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SARS-CoV-2 , MERS-CoV and SARS-CoV, the Emerging Coronaviruses: An insight into the Pathological features

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Abstract

The zoonoses as causes of human infections have been progressively reported. Many of these zoonotic diseases are viruses and cause severe pulmonary infections. The recent outbreak of severe acute respiratory syndrome (SARS) coronavirus-2 in Wuhan/China has now circulated worldwide with an elevation of a death rate. This paper focuses on the pathology of three zoonotic coronaviruses SARS-CoV, MERS-CoV, and SARS-CoV-2 that have been emerged in the last two decades and caused severe lower respiratory infection and fatal pneumonia worldwide. However, scarce publications on pathological and ultrastructural features have been reported because of hardly accessible biopsy or autopsy due to cultural and religious intentions, additionally to avoid environmental contagion with consequent infection of health- care staff. Pathological findings have a vital role in improving the understanding of diseases, although it is rarely considered as a diagnostic tool for these types of infections. Additionally, histopathological features raise the suspicion of these diseases and help toward prompt control of viral spreading between populations. Similar pathological findings were reported in human infections with SARS-CoV, MERS-CoV and SARS-CoV-2 comprise bilateral diffuse alveolar damage (DAD), pulmonary edema, desquamation of pneumocytes and formation of hyaline membrane, indicative of acute respiratory distress syndrome (ARDS), presence of cellular fibromyxoid exudate accompanied by marked cytopathic effects, multinucleated syncytial cells along with atypical enlarged pneumocytes and interstitial mononuclear inflammatory infiltration dominated by lymphocytes in the affected lungs. However, in particular, the MERS-CoV mainly infects type II pneumocytes, while both SARS-CoV and SARS-CoV-2 also infect type 1 pneumocytes. In conclusion, COVID-19 macroscopic features are found in the chest and depend on the stage of the disease. While, the histopathological features are like those seen in SARS and MERS-coronavirus infections. Moreover, the nature of coronaviruses outbreaks, specially COVID-19 in many more countries, a greater awareness of SARS-CoV-2 pandemic infection is essential.

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