

Gross pathology and histopathology of asthma

Editor's note: This new feature, Images in allergy and immunology, is designed to highlight the current concepts of immunopathology of allergic diseases and other common immunologically mediated diseases. The presentation takes the form of sets of images that involve cross-pathology, histopathology, and molecular pathology.

In the first few Journal issues in which it appears, this feature will focus on asthma. Other topics to be addressed (in subsequent issues) include allergic rhinitis, sinusitis, atopic dermatitis, food allergy, and immune deficiency.

The histopathology of asthma is characterized by a number of structural changes, including epithelial detachment, mucus gland hyperplasia, subepithelial fibrosis, inflammatory cell infiltrate, bronchial smooth muscle hypertrophy/hyperplasia, and vascular changes. These changes are observed in proximal airways as well as in the distal lung, and they can be observed in resected lungs in fatal asthma and endobronchial biopsies of mild, moderate, and severe asthmatics.

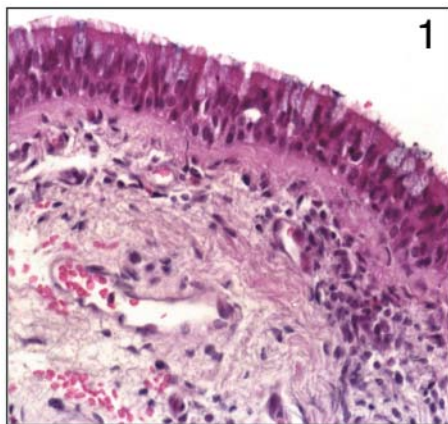


FIG 1. Biopsy from the proximal airways of a normal, nonasthmatic subject shows an intact epithelium containing a small number of goblet cells and inflammatory cells in the submucosa.

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Images in Allergy and Immunology

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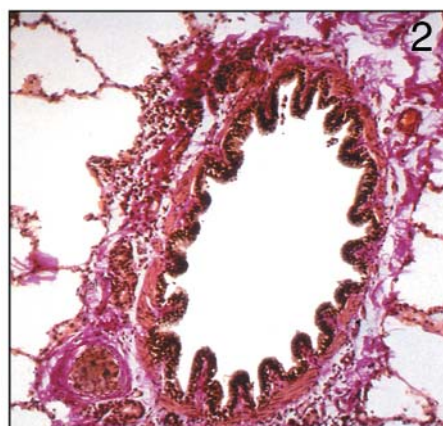


FIG 2. Cross section of a small airway (<2 mm in diameter) shows an intact epithelium that is lined by cuboidal cells and a thin layer of smooth muscle around the airway.

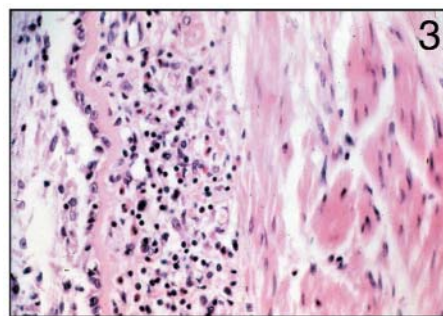


FIG 3. Section from the proximal airway of a patient who died of status asthmaticus shows many of the classic pathologic changes described in asthma. In particular, note the eosinophilic plug, a detached epithelium, subepithelium, thickening, smooth muscle hyperplasia/hypertrophy, and the marked inflammatory infiltrate.

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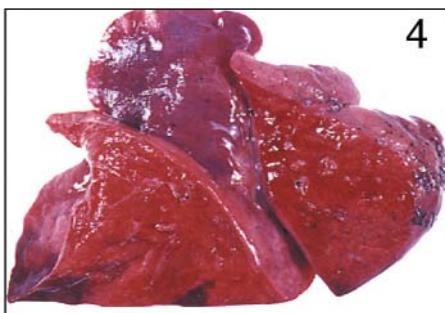


FIG 4. Gross pathology of lung of asthmatic patient who died of status asthmaticus. There are notable hemorrhagic changes, edema, and hyperinflation from obstruction of the small airways.

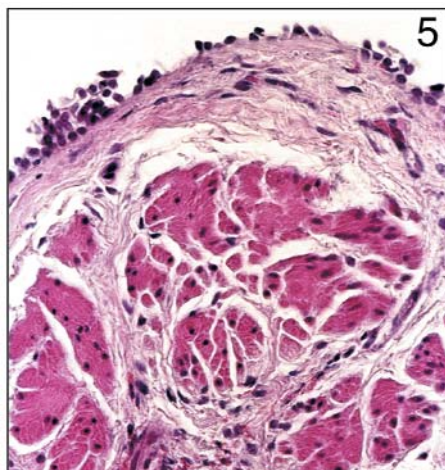


FIG 5. Endoscopic biopsy from a patient with chronic moderate asthma shows partial epithelial detachment and hypertrophy of smooth muscle layer with close approximation to the epithelium.

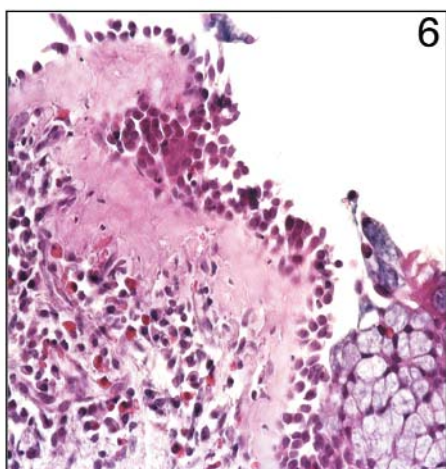


FIG 6. Endoscopic biopsy from a patient with severe asthma shows mucus hyperplasia, extensive thickening of the subepithelial layer and marked infiltration of inflammatory cells—in particular, eosinophils.

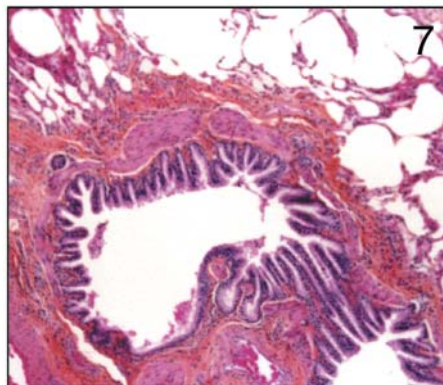


FIG 7. Cross section of a small airway from a patient who died of complications from severe chronic asthma shows extensive airway remodeling of the small airways with increased smooth muscle mass and collagen deposition.

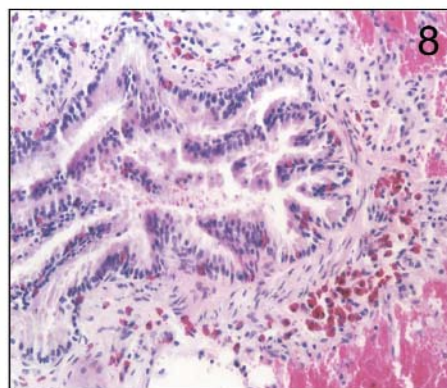


FIG 8. Cross section of a small airway from a patient with chronic severe asthma shows eosinophilic infiltrate in the submucosa and in the area of the smooth muscle.

Next in the series *Images in allergy and immunology*:

Immunocytochemistry: In situ hybridization of inflammatory cells and mediators in asthma