International Journal of Psychosocial Rehabilitation, Vol. 24, Special Issue 1, 2020
ISSN: 1475-7192

Pathomorphology of Viral Pneumonia of Immuno Deficiency Children

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***Abstract**--This study explores morphogenesis and morphological changes in acute respiratory viral infections in immunocompromised children. Initially, immune status was assessed as 4–5 cases of acute thalamus, increased atrophy, and immune dysfunction in peripheral organs with deficiency and atrophy of primary morphofunctional areas. In children with immunodeficiency, viral pneumonia manifests itself mainly in the form of bilateral multicenter hemorrhagic bronchopneumonia, most often with damage to segments II, IV, IX and X-X. Immunodeficiency is the most common complication of hemorrhagic bilateral polysegmental pneumonia, paraseric desquamatic hemorrhagic pneumonia, RS-virus infection with generalized pneumonia, adenovirus infection with serous-mammalian pneumonia, mixed virus.*

***Keywords**--children, immunodeficiency, lungs, pneumonia, virus, influenza, paragrid, RS-virus, adenovirus*

I. INTRODUCTION

In recent years, the role of viral infections worldwide has been steadily increasing.Statistics show that acute respiratory viral infections (SARS) have a high incidence rate and are the leading cause of infant mortality [1, 2, 8, 11, 13]. According to various authors, the cause of pneumonia is a viral infection from 69.5% to 67.5%. In Uzbekistan, HIV-infected children were diagnosed with 52% influenza, adenovirus 29.5%, respiratory syncytial virus 12.5%, and paraflux 16% [3.4, 9.10]. Depending on the pathogenicity of the virus strains and the presence of immunodeficiency in the body.Therefore, children with viral infections are more likely to develop immunity [5, 6, 7, 10, 12]. The constancy of viruses in the cells of the body's immune system, lymphocytes, causes the infection to manifest itself in the form of epidemics. As a result, pathomorphological signs of viral infections are also atypical. Therefore, the study of morphogenesis and morphological changes in viral infections in children with immuno deficiency is an important problem in medicine.

The aim of research work

The aim is to improve the data on morphogenesis and morphological changes in viral pneumonia in immuno competent children.

II. MATERIALS AND METHODS OF RESEARCH WORK

To achieve this, in 2015-2019, 82 autopsies of children from viral pneumonia were used in the RPAM of the Ministry of Health of the Republic of Uzbekistan. As an object, sections of the throat, tonsils and lung tissue were

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DOI: 10.37200/IJPR/V24SP1/PR201246
Received: 20 Jan 2020 | Revised: 08 Feb 2020 | Accepted: 27 Feb 2020

excised for histological examination. Children are grouped into 4 groups by age: from 7 days to 28 days - 1 group, from 29 days to 3 months - 2 groups, from 4 to 6 months - 3 groups, from 7 to 12 months - 4 groups. Among the dead children were 48 boys and 34 girls. Pathological investigation of corpses Complete evisceration of the organ complex of internal organs by the coastal method. Initially, large serous cavities were examined, i.e., the abdominal cavity and pleura. The ear was burned with alcohol, and blood was taken for serological and bacteriological studies. Appearance of the respiratory system This was studied by the Xinzerling method. At the same time, the lungs were cut from the periphery to the gate, so that the foci infected with pneumonia could be completely removed. As a result, blood vessels, lymphatic vessels, respiratory and respiratory parts of the lungs are considered as a single bush. For bacteriological studies, 2 × 3 cm were excised from the bifurcation region and lungs. For virological examination, the lungs were isolated in sterile containers that were outside the foci of pneumonia.

SARS antigen was detected by fluorescence microscopy in negative lubricants from the throat, bronchi and lungs. For immunofluorescence staining, fluorescent antibodies of influenza A and B viruses (H1N1, H3N2), type I, II, III, and paraffin, adenovirus, and RS viruses were used. The preparations were diluted with acetone for 10 minutes and stained with fluorescent serum for 30 minutes. Then the preparations were washed three times in physiological saline at a pH of 7.2-7.4 and examined using a fluorescent microscope labeled LUMAM and analyzed according to the results.

III. RESULTS OF THE RESEARCH WORK.

Initial studies were based on morphological studies of the lymph nodes and spleen, the state of immunodeficiency in the body of children who died from viral pneumonia, the central member of the immunogenesis, that is, the thymus and peripheral organs.It was believed that in the thymus immunodeficiency is present in the case of 4-5 stages of acute invasion, increased atrophy, lymph nodes, as well as insufficiency and atrophy of talph.

The results of the study showed that in children with immunodeficiency syndrome who died before the age of one year, the disease mainly manifested itself as bilateral bronchopneumonia, most often with fractures of segments II, IV, IX, and X. It was observed that foci of inflammation in the lung tissue continue to develop in large quantities, in different sizes, with severe circulatory disturbance, mainly in the central part of the lungs. These children were diagnosed with an anamnesis 3-10 days before hospitalization. After hospitalization, 29.4% of the children died on the first day, 27.6% on the 3rd day, 16.5% on the 4th day and 9.8% on the 5th day.

Morphological changes characteristic of viral pneumonia are found in the throat, bronchi and lungs, which suggests that the viruses are tropical in nature.

A fluorescence tomograph showed that the infected epithelium lost its feathers and became indistinguishable, lost contact with each other and migrated from its place, i.e. decompress. The result is positive if clear fluorescence is observed in the cylindrical epithelial cytoplasm that appears on the microscope.Antigens of various respiratory viruses are identified in different epithelial cells and in their nuclei or cytoplasm.Influenza emits both the nucleus and the cytoplasm of the cylindrical epithelium. In Paragripp, radiation was detected in the perinuclear region of the

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epithelial cytoplasm. In the RS virus, irradiation was detected in epithelial bundles, which turned into protozoa, or in the perinuclear region of the cytoplasm of multinucleated epithelial cells.

Hemorrhagic tracheobronchitis was the main morphological sign of influenza.At the same time, it was found that the head and bronchi of the lungs are damaged, and segmental bronchi are characterized by desquamation of the epithelium of the bronchi and alveoli. The lungs are enlarged, strongly hyperemic, overweight, and the color of the outer surface and the color of the slice are also colored. Histological examination showed that lung tissue abruptly expanded blood vessels, whole blood, around the blood and foci of atelectasis.In the inflamed areas of the lungs, the alveoli are filled with serous-hemorrhagic exudate (Fig. 1), which contains red blood cells, small white blood cells, alveolar macrophages and desquamated alveoli.The cytoplasm of the alveolocytes under the influence of the virus underwent gigantic cell metaplasia, some of which were cyanoplasms rich in eosin, while the cytoplasm was expanded by a colorless by vacuolar dystrophy. It is observed that lymphocytes and plasma cells accumulate in the bronchi, blood vessels and in the walls of the alveoli.Peribronchial lymphoid tissues were found to be rare, common, and atrophic. When influenza pneumonia develops against the background of immunodeficiency, it is often associated with neurotoxicosis, toxic encephalopathy, heart and lung failure.

Paragliding pneumonia is accompanied by the appearance of a massive large blood vessel of the bladder with a swollen mucous membrane of the throat and bronchi. The lungs become pale.Inflammation is localized in the posterior and lower segments of the lungs and has a dense reddish-blue color.Histologically, pulmonary tissue develops serous-stable intermatic pneumonia and is associated with atelectasis and emphysema.It was observed that the epithelium of the coating was displaced and decomposed, and there was severe edema and lymphoid infiltration in the basement membrane. The presence of serous fluid, desquamated epithelium, several leukocytes, macrophages and red blood cells in the bronchi and alveolar cavity.It has been observed that in some mucous membranes of the bronchi, the epithelium covers the overlays, adhesions and pillows.

In RS-viral pneumonia, macroscopically, the lungs were full, inflammation localized in the back and lower lobes, and the color was dark red. When examining these foci, it was noticed that blood flows from the surface. Morphological changes in the upper mucous membrane of the upper cornea are underdeveloped, with the exception of the presence of foam in the cavity. The main morphological changes occur in the respiratory part of the lungs, developing serous-desquamic, giant cell and interstitial pneumonia.

In the epithelium of the bronchial mucosa and in the alveolar epithelium, multinuclear annual simplases are formed. It is observed that the cytoplasm of these cells has a different color, some contain fine-grained grains coated with eosin, others have drops of hyaline-like proteins, and others have large vacuoles. Acute bronchiolitis and alveolitis of this type can be seen in their interstitial tissue in the form of lymphocytic, plasma, macrophage infiltration. The alveolar cavity is filled with dense protein sand, macrophages, white blood cells, red blood cells and large protozoa.

If a dead child develops a deficiency of the immune system, RS virus infection is common in the body and spread in other organisms. These organs also look like giant unicellular organisms, with the accumulation of

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lymphoid infiltrates around them. The cause of death in RS-viral infection is often bronchopulmonary obstruction due to respiratory and cardiovascular failure.

Pneumonia caused by adenovirus infection reveals hyperemia, edema, small hemorrhages in the bladder and erosion in the macroscopic mucous membrane of the upper respiratory tract. The lungs are pale, and the posterior and lower segments harden and become concentrated grayish-red. Microscopic examination reveals specific changes in the epithelium of the bronchi and alveoli. They come in different sizes, hyperchromic, with some kind of basophilic paint, surrounded by a light ring with a core size (Fig. 2). These cells entered the alveolar cavity. Enlarged cytoplasm, small eosinophilic inclusions, peribronchial and alveolar interstitial tissue, infiltrated by lymphocytes, plasma cells and macrophages. The alveolar cavity is filled with a protein-mucous membrane containing red blood cells, macrophages, lymphocytes. Since adenoviral lymphoid tissue is also tropic, changes in the organs of immunogenesis are also detected.

Sometimes pneumonia is caused by a combination of viruses, and it is discovered that the RS virus is accompanied by influenza and paraffin. It was morphologically established that very strong infiltration, massive blood transfusion into the peripheral vein and alveolar cavity is observed in the airways and lung tissue (Fig. 3).

SONVI presents pneumonia with deeper pathomorphological changes in premature babies. It is often characterized by the formation of eosin-stained hyaline membranes (Fig. 4) adhering to the alveolar wall. It is noticed that some alveoli fill the cavity almost completely. It was found in the lung tissue that foci of atelectasis and distelectase are formed on the basis of severe edema and fullness. Alveolar tissue of the spine is covered with infiltration of lymphoid and macrophage cells.

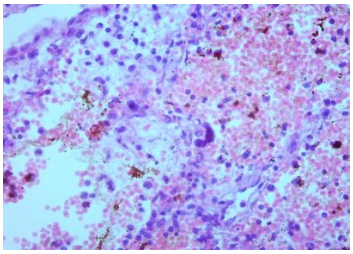

Figure 1. 6 months old lungs with influenza pneumonia. Giant-cell metaplasia of alveolacitis, hemorrhagic pneumonia.

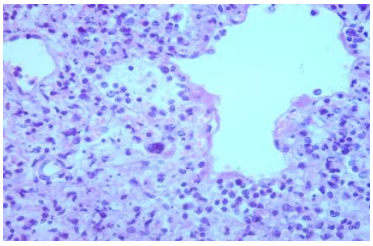

Figure 2. 9-month-old infant lungs with adenovirus pneumonia. Adenovirus cell with enlarged nucleus, lymphoid infiltration.

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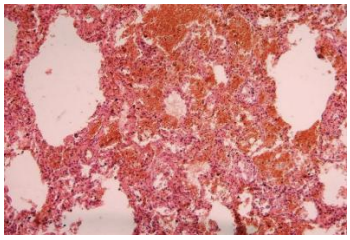

Figure 3. Mixed viral pneumonia, 7 month old lungs. Hemorrhagic inflammation and blood transfusion.

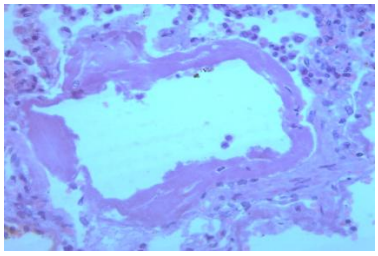

Figure 4. Premature baby lungs of 3 months. The hyaline membrane in the alveolar cavity

IV. CONCLUSION

In children who died of viral pneumonia, immunodeficiency was confirmed by 4-5 acute axial injections of the thymus, atrophy, lymph nodes and atrophy of the main morphofunctional areas of the spleen.

In children with immunodeficiency, viral pneumonia manifests itself mainly in the form of bilateral multicenter hemorrhagic bronchopneumonia, most often with damage to segments II, IV, IX and X-X.

Immunodeficiency is the most common complication of hemorrhagic bilateral polysegmental pneumonia, paragrid serous-desquamatic hemorrhagic pneumonia, RS-virus infection with generalized pneumonia, adenovirus infection with serous-mammalian pneumonia, mixed virus.

The morphology of viral pneumonia as a diagnostic marker: a giant cell with influenza cytoplasm, a pillow with an epithelium in the paraglip, multinucleated simple prostases with RS-virus infection and a hypertrophic giant cell with adenovirus infection.

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DOI: 10.37200/IJPR/V24SP1/PR201246
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