**Comparison of Radiological Manifestations of Patients with Chinese and Delta Strains of Covid-19**

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**Abstract**

**Background**: Coronavirus disease is an emerging infection caused by a novel coronavirus that is moving rapidly. The standard for diagnosis of severe acute respiratory syndrome coronavirus is a reverse transcription polymerase chain reaction (RT-PCR) test, but chest CT may play a complementary role in the early detection of Coronavirus Disease 2019 (COVID-19) pneumonia.

**Method:** In this cross-sectional study, patients were randomly selected in two-time frames: July 2020, which coincided with the peak of the initial Chinese strain of Covid-19, and August 2021, which coincided with the peak of the Delta strain in Iran. All the patients were hospitalized at Afzalipour Hospital, who had a positive PCR test for Covid-19 and underwent a CT scan, and in radiological manifestations of the CT scan and a series of laboratory tests and its relationship with the prognosis Patients and their demographic characteristics were investigated and Chi-square test and independent t-test were used to compare quantitative and qualitative variables between patients.

**Results**: Among the examined 244 patients in this study, 50.8% were male. 133 patients were related to the Chinese strain and 111 patients were related to the Delta strain, the age of the patients was from 11 years to 92 years. The average age in Chinese strain is 53.45±17.10 and in Delta strain is 17.4±52.79. 76.7% of patients were hospitalized in normal wards related to covid-19 and 23.3% were hospitalized in special wards, the number of hospitalization days of patients in was 6.76 ± 7.38, and there was no significant difference between the Delta and Chinese strains. Overall mortality was 20.6%, which was 20.6% and 24% in delta and Chinese strains respectively. A total of 244 CT scans were examined in these patients. Bilateral pulmonary infiltration was in 55.3% of patients, and the rate of this involvement was 64.9% and 47.4% in the Delta and Chinese groups, which was significantly higher in the Delta group. In examining the location of pulmonary infiltration, involvement simultaneous in the anterior and posterior regions was the most frequent with 54.9%, the frequency of all three locations of pulmonary infiltration was significantly higher in the Delta type than in the Chinese type. In terms of the location of infiltration in the central and peripheral parts, simultaneous peripheral & central involvement had the highest frequency with 32.4%, which was significantly higher in the delta type than the Chinese type. Peribronchovascular involvement was observed in only one Chinese patient. In examining the margins of the lesions, most of the infiltrations were ill-defined, which was significantly more in the Delta group than in the Chinese group. In determining and comparing the shape of infiltrations in these patients, the highest frequency is related to GGO with a frequency of 23.8%, which was higher in Chinese group, but no statistically significant difference was observed, followed by crazy paving with a frequency of 20.9%, and then simultaneous GGO and consolidation were 20.1%. The frequency of consolidation in the Delta and Chinese groups was 23.4% and 4.5%, respectively, which was significantly higher in the Delta group. Involvement in the form of cavitation and pneumothorax was observed only in the Delta group with frequencies of 2.7% and 0.9%, respectively, and they were not found in the Chinese group. In the investigation of the relationship between the type of lesions and the prognosis of the disease, it was found that in the Chinese group of patients who had lung involvement in the shape of crazy paving (P-value= 0.04) and pleural effusion (P-value= 0.001), the frequency of mortality was significantly higher and also in delta species, a case of pneumothorax led to death. Among the reviewed data, the mean CPK, and LDH factors were significantly increased in patients with delta strain compared to the Chinese type, with p-value 0.04, 0.03, respectively, and the average platelets of delta strain patients compared to the Chinese type was significantly lower, p-value 0.04.

**Conclusion:** In our study, we examined 244 patients from the primary Chinese strain and the Delta strain. 20.6% of the patients died. Perhaps the cause of higher mortality in the Chinese strain than in the Delta strain may be because there was no approved treatment protocol for Covid-19 at that time. Bilateral and ill-defined lesions were observed in about half of the patients, which were more common in the Delta strain. The most common lesions found were GGO and crazy paving, GGO, and consolidation respectively. The first lesions were more common in the Chinese strain and the other cases in the Delta strain; Cavitation and pneumothorax were also the least frequent and were observed only in Delta species. In the Chinese species, crazy paving, pleural effusion, and in the Delta species, pneumothorax significantly increased mortality.

**Keywords:** Radiological Manifestations, Patients, Covid-19