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RESEARCH ARTICLE

CASE SERIES OF ATYPICAL CT FINDINGS IN COVID 19

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Abstract

Introduction:-

In December 2019, several cases of pneumonia of unknown origin have emerged in Wuhan city, of China, manifesting as respiratory symptoms like fever, cough and dyspnea[1-4].

Patients affected by COVID-19 pneumonia usually showed on chest CT some typical features, such as: Bilateral ground glass opacities characterized by multilobe involvement with posterior and peripheral distribution; parenchymal consolidations with or without air bronchogram; interlobular septal thickening; crazy paving pattern, represented by interlobular and intralobular septal thickening surrounded by ground-glass opacities; subsegmental pulmonary vessels enlargement (> 3 mm).

Halo sign, reversed halo sign, cavitation and pleural or pericardial effusion represent some of atypical findings of COVID-19 pneumonia. On the other hand lymphadenopathy and bronchiectasis frequency is unclear, indeed conflicting data emerged in literature.

Materials And Methods:-

We retrospectively evaluated medical records and imaging of 4000 Covid-19 positive patients who underwent HRCT at our Institute from 1st August 2020 to 30 November 2021. HRCT Images were evaluated for the presence of typical and atypical findings.

Typical CT findings were defined as: Bilateral ground glass opacities[5-6] characterized by multilobe involvement with posterior and peripheral distribution; parenchymal consolidations with or without air bronchogram; interlobular septal thickening; crazy paving pattern, represented by interlobular and intralobular septal thickening surrounded by ground-glass opacities; subsegmental pulmonary vessels enlargement (> 3 mm).

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Atypical chest CT findings

Lobar Pneumonia

We found 5 cases of Isolated Lobar pneumonia in documented Covid-19 cases. The clinical details of the patients are described in table 1.

S. No.	Patient Name	Symptom	Lobe involved	Pattern (GGO/ Consolidation/ mixed)	CT Score	HRCT done on which day after symptom onset
1	AK	Fever	RML	mixed	13-15/25	Fifth day
2	MJ	Fever, breathlessness	LML	mixed	15-16/25	Fourth day
3	PT	Sore throat, Fever	LUL	GGO	17-18/25	Third day
4	AN	Fever	RUL	mixed	14-15/25	Second day
5	MK	Bodyache	RUL	GGO	13-15/25	Third day

Out of the 5 cases in which lobar involvement was seen, right upper lobe was involved in 2 patient , right middle lobe was involved in 1 patient . Average CT score was 15-16, and consolidation was the predominant pattern.

Figure 1 shows the right middle lobe isolated involvement in a patient

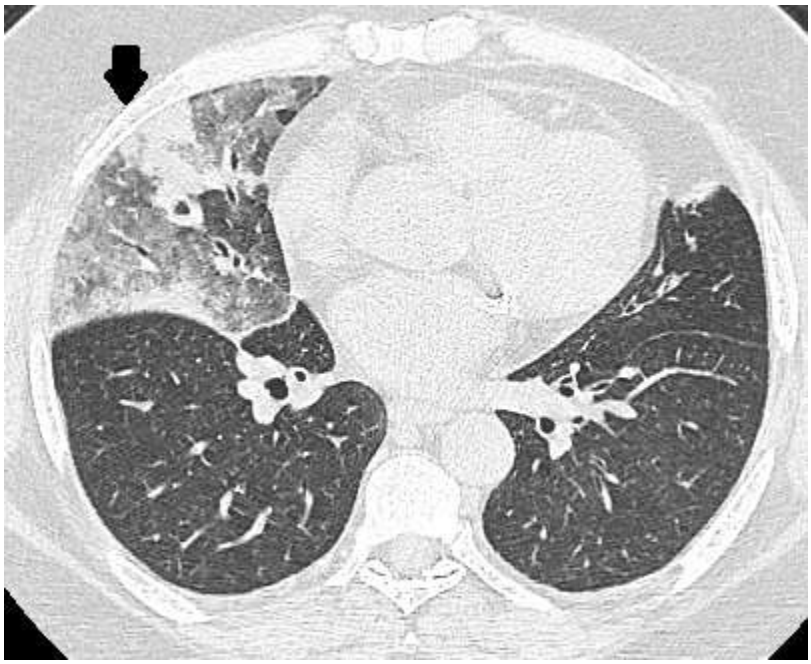

Figure 1:- Axial HRCT Chest Image shows a large area of consolidation and ground glass opacification involving entire right middle lobe (Black arrow).

Nodules

Nodular opacities were seen in 10 patients. Nodules were reported in a small percentage of patients with COVID-19 pneumonia. It is seen less frequently than in other types of viral and bacterial pneumonia. It should be kept in mind that it can be seen with common findings such as GGO and consolidation, as well as rarely observed sole findings in COVID-19 pneumonia.

Figure 2 shows multiple small nodular opacities surrounding a patch of consolidation.

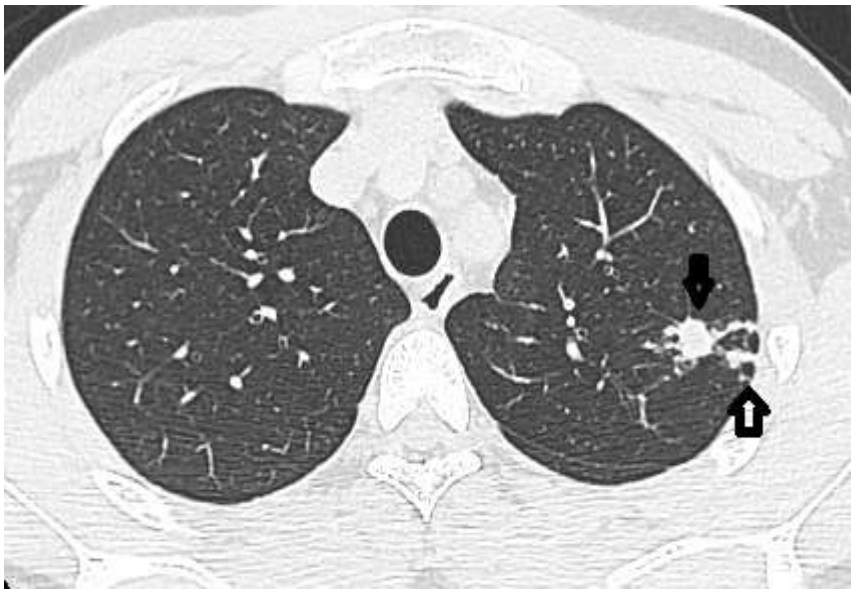

Figure 2:- Axial HRCT Chest image at the level of great vessels shows a small patch of consolidation with adjacent small nodular opacities (arrows).

Pleural Effusion

Pleural effusion was seen in 15 patients. It was unilateral in 10 cases, and bilateral in remaining. Average CT score was 15/25. Cardiac, renal or other causes which could have lead to transudative pleural effusion were ruled out by cardiac echocardiography, and blood investigations like RFT, LFT and Sr. albumin.

On comparing with early disease, advanced stage is associated with a significantly increased frequency of pleural changes ,subpleural transparent line, and pleural effusion as commented by Zhou et al[7]. Further, this manifestation is quite rare and documented in the 7% of COVID-19 patients in the later stage disease by Wang et al[8].

Figure 3 shows mild pleural effusion in a patient, who otherwise showed just a small area of GGO in right middle lobe.

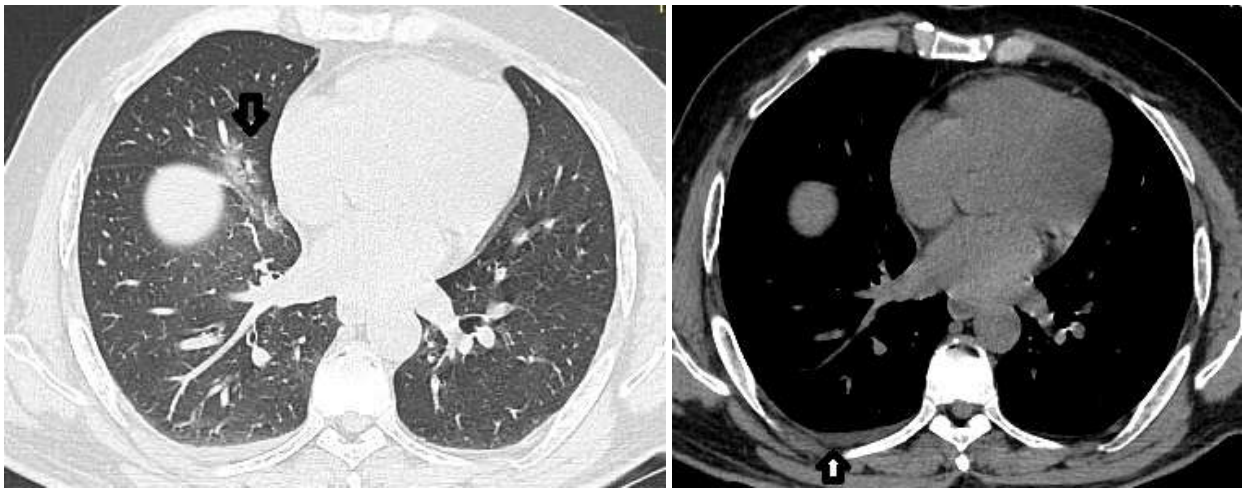

Figure 3A:- Axial HRCT Chest Image at the level of heart shows an ill-defined area of ground glass opacification in right middle lobe (Hollow black arrow).

Figure 3 B:- Axial non-contrast HRCT chest image of the same patient at the same level shows mild right pleural effusion (Solid black arrow)

Halo Sign

Halo sign is a non-specific sign defined as a circular zone of ground glass attenuation surrounding a pulmonary nodule or mass (Figure 4), it was used to describe hemorrhagic nodules, in pathologies as angioinvasive fungal infections, hypervascular metastases and Wegener granulomatosis, vasculitis, halo sign could be also detected in viral infections and cryptogenic organizing pneumonia[9,10].

The halo sign was described also in COVID-19 patients as reported by Li et al[11] describing pulmonary nodules with a halo sign in 9 patients (17.6%), while Chen et al[12] observed it in 7 patients (11.3%), considering the halo sign as a feature of the early stage of the disease.

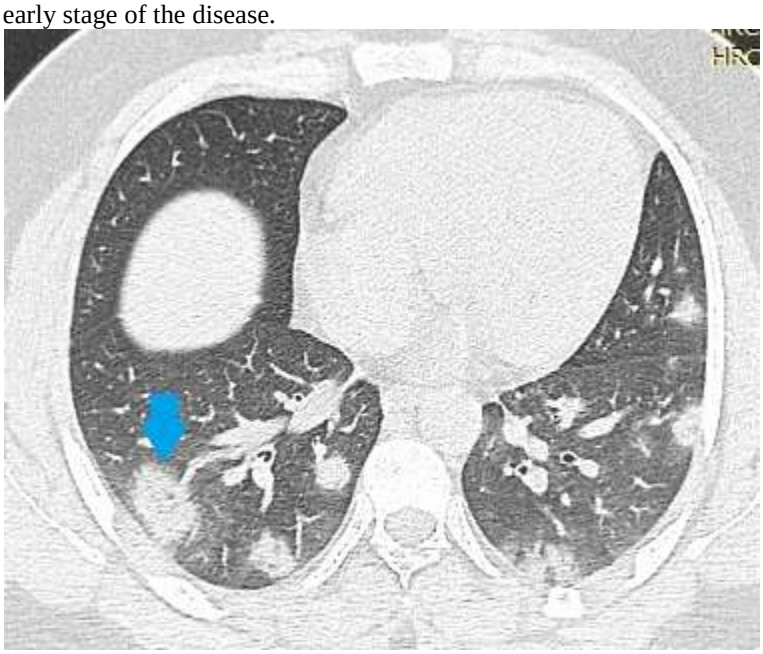

Figure 4:- Axial HRCT Chest Image at the level of heart shows multiple round areas of consolidation in both lungs with halo of ground glass opacity around them (blue arrow).

Lymph Node

Mediastinal lymph node enlargement is not a typical computer tomography of the chest finding of patients with COVID-19 infection.

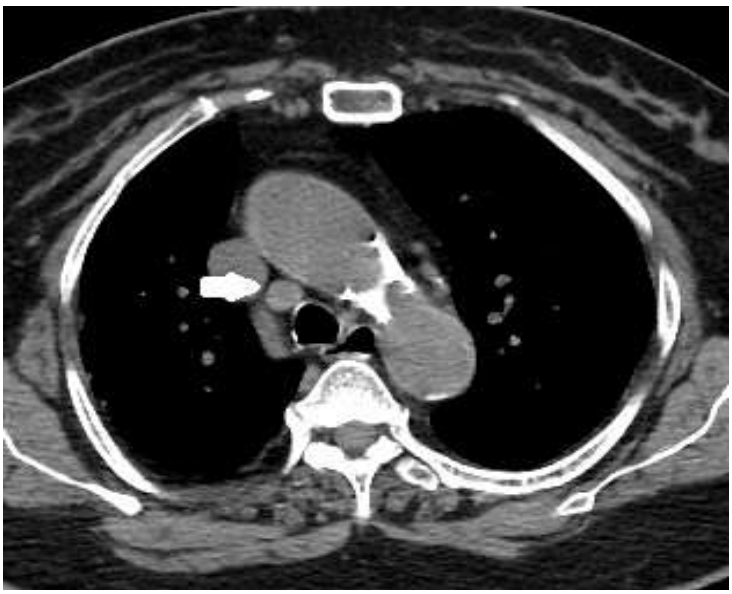

Figure 4:- Axial HRCT Chest Image shows pretracheal lymph node enlargement (arrow).

Discussion:-

In our study, GGO was the most common finding in both groups. In the literature, it has been reported that GGO is the most common typical finding in the early stage of COVID-19 pneumonia . It is reported that as the stage and severity of the disease increases, consolidation and interstitial thickening are indicative of interstitial edema and alveolar exudation.

Like most respiratory viruses, novel coronavirus first invades the epithelial cells of bronchioles. It then causes interstitial changes in and around the lobules to form ground-glass density shadows, interlobular septal thickening, interstitial thickening, and edema around the bronchial vessel, forming a fine grid shadow. Progression of the lesions can extensively affect pulmonary alveoli, inducing alveolar exudation, congestion, and consolidation to form patchy density, increasing shadow, and consolidation shadow. Halo sign, reversed halo sign, cavitation and pleural or pericardial effusion represent some of atypical findings of COVID-19 pneumonia. Our study shows atypical signs like lobar pneumonia, nodules, pleural effusion, halo sign and lymph nodes.

As the sensitivity of RT-PCR test is low in the early stage of COVID-19, HRCT chest play a vital role in the diagnosis and follow-up of COVID-19 cases. Diseases associated with COVID-19 can cause an atypical appearance. Our study analyze atypical CT findings ,it has been reported that GGO is the most common typical finding in the early stage of COVID-19 pneumonia. The cases with atypical imaging findings were mainly young and middle-aged people. This may be due to the strong resistance and atypical pathological changes in young and middle-aged people. High CT severity score and widespread lung involvement in the patient group with atypical CT findings can be due to disease progression or other concomitant diseases.

In summary, image diagnosis plays an important role in the diagnosis of COVID-19. We need to be highly alert to its atypical image findings when we are familiar with its typical image findings, and the image findings may change greatly in a short time. Depending on the clinical manifestations and epidemic history, an atypical CT imaging finding should be taken as a suspected case for further reexamination or nucleic acid test. This is important to avoid missed diagnoses that increase the difficulty of prevention and control.

Conclusion:-

The atypical findings in association with the typical findings of COVID-19 pneumonia will result in the awareness that the diagnosis of several other diseases may be directly related to COVID-19 pneumonia, and if typical findings accompany the atypical findings COVID-19 pneumonia, false negative rates will decrease. Patients with COVID-19 may have atypical imaging findings. Radiologists should improve their understanding of the novel coronavirus pneumonia to avoid any missed diagnoses.

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