

Morphological Aspects of Development in Congenital Bronchopulmonary Anomalies

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Abstract: It has been established that the substrate of morphological changes characteristic of anomalies in the development of bronchial tissue are predominantly atrophic and metaplastic changes in the bronchial mucosa in certain areas, which continue with the formation of a multilayered squamous epithelial lining, the development of fibrous tissue and the formation of interstitial tumors in the submucosa. Atrophic and hypertrophic changes in the muscle layer that forms the wall of the bronchial tissue, morphological changes indicating anomalies in the development of the bronchial walls from a morphofunctional point of view are considered.

Keywords: bronchus, lung, anomalies, morphology, dysplasia, metaplasia.

Relevance of the problem. Congenital anomalies among newborns in the world account for 4-6% per 1000 births, and bronchopulmonary anomalies account for 4-7% of these anomalies. In 2022, an average of 34 million babies will be born each year worldwide with bronchopulmonary anomalies, and approximately 20-25% of these will die within the first 7 days. In the USA and European countries this figure is collectively 4.5 million per year, and in the Russian Federation and CIS countries this figure is 7 million per year. Currently, in the Republic of Uzbekistan, on average, 2842 children are born with bronchopulmonary anomalies per year, of which, on average, 720 die in the early neonatal period. About 25-35% of the rest die in the late neonatal period. This situation is extremely relevant at the moment and shows that the topic of the dissertation has been chosen correctly. In all developed countries, maternal and child mortality rates are very low. According to CIS countries, the Republic of Uzbekistan ranks 15th among 174 countries in the world in terms of mortality from congenital anomalies, and has a very low level of maternal and child health care. Despite the fact that a lot of research work is being done on these bronchopulmonary anomalies in the CIS countries, mortality from developmental anomalies in young children has decreased to varying degrees over the past 5 years, averaging 1.2% per year. In the period after the covid-19 pandemic in 2020, the above mortality rates did not decrease; it became known that in the Republic of Uzbekistan in the period 2018-2023 this figure was in the range of 1.2-1.7%. on average, and the highest mortality was in 2022 (congenital development, mortality from secondary infectious factors caused by anomalies averaged 27 per 1000 births (15,660 children died. Statistics provided by UzSSV 2022, 11/04/2022). Dysonogenetic bronchiectasis, bronchial atresia, congenital tracheobronchoesophageal adhesions, cystic bronchial hypoplasia, single bronchial cysts of the lungs and others are among the most common types of bronchial developmental anomalies in young children.

Purpose: to study the pathomorphological aspects of bronchial anomalies in newborns.

Materials and methods: based on autopsy materials, data were obtained on 126 cases delivered to the Republican Center for Pathological Anatomy and the Andijan Regional Bureau of Pathological Anatomy and confirmed congenital anomalies of bronchial and lung tissues. Among the morphology methods: using hematoxylin and eosin, the obtained data on the structural structures of the tissue are analyzed.

¹ UNSDG- United Nations Global SDG Database 2021years.

Discussion and results. In case of congenital anomalies of the bronchus, the most characteristic morphological changes include the permanent structures of the bronchial walls: mucous membrane, submucosa, mucous tissue, adventitial layer of the bronchus and sparse fibrous connective tissue components in the peribronchial branches. Dysontogenetic bronchiectasis is predominantly characterized by a sharp decrease in the thickness of the walls of the bronchi, flattening of the relief of the mucous membrane and transformation of columnar single-layer epithelium into flat multilayered epithelium, intermediate swellings in the submucosal layer. , and almost does not form glandular structures. It was established that the surface of the mucous membrane sometimes had a scaly appearance, and under the scales edematous changes continued with the formation of foci of neutrophilic and lymphocytic infiltration.

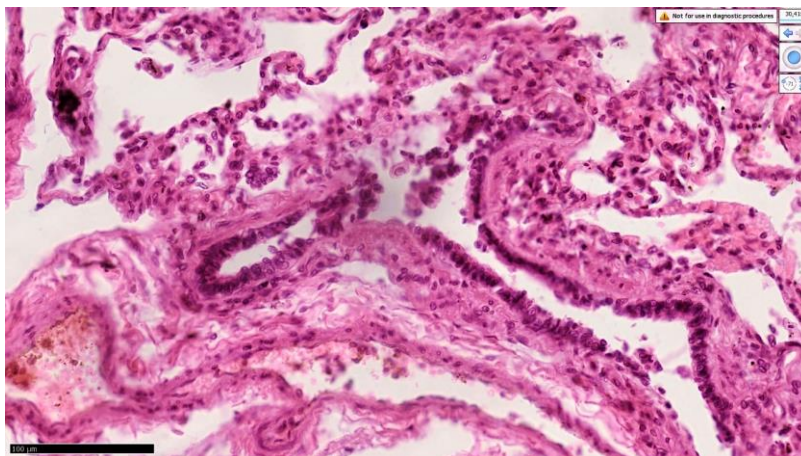


Figure 1. A three-day-old boy was born at 37 weeks. Deformation of the wall of the preterminal bronchus and foci of bronchopulmonary dysplasia in the peribronchial region (1), foci of malformations of abnormal arrangement of blood vessels in the peribronchial region (3) are detected. Alveolar walls vary in thickness (3). G.E. paint Size 40x10.

With bronchial atresia, deformation of the wall and atrophic changes in the edges of the deformed areas of the mucous membrane, hyperplastic changes in the mucous membrane in deep areas are detected. This manifests itself in the form of congenital dysplasia of all anatomical layers of the bronchial mucosa, a lag behind the same development indicators in all anatomical layers, and the development of intermediate tumors in the submucosal layers (see Fig. 1). It has been established that the locations of the bronchioles and vessels are changed, bronchial malformations are visible, the bronchial mucosa is represented by hypercellular and embryonic cells.

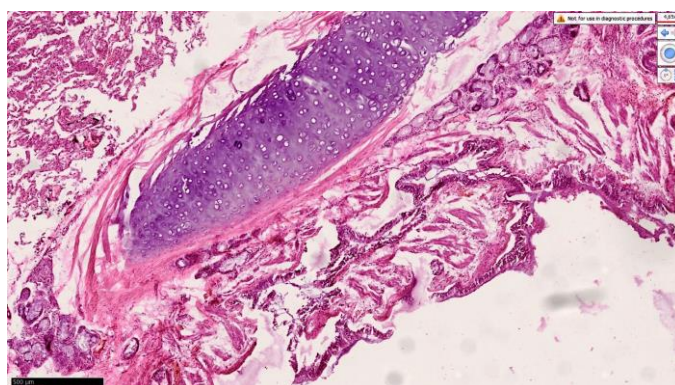


Figure 2. The child is 1 day old, 37 weeks old. Bronchial mucosa in bronchial atresia. Foci of metaplasia and hyperplasia are detected in the epithelium of the mucous membrane (1), interstitial edema in the mucous and submucous membrane of the bronchi (2), foci of chondrolysis and chondrosclerosis along the perimeter of the bronchial tissue (3). G.E. paint Size 40x10.

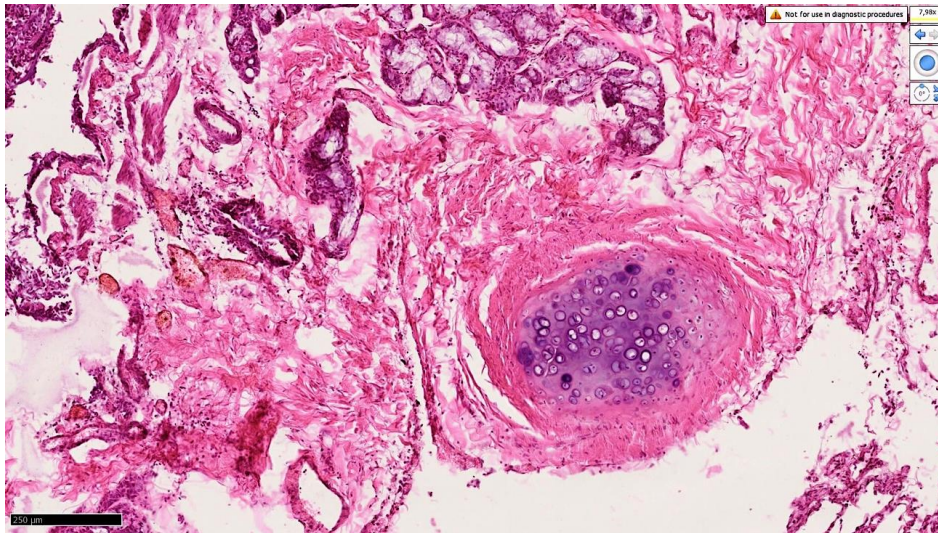


Figure 3. Baby is 9 days old. Born at 36 weeks. Dysontogenetic bronchiectasis of the bronchial wall. Hypoplasia and sclerosis of bronchial tissue in the bronchial wall (1). Peribronchiosclerosis and atrophic and sclerotic changes in the glands (2), the mucous membranes of the bronchi are practically not detected, the surface is a single-layer squamous epithelial cover. G.E. paint Size 40x10.

Many factors are involved in the occurrence of bronchial atresia, which is one of the anomalies in the development of the bronchi. With atresia, the most noticeable manifestations of the condition of the bronchial walls are incomplete formation of bronchial tissue, foci of sclerosis in the peribronchial areas, location and reduction in the size of the bronchi. chondrocytes in the peribronchial areas, fullness of blood vessels in the perichondral areas, roughness, characterized by a sharp increase in fibrous connective tissue elements.

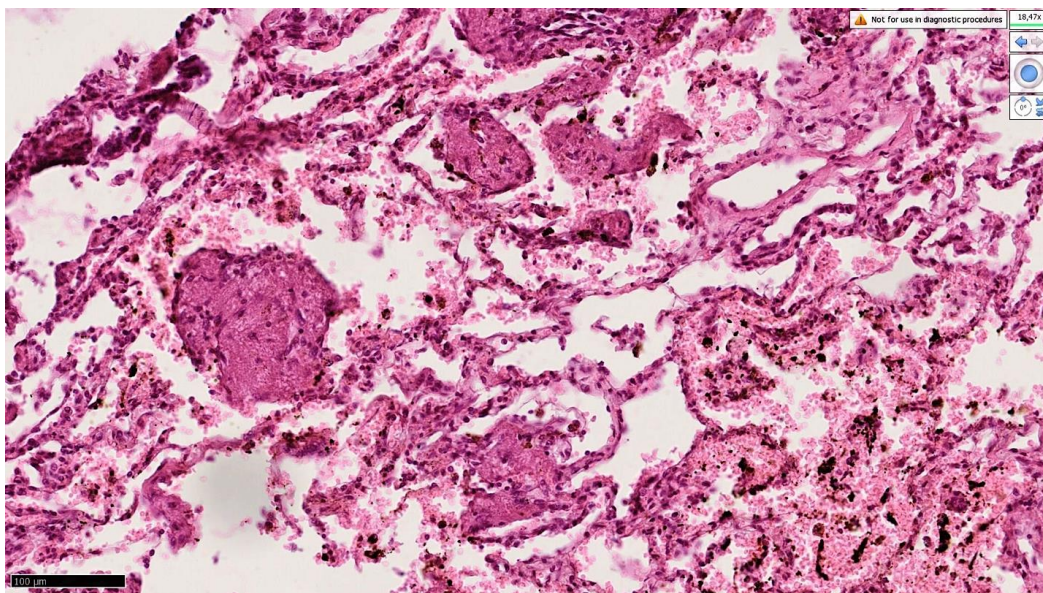


Figure 4. Changes in the appearance of obliteration and sclerosis of the walls of the terminal bronchi in bronchopulmonary anomalies. Foci of perialveolar sclerosis and atelectasis are detected in the walls of the alveoli (1). G.E. paint Size 20x10.

It is characterized by metaplasia of the epithelium covering the surface of the mucous membrane into stratified squamous epithelium, the appearance of folds on the surface of the mucous membrane, and the presence of focal inflammatory infiltrate in the submucosa (see pictures). 2-3). From a clinical and morphological point of view, it was established that it continued with morphofunctional paralysis of the bronchi and complete closure of the pathways. As a result, newborns develop acute respiratory failure and a high mortality rate. It has been established that the main changes in bronchial anomalies

are atrophic and sclerotic changes in the mucous membrane and submucosa, as well as atrophic and hypertrophic changes of varying degrees in the muscle layer with a nodular appearance. The lag of these morphological changes from the same development is a morphological substrate indicating an anomaly of the bronchi, bronchioles and components of the lung tissue.

Summary.

Thus, it has been established that the substrate of morphological changes typical for anomalies in the development of bronchial tissue are predominantly atrophic, and in some areas metaplastic changes in the bronchial mucosa with the formation of multiple and squamous epithelial lining, the development of fibrous tissue and the formation of interstitial tumors in the submucosal layer. Atrophic and hypertrophic changes in some areas of the muscular layer that forms the wall of the bronchial tissue are morphological changes indicating anomalies in the development of the bronchial walls. It is characterized by the development of thin, widespread chondrocytes of bronchial tissue in the bronchial wall, small-sized intermediate tumors, the proliferation of many coarse fibrous connective tissues in the perichondral areas, and the presence of uneven foci of peribronchial sclerosis in the adventitial layer. Summarizing these changes, it has been established that with anomalies of the bronchial wall, all anatomical layers lag behind in development, and hypertrophic and hyperplastic processes predominate in their developed areas.

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