleic acid amplification methods into the diagnostic standard. To detect infections that make up the TORCH syndrome, it is necessary to use serological methods with the detection of specific immunoglobulins, including the determination of the immunoglobulin avidity index G [6]. Screening for group B streptococci is not carried out in our country. According to international standards, such screening is necessary at 35–37 weeks of gestation by seeding the contents of the vagina and anorectal area on special nutrient media [11]. The general principles of managing pregnant women with suspected infection are as follows. In order to prevent intrauterine infection of the fetus, when a particular microorganism is detected in a pregnant woman, treatment is usually carried out with the appointment of antibacterial drugs. The mistake of an obstetrician-gynecologist is to prescribe therapy only on the basis of the conclusions received from the laboratory (treatment of tests). In addition, drugs, treatment regimens and routes of drug administration are not always reasonably chosen. So-called non-specific therapy (immunomodulators, hepatoprotectors, biostimulants, etc.) is often unreasonably used. And, finally, treatment is unjustifiably prescribed for sexual partners.

Thus, in order to solve the problem of rational diagnosis and treatment of perinatal infections, it is essential to create national standards for the management of patients with infections of the reproductive tract that are currently missing. It is also necessary to create an expert council to revise existing standards and create algorithms for examining women to prevent intrauterine infection at the stage of pregnancy planning and early pregnancy. It is also necessary for doctors to be aware of the principles of evidence-based medicine and the use of the proposed standards.

Literature

1. P osiseeva LV. Intrauterine infection: questions and answers. Issues of gynecology, obstetrics and perinatology. 2020;19(2):124-128. DOI: 10.20953/1726-1678-2020-2-124-128
2. Renge LV, Grigorieva EY, Zorina VN, Vlasenko AE. New protein markers in the prognosis of intrauterine infection in preterm birth. Issues of gynecology, obstetrics and perinatology. 2020;19(5):29-35. DOI: 10.20953/1726-1678-2020-5-29-35

3. Romanovskaya AV, Davydov AI, Khvorostukhina NF, Novichkov DA, Trushina OV, Stepanova NN, et al. Fetoplacental insufficiency and timing of its correction in pregnant women with influenza. Issues of gynecology, obstetrics and perinatology. 2018;17(3):41-44. DOI: 10.20953/1726-1678-2018-3-41-44
4. J aan A, Rajnik M. TORCH Complex. 2020 Jul 21 Treasure Island (FL): Stat Pearls Publishing; 2021 Available at: https://www.ncbi.nlm.nih.gov/books/NBK560528/
5. Emery VC, Lazzarotto T. Cytomegalovirus in pregnancy and the neonate. F1000Res. 2017 Feb 14;6:138. DOI: 10.12688/f1000research.10276.1
6. Lanzieri TM, Dollard SC, Bialek SR, Grosse SD. Systematic review of the birth prevalence of congenital cytomegalovirus infection in developing countries. Int J Infect Dis. May 2014;22:44-8. DOI: 10.1016/j.ijid.2013.12.010
7. Davis NL, King CC, Kourtis AP. Cytomegalovirus infection in pregnancy. Birth Defects Res. 2017 Mar 15;109(5):336-346. DOI: 10.1002/bdra.23601
8. Lamont RF, Sobel JD, Vaisbuch E, Kusanovic JP, Mazaki-Tovi S, Kim SK, et al. Parvovirus B19 infection in human pregnancy. BJOG. 2011 Jan;118(2):175-86. DOI: 10.1111/j.1471-0528.2010.02749.x
9. Lassen J, Bager P, Wohlfahrt J, Böttiger B, Melbye M. Parvovirus B19 infection in pregnancy and subsequent morbidity and mortality in offspring. Int J Epidemiol. 2013 Aug;42(4):1070-6. DOI: 10.1093/ije/dyt117
10. Shubina KA, Shumkova PV. prenatal diagnosis. Bulletin of the Council of Young Scientists and Specialists of the Chelyabinsk Region. 2016;1(3):54-59.