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Immunohistochemistry

Immunohistochemistry in the recognition of respiratory syncytial virus (RSV) pneumonia

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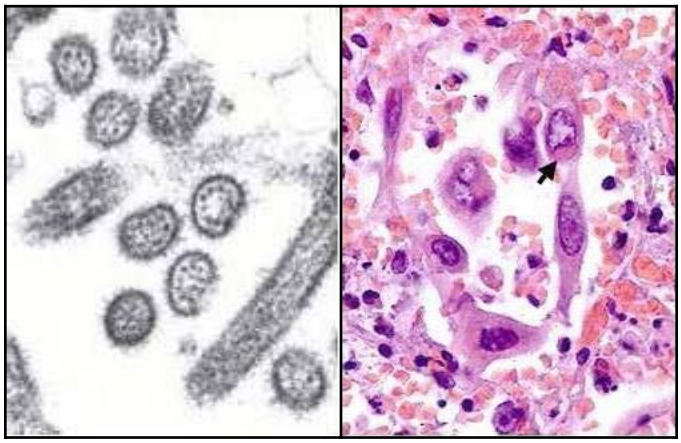
by Rodney T. Miller, M.D., Director of Immunohistochemistry

Respiratory syncytial virus (RSV) is a common pathogen. Although most infections are not serious, in certain situations RSV infection may lead to significant morbidity. This month we call attention to the availability of an immunostain for RSV at ProPath, for those readers who may have need for such staining in the workup of their patients.

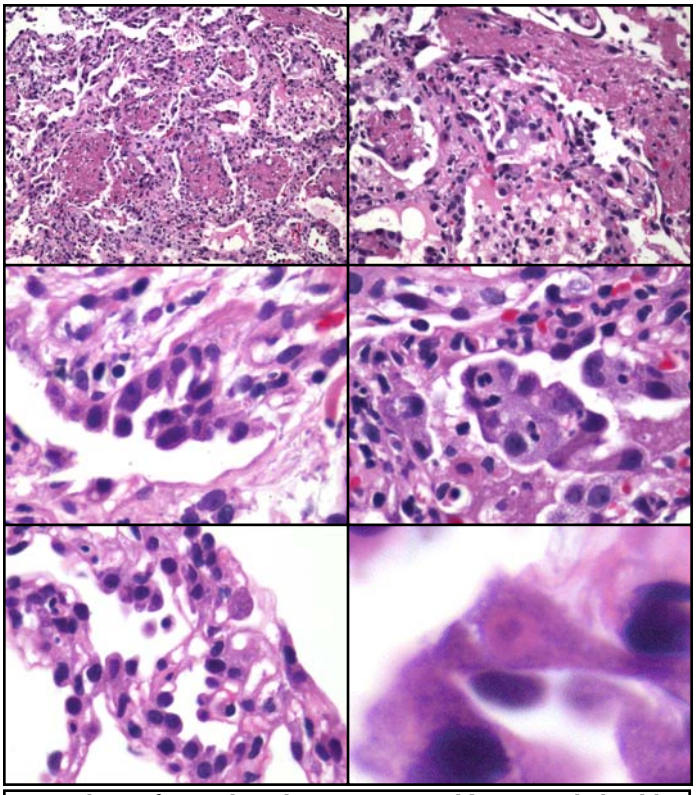
RSV is a paramyxovirus found worldwide that is structurally similar to parainfluenza viruses. It occurs in two antigenic forms, designated types A and B, with the former typically giving rise to more serious infections. Nearly all children are infected by RSV at some point in time during the first 2 or 3 years of life, with estimates of up to half of children infected within the first year. The virus is spread by inoculation of infected secretions or large particle aerosols into the eyes or nose. The most common manifestation of RSV is upper respiratory tract infection, although it may also give rise to laryngotracheobronchitis and pneumonia. It is a very common cause of bronchiolitis in infants and young children, and is reported to be responsible for 40% of cases of pneumonia in this age group. However, only 1-2% of patients require hospitalization. Those at increased risk for severe disease include immunosuppressed patients and those with cystic fibrosis, bronchopulmonary dysplasia, or cyanotic congenital heart disease.

In adults, upper respiratory tract infection is seen in about 50% of recurrent RSV infections, but in immunosuppressed adults, RSV pneumonia (which usually develops following an upper respiratory tract infection) can be very serious, and may lead to long-term pulmonary damage. Elderly patients who are reinfected with RSV commonly develop additional secondary viral or bacterial bronchopneumonia.

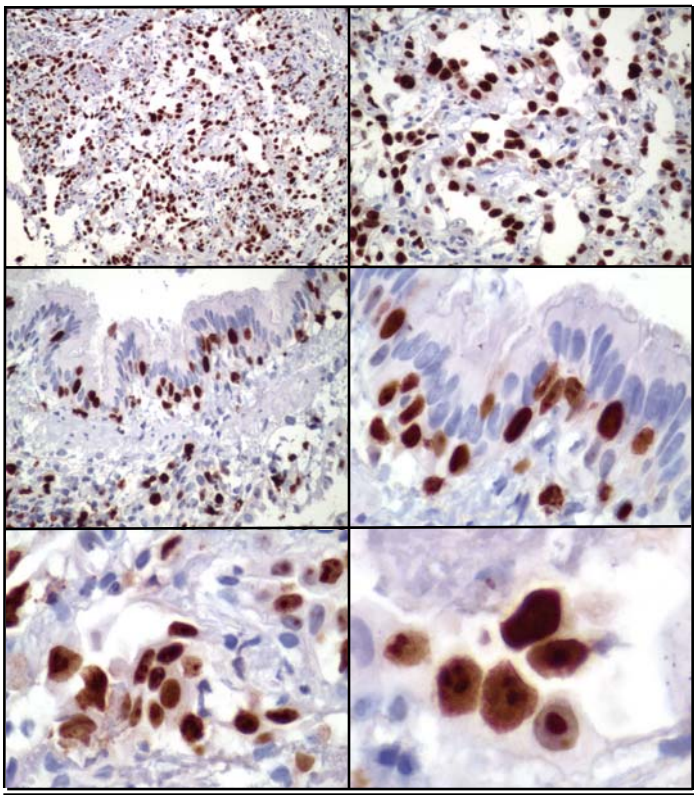


Left: Electron micrograph of RSV particles. Right: H&E of lung biopsy from RSV pneumonia. Arrow points to cytoplasmic inclusion. Images obtained from Google courtesy of Martha Warnock, M.D. at http://pathhsw5m54.edu

My experience with cases of RSV pneumonia cannot be much more limited than it currently is, and consists of a single recently-identified positive case that is illustrated in this newsletter. This case occurred in a 16 year-old previously healthy male with pneumonia who was treated with a short course of steroids, without response. A subsequent transbronchial biopsy with RSV immunostains showed innumerable RSV-positive cells. According to the literature, pathologic manifestations of RSV infection include interstitial pneumonia and bronchiolitis, often with obstruction of airways secondary to accumulation of mucus, necrotic epithelial debris, and inflammatory debris. Reportedly some cases have the appearance of diffuse



H&E photos from a lung bx on a 16-yr.-old previously healthy male with RSV pneumonia. Syncytial collections of cells were not particularly prominent. A cytoplasmic inclusion is illustrated in the lower right photo.



Photos at various magnifications of the RSV immunostain from the case shown at left.

alveolar damage with the formation of syncytial giant cells that may line the bronchi, bronchioles, or alveolar spaces. Eosinophilic cytoplasmic inclusions, sometimes surrounded by a clear halo, are also described. I must admit that on review of the H&E slide from the positive case that we recently saw, I did not appreciate obvious syncytial giant cells, and finding the cytoplasmic inclusions was a challenge. Nevertheless, this biopsy was extensively involved upon reviewing the immunostain.

We frequently receive requests for uncommon infectious disease markers at ProPath, and it is our intention to add as many of these as possible. However, before we can offer these immunostains to our clients, obviously we need to have a supply of positive control material to validate the results of the stain. ProPath is very fortunate to have an experienced microbiologist on our staff, Dr. Robert Cavagnolo, and thanks to his expertise in growing RSV-infected and RSV noninfected cell cultures for us to use as control material, we can now offer immunostains for RSV. Parenthetically, if any readers are willing to provide us with positive control material for uncommon infectious agents (Lyme disease, Legionnaires disease, etc.) we will do our very best to obtain an antibody to the agent and offer the immunohistochemical stain to our clients.

Immunohistochemistry for RSV can be performed on BAL specimens or paraffin blocks (cell block specimens or lung biopsies).

Reference:

Travis WD, Colby TV, Koss MN et al, Editors: Non-neoplastic disorders of lower respiratory tract. Armed Forces Institute of Pathology Atlas of Non-Tumor Pathology, volume 2, pages 527, 651-653, American Registry of Pathology, Washington, DC, 2002.

Rodney T. Miller, M.D.
Director of Immunohistochemistry
214-237-1631 • Fax 214-237-1770
rmiller@propathlab.com

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PROPATH
The Leader in Pathology Services

8267 Elmbrook Dr, Ste 100 • Dallas, Texas 75247-4009
(214) 638-2000 • Fax: (214) 905-3457
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