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# MORPHOLOGICAL CHANGES IN THE ADRENAL GLAND OF BABIES WHO DIED FROM INTRAUTERINE INFECTION

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**Abstract: Objective:** This study aims to analyze the pathomorphological changes in the adrenal glands of neonates who succumbed to intrauterine infections (HII). It investigates the impact of such infections on the adrenal gland's morphological structure and endocrine function. **Methods:** The study examines cases of intra-fetal infections caused by microorganisms transmitted during pregnancy. Histopathological analyses of the adrenal glands were performed to identify structural and functional alterations caused by these infections. **Results:** Findings indicate significant morphological changes in the adrenal glands, including disruptions in glandular architecture and evidence of endocrine dysfunction. These alterations highlight the vulnerability of the adrenal gland to intrauterine infections and the subsequent complications that arise in neonates. **Novelty**: This research provides unique insights into the relationship between intra-fetal infections and adrenal gland pathologies, emphasizing the critical role of the adrenal gland in neonatal health. The findings contribute to a deeper understanding of the systemic effects of intrauterine infections on fetal development.

**Keywords:** intrauterine infection, adrenal gland, morphological changes, pathology, infant mortality, endocrine system, infectious diseases, histology



## Introduction

Intra-fetal infections are infections that infect the fetus during pregnancy and have a negative impact on its normal development. Such infections damage various organs and systems of babies, including the endocrine system [1]. The adrenal gland, one of the central organs of the endocrine system, plays an important role in ensuring the hormonal balance of children [2]. These hormones are important in immune response, adaptation to stressful situations and various physiological processes [3].

Intrauterine infections cause various pathomorphological changes in the adrenal gland. These infections disrupt the functioning of the endocrine system in babies, causing hormonal deficiency and various diseases. In this article, pathomorphological changes in the adrenal glands of babies who died as a result of intrauterine infections are analyzed in detail [4].

## Methods

Intrauterine infections are caused by a number of pathogenic microorganisms. Most of them

have a serious effect on the activity of the adrenal gland. The following infections are transmitted to the fetus during pregnancy and information is given about the changes that begin to appear in the adrenal gland.

## Results and Disscusion

### A. Cytomegalovirus (CMV)

Cytomegalovirus infection is transmitted during pregnancy and seriously changes the endocrine function of the adrenal gland in the baby [5], [6].

Cytomegalovirus (SMV) is a virus belonging to the Herpesviridae family, and is a pathogen that causes chronic infectious conditions when it infects the human body. SMV, like other types of herpes virus, remains latent in the body for a long time and is activated when the immune system is weakened. It can damage various organs, including the liver, kidneys, adrenal glands, and central nervous system. CMV is mainly transmitted in the following ways:

a. Intrauterine: from the pregnant mother to the fetus through the placenta;
b. By contact: through infectious bodily fluids, including saliva, urine, semen, and tears;
c. Through blood transfusion or organ donation.

Cytomegalovirus infection can be dangerous for the fetus, especially if this infection occurs during fetal development, it can cause congenital pathologies, death, damage to the nervous system or developmental delay in babies. Mothers infected with SMV during pregnancy are at risk, and damage to the fetus can cause morphological changes in various organs of the baby, including the adrenal glands. Pathomorphological changes in the adrenal gland in SMV infection are as follows:

a. Cortical atrophy: Corticosteroid cells atrophy due to SMV, which causes hormonal imbalance in infants.
b. Adrenocortical histological changes: the tissue of the cortical substance of the adrenal gland undergoes infiltration of viral cells, which reduces the activity of its tissue.
c. Adrenaline deficiency: The cells of the substantia nigra are damaged, and the production of adrenaline and noradrenaline decreases, which reduces the ability of babies to adapt to stressful situations.

### B. Herpes Simplex Virus (HSV)

Herpes simplex virus is one of the most common causes of congenital infections and also damages the tissues of the adrenal gland. Herpes simplex virus (HSV) is a virus belonging to the Herpesviridae family that causes various infections in humans. HSV is divided into two types: HSV-1 and HSV-2. Both viruses can cause different infections, but the difference between them mainly depends on the places of transmission.

HSV-1 causes infection mainly in the mouth (painful pustules called "sticky" or "boils" on the lips) and around the eyes. At the same time, this virus can affect the kidneys, central nervous system, heart and other organs. HSV-2 mainly affects the genitals and is transmitted sexually, but it can also spread to other places, such as the mouth or other parts of the body.

Herpes simplex virus infection can be severe when a person's immune system is weakened, especially in newborns or patients with weakened immune systems. Usually, the virus exists latently in the body and is activated only when the body's immune response to stress, infection or other factors is weakened.Adverse effects of herpes simplex virus:

a. In infants: As an intrauterine infection, herpes simplex virus can cause severe neurological disorders, vision loss, etc. in infants. Such conditions can lead to congenital infections and death.

b. In immunocompromised people: Herpes simplex virus is more likely to cause serious, chronic infections in people with weakened immune systems. An example of this is HIV-infected patients.

The herpes simplex virus can remain in the body after just one infection, but the virus only becomes active when the immune system is weakened. Herpes infection causes the following pathomorphological changes:

a. Disturbance of the histological structure: Herpes virus causes abnormalities in the tissues of the adrenal gland and creates viral infiltrations in the cells.
b. Necrosis in the cortex: The cells of the cortex of the adrenal gland die under the influence of the virus, which leads to a decrease in hormonal activity.

**C. Toxoplasmosis**

Toxoplasmosis - Toxoplasmosis is an infectious disease caused by the parasite Toxoplasma gondii, which spreads between humans and animals (especially cats). Toxoplasmosis is a parasitic infection that is usually spread through the urine of cats. Toxoplasma gondii is a type of protozoan that can complete its life cycle in cats and other intermediate hosts, but humans and many other mammals are its "intermediate" hosts. Toxoplasma gondii is an infection caused by the parasite, and if contracted during pregnancy, it can seriously affect the adrenal glands.

The main ways of toxoplasmosis:

a. Feline transmission: Cats multiply the parasite in their bodies and excrete it in their urine. It can be transmitted to humans through contaminated urine, plants, food, or other surfaces.
b. Foodborne transmission: Toxoplasmosis is transmitted to humans mainly through direct contact with contaminated food (raw meat, especially pork or mutton, soft, unwashed vegetables and transmitted through fruits).

Spread through eyes and other body fluids: In rare cases, toxoplasmosis can be transmitted to the fetus during pregnancy. Pathomorphological changes observed in toxoplasmosis:

a. Poisoning in the substantia nigra: Parasites damage the substantia nigra of the adrenal gland and slow down the production of adrenaline.
b. Lymphocytic infiltration in the cortex: Due to parasites, the cortex undergoes lymphocytic infiltration, which negatively affects the normal functioning of the tissue.

**D. Syphilis is a sexually transmitted infection caused by the bacterium Treponema pallidum**

Syphilis is a serious and progressive disease that progresses through various stages and can cause serious organ damage if left untreated. The main way syphilis is spread is through sex, but it can also be spread through:

a. Sexual intercourse (the most common way of spreading);
b. From mother to fetus during pregnancy (congenital syphilis);
c. Through the blood (for example, by blood transfusion or injection).

Syphilis is a bacterial infection that affects the adrenal glands if contracted during pregnancy. Syphilis causes the following pathomorphological changes in the fetus:

a. Microscopic lesions in the substantia nigra: Bacteria damage the substantia nigra of the adrenal gland, disrupting the process of adrenaline production.
b. Violation of vascularization in the cortex: Blood circulation is disturbed, and the ability of the adrenal gland to produce hormones is lost.

**E. Measles and Rubella**

Measles and rubella are both caused by viruses and may have similar symptoms, but their causative viruses and disease outcomes are different.

**1. Measles**

Measles is a highly infectious disease caused by the measles virus (Morbilivirus). It is mainly spread through the air and is usually common among children.

The main symptoms of measles:

a. Heat (fever): A fever precedes the onset of illness.
b. Rashes: Small, red spots and rashes appear on the body, first around the face and neck, then spreading to the whole body.
c. Coriander and runny nose: Cough, runny nose, redness and inflammation of the eyes are observed.
d. Plaques: Small white spots may appear on the inside of the mouth, especially behind the teeth. These spots are a characteristic sign of measles.

**2. Measles (Rubella)**

Measles is an infectious disease caused by the rubella virus, which is usually mild but very dangerous for pregnant women. The main symptoms of measles:

a. Fever: Measles can also cause fever.
b. Rashes: Rashes start on the face and spread to the body and limbs. However, measles rashes tend to be less swollen and milder than those of measles.
c. Lymphadenopathy (swollen lymph nodes): Another major symptom is swollen lymph nodes around the neck, ears, and back.
d. Headache, muscle pain, cough and runny nose: These are also common symptoms of measles.
e. Measles and rubella viruses have a negative effect on the adrenal gland and disrupt its endocrine function. These viruses cause the following changes:
f. Infiltration in the cortex: Under the influence of viruses, the cortex of the adrenal gland is filled with lymphoid cells, and its tissue productivity decreases.
g. Decreased Adrenaline Production: Adrenaline deficiency occurs in babies and their resistance to stressful situations decreases.

**F. HIV (Human Immunodeficiency Virus)**

HIV (Human Immunodeficiency Virus) is a virus called HIV (Human Immunodeficiency Virus), which weakens the human immune system and destroys its protective functions. The main effect of HIV is to damage T-cells (or CD4 cells), one of the most important parts of the human immune system. These cells play a key role in protecting the body from diseases and infections. Ways of spread of HIV:

a. HIV is mainly spread through infectious body fluids, including:
b. Sexual relations (sexually transmitted);
c. Through blood (blood transfusion, using improperly sterilized medical devices);
d. During pregnancy (from mother to fetus, through childbirth or breastfeeding);
e. Other body fluids (less likely to spread through superficial lesions or mouth, but not clear).

When HIV is transmitted to the fetus, the endocrine function of the adrenal gland is seriously weakened. Pathomorphological changes observed in HIV infection are as follows:

a. Lymphoid infiltration in the cortex: HIV virus fills the adrenal gland with lymphoid tissue and reduces hormonal activity.
b. Depletion of T-lymphocytes in the substantia nigra: HIV causes the cells of the substantia nigra to fail to mount an immune response against infection, leading to a lack of defense mechanisms in the infant.

## Conclusion

In conclusion, intrauterine infections during pregnancy seriously affect the adrenal gland of the baby. These infections cause pathomorphological changes in the endocrine system, disrupt the hormonal balance of babies, which weakens their resistance to stress and immunity. Timely detection of intrauterine infections and their prevention is important for the healthy development of babies.

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