The pathogenesis of pathology of fetal development and its diagnosis

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ABSTRACT

The problem of the occurrence of congenital and hereditary pathologies is relevant not only in medical terms. It has a negative impact on the demographic situation in the country and is of great socio-economic significance due to the disability of patients with a severe hereditary disease and the lack of labor in the production of people involved in caring for them. According to scientific research, the share of congenital and hereditary pathology in the structure of morbidity and mortality in newborns and young children in the late XX - early XXI century. is growing steadily: 3-5% of live births are born with congenital malformations, 20-30% of newborns die due to genetic diseases, 30-50% of infant mortality in the postneonatal period is due to congenital malformations. Prognostic risk factors for the pathological development of the fetus are: heredity, consanguinity, complicated obstetric and somatic history, viral infection, inadequate antenatal care, low level of qualification of functionalists, non-compliance with screening terms and examination methods . Methods for early diagnosis of early detection of the studied pathology are given.

Keywords: congenital malformations, prenatal diagnosis, infant mortality

Introduction. The problem of congenital and hereditary pathology is relevant not only from a medical point of view. It negatively affects the demographic situation in the country, and is also of great socio-economic importance due to the disability of patients with severe hereditary diseases and unemployment in the production of persons caring for them. At the moment, despite the high level of development of genetics and medical sciences, practice states a high birth rate of children with congenital malformations [1]. According to world statistics, it is indicated that 40-60% fetal anomalies cannot be associated with any specific causes, they are called "sporadic birth defect", meaning unknown causes or accidental occurrence. World statistics indicate that in 40-60 % of cases of fetal anomalies cannot be attributed to any specific cause, they are called "sporadic birth defects", denoting an unknown cause or an accidental occurrence. At the same time, the risk of recurrence of this pathology in the future in these children is low [2, 3]. For 20-25% of anomalies, multifactorial causes are most likely - a complex relationship of many genetic defects and environmental factors [1]. The remaining anomalies, 10-13%, are related to the effects of the environment, and only 12-15% are purely genetic reasons [2]. It is believed that 10% of them are caused by the action of harmful environmental factors, 10% - by chromosomal changes, and the remaining 80% are usually mixed [4]. WHO has published data that patients often have to turn to ultrasound screening only in the third trimester of pregnancy [5, 6]. It has been argued that early diagnosis of the pathology of congenital and hereditary organs and complex

diagnosis of the fetus using modern methods is a necessary component of high-quality medical care during pregnancy and childbirth [2, 4, 7, 8]. Thus, early diagnosis of fetal malformations will allow timely resolution of the issue of possible prolongation of pregnancy, and the main attention should be paid to preventive measures. The above determined the choice of the purpose of this study.

Purpose of the study. To study the factors influencing the development of fetal pathology.

Research methods. The research materials are the results of a search conducted in the databases PubMed , ISI Web of Science , EMBASE and the Cochrane Libraries (Cochrane library). By careful study of the material, starting with the creation of relevant studies, a conclusion was made.

Research results. The family should be aware of the need for medical genetic counseling prior to pregnancy planning. A geneticist is called upon to assist a married couple in making a decision about childbearing. New possibilities of medical genetics make it possible to plan pregnancy even at a high risk of some severe hereditary diseases (Down's syndrome, hemophilia, etc.). These diseases can be detected by modern methods of prenatal diagnosis. Pregnancy with the consent of the woman can be terminated, preventing the birth of a child with an incurable hereditary pathology.

Hereditary diseases arise as a result of mutations of hereditary structures - chromosomes or genes. Accordingly, chromosomal and gene diseases are distinguished. The reason for the appearance of mutations is the action of mutagenic environmental factors. But after the mutation has arisen, its manifestation does not depend on the environment. The external environment can only influence the severity of the symptoms of the disease and the severity of its course.

Congenital malformations of the fetus can be divided into two large groups - hereditary (that is, inherent in genes and chromosomes, inherited) and actually congenital (acquired during intrauterine development). Such a division is rather arbitrary, since most developmental defects are caused by a combination of hereditary predisposition and adverse external influences, representing multifactorial anomalies.

Depending on the object of damage and the time of exposure to harmful factors, the following malformations are distinguished:

- ✓ Gametopathies are changes in germ cells that occurred before fertilization. These are inherited defects based on sporadic mutations in the parent germ cells.
- ✓ Blastopathy is a violation that occurred in the first two weeks after fertilization.
- ✓ Embryopathies are lesions that have affected the embryo even before it is attached to the wall of the uterus. Often, such a damaging effect on the fetus occurs at 4-6 weeks of gestation and leads to the development of heart disease, at 12-14 weeks it causes abnormalities in the child's genital organs.
- ✓ Fetopathies are diseases of the fetus that occur from the 11th week of pregnancy until birth.

The role of individual factors in the development of congenital and hereditary diseases in children is also important.

- ✓ Maternal causes: - neuro -endocrine - hypofunction of the ovaries (failure of the follicular phase of the cycle, insufficiency of the luteal phase of the cycle, chronic anovulation , primary ovarian failure), disorders in the hypothalamus-pituitary-ovary system (hypofunction of the pituitary gland, polycystic ovary syndrome -PCOS , hyperprolactinemia , , adrenal, mixed genesis, thyropathy , and their combination); - anatomical and functional - malformations of the genital organs, isthmic -cervical insufficiency, uterine defects (intrauterine synechia , pathology of the receptor apparatus, uterine hypoplasia, anomalies in the development of the uterus), tumors of the uterus and ovaries; - infectious - infections with bacterial, viral, parasitic

and opportunistic microorganisms; - immunological - autoimmune processes (antiphospholipid syndrome, systemic lupus erythematosus and other autoimmune diseases), aloimmune processes (isoantigenic incompatibility of maternal and fetal blood according to the Rh factor and antigens of the ABO system, sensitization by fetal antigens), immunodeficiency processes; - genetic factors and chromosomal abnormalities - the most common chromosomal disorders are trisomy , monosomy , triploidy , tetraploidy.

- ✓ Mother's age. It has the greatest significance in the development of hereditary diseases associated with nondisjunction of chromosomes in meiosis. The older the woman, the longer the time interval separates meiosis-I and meiosis-II and the higher the likelihood of a violation of the normal formation of the egg. So, with the age of the mother, the risk of having a child with Down syndrome increases. A high frequency of the birth of children with Down syndrome in young mothers has also been established.
- ✓ pathology of the state of the body of the father, including factors contributing to the occurrence of pathological changes in the ejaculate
- ✓ Father's age. The constant formation of spermatozoa almost does not change the time interval between meiosis-I and meiosis-II, but contributes to the accumulation of gene mutations. The older the man, the higher the risk of hereditary pathology caused by gene mutations in offspring.
- ✓ Pathology of pregnancy - severe forms of early gestosis , cervical pregnancy, cystic skid
- ✓ Extragenital pathology of the mother.
- ✓ Social and environmental factors: environmental (radiation, chemical air pollution, etc.); mother's age (up to 18 and after 30 years);
- ✓ unfavorable living conditions. Unbalanced nutrition of a pregnant woman. In the development of some congenital malformations of the fetus, an important role is played by the deficiency of essential amino acids, vitamins and minerals, especially folic acid, iodine and selenium;
- ✓ occupational and industrial hazards (temperature, noise, vibration, chemical, radiation);
- ✓ bad habits (alcoholism, drug addiction, smoking). The systematic use of alcohol during pregnancy leads to multiple congenital malformations of the central nervous system, heart, limbs, which are combined by the term "fetal alcohol syndrome". Drinking alcohol is especially dangerous in the first half of pregnancy, when the fetal organs are forming. The characteristic signs of "fetal alcohol syndrome" are microcephaly, microphthalmia , epicanthus , a small saddle nose, a large mouth, underdevelopment of the upper or lower jaw, fusion of the fingers, congenital dislocation of the hip joints, congenital heart defects. The vast majority of children are mentally retarded. The severity of an intellectual defect may be different. Significant growth retardation is characteristic, especially in the first months and years of a child's life. There is no safe dose of alcohol for a pregnant woman and a fetus!
- ✓ Intrauterine infections (rubella, toxoplasmosis, cytomegalovirus infection, herpesvirus infection)
- ✓ Induced ionizing radiation. X-ray examination of a woman in the early stages of pregnancy is dangerous. The dependence of the teratogenic effect on the dose of radiation has been established. Congenital malformations, as a rule, are nonspecific, but malformations of the central nervous system occur most often. Established mutagenic effects on the human embryo emissions of radioactive substances as a result of the Chernobyl accident.

Prenatal diagnosis of congenital and hereditary diseases consists of three methods - ultrasound examination (ultrasound) of the fetus, blood tests of a pregnant woman (biochemical screening) and a group of invasive methods.

Also, to clarify the etiology of congenital malformation and prognosis for the life and health of the fetus, invasive prenatal diagnosis is carried out - amniocentesis , during which amniotic fluid is taken and fetal cells are isolated from it, followed by karyotyping (determining the number and quality of chromosomes).

Invasive methods for examining the fetus:

- ✓ chorionbiopsy : detection of genetic pathologies in the fetal egg is carried out at 11-12 weeks of pregnancy;
- ✓ amniocentesis : a study of the amniotic fluid, which allows to identify hyperplasia of the adrenal cortex, chromosomal pathologies and diseases of the nervous system;
- ✓ placentocentesis : detection of genetic pathologies through the study of placental cells;
- ✓ cordocentesis : diagnosis of blood diseases, intrauterine infections by examining blood taken from the umbilical cord of the fetus;
- ✓ fetal skin biopsy: possible skin diseases are detected.

Prevention of congenital and hereditary diseases includes measures aimed at preventing the conception of a sick child. It is implemented in three ways: • planning for childbearing; • protection of the human environment from additional anthropogenic pollutants (mutagens and teratogens); • fortification of the population.

Conclusion. Congenital anomalies of development in the structure of morbidity and mortality occupy one of the first places in the group of full-term children. The main reasons for the growth of CM in newborns are: burdened obstetric history and heredity, environmental degradation, bad habits and occupational hazards, past viral and bacterial infections, late prenatal diagnosis. Features of the general and obstetric anamnesis, as well as the course of pregnancy, determine the nature of the intrauterine development of the fetus and the type of formation of defects (time of pathological exposure).

List of used literature.

1. Demikova N.S., Podolnaya M.A., Lapina A.S., Asanov A.Yu. Influence of prenatal diagnosis and selective abortions on the incidence of congenital malformations // Obstetrics and Gynecology. 2017. n 7. P.130-135
2. Altynnik N.A. Prenatal ultrasound diagnosis of Ebstein's anomaly before 12 weeks of gestation. Prenatal diagnosis. 2018. Volkov A.E., Voloshin V.V., Fomenko O.A., pp. 152-154. Prenatal diagnosis of congenital cerebral teratoma // Prenatal diagnosis. 2018. V. 17. No. 4. S. 350-354
3. Galkina O.L. Features of blood flow in the venous duct in fetuses with congenital developmental anomalies diagnosed in the first trimester of pregnancy. Prenatal diagnosis. 2018. V.17. No. 3. S. 211-214
4. Begimbekova L.M., Alieva E.N., Suleimenova Zh.U. etc. Optimization of prenatal diagnosis of congenital malformations of the fetus and prognosis issues//Bulletin of KazNMU . No. 2. 2015. S. 6-8.
5. Mirzabekova B.T., Mukhamadieva S.M., Khayriddinova J. Medical and social aspects of the development of congenital malformations of the fetus (literature review) // Bulletin of postgraduate education in the field of health care. No. 2. 2020. P .66-73
6. Alghamdi MA., Ziermann JM., Gregg L., Diogo R. A detailed musculoskeletal study of a fetus with anencephaly and spina bifida (craniorachischisis), and comparison with other cases of human congenital malformations. // J Anat - 2017 - Vol230 - N6 - p.842-858
7. Voevodin S.M., Shemanaeva T.V. Prevention of malformations// Medical Council. 2016. №2. pp. 26-31.

8. Volkov A.E., Voloshin V.V., Fomenko O.A. Prenatal diagnosis of congenital cerebral teratoma // Prenatal diagnosis. 2018. V. 17. No. 4. S. 350-354