



# PATIENT CLINICAL CONDITION IN RELATION TO HYPOXEMIA AND CHEST X-RAY CHANGES IN NOVEL CoV-19 PNEUMONIA: A CASE REPORT

Mirza Kovačević

Department of Anesthesiology and Intensive Care Unit, Zenica Cantonal Hospital, Zenica, Bosnia and Herzegovina

**SUMMARY** – Persistent changes on chest x-ray and hypoxemia in arterial blood gas analyses have been described in several cases in novel CoV-19 virus (nCoV-19) patients. These changes are usually not expressed to a large extent. Our goal was not only to present a patient with comorbidities in whom residual pulmonary infiltrates remained with consequent hypoxemia after extubation, but also to show that these changes do not always correlate with the clinical condition. In summary, despite chest x-ray changes and hypoxemia, with appropriate respiratory physiotherapy, the patient had a satisfactory clinical status.

**Key words:** *COVID-19; Clinical status; Chest x-ray; Hypoxemia*

## Introduction

Novel CoV-19 virus (nCov-19) enters the cell through angiotensin converting enzyme 2 receptor cells in the lungs. Therefore, primary presentation of nCoV-19 infection includes respiratory symptoms. Some nCov-19 patients deteriorate rapidly and without warning. This is also true for young patients or those who have only minor underlying conditions. Dynamics of viral entrance and outcome of severe nCov-19 infection is hard to predict<sup>1</sup>.

We present an elderly man with a number of comorbidities who developed severe pneumonia, secondary respiratory weakness, and required mechanical support. After extubation, there were severe residual changes on chest x-ray and hypoxemia in arterial blood gas analysis. Our unique case highlights the importance of the patient clinical status in relation to chest x-ray changes and hypoxemia in arterial blood gas (ABG) analysis.

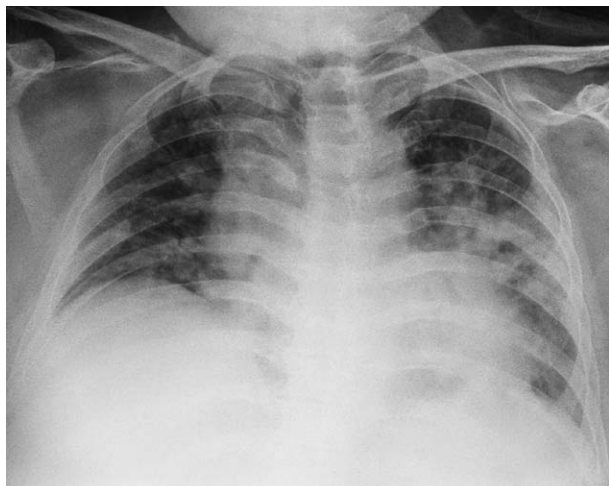
Correspondence to: *Mirza Kovačević, MD*, Crkvice 67, 72 000 Zenica, Bosnia and Herzegovina  
E-mail: [kovacevic.mirza@hotmail.com](mailto:kovacevic.mirza@hotmail.com)

Received September 29, 2020, accepted December 22, 2020

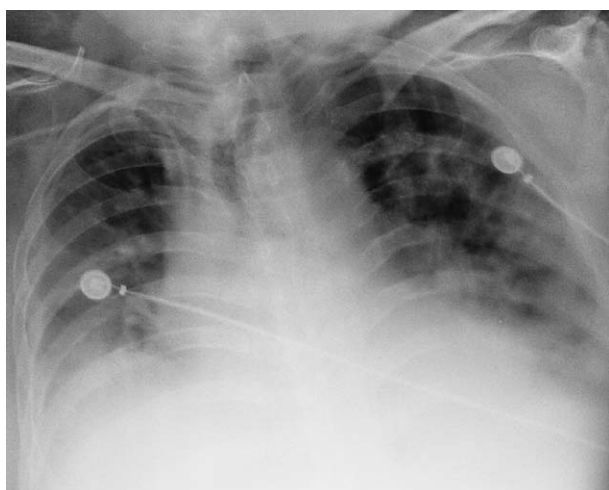
## Case Report

A 55-year-old man weighing 125 kg with numerous comorbidities (bronchial asthma, hypertension, diabetes mellitus, and multiple sclerosis) was admitted to Emergency Department, Zenica Cantonal Hospital because of detected nCov-19 infection. The cough, poor expectoration and sporadic vomiting began four days before, while fever up to 38 °C and headache occurred two days before hospital admission. The real-time fluorescence polymerase chain reaction assay of pharyngeal swabs was positive for nCov-19 nucleic acid three days prior to hospitalization. The patient denied any travel during the last months, but reported a history of contact with several people with nCoV-19 infection, currently considered a high-risk area for nCoV-19 infection in Bosnia and Herzegovina.

On clinical examination, the patient was subfebrile (37.5 °C), conscious, dyspneic, hypertensive (170/110 mm Hg) and tachycardic (125/min). Peripheral oxygen saturation (SpO<sub>2</sub>) was 85%. Blood tests revealed lymphocytosis, neutrophilia, and elevated C-reactive protein levels. Chest x-ray scan showed ground-glass bilateral opacities, indicating viral pneumonia.



*Fig. 1. X-ray scan on hospital admission: multifocal bilateral ground glass opacities more prominent and with pleural effusion of the left lobe and perihilarly right.*



*Fig. 2. X-ray scan after extubation: bilateral progression, pleural effusion cannot be excluded.*

Initial therapy included supplemental oxygen at 6 L/min by facial mask; empirical antibiotic ceftriaxone 2 g twice daily; azithromycin 500 mg daily due to the immunomodulatory effect; expectorant agent; and continuous normal saline infusion 20 mL/h. Hydroxychloroquine (200 mg twice daily) was added on hospital day 4. Due to further respiratory and mental deterioration, the patient was admitted in the intensive care unit, intubated and mechanically ventilated on hospital day 5.

After seven days of mechanical ventilation, the patient was extubated. Immediately after extubation,



*Fig. 3. X-ray scan at discharge from the hospital: slight bilateral regression of the ground glass opacities.*

SpO<sub>2</sub> was 91%. The patient was hemodynamically stable, without tachypnea. In the following days, hypoxemia and hypercapnia occurred in the ABG. Partial arterial oxygen pressure (paO<sub>2</sub>) was analyzed three times daily and ranged from 59.5 to 65.3 mm Hg. Partial pressure of arterial carbon dioxide (paCO<sub>2</sub>) ranged from 45.2 to 60.1 mm Hg. SpO<sub>2</sub> values ranged from 85% to 90%. Additional oxygen therapy was required, up to 10 L/min. In the situation of SpO<sub>2</sub> decline, the prone position was performed and the necessity of mechanical ventilation was successfully avoided. Continuous respiratory rehabilitation measures were also carried out such as deep-slow breathing exercises, techniques for expanding the girdle and shoulders, and an active cycle of breathing techniques to increase expectoration. Serial chest x-rays were performed on admission to the hospital, after extubation and at discharge from the hospital, and revealed persistent bilateral pulmonary patches (Figs. 1-3). At the same time, the patient was conscious, communicative, and hemodynamically stable. Supplemental oxygen therapy was continued on hospital day 27. The patient's SpO<sub>2</sub> improved to 90%-93%, and so did his clinical condition despite residual hypoxemia (paO<sub>2</sub>=70 mm Hg) and changes on x-ray scanning. The patient was discharged from the intensive care unit.

Results of subsequent real-time reverse-transcriptase-polymerase chain reaction of oropharyngeal swabs were repeatedly negative on hospital days 27 and 29. The patient was discharged for home treatment on day 34 of disease, with recommendation for

periodical oxygen support at 4–6 L/min and respiratory rehabilitation.

## Discussion

Numerous cases of respiratory manifestations have been described in patients infected with nCoV-19 in China at the end of 2019. Respiratory signs and symptoms of nCoV-19 infection have already shown heterogeneous behavior<sup>2,3</sup>. Mostly, hypoxemia with accompanying hypercapnia does not generate any symptoms and respiratory effort appears to be less severely affected than in patients with bacterial pneumonia<sup>4</sup>. Respiratory failure develops in a small percentage of previously healthy patients but more often in those with a number of comorbidities<sup>5</sup>.

In our case, the patient with comorbidities required mechanical ventilation for seven days due to bilateral nCoV-19 pneumonia and consequent respiratory failure. Immediately after extubation, we recorded improvement in the patient's clinical presentation, ABG and chest x-ray scan. Subsequent onset of hypoxemia and exacerbations on chest x-ray scans did not coincide with clinical status of the patient. The patient was active, communicated without effort, ate independently, exercised in bed, and even was able to take a few steps next to the bed. The decision on further treatment was difficult, especially regarding reintubation. Timely reintubation can be the keyword in decision-making in patients with numerous comorbidities; however, it may be a life-threatening procedure and real challenge<sup>6,7</sup>. We tried to avoid reintubation because prolonged mechanical ventilation can lead to harmful complications in a patient with comorbidities. Very carefully, continuous and consistent respiratory rehabilitation measures were conducted, which improved the patient's clinical course over time.

According to the Chinese Society of Anesthesiology for airway management, the discharge criteria include the following: afebrile status for more than 3 days; significantly improved respiratory symptoms; improvement in radiological abnormalities on chest x-ray or computed tomography; and two consecutive negative results of Covid-19 nucleic acid detection at least 24 h apart<sup>8</sup>. Our patient met all these criteria, except for changes on x-rays and in ABG.

To date, no case has been reported of a patient recovering from nCoV-19 pneumonia with such a range of bilateral opacity on chest x-ray at discharge.

## Conclusion

During the treatment for nCoV-19 pneumonia in the patient with comorbidities, we observed a special presentation. The extent of chest x-rays and the level of hypoxemia were not consistent with the patient's clinical status. Clinical status is a better parameter on assessing and deciding on mechanical ventilation and patient discharge for home treatment. We believe that our case report can be helpful for better understanding the treatment of nCoV-19 pneumonia in patients with comorbidities, and can be an introduction to larger studies, which would make it easier for clinicians to make decisions when treating Covid patients in the recovery phase.

## References

1. Li S, Tang Z, Li Z, Liu X. Searching therapeutic strategy of new coronavirus pneumonia from angiotensin-converting enzyme 2: the target of COVID-19 and SARS-CoV. *Eur J Clin Microbiol Infect Dis*. 2020;39:1021–6. doi: 10.1007/s10096-020-03883-y.
2. Huang C, Wang Y, Li X, Ren Li, Zhao J, Hu Y, *et al*. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet*. 2020;395:497–506. doi: 10.1016/S0140-6736(20)30183-5.
3. Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, *et al*. Clinical characteristics of 138 hospitalized patients with 2019 novel coronavirus-infected pneumonia in Wuhan, China. *JAMA*. 2020;32:106–9. doi: 10.1001/jama.2020.1585.
4. Ottestad W, Seim M, Maehlen J. COVID-19 with silent hypoxemia. *Tidsskr Nor Laegeforen*. 2020;140:10.4045/tidsskr.20.0299. doi: 10.4045/tidsskr.20.0299.
5. Xie J, Tong Z, Guan X, Du B, Qiu H, Slutsky AS. Critical care crisis and some recommendations during the COVID-19 epidemic in China. *Intensive Care Med*. 2020;46:837–40. doi: 10.1007/s00134-020-05979-7.
6. Zuo MZ, Huang YG, Ma WH, Xue Z, Zhang J, Gong Y, *et al*. Chinese Society of Anesthesiology Task Force on Airway Management: Expert recommendations for tracheal intubation in critically ill patients with novel coronavirus disease 2019. *Chin Med Sci J*. 2020;35:105–9. doi: 10.24920/003724.
7. Price S, Singh S, Ledot S, Bianchi P, Hind M, Tavazzi G, *et al*. Respiratory management in severe acute respiratory syndrome coronavirus 2 infection. *Eur Heart J Acute Cardiovasc Care*. 2020;9:229–38. doi: 10.24920/003724.
8. Meng L, Qiu H, Wan L, Ai Y, Xue Z, Guo Q, *et al*. Intubation and ventilation amid the COVID-19 outbreak Wuhan's experience. *Anesthesiology*. 2020;132:1317–32. doi: 10.1097/ALN.0000000000003296.

## Sažetak

ODNOS KLINIČKOG STANJA BOLESNIKA, HIPOKSEMIJE  
I PROMJENA RENDGENSKE SNIMKE PRSNOG KOŠA KOD NOVE CoV-19 PNEUMONIJE:  
PRIKAZ SLUČAJA*M. Kovačević*

Trajne promjene na rendgenskoj snimci prsnog koša i hipoksemija u analizi plinova u arterijskoj krvi opisane su u nekoliko slučajeva kod bolesnika s novim virusom CoV-19 (nCoV-19). Te promjene obično nisu izražene u velikoj mjeri. Cilj nam je bio ne samo predstaviti bolesnika s popratnim bolestima kod kojeg su zaostali plućni infiltrati s posljedičnom hipokseijom nakon ekstubacije, nego i pokazati da te promjene nisu uvijek u korelaciji s kliničkim stanjem. Ukratko, unatoč rendgenskim promjenama prsnog koša i hipoksemiji, uz odgovarajuću respiracijsku fizioterapiju bolesnik je imao zadovoljavajući klinički status.

Ključne riječi: *COVID-19; Klinički status; Rtg prsnog koša; Hipoksemija*