

Lung Pathology in COVID-19 Disease: We Must Be Aware!

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SARS-CoV-2 was first isolated from a 41-year-old patient's bronchoalveolar lavage (BAL) fluid in December 2019 in China, and this potentially fatal disease was named "COVID-19." Till date, approximately 1.200.000 humans have tested positive and 65.000 are dead. The virus primarily targets the lung epithelial cells, initiates a "cytokine storm," and causes lung injury by mediating an immuno-pathological response and finally massive alveolar damage (DAD)/acute respiratory distress syndrome (ARDS).

Early histopathological changes of viral pneumonias are rarely observed because histopathological examination is not necessary for diagnosis, but late stage changes in viral pneumonias are well defined, most commonly in autopsy series. SARS-CoV related lung changes were described in detail in the early 2000s, but SARS-CoV-2 related changes have not been defined in detail yet.

SARS-CoV-2 related histopathological changes are acute fibrinous pneumonia, organizing pneumonia, and DAD. However, the cytologic findings of the BAL have not been reported yet. There is one study describing the early phase histological changes in two asymptomatic COVID-19 patients operated for lung carcinoma and diagnosed as COVID-19 [1]. Late phase pathological characteristics of lung were defined in two studies including four autopsies of COVID-19 patients from China [2, 3]. Additionally, the hamster model helps to understand the SARS-CoV-2 related lung changes [4]. Histopathological findings in the lung are intra-alveolar serous/fibrinous exudation, fibroblastic plugs (organization), predominantly lymphocytic immune cell infiltration especially with CD4-positive T cells, and dense spherical secretions [5]. Multinucleated giant cells with large nuclei, prominent nucleoli, and amphophilic granular cytoplasm can be identified in the intra-alveolar spaces [3]. Giant cells with viral cytopathic-like changes, and viral inclusion-like appearance can be seen [1]. In late stages, hyaline membranes and desquamation of alveolar epithelia can be seen, indicating ARDS. In alveolar wall, type II alveolar epithelial proliferation, vascular congestion, monocytes and lymphocytes in the vascular lumen, hyaline thrombi in micro vessels, fibroblastic proliferation, and eventually, interstitial fibrosis can be observed in the late stage of the disease [2, 3]. Prominent neutrophilic infiltration was not defined. Immunohistochemical analysis can help the diagnosis, macrophages and alveolar epithelium can show positivity for 2019-nCoV antigen [2]. Electron microscopic examination shows viral particles in both bronchial and alveolar epithelia [2]. Bacterial and fungal super-infections can be seen.

COVID-19 infection is on the rise worldwide, including Turkey; however, patients still need surgery or diagnostic biopsy for a number of different reasons. We aimed to summarize SARS-CoV-2 related histopathological findings in the lung to increase the awareness about the disease. Preoperatively undiagnosed asymptomatic patients can be diagnosed by microscopic examination, thereby enabling us to isolate the patient immediately and protect the health of healthcare workers.

Finally, it must be kept in mind that fresh and/or insufficiently fixed surgical specimens or biopsies can be infectious [5]. As healthcare workers in pathology laboratories, we must be aware about this possible and unheeded transmission and wear proper personal protective equipment in the gross room [1].

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