



THE STATE OF THE IMMUNE AND REGULATORY STRUCTURES OF THE BRONCHIAL MUCOSA IN PULMONARY PATHOLOGY IN CHILDREN

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ANNOTATION

Using histological methods, lung lobes and segments were studied in 12 children aged 5 to 12 years operated on for bronchiectatic pulmonary disease. Sections stained with hematoxylin and eosin. To identify the endocrine structures of the bronchi (apudocytes), the impregnation of sections with silver nitrate was used according to the Grimelius method. It has been established that with bronchiectatic disease in children, maintaining the structure of the bronchial epithelium provides the afferent phase of the immune response of the mucous membrane in inflammatory processes. At the same time, there is a close interaction of lymphocytes and apudocytes, which apparently provide regulatory function. Violation of the structure of the epithelium leads to the formation of an efferent phase of immunogenesis due to cells in the lamina propria mucosa.

KEY WORDS: bronchus, mucous membrane, bronchiectatic diseases, children, epithelium, lymphocyte, basement membrane, lungs, apudocyte.

INTRODUCTION

In recent years, there has been an increase in the incidence of chronic lung diseases in children [3,5]. Recent genetic, structural and functional studies have revealed that the epithelium of the mucous membrane of the respiratory tract and lungs is a key organizer of the immune response. In addition, there is now strong evidence that epithelial dysfunction is involved in the development of inflammatory lung diseases [4]. The noted indicates that studies of the bronchial mucosa, both in normal conditions and in pathological conditions, should be continued.

Objective of the study: to reveal the structural and regulatory components of the mucous membrane of the intrapulmonary bronchi in bronchiectasis in children.

Material and methods. The material for the study was the lobes and segments of the

lungs of 12 children aged 5 to 12 years, operated on for bronchiectasis of the lungs. 5-7 pieces were cut out from different parts of the surgical material, which were fixed in 12% neutral formalin and Bouin's liquid. After passing through the battery of alcohols, the material was embedded in paraffin. Sections are stained with hematoxylin and eosin. To identify the endocrine structures of the bronchi (apudocytes), the sections were impregnated with silver nitrate according to the Grimelius method.

Results of their discussion. The study of histological preparations made it possible to establish that the epithelium in different parts of the bronchi has a different structure. The most common multi-row ciliated epithelium (Figure 1A). This epithelium is characterized by increased multiplicity due to cell hyperplasia. The cilia of prismatic epithelial cells are not expressed over the entire surface of the epithelium, but where

they are present, their adhesion is noted. Goblet cell hyperplasia is observed. Among the epithelial

cells are also small lymphocytes, which penetrate to the surface of the epithelium.

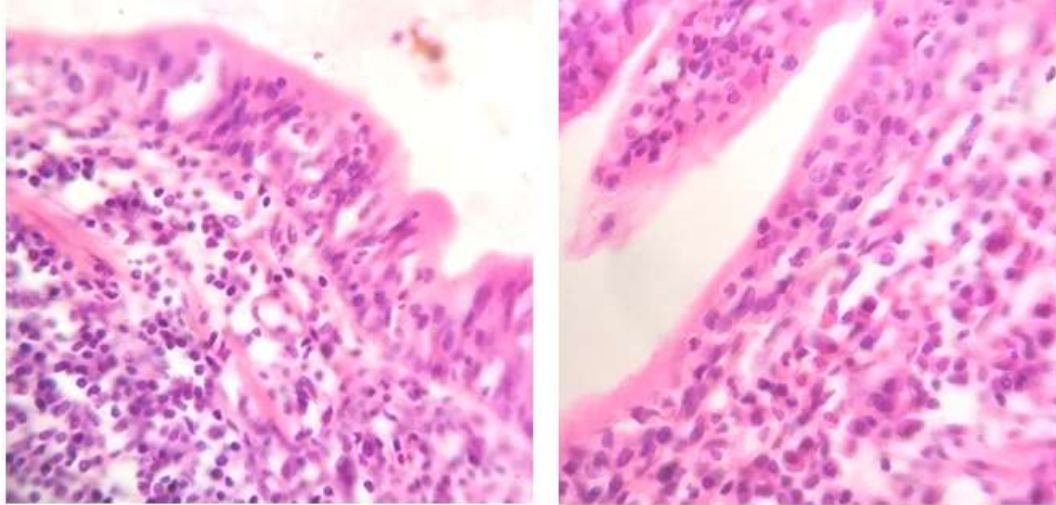


Figure: 1. Types of bronchial epithelium in bronchiectasis. A - Multi-row ciliated epithelium with goblet cells infiltrated by lymphocytes. B - Epithelium in the zone of bronchiectasis and numerous plasma cells under it. Staining with hematoxylin and eosin. x10, x90.

MATERIALS AND METHODS

Attention is drawn to the fact that the basement membrane of the epithelium is slightly thickened. Under it, infiltration of the lamina propria with lymphocytes is observed, other cellular elements of immunogenesis (plasma cells, macrophages) are rare. The muscular plate of the mucous membrane is preserved, although it is divided into separate bundles. There are much more lymphocytes under the muscle plate than under the epithelium, and plasmocytes and macrophages are also more often determined. The noted morphological signs of the epithelium characterize the relative safety of its functional characteristics, namely, protective properties. This is also confirmed by the structure of the underlying structures of the mucous membrane. The structure of this epithelium is characteristic of the bronchi, not subjected to ectasia. Along with the preserved epithelium, histological preparations reveal areas of bronchiectasis, the epithelium of which has lost its typical structure. In this epithelium on the basement membrane there is

only one row of cubic basal cells or they are absent altogether (Fig. 1B). Under the epithelium, the lamina propria is densely infiltrated with plasma cells. The cytoplasm of plasma cells is sharply oxyphilic, which indicates an increased secretory activity of these cells of immunogenesis and the accumulation of secretion. The presence of macrophages, including multinucleated ones, is also determined. The muscle plate of the mucous membrane in these areas is absent.

RESULTS AND DISCUSSIONS

The study of the presence of apudocytes in the lungs with bronchiectasis made it possible to detect them only in the multi-row epithelium. These cells are of the open type and are spindle-shaped. The apical process is long, convoluted, it reaches the lumen of the bronchus and ends with a small clavate thickening. The basal part of apudocytes is poorly impregnated, which is a sign of secretion (Fig. 2).

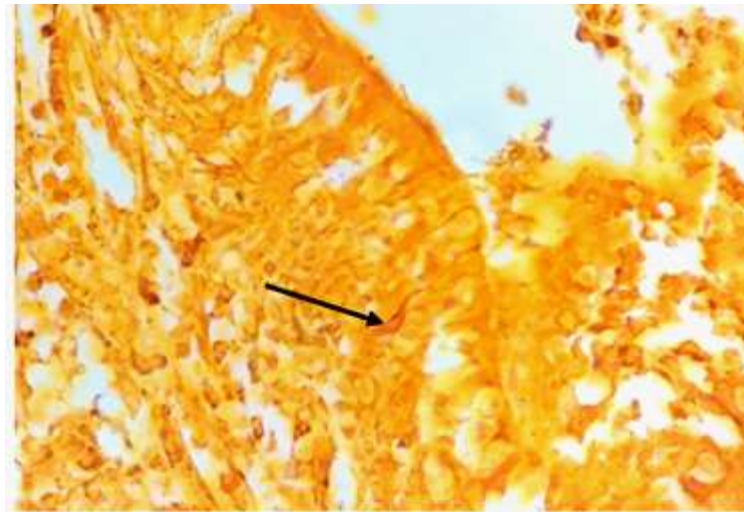


Fig. 2. Argyrophilic apudocyte in the multi-row epithelium of the bronchus. Impregnation according to the Grimelius method. x 40, x 10.

The study showed that in inflammatory processes in the lungs associated with bronchiectasis, there is an interaction of immune and endocrine structures in the epithelium. Apparently, their joint arrangement contributes to the performance of the afferent function by lymphocytes. The role of APUD-system cells in the development of the lung and postnatal restructuring of blood circulation in fetuses and newborns is well known. Under experimental conditions, apudocytes release secretory granules under the influence of acute or chronic hypoxia, hypercapnia, irritation with nitric oxide and various drugs and narcotics (nicotine, reserpine, calcium iontophoresis). Apudocytes are also involved in the pathogenesis of diseases. Their hyperplasia is observed in patients with acute pneumonitis, chronic obstructive pulmonary diseases, in heavy smokers, in patients with non-immune bronchial asthma, in children with bronchodysplasia [1]. In case of violation of the structure of the epithelium and the absence of endocrine cells in it, the processes of immunogenesis proceed under the epithelium. The appearance of numerous plasma cells indicates an intense efferent phase of the development of immunity.

CONCLUSION

Thus, in children with bronchiectasis, the preservation of the structure of the bronchial epithelium provides the afferent phase of the immune response of the mucous membrane in inflammatory processes. At the same time, there is a close interaction of lymphocytes and apudocytes, which apparently provide a regulatory function. Violation of the structure of the epithelium leads to the formation of an efferent

phase of immunogenesis due to cells in the lamina propria of the mucous membrane.

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