ramr
Revista Americana de Medicina Respiratoria
American Review of Respiratory Medicine

CASE REPORT

RAMR 2022;2:160-164
ISSN 1852 - 236X

Post-COVID-19 Pneumonia Pulmonary Fibrosis 3 Cases Reported

Fibrosis pulmonar posneumonía causada por COVID-19. Reporte de 3 casos

Pérez Conde Lucas[1]

Received: 03/17/2021
Accepted: 09/11/2021

Correspondence
E-mail: lucasperezconde@yahoo.com.ar

ABSTRACT

The prevalence of respiratory complications subsequent to COVID-19 pneumonia is currently unknown, but the data obtained from previous coronavirus outbreaks may provide important information. The preliminary evidence supports the hypothesis that some survivors could develop long-term respiratory sequelae, being the pulmonary fibrosis the most important.
We report three cases of patients hospitalized in the ward with moderate to severe COVID-19, never requiring mechanical respiratory assistance (MRA). Follow-up computed tomography scans after discharge showed images compatible with post-pneumonia pulmonary fibrosis.

Key words: COVID-19; Pulmonary fibrosis; Sequelae

RESUMEN

La prevalencia de complicaciones respiratorias posteriores a la neumonía por COVID-19 se desconoce actualmente, pero los datos obtenidos de brotes anteriores de coronavirus, pueden proporcionar información importante. La evidencia preliminar apoya la hipótesis de que algunos sobrevivientes podrían desarrollar secuelas respiratorias a largo plazo, entre ellas, la principal sería la fibrosis pulmonar. Se presentan tres casos de pacientes que fueron internados en sala por COVID-19 de moderado a grave, pero sin requerimiento de ARM en ningún momento, y que, en controles tomográficos posteriores al alta, presentaron imágenes compatibles con fibrosis pulmonar posterior a la neumonía.

Palabras clave: COVID-19; Fibrosis pulmonar; Secuelas

INTRODUCTION

The prevalence of respiratory complications after COVID-19 pneumonia is currently unknown, but the data obtained from previous coronavirus outbreaks may provide important information[1].

Some reports state that between 20% and 60% of survivors of the global SARS (severe acute respiratory syndrome) outbreak caused by SARS-CoV (SARS-associated coronavirus) and MERS-CoV (Middle East respiratory syndrome coronavirus) experienced some persistent physiological deterioration and pulmonary images compatible with fibrosis[1].

The preliminary evidence supports the hypothesis that some survivors could develop long-term

[1] Pulmonary Laboratory, Instituto Argentino de Diagnóstico y Tratamiento (IADT), Buenos Aires, Argentina.

respiratory sequelae. Pulmonary fibrotic anomalies have been detected three weeks after the onset of symptoms, regardless of the degree of severity of the disease (mild, moderate or severe)[2].

We present three patients with moderate to severe pneumonia, who required oxygen, antibiotics and corticosteroids but never needed invasive mechanical respiratory assistance (MRA). Follow-up computed tomography scans between 30 and 60 days after discharge showed images with interstitial infiltrates compatible with post-COVID-19 pneumonia pulmonary fibrosis.

CLINICAL CASES

Case 1: 84-year-old female patient, with history of light smoking (5 packages per year), obesity, arterial hypertension (AHT), chronic renal failure and coronary disease. The patient was hospitalized in the ward due to moderate COVID-19 pneumonia (according to the severity criteria of the 2007 ATS/IDSA [American Thoracic Society/Infectious Diseases Society of America] Guidelines) (3) for 34 days; chest CT done on admission (Figure 1). She received antibiotic treatment (ampicillin/sulbactam [AMS], 1.5 g every 6 h for 10 days, and clarithromycin, 500 mg every 12 h for 10 days), oxygen therapy (with nasal cannula, between 3 L/min and 4 L/min for 3 days), and corticosteroid therapy (dexamethasone, 8 mg per day for 10 days). Follow-up CT scan done two months after the onset of symptoms (Figure 2).

Case 2: 58-year-old female patient with history of obesity, a professional nurse. Hospitalized due to moderate to severe COVID-19 pneumonia (according to the severity criteria of the 2007 ATS/IDSA Guidelines)[3] for 18 days, requiring oxygen therapy (with nasal cannula at 6 L/min for 6 days) and non-invasive ventilation (NIV), (pressure support ventilation [PSV], inspiratory positive airway pressure [IPAP]: 10, expiratory positive airway pressure [EPAP]: 5 for 2 days) in a closed unit; she also received 2 units of convalescent plasma, antibiotic treatment (AMS, 1.5 g every 6 h for 10 days and clarithromycin, 500 mg every 12 h for 10 days) and corticosteroid therapy (dexamethasone, 8 mg per day for 10 days). Chest CT done on admission (Figure 3). Follow-up CT scan done 2 months after discharge due to persistent dyspnea FC II/III. (Figure 4).

Case 3: 63-year-old male patient with history of smoking (32 packages per year), diabetic. Hospitalized in the ward due to moderate COVID-19 pneumonia (according to the severity criteria of the 2007 ATS/IDSA Guidelines) (3) for 17 days. While hospitalized, the patient required oxygen therapy (with nasal cannula at 3 L/min for 2 days), corticosteroid therapy (dexamethasone, 8 mg per day for 10 days) and antibiotic treatment (AMS, 1.5 g every 6 h for 7 days and clarithromycin, 500 mg every 12 h for 7 days). Chest CT done on admission (Figure 5). 20 days after discharge, the patient attended the on-call service with dyspnea, functional class III/IV. CT was done with pulmonary thromboembolism (PTE) protocol, without positive result, and progression of septal thickening to subpleural predominance and honeycombing were evidenced in parenchymal window (not present in the previous study). Symptoms are interpreted as secondary to the sequelae of previous pneumonia; no new supplementary tests were done (Figure 6).

DISCUSSION

It's a well-known fact that many patients suffering from acute respiratory distress syndrome (ARDS) experience deterioration of their quality of life, years after the disease, despite the breakthrough in clinical care related to the pulmonary protection strategies of mechanical ventilation.

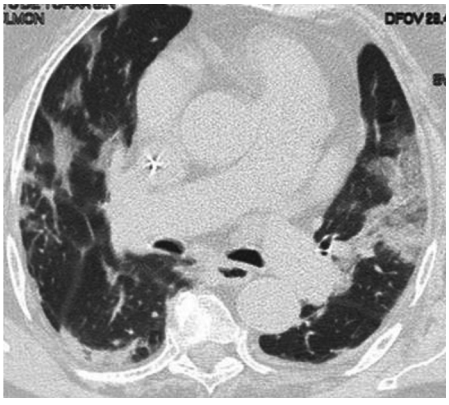

Figure 1. August 2020

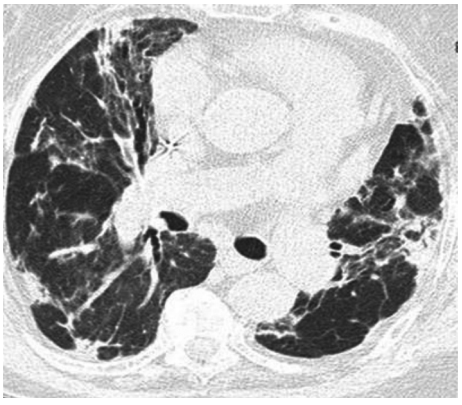

Figure 2. October 2020

Figure 3. Jun3 2020

Figure 4. September 2020

Figure 5. July 2020

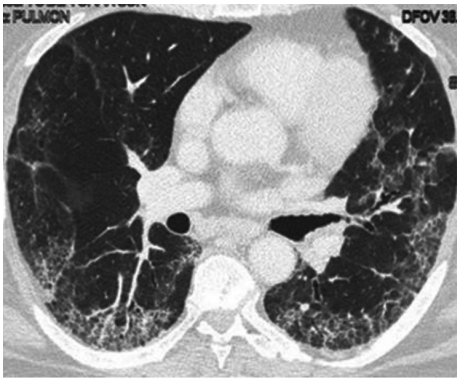

Figure 6. August 2020

A percentage of ARDS survivors develop a fibroproliferative response characterized by the accumulation of fibroblasts and deposit of collagen and other elements of the extracellular matrix in the lung.

The development of severe fibroproliferative lung disease has been associated with bad prognosis and high mortality rates[4].

Four stages of COVID-19 at chest CT have been described: early stage (0 to 5 days after the onset of symptoms), characterized by normal findings or mainly ground glass opacities; progressive stage (5-8 days after the onset of symptoms), may show increase in ground glass opacities and *crazy paving*; peak stage (9 to 13 days after the onset of symptoms), characterized by progressive consolidation; and late stage (≥ 14 days after the onset of symptoms), characterized by a gradual decrease in consolidation and ground glass opacities, whereas signs of pulmonary fibrosis can start manifesting (including interstitial parenchymal bands, lung architectural distortion and traction bronchiectasis)[5].

Patients referred to chest CT must do it without contrast, unless CT pulmonary angiogram is required to detect pulmonary thromboembolism (PTE)[5].

If a follow-up CT scan is to be done, we suggest the use of a low radiation dose protocol in order to minimize the radiation load[5].

A cohort study of COVID-19 patients, with follow-up done six months after discharge, which, as mentioned by the authors, is the largest study with the longest follow-up duration of discharged patients, showed that the evaluation of the lung function in a considerable propor-

tion (22%-56% in different degrees of severity) of participants showed certain deterioration of the diffusing capacity of the lungs for carbon monoxide (DLCO), six months after the onset of symptoms. This was consistent with the findings that the abnormal patterns most frequently found in the chest CT were interstitial pulmonary infiltrates (ground glass infiltrates and septal thickening).

The respiratory viral infection could potentially induce a different fibroblast activation in the convalescence phase. We found that, the more severe the disease in the acute phase, the more important the alteration in the DLCO and tomographic pattern.

The results of this study didn't suggest that corticosteroids can accelerate pulmonary lesion recovery in the evaluation of the lung function and chest images, even though the evidence has shown the benefits of this treatment for patients with severe COVID-19 in the acute phase[6].

In agreement with these results, another study was published with the follow-up of patients who required hospitalization in the intensive care unit (ICU) and were evaluated three months after hospital discharge. The follow-up included symptoms and quality of life, anxiety and depression questionnaires, lung function tests, 6-minute walk test (6MWT) and chest CT. We found that there is a relationship between age and days of MRA and tomographic findings. The main patterns that were found were ground glass infiltrates (59.6%), septal thickening (80.7%) and bronchiectasis (71.9%). The rate of reticular and fibrotic lesions was 49.1%, even higher than the rate of survivors of other viral types of pneumonia, including SARS, H1N1 and H7N9[7].

Recent studies have also shown that patients with COVID-19 are more frequently hospitalized, have longer hospital stays and higher risk of developing SDRA, in comparison with patients with other acute respiratory diseases[7, 8].

In relation to the large number of patients with pneumonia caused by SARS-CoV2 and the possible risk of pulmonary sequelae, it is important to do a follow-up in order to detect possible complications.

To do so, various societies of respiratory medicine have published some recommendations for the clinical and radiological follow-up that suggest control of pulmonary images and lung function tests mainly according to the severity of the condition and the presence at the moment of clinical symptoms, at a reasonable interval[1, 9, 10].

The purpose of this series is to show examples of possible sequelae in patients who have suffered COVID-19 pneumonia.

Conflict of interest

The author declares no conflicts of interest.

Acknowledgment

To doctors Darío Raúl Rey and Carlos Gustavo Di Bartolo, for their contributions

REFERENCES

1. George PM, Barratt SL, Condliffe R, et al. Respiratory follow-up of patients with COVID-19 pneumonia. Thorax 2020; 75: 1009-16. http://dx.doi.org/10.1136/thoraxjnl-2020-215314
2. Raghu G, Wilson KC. COVID-19 interstitial pneumonia: monitoring the clinical course in survivors. Lancet Resp 2020; 8: 839-42. https://doi.org/10.1016/S2213-2600(20)30349-0
3. Mandell LA, Wunderink RG, Anzueto A, et al; Infectious Diseases Society of America; American Thoracic Society. Infectious Diseases Society of America/American Thoracic Society consensus guidelines on the management of community-acquired pneumonia in adults. Clin Infect Dis. 2007; 44(Suppl 2):S27-72. https://doi.org/10.1086/511159
4. Burnham EL, Janssen WJ, Riches DWG, et al The fibroproliferative response in acute respiratory distress syndrome: mechanisms and clinical significance. Eur Respir J 2014;43:276-85. https://doi.org/10.1183/09031936.00196412
5. Kwee TC, Kwee RM. What the Radiologist Needs to Know. Radiographics 2020; 40: 1848-65. https://doi.org/10.1148/rg.2020200159
6. Huang C, Huang L, Wang Y, et al. 6-month consequences of COVID-19 in patients discharge from hospital: a cohort study. Lancet 2021; 397: 220-32. https://doi.org/10.1016/S0140-6736(20)32656-8
7. González J, Benítez ID, Carmona P, et al. CIBERESUCICOVID Project (COV20/00110, ISCIII). Pulmonary Function and Radiologic Features in Survivors

of Critical COVID-19: A 3-Month Prospective Cohort-Chest. 2021;160: 187-98. https://doi.org/10.1016/j.chest.2021.02.062

8. Shah SJ, Barish PN, Prasad PA, et al. Clinical features, diagnostics, and outcomes of patients presenting with acute respiratory illness: A retrospective cohort study of patients with and without COVID-19. EClinicalMedicine 2020; 27: 100518. https://doi.org/10.1016/j.eclinm.2020.100518
9. Sibilaa O, Molina-Molina M, Valenzuela C, et al. Documento de consenso de la Sociedad Espanola de Neumología y Cirugía Torácica (SEPAR) para el seguimiento clínico post-COVID-19. Op Resp Arch 2 2020;278-83. https://doi.org/10.1016/j.opresp.2020.09.002
10. National Institute for Health and Care Excellence, Practitioners RC of G, Scotland HI. COVID19 rapid guideline: managing the long-term effects of COVID-19. NICE Guidel. 2020; 1-35.