

Corelation of Imaging in Corads 3 with RT PCR Result in Covid-19 Pneumonia.

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Abstract

The present study aimed at studying the role of CT scan in diagnosing COVID-19 pneumonia in equivocal imaging finding and its correlation with RT-PCR.

Materials and methods: - The present retrospective study was carried out at department of radiology, Guru Gobind Singh Hospital and M P Shah Medical College, Jamnagar. Total 134 patients with travel history, family history, history of contact with confirmed cases and suspicious symptoms of covid-19 pneumonia were examined with imaging finding of CT chest and CT findings were correlated with RT PCR results.

Results: -In our study of 134 patients, 57.46 % were male and 42.43% were female.35 patients with CORADS-3 have positive RT-PCR result.

Conclusions: CT scan is very helpful in identification and characterisation of various imaging finding involving lung in COVID-19 pneumonia with very high sensitivity and specificity with RT PCR results.

Key Words: RT PCR, CORADS score.

Date of Submission: 28-07-2021

Date of Acceptance: 12-08-2021

I. Introduction

CT scan plays a very significant and crucial role in early diagnosis and management of the COVID-19 pneumonia. The typical chest CT findings in COVID-19 pneumonia are bilateral, peripheral, and basal predominant ground-glass opacities (GGOs) with or without consolidation and broncho vascular thickening [1]. In addition, atypical chest CT findings include central upper lobe predominance, masses, nodules, cavitation, tree-in-bud sign, lymphadenopathy and pleural effusion.

Computed tomography (CT) examination plays vital role in the diagnosis of COVID-19 because of its high sensitivity [2,3]. The combination of RT-PCR with CT scans is expected to improve the diagnosis of COVID-19 [2,3]. Several characteristic COVID-19 pneumonia findings are bilateral, peripheral/subpleural, or posterior ground-glass opacities with or without consolidations [4-7]. The Dutch Radiological Society created a COVID-19 Reporting and Data System (CO-RADS) that standardizes the assessment scheme and simplifies reporting with a five-point scale of suspicion for COVID-19 pneumonia in chest CT images [6]. The diagnostic performance of CO-RADS for COVID-19 through the interpretation of chest CT images was shown to be excellent and the interobserver agreement was moderate to substantial [6]. It is known that equivocal CT imaging finding in current pandemic it is very difficult to diagnose COVID-19 pneumonia only on CT; therefore, it is necessary to correlate imaging finding of CORADS 3 with RT PCR result.

II. Materials and Methods

The present study of 134 patients between time periods of November 2020 to March 2021 was carried out at department of radiology, Guru Gobind Singh Hospital and M P Shah Medical College, Jamnagar.

Study Population:

Patients of various age groups presenting to flu OPD with complaints of fever, sore throat, malaise are included in the study.

Inclusion criteria:

1. All the symptomatic Patients referred to radiology department for CT scan of lung for COVID-19 pneumonia.
2. Only those patients fulfilling above mentioned inclusion criteria and willing to participate in study.

Exclusion criteria:

1. Known case of tuberculosis, lung malignancy or other interstitial lung disease.
2. Patients with CORADS 4, CORADS 5 and CORADS 6.

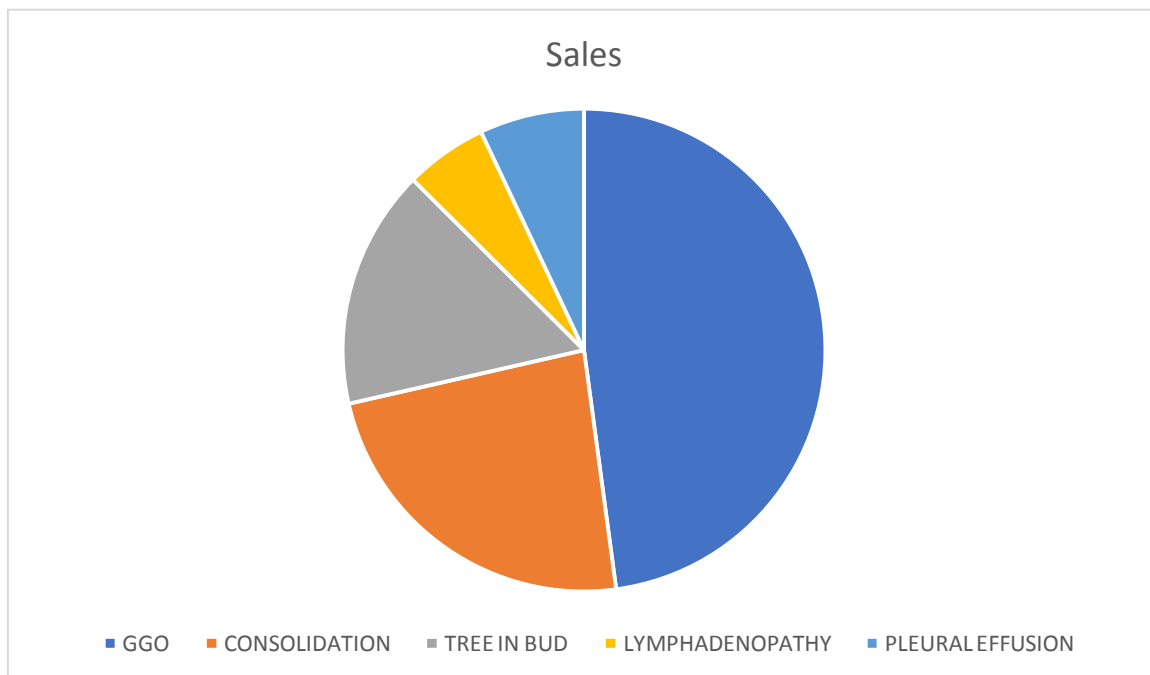
Imaging technique:

All CT examinations were obtained with the dedicated CT scanner for COVID-19 suspects using GE bright speed 16 CT system helical mode scanner. The tube voltage was at 120 kVp and tube current was set to dose of 200-250 mAs. The images were obtained from the thyroid gland level up to the level of the pancreas. No contrast was administered. The scan was captured in the end-inspiratory phase, whenever it was possible for the patient to hold the breath adequately. The slice thickness was 0.8 mm. The images were analyzed in both lung (window width 1500 Hounsfield unit, HU; level, -700 HU) and mediastinal (window width 350 HU; level, 40 HU) settings. Multiplanar reconstructions in the coronal, sagittal, and oblique planes were also performed and read in addition to the axial sections whenever required.

III. Observations And Results

| LUNG FINDING | PATIENTS | PERCENTAGE (%) |
|------------------|----------|----------------|
| GGO | 128 | 95.52 |
| Consolidation | 63 | 47.01 |
| Tree in bud sign | 43 | 32.08 |
| Lymphadenopathy | 15 | 11.19 |
| Pleural effusion | 19 | 14.17 |

TABLE NO. 3- SHOWS VARIOUS MORPHOLOGICAL CT FINDING IN COVID -19 PNEUMONIA SUSPECTS.



NO. OF PATIENTS WITH CORADS 3 IMAGING FINDING.

| | NO. OF PATIENTS | RT PCR POSITIVE |
|----------|-----------------|-----------------|
| CORADS 3 | 134 | 35 |

IV. Results

This study involved 134 patients, including 77 males (57.46%) and 57 females (42.43%), with their ages ranging from 20 to 87 years (average age, 54 years) (mean ± SD; 54.2 ± 10.8).

All patients were clinically suspected of having COVID-19 and underwent one RT-PCR tests. Twenty-six of them tested positive with RT-PCR and were diagnosed with COVID-19. Among the COVID-19 patients, clinical presentations included fever ($n = 61$; 48.41%), cough ($n = 39$; 29.10%), dyspnoea ($n = 9$; 6.71%), and fatigue ($n = 23$; 17.16%). There were no asymptomatic COVID-19 patients in this study. The time between symptom onset and the CT scan was between 0 and 22 days (mean ± SD; 7.3 ± 5.6). Among the 99 COVID-19-

negative patients, 21 were diagnosed as having pneumonia other than COVID-19, which were community-acquired pneumonia ($n = 12$), interstitial pneumonia ($n = 3$), ($n = 1$), pulmonary oedema ($n = 3$), lung abscess ($n = 1$) and emphysema ($n = 1$). Patients with COVID-19 were older and had more comorbidities than the patients with COVID-19 negative.

V. Discussion

COVID-19 is a highly infectious disease that has been spreading widely worldwide. Early diagnosis is an essential disease management strategy [8]. Therefore, radiology, such as X-ray and CT, had become the principal method for diagnosis during the COVID-19 outbreak. Chest CT could be an important complement for disease diagnosis as it assesses the extent and severity of the disease, which could express the disease burden [9]. Chest CT has a high sensitivity and a low specificity. Due to this low specificity, chest CT could hardly distinguish COVID-19 pneumonia from other diseases, such as community-acquired pneumonia and other noninfectious causes of acute GGO [10,11]. The most common clinical symptoms of patients with COVID-19 are fever, cough, dyspnoea, and fatigue [9]. In this study, fever and lower respiratory symptoms are the most common presenting symptoms in 69.5% and 66% of the patients, respectively.

CO-RADS 3 means CT findings equivocal for pulmonary involvement of COVID-19 that can also be seen in other types of viral pneumonia or non-infectious etiologies. Findings include perihilar ground-glass, homogenous extensive ground-glass with or without sparing of some secondary pulmonary lobules, or ground-glass together with smooth interlobular septal thickening with or without pleural effusion in the absence of other typical CT findings.

References:

- [1]. Wang Y, Dong C, Hu Y et al (2020) Temporal changes of CT findings in 90 patients with COVID-19 pneumonia: a longitudinal study. *Radiol* 296(2):1–9 1515.
- [2]. Fang, Y.; Zhang, H.; Xie, J.; Lin, M.; Ying, L.; Pang, P.; Ji, W. Sensitivity of chest CT for COVID-19: Comparison to RT-PCR. *Radiology* **2020**, 200432, doi:10.1148/radiol.2020200432.
- [3]. Ai, T.; Yang, Z.; Hou, H.; Zhan, C.; Chen, C.; Lv, W.; Tao, Q.; Sun, Z.; Xia, L. Correlation of chest CT and RT-PCR testing in coronavirus disease 2019 (COVID-19) in China: A report of 1014 cases. *Radiology* **2020**, 200642, doi:10.1148/radiol.2020200642.
- [4]. Ojha, V.; Mani, A.; Pandey, N.N.; Sharma, S.; Kumar, S. CT in coronavirus disease 2019 (COVID-19): A systematic review of chest CT findings in 4410 adult patients. *Eur. Radiol.* **2020**, 1–10, doi:10.1007/s00330-020-06975-7.
- [5]. Sun, Z.; Zhang, N.; Li, Y.; Xu, X. A systematic review of chest imaging findings in COVID-19. *Quant. Imaging Med. Surg.* **2020**, *10*, 1058–1079, doi:10.21037/qims-20-564.
- [6]. Prokop, M.; van Everdingen, W.; van Rees Vellinga, T.; Quarles van Ufford, J.; Stöger, L.; Beenen, L.; Geurts, B.; Gietema, H.; Krdzalic, J.; Schaefer-Prokop, C.; et al. CO-RADS-A categorical CT assessment scheme for patients with suspected COVID-19: Definition and. *Radiology* **2020**, 201473, doi:10.1148/radiol.2020201473.
- [7]. Cellina, M.; Orsi, M.; Valenti Pittino, C.; Toluian, T.; Oliva, G. Chest computed tomography findings of COVID-19 pneumonia: Pictorial essay with literature. *Jpn. J. Radiol.* **2020**, 1–8, doi:10.1007/s11604-020-01010.
- [8]. Chung M, Bernheim A, Mei X et al (2020) CT imaging features of 2019 novel coronavirus (2019-nCoV). *Radiol* 295(1):202–207
- [9]. Yang R, Li X, Liu H et al (2020) Chest CT severity score: an imaging tool for assessing severe COVID-19. *Radiol Cardiothorac Imaging* 2:
- [10]. Hani C, Trieua NH, Saaba I, Dangearda S, Bennani S, Chassagnona G, Revel MP (2020) COVID-19 pneumonia: a review of typical CT findings and differential diagnosis. *Diagn Inter Imaging* 101:263–268.
- [11]. Bai H, Hsieh B, Xiong Z et al (2020) Performance of radiologists in differentiating COVID 19 from viral pneumonia on chest CT. *Radiol*. Published Online:E46–E45

Dr Sanjay Parmar, et. al. “Corelation of Imaging in Corads 3 with RT PCR Result in Covid-19 Pneumonia.” *IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)*, 20(08), 2021, pp. 39-41.