Radiographic findings of a patient with acute severe COVID-19 pneumonia in a tertiary care hospital : A case report

Authors Dr Aysha Ghayyur, Dr Farhan Mustafa, Dr Samina Saeed, Dr Emman Salam, Dr Subhan Saeed, Dr Hayyan Ahmad, Professor Dr Tanvir Us Salam

ABSTRACT

Since December 2019, SARS_Cov 2 pandemic has emerged as a major challenge for the physicians starting from the difficulties in making definitive diagnosis and obstacles in suggesting an optimum drug therapy with documented efficacy and antiviral properties. The wide diversity of symptoms is well explained by the genomic variations amongst the different Covid strains.

Classic radiographic presentation of COVID- 19 pneumonia includes "bilateral" peripheral sub pleural ground glass opacities.

We hereby present case report of a 60 years hypertensive male who presented with symptoms of high grade intermittent fever , dry cough , generalized body aches and lethargy (symptoms typical for covid 19). Radiological investigations revealed "unilateral " (right lower lobe) ground glass opacities resembling the more common bilateral opacities in patients of COVID pneumonia.

INTRODUCTION

A novel coronavirus, named the severe acute respiratory syndrome coronavirus (SARS-CoV-2) was discovered in 2019 in city of Wuhan, China. The disease is caused by the highly contagious virus is called the coronavirus disease 2019 (COVID-19). It spread over the world in a couple of months, causing high fatality and enormous burden on the health care providers, the total cases exceeding the figure of 62.8 million . A research data reveals SARS-CoV-2 strains of L, G, S and I have been identified and compared Pakistan from March, from the start of the pandemic [1]. The SARS-CoV-2 is a member of the family of *Coronaviridae* and causes respiratory tract infection, acute respiratory distress syndrome, cytokine storm or multi-organ failure. The entry of the virus into the cell is facilitated by spike protein which binds the angiotensin-converting enzyme 2 receptor which are expressed on the alveolar cells of the lung epithelium [2] .

Covid -19 pneumonia now remains an important differential diagnosis in patients presenting with fever, flu like symptoms, dry cough , myalgias , lethargy and anosmia. No fixed case definition exists but patients with classic clinical signs along with radiological evidence or acute respiratory distress should be considered as COVID 19 infection . The spectrum of symptoms varies from asymptomatic state to severe acute respiratory distress syndrome . Tools for definite diagnosis include RT-PCR (real time PCR) and radiological investigations. COVID 19 is classed as atypical pneumonia because of multifocal ground glass opacities (GGO) , linear opacities and consolidations on chest xrays .

A quantitative meta-analysis covering 2847 patients in China and Australia found that covid-19 pneumonia changes are mostly bilateral on chest X rays (72.9%), and have typical ground glass opacity in 68.5% of cases [3].

In a case series of 1099 admitted patients with confirmed diagnosis of covid-19 from all across China, of the 274 patients who had chest radiography on admission , 162 (59.1%) showed abnormalities, most commonly "bilateral patchy shadowing". Of 1099 patients 975 had a positive computed tomography findings. Chest radiographs might be normal in some patients with clinically diagnosed covid-19 pneumonia, or who have been diagnosed with covid-19 pneumonia by computed tomography—i.e, there may be false negative radiographs [4].

Another case series including nine patients with positive PCR for covid-19 infection in Korea concluded that only three patients had an abnormal baseline radiograph but eight of them had definitive changes on baseline computed tomography, suggesting five of eight baseline radiographs (63%) were false negatives [5].

A retrospective study conducted in China on 21 patients with PCR proven COVID-19 reported that on the chest CT scan 71% of cases revealed bilateral involvement, 57% ground-glass opacities, 33% rounded opacities, 33% peripheral distribution, 29% consolidation with ground-glass opacities and only 19% of the patients presented crazy-paving pattern [6].

Another analysis unveiled important radiological indicators of Covid 19 Infection on chest CT [7]

Table 2: Findings on Chest CT Scans

Finding	No. of Patients (n = 121)
GGOs and consolidation	
Absence of both GGOs and consolidation	27 (22)
Presence of either GGOs or consolidation	94 (78)
Presence of GGOs without consolidation	41 (34)
Presence of GGOs with consolidation	50 (41)
Presence of consolidation without GGOs	2 (2)
No. of lobes affected	
0	27 (22)
1	18 (15)
2	14 (12)
3	11 (9)
4	18 (15)
5	33 (27)
>2	62 (50)
Bilateral lung disease	73 (60)
Frequency of lobe involvement	
Right upper lobe	53 (44)
Right middle lobe	50 (41)
Right lower lobe	79 (65)
Left upper lobe	58 (48)
Left lower lobe	76 (63)
Total lung severity score	
Mean	3
Range	0–18
Standard deviation	3

Note.—Except where indicated, data are numbers of patients. Numbers in parentheses are percentages. GGO = ground-glass opacity.

Covid 19 reporting and data system (Co-rads) score helps to assess the strength of radiological suspicion of Covid 19 based on CT chest findings [8].

Table 1: Overview of CO-RADS Categories and the Corresponding Level of Suspicion for Pulmonary Involvement in COVID-19

CO-RADS Category	Level of Suspicion for Pulmonary Involvement of COVID-19	Summary
0	Not interpretable	Scan technically insufficient for assigning a score
1	Very low	Normal or noninfectious
2	Low	Typical for other infection but not COVID-19
3	Equivocal/unsure	Features compatible with COVID-19 but also other diseases
4	High	Suspicious for COVID-19
5	Very high	Typical for COVID-19
6	Proven	RT-PCR positive for SARS-CoV-2

Note.—CO-RADS = COVID-19 Reporting and Data System, COVID-19 = coronavirus disease 2019, RT-PCR = reverse transcription-polymerase chain reaction, SARS-CoV-2 = severe acute respiratory syndrome coronavirus 2.

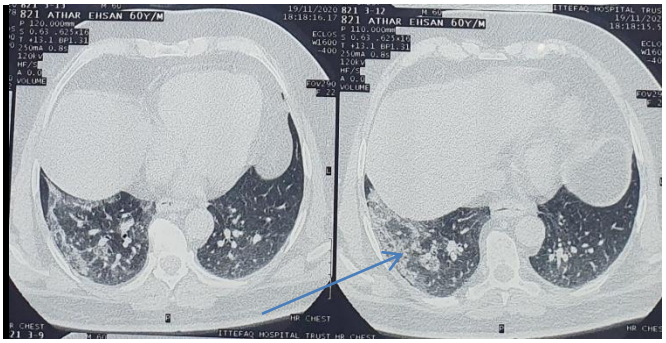
CASE REPORT

We hereby report an interesting case of a 60 years hypertensive male who presented in our hospital with complains of acute high grade intermittent fever documented maximum 101 degrees Fahrenheit, dry cough and generalized body aches. The oxygen saturation of the patient was 90-92% at room air.

Biochemical profile revealed raised inflammatory markers Ferritin: 5110 ng/ml CRP: 1.19 mg/dl D Dimer 481U/ml LDH: 256 U/L

Complete blood picture showed Lymphopenia (12%) with a NLR (neutrophil lymphocyte ratio of 6.8)

HRCT was done



Radiological reporting stated unilateral Right sided ground glass opacities with Co-rads score of 4 favouring atypical viral aetiology.

Keeping in view the current pandemic and Co-rads score of 4 , we treated it as Covid-19 pneumonia.

RT-PCR for covid-19 sampled via nasopharyngeal swab could not detect the virus .

TREATMENT

After admission we started the patient on I.V Remdesivir 100mg (OD) after ruling out all contraindications (known Allergy, raised ALT/AST 5 times than normal, eGFR less than 30ml/min/1.73m^2) .In addition to prophylactic anticoagulation, antiplatelet ,chest physiotherapy, incentive spirometry and nutritional supplements. Prone positioning was advised too. The patient showed signs of improvement after 5 days of treatment. Titres of CRP improved significantly (from 1.19 mg/dl to 0.19 mg/dl)

CASE DISCUSSION

The diagnosis of Covid 19 is commonly done by reverse transcription-polymerase chain reaction (RT-PCR) or gene sequencing of sputum, throat swab or lower respiratory tract secretions. In a study from Shanghai, China, on 38 suspicious COVID-19 patients , chest CT was found to have a sensitivity of 100%, specificity of 25%, and accuracy 47% [9].

In another set of patients, from Wuhan, 80 patients with classic symptoms and positive RT-PCR report were investigated. Chest CT was positive in 76 (sensitivity of 95%) patients [10].

Further a study on 87 symptomatic patients in China , who had both RT-PCR and chest CT performed, RT-PCR test was positive only in 36 cases. Out of the 36 patients, chest CT was normal only in one (sensitivity 97%) [11].

Co rads score is an additional tool helping us estimate strength of radiological diagnosis of covid 19 pneumonia.

572 patients were investigated to evaluate the accuracy of Co-RADS score. COVID-19 Reporting and Data System

(CO-RADS) depicts a reliable diagnostic accuracy for diagnosis of Covid 19 infection . When a threshold of ≥ 4 was used, sensitivity and specificity was strikingly found to be 61% and 81% , respectively [12].

CONCLUSIONS

We conclude that Chest HRCT is a useful tool for COVID-19 diagnosis in patients with a clinical suspicion of infection but with negative microbiological tests. Therefore, it is necessary to become familiar with the typical and atypical CT manifestations of COVID-19. It is crucial to highlight that during this pandemic unusual **unilateral consolidations or unilateral ground glass opacities** must be considered with high degree of suspicion for Sars-Cov-2 infection [13]. Patients who have negative RT-PCR result with typical clinical symptoms in highly infected regions or with close contact of COVID-19-infected patients; the use of chest CT is really useful tool. Prompt diagnosis of the diverse and deadly virus, identification and isolation of all the ill patients , adopting all precautionary measures and early initiation of the convalescent medical therapy is the only ray of hope with which the world will get rid from the disastrous pandemic.

KEY WORDS : COVID-19 pneumonia, pandemic, High resolution CT chest, Unilateral, ground glass opacities, peripheral consolidations, Polymerase chain reaction to identify genome

REFERENCES

1. Ghanchi NK , Masood KI , Nasir A ,, Abidi S , Shahid S ,Mahmood SF , Kanji A, Razzak S , AnsarZ , Islam N , Dharejo MB , Hassan Z, Hasan R. SARS-CoV-2 genome analysis of strains in Pakistan reveals GH, S and L clade

strains at the start of the pandemic, bioRxiv, 4 august 2020; page 2.

2. Boopathi S, Adolfo B, Ponmalai K . Novel 2019 coronavirus structure, mechanism of action, antiviral drug promises and rule out against its treatment. Journal of Biomoleclar structure and dynamics, 1 october 2020; page 5.

3.Rodriguez-Morales AJ, Cardona-spina JA, Gutiérrez-Ocampo G. Latin American Network of Coronavirus Disease 2019-COVID-19 Research (LANCOVID-19). A systematic review and meta-analysis. Travel Med Infect Dis2020;34:101623.

4. Cleverley J , Piper J, Jones M . The role of chest Radiography in confirming covid-19 pneumonia. BMJ 2020;370:m2426.

5. Yoon SH, Lee KH, Kim JY, Chest radiographic and CT findings of the 2019 novel coronavirus disease (COVID-19): analysis of nine patients treated in Korea. Korean J Radiol2020;21:494500. doi:10.3348/kjr.2020.0132 pmid: 3210048

6. Time course of lung changes on chest CT during recovery from 2019 novel coronavirus (COVID- 19) pneumonia, Radiology 2020 Feb 13:200370 (PMID: 3205347)

7.Bernheim A , Mei X, Huang M, Yang Yang, Fayad Z, Zhang N, Diao K, Li n B, Zhu X, Li K, Li S, Shan H, Jacobi A, Chung M. Chest CT Findings in Coronavirus Disease (COVID-19): Relationship to Duration of Infection. RSNA Radiology.20Feb2020; https://doi.org/10.1148/radiol.2020200463.

8.Prokop M, Everdingen WV, Vellinga TV, van Ufford HQ, Stöger L, Beenen L, Geurts B , Krdzalic J, Schaefer- Prokop C, Ginneken B, Brink M. CO-RADS: A Categorical CT Assessment Scheme for Patients Suspected of Having COVID-19—Definition and Evaluation. 27April2020;Volume296,No2,https://doi.org/10.1148/radiology.2020201473.

9. Cheng Z, Lu Y, Cao Q et al (2020) Clinical features and chest CT manifestations of coronavirus disease 2019 (COVID-19) in a single-center study in Shanghai, China. AJR Am J Roentgenol 215(1):121–126.

10. Himoto Y, Sakata A, Kirita M et al (2020) Diagnostic performance of chest CT to differentiate COVID-19 pneumonia in non-high-epidemic area in Japan. Jpn J Radiol 38(5):400–406

11. Diagnosis of the coronavirus disease (COVID-19): rRT-PCR or CT? Eur J Radiol 126:108961 Long C, Xu H, Shen Q (2020)

12. Bellini, D., Panvini, N., Rengo, M. Diagnostic accuracy and interobserver variability of CO-RADS in patients with suspected coronavirus disease-2019: a multireader validation study. *Eur Radiol* (2020).

13.Currò F, Pizzolato R, Zdjelar A , Francesco MC, Ukmar M, Cova MA, Unilateral crazy paving pattern in a healthy man with COVID-19 infection, 28 May 2020; Case16755,

ISSN: 1563-4086