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Research Article

MORPHOLOGICAL STRUCTURE OF THE BRONCHIAL WALL WITHOUT LUNG PATHOLOGY IN ADULTS

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ABSTRACT

The selection of this particular subject is motivated by the necessity to examine the cellular composition of the respiratory epithelium. Within the respiratory epithelium lies a sophisticated tissue network that plays a crucial role in safeguarding the mucous lining of the respiratory passage. Goblet cells and submucosal glands situated in the layers serve as the primary origins of mucus. The mucociliary transport system of the respiratory passage is established through the collaboration of mucociliary cilia and secretory components. Although information regarding the bronchial epithelial layer is scarce, research studies have delved into the microscopic configuration of this layer and the age-related attributes of its transport function.

KEYWORDS

bronchus, epithelium, bronchial gland, mucus, lungs.

INTRODUCTION

Following birth, a number of new functions arise in the respiratory system, resulting in significant changes [4,5]. Mucociliary clearance is a key respiratory defense mechanism that maintains the tracheobronchial tree's sterility. The secretory system of the tracheobronchial tree and the existence of ciliated epithelium are

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responsible for this [1,3,5]. Mucous secretion is copious and is the protective response of mucociliary clearance to foreign bodies, both infectious and non-infectious, changing their physicochemical properties and speed of movement in addition to eliminating harmful substances [6,7]. The cilia are submerged in a fluid layer that extends from the base of the cilia and microvilli to the epithelial lining; at the tip, the cilia are resting on a gelatinous layer of mucus, says current theory [2,9,10]. The epithelial lining's surface is coated in droplets of mucus, which are released by proteinaceous mucous glands and goblet cells and have a diameter of 1-2 microns [2, 3,7,8].

The purpose. of the study is to characterize the morphological structure of the bronchial wall without lung pathology.

Materials and methods. Comprehensive histological and histochemical analyses of the lungs and lung lobes of deceased individuals who did not have lung damage were conducted in the pathology department of the multidisciplinary clinic of Samarkand State Medical University between 2020 and 2024. After the material was fixed in 10% neutral formalin, the bronchial fragments were extracted, both from the resected area and from surrounding tissues, to a thickness of approximately 0.004. These sections were then embedded in paraffin and treated with alcohol to produce sections that were 4-6 µm thick. Hematoxylin and eosin-stained samples of the tissue under investigation were used to evaluate its general state. Picrofuchsin staining was carried out using the van Gieson method to identify connective tissue structures and the Weigert method to identify elastic fibers.

Research results. A small amount of eosinophilic mucus combined with exfoliated bronchial epithelial cells is visible upon microscopic examination of a large-caliber bronchial lumen sample (Fig. 1. The mucous membrane has uneven folds and is lined by multirow ciliated epithelium that has goblet cells present, small, round basal nuclei, and moderately eosinophilic cytoplasm. The continuous and thin epithelial basement membrane is shown in Fig. 2. According to van Gieson, the inner layer of the mucosa is represented by thin longitudinal connective tissue fibers that turn brick-red when stained with picrofuchsin. Blood vessels of the capillary type (pulmonary arteries, bronchial arteries, pulmonary veins, and branches of the bronchial veins) with thin, somewhat pro-fluorotic walls, a well-defined lumen, and a moderate volume of blood are found in between the fibers. Extended endothelial cells with round or oval basophilic nuclei and weakly basophilic cytoplasm line the vessels. Mostly, a few fibroblasts, lymphocytes, and lone macrophages are located around the vessels.

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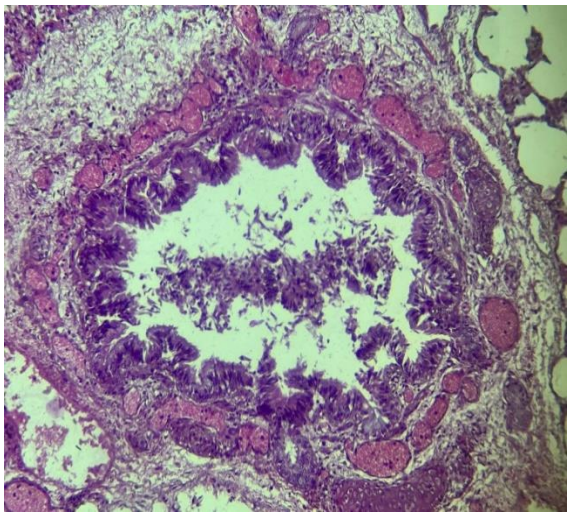

Fig. 1. Large-caliber preparation of the bronchial wall. Hematoxylin and eosin staining, x 100.

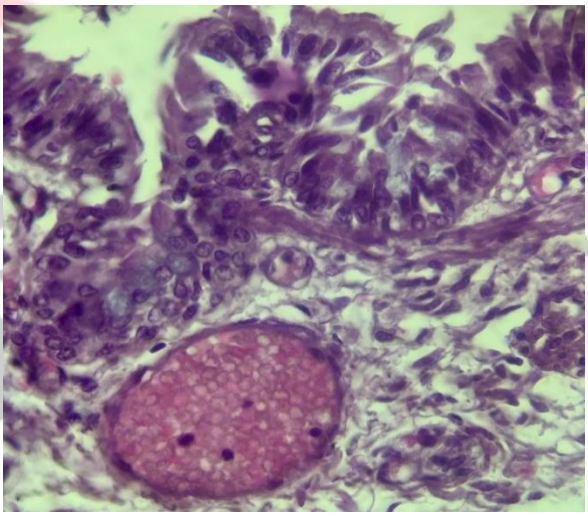

Fig. 2. Large-caliber preparation of the bronchial wall. Hematoxylin and eosin staining, x 200.

A small amount of eosinophilic mucus combined with exfoliated bronchial epithelial cells is visible upon microscopic examination of a large-caliber bronchial lumen sample (Fig. 1). There are irregular folds in the mucous membrane and the occasional small lymph node. Three to five rows of smooth muscle cells with an elongated, weak basophilic nucleus and eosinophilic cytoplasm make up the muscular layer of the bronchial mucosa. A fibrocartilaginous layer is formed in the submucosal connective tissue base of the bronchi by a hyaline cartilaginous layer and bundles of longitudinally running eosinophilic connective tissue fibers. There are lots of chondroblasts around the edge of the hyaline-cartilage plate, chondrocytes in the middle, and some chondroblasts with purulent, atrophic nuclei. A collection of bronchial glands lined

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with large epithelial cells with pale, sometimes optically empty cytoplasm and oval basophilic nuclei can be found in the submucosa, which has lost its hyaline cartilage. The glands' excretory ducts open on the ciliated epithelium's surface after penetrating the mucus layer. A moderate volume of blood is generated in the submucosa's tiny venous and arterial vessels. The vascular wall is made up of thin, mildly acidophilic endothelial cells that are suspended on a continuous fundal membrane. The cells have rounded, basophilic nuclei and weakly basophilic cytoplasm. Smooth muscle cells with elongated basophilic nuclei and weakly acidophilic cytoplasm can be found in the vessel lining. (Fig. 3). Lymph nodes are found in places. Van Gieson described the fibrous connective tissue that makes up the bronchial wall's outer membrane as having brick-red color when stained with picrofuchsin (Fig. 4). Seldom can basophils, macrophages, limbal cells, and fibroblasts be discovered in the space between the fibers. The moderately blood-filled muscle veins and arteries that make up the peribronchial adipose tissue are clearly separated into inner, middle, and outer layers. The outer layer is lined with flattened endothelial cells that have weak basophilic cytoplasm and round basophilic nuclei. A somewhat acidophilic connective tissue capsule encases the inner layer of the ganglia, which is also visible here. Between these are ganglion cells, which have oval or elongated basophilic nuclei with an uneven distribution of chromatin, and slightly swollen, slightly acidophilic cytoplasm.

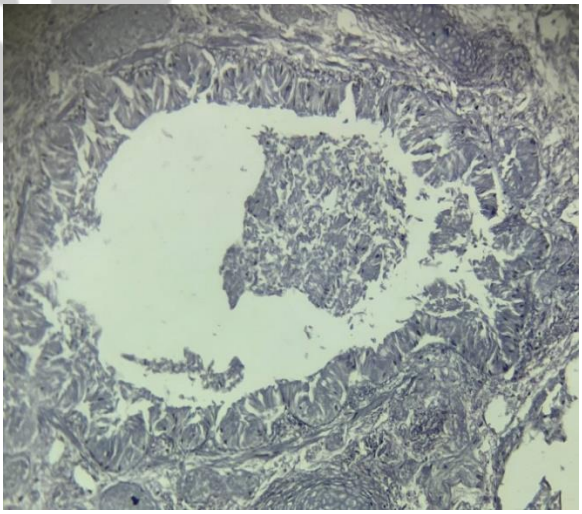

Fig. 3. Large-caliber preparation of the bronchial wall. Weigert staining, x 100.

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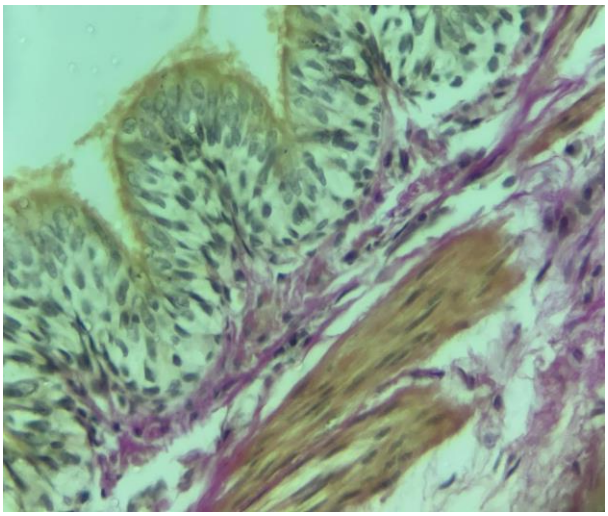

Fig. 4. Large-caliber preparation of the bronchial wall. Coloring according to Van Gieson, x 200.

Alveolar macrophages are found in the lumens of certain alveoli in the surrounding lung tissue, where the alveolar lumens are well-developed and empty. One alveoli, each with a larger lumen. Epithelial cells cover the inner surface of the alveoli, and alveolar macrophages are found within. The epithelium's basement membrane is relatively colorless and thin. Van Gieson staining shows that the alveolar space, which separates the alveoli, is lined with solitary neutrophils, tissue basophils, macrophages, and thin yellow connective tissue fibers. Near the alveolar epithelial membrane are several capillaries in the alveolar spaces that are somewhat blood-filled. These capillaries are lined by endothelial cells that have rounded basophilic nuclei and slightly basophilic cytoplasm. Little clusters of lymphoid tissue surround the vessels.

CONCLUSIONS

Data obtained from histological and histochemical examination of fragments of the bronchial wall taken from patients who died without respiratory diseases can be used as a basis for direct comparison with changes occurring in the bronchial wall of patients who died from respiratory diseases.

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