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Mini Review

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Follow-up and evolution of a patient with COVID-19 and severe ARDS: case report

Abstract

A 42-year-old patient, a physician, with a history of high blood pressure and essential tremor, who received a dose of ChAdOx1 nCoV-19 vaccine (AZD1222). It began with symptoms compatible with COVID-19 and evolved unfavorably, developing Severe Respiratory Distress Syndrome. He was admitted to Intensive Care Unit requiring mechanical respiratory assistance, sedation, neuromuscular blockers and prone position. He evolved favorably so he was placed in the supine position 24 hours a day and managed to be extubated on the third day. On the 13th day of hospitalization, he was discharged from the hospital. One month later, pulmonary rehabilitation begins on an outpatient basis. A self-administered quality of life questionnaire (RAND36) was taken, where all spheres, mainly physical and emotional, were found to be affected, achieving improvement in each of them 4 weeks after rehabilitation. Functionality was evaluated through the Sit to Stand 1 minute and the Time Up and Go where favorable results were also obtained at 4 weeks.

Volume 10 Issue 2 - 2022

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Received: September 16, 2022 | **Published:** October 19, 2022

Introduction

The intensive care unit plays a fundamental role in patients with severe COVID-19 disease. Although mortality in Intensive care unit (ICU) patients decreases as the pandemic progresses, the figures continue to be high, even more so in those patients who required mechanical ventilation (MV). However, ICU survivors will experience the consequences of this in the short and medium term so it is vital that we prepare for the aftershocks of the pandemic. Post-Intensive care syndrome in COVID-19 patients will require not only appropriate evaluation, but also early rehabilitation and other interventions.

Case report

42-year-old patient, physician, with a history of arterial hypertension and essential tremor, who received a dose of ChAdOx1 nCoV-19 vaccine (AZD1222) at the end of February 2021 (vaccinations for healthcare personnel had just begun). He started on April 12, 2021 with fever and myalgia. A rapid test for COVID-19 was performed and was negative. As fever persisted, a chest computed tomography (CT) scan was performed on April 16 with infiltrates in the right base and treatment with amoxicillin/clavulanic acid and clarithromycin was started. The following day, a new rapid test and swab for polymerase chain reaction (PCR) were negative. On April 19, due to persistent fever, the chest CT scan repeated and radiological progression of the infiltrates was evidenced, so it was decided to admit him to the hospital room.

On admission, blood pressure (BP) 110/70mmhg, heart rate (HR) 100 beats per minute, respiratory rate (RR) 18 breaths per minute, axillary temperature 37.3°C, rales predominantly from base to right midfield, saturation of 97% on room air. The admission laboratory showed a hematocrit of 38%, hemoglobin 12.1 gr/100ml, with blood cells 3900 per mm3, erythrocyte sedimentation 100mm, prothrombin time 15 seconds, prothrombin concentration 95%, sodium 139, potassium 4.7, chlorine 102, glycemia 90, uremia 30, creatinine 1.20, TGO 38, TGP 27, alkaline phosphatase 91, total protein 7.20, LDH 354 and C Reactive Protein 12. Treatment with enoxaparin and dexamethasone was indicated. The infectious disease department decided to rotate the antibiotic to pipercycline and tazobactam and requested convalescent plasma which was given that the same day. Nasal canula (NC) was placed at 1-liter por minute. On day 1 hospitalization he was afebrile with BP 110/70mmhg, HR 78bpm, RR 20bpm, 95% saturation with NC at 3 liters por minute. The patient reported dyspnea on moderate effort.

On the third day of hospitalization, he continued with permanent oxygen, so an arterial blood gas (ABG) was taken showing PH 7.49, bicarbonate 24 (HCO3), carbon dioxide pressure 32 (PCO2), oxygen pressure 86 (PO2), saturation 97% with NC at 4lpm. Continues afebrile. The following day, the patient reported a progression of dyspnea and it was decided to place a 10-liter reservoir mask, achieving a saturation of 97%, with a BP 120/70mmhg, HR 58bpm, RR 24bpm, afebrile. It was suggested to start with awake prone with good response to it, but since dyspnea persisted, it was decided to place a high flow cannula (HFNC) with an inspired oxygen fraction (FIO2) of 70% and flow of 40lpm achieving a saturation of 97%. A control ABG was taken: Ph 7.44, Bic 24, PCO2 35, PO2 65, Saturation 93%.

On day 5 he began with dyspnea at rest, increased work of breathing, tachypnea (40bpm), saturation 88-90% with HFNC with FIO2 at 100%, so it was decided to transfer him to the ICU with subsequent orotracheal intubation and connection to MV. It started with sedoanalgesia (midazolam and fentanyl). The ventilator settings after intubation were as follows: Volume Control Mode (VCV) with the volume adjusted according to his height, remaining with 400ml (6ml/kg), RR 24, Positive end expiratory pressure (PEEP) 16 cmH2O, Inspiratory Time of 0.7sec, FiO2 100% and with pulmonary mechanics measurements of Peak Inspiratory Pressure 34cmH2O, Plateau Pressure 31cmH2O, Driving Pressure 15, Compliance 28ml/cmH2O, Resistance 7, Auto-PEEP 0.5cmH2O. Blood gas data on these setting were PaO2/FIO2 85, so neuromuscular blocking agents (NMB) were added at maximum dose achieving a PaO2/FIO2 of 123. After 12 hours of MV, the patient was placed in prone position (PP), achieving an improvement in his PaO2/FIO2 to 230. Tracheal aspirate was taken for PCR were the results was positive.

After 48hours in the ICU, NMB suspended, remaining with sedoanalgesia (midazolam/fentanyl). The patient is switched to Pressure Control Mode (PCV), with a pressure of 20 cmH2O, PEEP 8cmH2O and FIO2 40%. The patient started with arterial hypertension (nitroglycerin was added), psychomotor excitation (dexmedetomidine was added) and sinus bradycardia (fentanyl was changed by morphine). In the afternoon, the patient is switched to Pressure Support Mode (PSV), achieving a PaO2/FIO2 of 330.

The following day, it was decided to perform a t-tube test for 30minutes, were the patient maintained a RR 22bpm, sat 98% with oxygen supply at 4lpm and good ventilatory mechanics. He was able to respond to simple commands, so extubation was decided. A NC was added at 3lpm. Helped him sit to the edge of the bed (day 4 in the ICU) and went to the hospital room the next day with NC, oral feeding and treatment for delirium with haloperidol and quetiapine. He continues with physical therapy with a general strengthening plan, sitting and walking in the room.

On the 13th day of hospitalization he was found with BP 110/70mmhg, HR 70bpm, RR 16bpm, sat 95% al 21%. Chest CT scan was repeated where he continued with bilateral infiltrates but as he was clinically stable it was decided to discharge him the following day with corticoids and enoxaparin. One month later, outpatient pulmonary rehabilitation (PR) began with an initial evaluation. A self-administered quality of the questionnaire (RAND-36) was taken. Where all areas were affected, mainly physical and emotional. Functionality was assessed through the Sit to Stand 1 Minute (STS 1) and the Time Up and Go (TUG).

During the first week, he adapts to physical activity to improve his physical deconditioning. He started with an exercise bike, with low load for 20minutes., added to strength work of lower and upper limbs without added load. Mobility and flexibility work were incorporated to correct muscle shortening. In the second week of PR, strength work with added load was started, and emphasis was placed on spinal stability work to facilitate the transfer of strength to the extremities and his work continued progressively during weeks 3 and 4th. The results obtained in STS1 and TUG during the four weeks are shown in Table1. Table 2 shows the changes that were evidenced from beginning to week 4th in the questionnaire RAND-36, where the favorable results in each of the spheres are observed.

Table 1 Evolution in STS1 and TUG from baseline to week 4

	Basal	Week 1	Week 2	Week 3	Week 4
STS1 (Repetitions)	16	23	31	37	36
TUG (Seconds)	8,32	6,78	5,66	4,22	3,99

Table 2 Comparison of RAND-36 between baseline and week 4 of Rehabilitation

	Basal	Week 4
Physical Performance	65%	100%
Physical Limitations	0%	100%
Emotional Limitatios	0%	100%
Energy Fatigue	35%	75%
Emotional Well-Being	60%	76%
Social Funcioning	25%	100%
Pain	58%	90%
General Health	60%	80%

Discussion

Our work describes the epidemiological characteristics, clinical course and most relevant laboratory and imaging data in a patient who, despite having suffered severe COVID-19 pneumonia, evolved favorably, requiring a few days of ICU and MV. Our case was a 42 years old male patient at the time of disease onset. Although the published articles agree that the majority of patients admitted to the ICU are male, the mean age reported is higher than that of our case. In the review presented by Serafin et al. conduced on a base of 32 published articles, a mean age of 56 years (48.5-59.8)[1] is reported however several publications show higher mean ages ranging from 62 to 66 years.[2,4] As a relevant fact, our patient required 3 days of MV despite having suffered a severe form of the disease. However, the literature consulted shows mean days of MV from 8.4 to 16 days.[1,3–5] In turn, the days of hospitalization in the ICU were lower those published, since the mean number of days of hospitalization varied between 9 and 12 days.[1,2,4]

Finally, the patient began outpatient rehabilitation one month after discharge, where he was admitted with limitation in all areas of the RAND-36 and limitations for the TUG and STS1. These results are expected if we observe what was published by Huang et al. who demonstrated in a cohort of 1733 patient that the majority of post COVID-19 patients have at least one symptom at 6 months after disease, particularly fatigue or muscle weakness, difficulty sleeping and anxiety or depression.[6] It should be noted that the variables studied improved after rehabilitation.

Our study has some limitations. In the first place, since it is is a retrospective analysis, it is subject to basis inherent to data record, leaving this subject to what is collected in the medical records. Second, it is a record of a case which relativizes the possibility of generalizing the observations obtained. However, a new contribution is the information of the favorable clinical evolution of a patient with severe form of COVID-19 who underwent early rehabilitation, which allowed him to return to his baseline state early.

Acknowledgments

None.

Conflicts of interest

The authors declare no conflicts of interest.

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