

COVID 19: An Evaluation of Acute Lung Injury and Role of Imaging

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ABSTRACT

Introduction: An outbreak of coronavirus disease 2019 (COVID-19) infection began in December 2019 in Wuhan, China. From China, the disease has spreaded all over the world and declared as global pandemic. The most common clinical symptoms at presentation are fever and cough in addition to other nonspecific symptoms including dyspnea, headache, muscle soreness, and fatigue. Estimated mortality ratio is 3-5%.

Case series: In this series of 5 cases, radiological features were followed by RTPCR. First case, 67-year-old male with fever, cough and breathlessness revealed left lower lobe consolidation and multiple patchy radio opacities on chest radiograph. Second case, 53-year-old male with fever and shortness of breath revealed peripheral consolidation on chest radiograph. Third case with CKD and positive COVID symptoms was diagnosed as Acute respiratory distress syndrome (ARDS). Forth case with suspected glomerulonephritis HRCT revealed multiple subpleural patchy ground glass opacities, later found COVID. Last case with corona, HRCT thorax revealed peripheral consolidation and ground glass opacities.

Conclusion: In this article, an emphasis on the imaging features of COVID-19 infection is presented, which will enable radiologists to recognize this entity with greater ease. X ray is usually earliest radiological investigation which may detect infiltrate or features of ARDS. CT thorax may play pivotal role. Peripheral subpleural GGO, consolidation are pathognomic on HRCT.

Keywords: COVID-19, Chest Radiograph, HRCT Thorax, Peripheral Ground Glass Opacity

INTRODUCTION

An outbreak of coronavirus disease 2019 (COVID-19) infection began in December 2019 in Wuhan, China.^{1,2} The virus likely has a zoonotic origin related to the city's Huanan Seafood Market. Human to-human transmission has been widely reported. The first case of the COVID-19 pandemic in India was reported on 30 January 2020, originating from China. As of 24 May 2020, the Ministry of Health and Family Welfare have confirmed a total of 131,868 cases, 54,441 recoveries (including 1 migration) and 3,867 deaths in the country.³ India's case fatality rate is relatively lower at 3.09%, against the global 6.63% as of 20 May 2020.⁴ Six cities account for around half of all reported cases in the country – Mumbai, Delhi, Ahmedabad, Chennai, Pune and Kolkata.⁵ As of 24 May 2020, Lakshadweep is the only region which have not reported a case. The most common clinical symptoms at presentation are fever and cough in addition to other nonspecific symptoms including dyspnea,

headache, muscle soreness, and fatigue.⁶ In this article case series of 5 case is presented with emphasis of radiographic and CT features.

CASE SERIES

Case-1

A 67-year-old male presented with fever, cough and breathlessness. He recently returned from Italy. He was admitted in COVID-ICU. X ray chest was done, which revealed left lower lobe consolidation and multiple patchy radio opacities in both lungs (figure-1). Patient died on day 3 of admission and nasal & throat swab PCR was positive for COVID.

Case-2

A 53-year-old male presented with fever and shortness of breath. He recently travelled from USA. He was admitted in COVID-ICU. X ray chest was done, which revealed peripheral consolidation in both lungs with central sparing (figure-2). PCR was positive for COVID. After 4 days of treatment patient could not survive.

Case-3

A 47-year-old male presented with fever, cough and breathlessness. He had positive COVID contact history. The patient also had CKD. He was admitted in COVID-ICU. X ray chest was done, which revealed bilateral ground glass

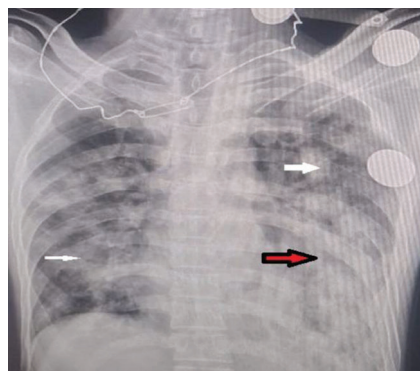


Figure-1: X ray chest AP view shows left lower lobe consolidation (red arrow) and patchy pulmonary infiltrates (white arrows)

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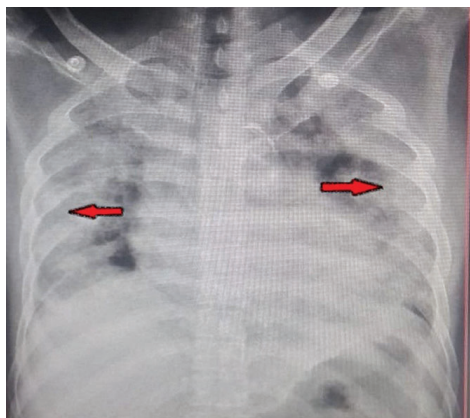


Figure-2: X ray CHEST AP view shows bilateral peripheral consolidation (red arrows) with central sparing

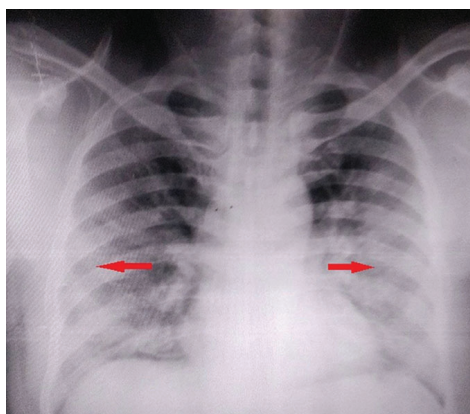


Figure-3: X ray chest AP view shows ground glass opacities in both lungs S/O ARDS (red arrows).

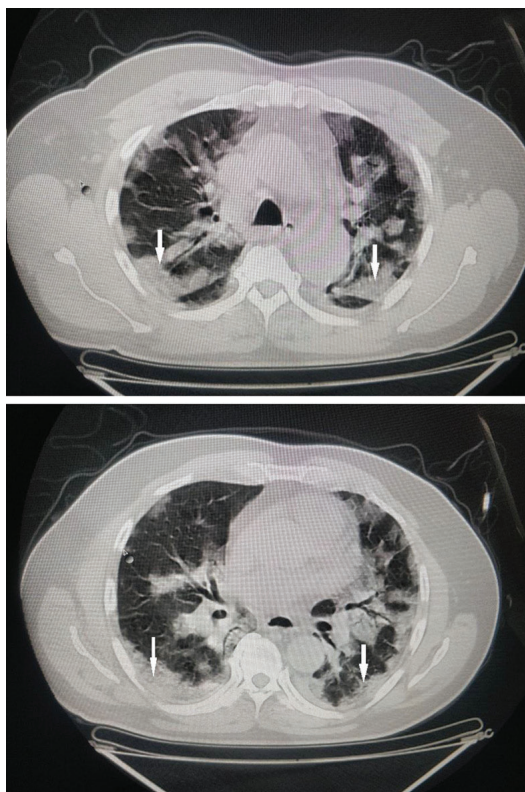


Figure-4(A&B): Axial HRCT image (pulmonary window) obtained in a 32-year-old man shows bilateral ground-glass and consolidative opacities with a striking peripheral distribution (arrows).

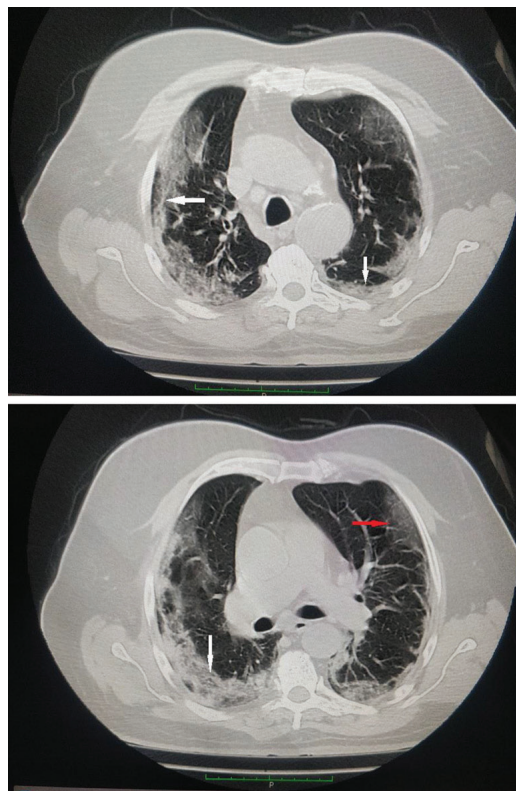


Figure-5(A&B): Axial HRCT image (pulmonary window) obtained in a 69-year-old man shows bilateral peripheral consolidation (white arrows) and ground-glass opacities (image b, red arrow)

opacities (figure-3). The patient was diagnosed as Acute respiratory distress syndrome (ARDS). Patient died on day 2 of admission and PCR was positive for COVID.

Case-4

A 32-year-old male presented with fever, cough and breathlessness. Patient denied foreign travel and contact history. The patient also had CKD. Clinically, pulmonary vasculitis and glomerulonephritis was suspected. ANCA was negative. PCR was positive for COVID. HRCT thorax was done which revealed multiple patchy ground glass opacities diffusely distributed in both lungs predominately in subpleural region (figure-4). Patient was treated with antiviral medications and successfully discharged on day 13.

Case-5

A 69-year-old male presented with breathlessness. Patient also had hypertension and diabetes, was on medication. HRCT thorax was performed which revealed peripheral consolidation and ground glass opacities (figure-5). Patient died within 6 hours of admission. Postmortem findings were positive for corona.

DISCUSSION

So far an average of 6000 new cases of coronavirus disease 2019 (COVID-19) have been reported per day in India. MOHFW has revised criteria for COVID suspects from time to time. Most of the time diagnosis of COVID-19 is clinical. In India, RTPCR (real-time reverse transcriptase polymerase chain reaction) is usually done to confirm the infection. Radiological imaging is limited for critical cases

only. The limited number of real-time reverse transcriptase polymerase chain reaction (RT-PCR) kits in some centers and the possibility of false-negative real-time RT-PCR results, the National Health Commission of the People's Republic of China has encouraged diagnosis based on clinical and chest CT findings alone.⁷ Radiographic findings like consolidation, ground glass opacity and features of ARDS were seen in our case admitted in COVID ICU. Peripheral distribution was commonly seen. Pleural effusion and lymphadenopathy was not seen. Some cases admitted in COVID ICU were evaluated by HRCT. HRCT revealed presence of bilateral ground-glass and consolidative opacities with a striking peripheral distribution. Although Chest CT has limited sensitivity and negative predictive value early after symptom onset. It can be used as screening tool for centers with shortage of PCR kits and treatment evaluation.

CONCLUSION

COVID 19 is infectious disease caused by coronavirus. The clinical presentation is variable from asymptomatic carrier to symptomatic illness like fever, malaise and cough. Critical illness may have low oxygen saturation. Chest pain is rare. X ray is usually earliest radiological investigation which may detect infiltrate or features of ARDS. CT thorax may play pivotal role. Peripheral subpleural GGO, consolidation are pathognomic on HRCT. Radiologic imaging may help in early case detection, diagnosis and management hence better patient care and survival.

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