HIGH RESOLUTION COMPUTED TOMOGRAPHY PATTERNS OF COVID-19 PNEUMONIA

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Introduction

Coronaviruses are serious pathogens that may harm both people and animals. At the end of 2019, it was discovered that a new coronavirus was responsible for an outbreak of pneumonia cases in Wuhan, China. As it disseminated quickly, an epidemic in China resulted in a pandemic that affected the entire world. In February 2020, the World Health Organization (WHO) designated the virus-related outbreak as COVID-19, short for coronavirus disease 2019. On January 30, 2020, the WHO categorized the COVID-19 pandemic as a Public Health Emergency of International Concern.

RT-PCR is the gold standard test for diagnosing COVID-19. But this lab test has many drawbacks, such as the potential for false negative results, the relatively low sensitivity of (60% to 71%), the lack of accessibility, and considering a time-consuming procedure.

With a sensitivity of up to 98%, HRCT is essential for diagnosing COVID-19 pneumonia, especially in patients who are asymptomatic or have negative PCR results. Additionally, HRCT scans are helpful in determining the extent of damage and tracking the course of the illness. There fore, owing to the essential role of chest HRCT, radiologists should have a greater understanding of the typical and atypical HRCT features associated with this disease.

Aim of the work

This study aims to describe typical and atypical patterns of COVID-19-confirmed patients' pneumonia using HR-CT.

METHODS AND PATIENTS

PATIENTS:

This prospective study was conducted on 100 confirmed COVID-19 patients referred to the radiology department, Faculty of Medicine, Alexandria University, as well as private radiology centers in Alexandria in the period from 2021 to 2022.

METHODS:

All patients that fulfill the inclusion criteria were subjected to complete history taking regarding onset and course of clinical condition, associated chest symptoms, medical, surgical and occupational history, Physical examination through clinical general and local chest examination, Laboratory investigations including ;reverse transcription polymerase chain reaction (RT-PCR) test, Complete Blood Count (CBC), White Blood Cells (WBC) differential film and C-reactive protein , Radiological studies including Conventional chest radiography PA and lateral views wherever possible and high resolution computed tomography.

Results

Table: The CT findings of all studied cases (n=100)

Radiological Findings	No.	(%)
Inter lobar septal thickening	71	71%
GGO only	64	64%
Atelectatic bands	40	40%
Mixed GGO with consolidation	28	28%
Crazy Paving	28	28%
Pleural Effusion	12	12%
Lymphadenopathy	8	8%
Nodules with GGO	8	8%
Subpleural Fibrotic Bands	8	8%
Pneumomediastinum	2	2%
Atoll sign	2	2%
Traction Bronchiolectasis	2	2%
Pericardial Effusion	1	1%
Mosaic Attenuation	1	1%
Bubble Air Sign	1	1%
Pneumothorax	1	1%

The distribution of studied cases based on lung region affection; regarding craniocaudal predominance distribution, 85% of cases had lower lobar predominance, 9% had middle or lingual lobar predominance and 6% had upper lobar predominance. Regarding axial predominance distribution, 73% had peripheral distribution, while 22% had diffuse distribution and 5% had central distribution. Regarding peribronchovascular distribution, it was found in 11% of cases. Regarding bilaterality, 99% of cases had bilateral lung affection while 1% had unilateral lung affection.

Figure 1: Non contract CT chest axial cuts of different Covid-19 patients showing different typical CT patterns of Covid-19 pneumonia.(A)showing bilateral ground glass opacification with superimposed interlobular septal thickening (crazy paving pattern) (black arrow), (B)showing bilateral ground glass opacities with peripheral distribution (blue arrows)and (C)showing interlobar septal thickening (red arrow).

Figure 2: Non contrast CT chest axial cuts of different Covid-19 patients showing different atypical patterns of pneumonia, (A) showing unilateral ground glass opacities (blue arrow), (B) showing pneumothorax (yellow arrow) and (C) showing bubble air sign (black arrow).

Conclusion

The current study concluded that:

Using HRCT can help in diagnosis of Covid-19 by detecting its typical features, which is highly suggestive for Cov-19 pneumonia, including; bilateral lower lobar peripheral pure GGOs or mixed with consolidation associated with crazy paving pattern and fibrotic changes like interlobar septal thickening .And its atypical features including, pleural effusion, pericardial effusion, lymphadenopathy, pulmonary nodules, pneumomediastinum, pneumothorax and cavitation.